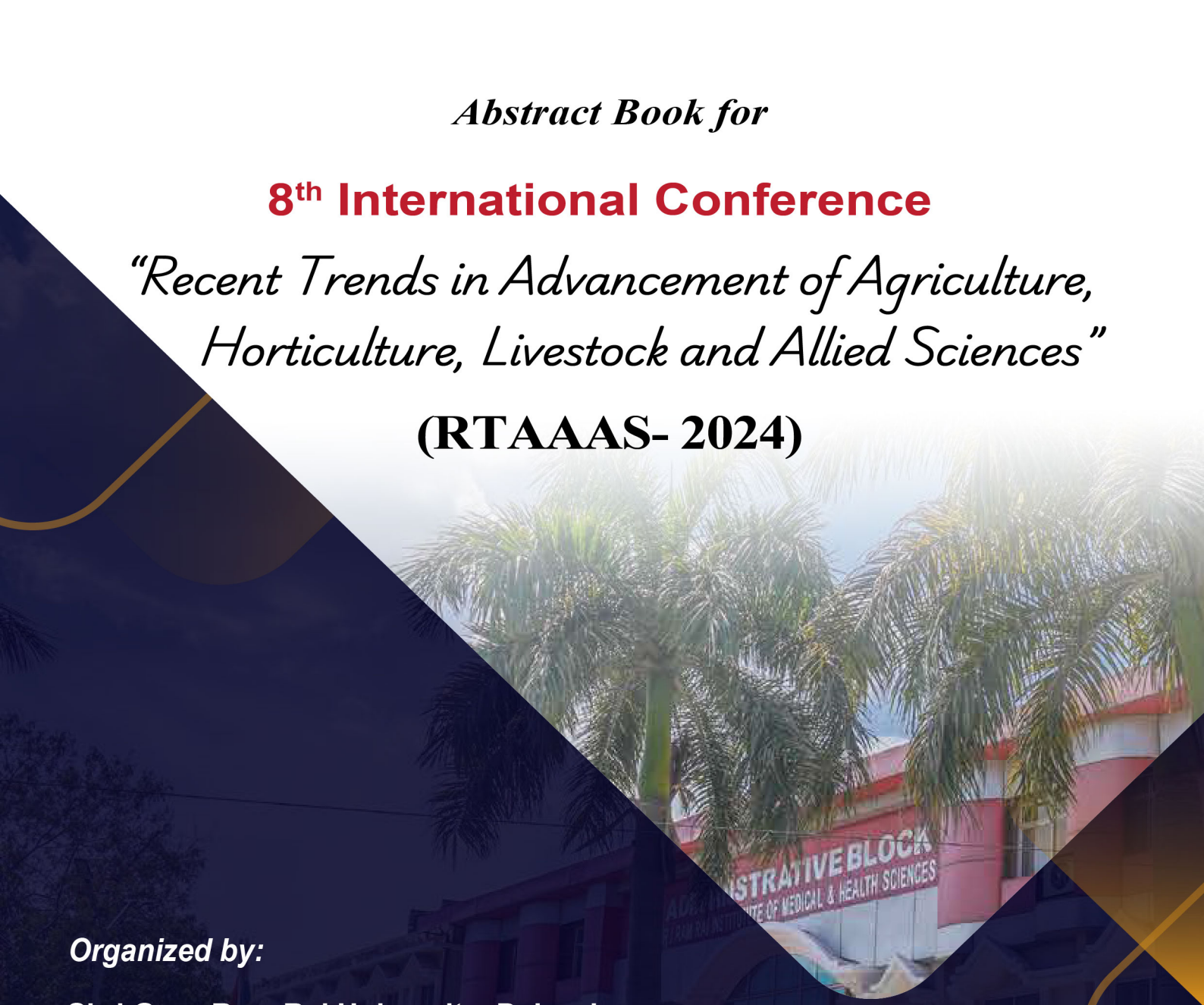
Abstract Book for

8th International Conference

"Recent Trends in Advancement of Agriculture, Horticulture, Livestock and Allied Sciences"

(RTAAAS- 2024)



Organized by:

Shri Guru Ram Rai University, Dehradun
(ICAR accredited)
in collaboration with
Just Agriculture Education Group &
SABSR, Noida

on 21st-22nd November, 2024
at SGRRU, Dehradun

Editors

Dr. D.P.S. Badwal
Dr. Mohit Bharadwaj
Dr. Sushila Hooda
Dr. Piyush Choudhary

JUST AGRICULTURE PUBLICATIONS

Abstract Book for

8th INTERNATIONAL CONFERENCE

RECENT TRENDS IN ADVANCEMENT OF AGRICULTURE, HORTICULTURE, LIVESTOCK & ALLIED SCIENCES (RTAAAS-2024)

Organized by:

Shri Guru Ram Rai University, Dehradun (ICAR accredited)
in collaboration with

Just Agriculture Edu. Group &

SABSR, Noida

on

21st – 22nd November, 2024

at
SGRRU, Dehradun

Editors:
Dr. D. P. S. Badwal
Dr. Mohit Bharadwaj
Dr. Sushila Hooda
Dr. Piyush Choudhary

JUST AGRICULTURE PUBLICATIONS

Published by Just Agriculture Publications
First Edition: 2024

Product Form:
Digital download, online and Paperback

Edition:
ISBN: 978-93-341-7358-1

Head, Production (Higher Education and Professional) & Publishing Director
Dr. Mohit Bharadwaj

Product Manager
Dr. Isha Thakur

Graphic Designer
Arya Maan

Office Address:

JUST AGRICULTURE PUBLICATIONS
Printed at: Jalandhar

BOOK OF ABSTRACTS

8th INTERNATIONAL CONFERENCE
on
RECENT TRENDS IN ADVANCEMENT OF AGRICULTURE, HORTICULTURE, LIVESTOCK & ALLIED SCIENCES

(RTAAAS-2024)

21st – 22nd November, 2024

Dr. DANDA RAJI REDDY
M.Sc. (Ag), Ph.D.
Vice Chancellor

SRI KONDA LAXMAN TELANGANA HORTICULTURAL UNIVERSITY

Administrative Office
Mulugu (Village & Mandal)
Siddipet District - 502279
Telangana, INDIA

Mobile: +91 8333981351
Email: vc@skltshu.ac.in
vcskltshu@gmail.com

FOREWORD

Agriculture is the backbone of Indian economy, contributing 14% GDP and has got direct impact on food security, economic development, and environmental sustainability. As the global population continues to grow and projected to reach nearly 10 billion by 2050, the demand for food, water and other resources is escalating. At the same time, agricultural systems are facing unprecedented challenges due to climate change, environmental degradation, soil erosion, depletion of natural resources and post harvest losses. As we steer these complexities, it is crucial that we embrace innovation and technological progress.

It is a privilege to address at the 8th International Conference "Recent Trends in Advancements of Agriculture: Horticulture, Livestock, and Allied Sciences" held on 21-22 Nov 2024, in virtual mode. The theme of this conference highlights the transformative potential of new research and technologies in enhancing productivity, sustainability, and resilience in agriculture and allied sciences.

I congratulate Shri Guru Ram Rai University, Dehradun and Just Agriculture Education Group for selecting the relevant theme and topics and bringing together experts, researchers, and industry leaders from around the globe. This Conference will provide a platform for invaluable exchange of most recent advancements in agriculture and allied sciences and collaborative efforts that can lead to ground-breaking solutions.

I am confident that the insights and discussions generated in this conference will play a pivotal role in shaping the future trajectory of agriculture, horticulture, livestock, food processing and allied sectors across the world. Let us work together for sustainable and prosperous future in agricultural economy.

Wishing you all a productive and successful conference.

D.Raji Reddy

भाकृअनुप-भारतीय मृदा एवं जल संरक्षण संस्थान (भामृजसंस)
२१८ कौलागढ़ रोड, देहरादून-२४८ १९५ (उत्तराखंड)
ICAR-Indian Institute of Soil & Water Conservation (IISWC)
218, Kaulagarh Road, Dehradun 248 195 (Uttarakhand)

डॉ० एम० मधु
निदेशक
Dr M. Madhu
Director

F.No.35-Cdn./Dir. Cell/2024
Dated: 6th Dec., 2024

Foreword

I am very glad that Just Agriculture Education Group and SABSR, Noida in collaboration with Faculty of Agriculture, Shri Guru Ram Rai, Dehradun, has successfully organized two days International Conference on "Recent Trends in Advancements of Agriculture: Horticulture, Livestock, and Allied Sciences" (RTAAAS-2024) at Shri Guru Ram Rai, Dehradun during 21st -22 Nov, 2024 in a hybrid mode. The efforts made by the organizing committee are truly commendable, and I congratulate all of them on the successful organization of this conference. I am confident that the deliberations held during the conference would pave the way for future growth and prosperity of the agriculture sector.

I would like to extend my sincere gratitude to the organizers and all the stakeholders who had contributed to making this conference a grand success. I hope that the knowledge and insights gained from the conference would empower all of us to contribute more effectively towards the development of sustainable agriculture practices that are environmentally friendly and socially responsible. I once again express my heartfelt appreciation to all the stakeholders who had participated in the conference, and I look forward to seeing the outcomes and recommendations of the conference being put into practice.

With regards,

(M. Madhu)

Ministry of AYUSH
National Medicinal Plants Board (NMPB)
Regional-cum-Facilitation Centre Northern Region-1 (RCFC NR-1)
Chandigarh, Delhi, Haryana, Himachal, Punjab, Uttar Pradesh & Uttarakhand
First Floor, COEDG Building,
Research Institute in Indian Systems of Medicine (RIISM)
Joginder Nagar-175015 District Mandi HP
E-mail: rcfcnorth@gmail.com, Tel: 01908-222333

No: RCFC NR-1(12)-24/662 Dated: 09th December, 2024

MESSAGE

It gives me immense pleasure to share that SABSR, Noida and Just Agriculture Education Group in collaboration with Faculty of Agriculture, Shri Guru Ram Rai University, Dehradun have successfully organized the International Conference on "Recent Trends in Advancements of Agriculture: Horticulture, Livestock, and Allied Sciences" (RTAAAS-2024) at Shri Guru Ram Rai, Dehradun during 21st-22 Nov, 2024 in a hybrid mode. I believe that this 8th International Conference has played an important role in bringing together experts, researchers and practitioners from across the world to exchange ideas, share their experiences and contribute towards the development of the agriculture sector. We have witnessed several innovative approaches, emerging technologies and sustainable practices that have the potential to revolutionize the agriculture sector and create a positive impact on our environment and economy.

The 8th conference has also highlighted the significance of collaboration among different stakeholders including government, academia, industry and farmers. Through constructive discussions, we have identified the key challenges faced by the agriculture sector and the possible solutions to address them. In conclusion, I would like to congratulate the organizing team for the successful organization of the 8th International Conference (RTAAAS-2024). We look forward to the next edition of this conference and hope to witness more innovative ideas and practices in the field of agriculture. Thank you all for your participation and support.

Regional Director

डॉ. विनीता कुमारी
उप निदेशक (जेंडर स्टडीज़)

Dr. VEENITA KUMARI
Dy. Director (Gender Studies)

FOREWORD

I am happy to know that the Shri Guru Ram Rai University, Dehradun and Just Agriculture Education Group is organizing the 8th International Conference on "Recent Trends in Advancements of Agriculture: Horticulture, Livestock, and Allied Sciences" (RTAAAS-2024) during November 21st-22, 2024 at Dehradun, Uttarakhand. This conference serves as a critical forum for the exchange of ground-breaking ideas and transformative technologies that are poised to shape the future of agriculture.

Agriculture today stands at a transformative juncture, driven by remarkable technological advancements and innovative practices. Technological options are not only enhancing productivity and sustainability but also addressing the challenges of food security, climate change, and resource management. Therefore, it is crucial to recognize the pivotal role of research and development in driving these transformative changes. Our commitment to integrate advanced technologies such as artificial intelligence, biotechnology, and precision farming into mainstream agricultural practices has produced significant results. These innovations empower our farmers, ensure efficient resource utilization, and promote environmental sustainability.

I congratulate the Shri Guru Ram Rai University, Dehradun and Just Agriculture Education Group for organizing the 8th International conference. I hope the event will provide the opportunity to inspire change, drive innovation, and build a resilient sustainable agricultural ecosystem.

I wish the 8th International Conference a grand success.

Veenita
(Veenita Kumari)

राष्ट्रीय कृषि विस्तार प्रबंध संस्थान (मैनेज)
(कृषि एवं किसान कल्याण मंत्रालय, भारत सरकार का संगठन, राजेन्द्रनगर, हैदराबाद - 500 030 टी.एस. भारत)
NATIONAL INSTITUTE OF AGRICULTURAL EXTENSION MANAGEMENT (MANAGE)
(An organization of Ministry of Agriculture and Farmers Welfare, Government of India)

भा.कृ.अनु.प. - राष्ट्रीय डेरी अनुसंधान संस्थान
ICAR-National Dairy Research Institute
(मान्य विश्वविद्यालय)
(Deemed University)
(भारतीय कृषि अनुसंधान परिषद)
(Indian Council of Agricultural Research)
करनाल 132001, (हरियाणा) भारत
Karnal 132001, (Haryana), India

डॉ अनुराग सक्सेना
प्रधान वैज्ञानिक एवं प्रभारी, चारा उत्पादन अनुभाग
Dr. Anurag Saxena
Principal Scientist & In-Charge, Forage Production Section

Dear Esteemed Delegates, Respected Colleagues, and Honoured Guests,

I am delighted that Just Agriculture has organized the 8th International Conference on *"Recent Trends in Advancements of Agriculture: Horticulture, Livestock, and Allied Sciences"*. This event represents a significant milestone in our shared quest for knowledge and progress in these essential fields.

Agriculture has always been the cornerstone of human societies, providing the foundation for sustenance and economic stability. Today, as we confront global challenges such as climate change and food security, it is imperative to leverage innovation and technology to develop sustainable and resilient agricultural practices. The theme of this conference underscores the transformative potential of cutting-edge research and technological advancements in addressing these urgent issues.

This gathering unites leading experts, researchers, practitioners, and policymakers from around the world. It serves as a dynamic platform for exchanging ideas, sharing groundbreaking research, and fostering collaborations that can drive impactful change. Over the next few days, we will delve into diverse topics, including precision agriculture, biotechnological innovations, sustainable farming practices, and the integration of artificial intelligence and machine learning in agriculture.

The university is deeply committed to fostering an environment that promotes scientific inquiry and innovation. Hosting this 8th conference is a reflection of dedication to advancing knowledge and tackling global challenges through interdisciplinary collaboration. I am confident that the discussions and insights emerging from this event will spark new ideas and lead to practical solutions that can be applied globally.

I extend my heartfelt gratitude to the organizing committee, sponsors, and all participants for their invaluable contributions to making this conference a success. Together, let us chart a course toward a future where agricultural practices are more efficient, sustainable, and equitable.

Thank you, and I wish you all a fruitful and inspiring conference.

(Anurag Saxena)

दूरभाष/Tel: 0184-2259322 फैक्स/Fax: 0184-2250042 ई मेल/e-mail: Anurag.Saxena@icar.gov.in

MESSAGE FROM CONFERENCE DIRECTOR

The development and adoption of innovative technologies have been instrumental in improving the lives of millions of farmers across the country by increasing their income, reducing their costs, and minimizing losses. As agriculture continues to evolve, the role of innovation will become even more critical in enhancing sustainability, resilience, and competitiveness in the sector. Keeping these facts in mind 8th International Conference on "Recent Trends in Advancement of Agriculture, Horticulture, Livestock and Allied Sciences" (RTAAAS-2024) was planned by Just Agriculture Education Group & SABSR, Noida in collaboration with Shri Guru Ram Rai University, Dehradun (ICAR accredited) during 21st- 22nd November, 2024. The conference was embellished by the presence of Chief Guest Dr. Danda Raji Reddy (Vice-Chancellor, SKLSTHU, Hyderabad).

The conference was a great platform for professionals and experts from different industries to come together, exchange ideas, and explore new opportunities. The keynote speakers and panelists provided valuable insights on a range of topics, from the latest developments in technology and innovation to the challenges facing businesses in a rapidly changing world. The success of this conference would not have been possible without the hard work and dedication of our organizing committee and volunteers. We are grateful for their support and contributions towards making this event such a huge success. Thank you to all the attendees for making this a memorable and enriching experience. We look forward to seeing you again at our future events, where we will continue to bring together the best minds in the industry and create valuable opportunities for learning and growth.

Dr. DPS Badwal
Founder & CEO,
Just Agriculture Education Group

MESSAGE FROM ORGANIZING SECRETARY

I am very glad that Just Agriculture Education Group and **SABSR, Noida** in collaboration with **Shri Guru Ram Rai University, Dehradun (ICAR accredited)** has successfully organized two days 8th International Conference on "Recent Trends in Advancement of Agriculture, Horticulture, Livestock and Allied Sciences" (RTAAAS-2024) at **SGRRU, Dehradun** during 21st- 22nd November, 2024 in a hybrid mode. The efforts made by the organizing committee are truly commendable, and I congratulate all of them on the successful organization of this conference. I am confident that the deliberations held during the conference would pave the way for future growth and prosperity of the agriculture sector.

I would like to extend my sincere gratitude to the organizers and all the stakeholders who had contributed to making this conference a grand success. I hope that the knowledge and insights gained from the conference would empower all of us to contribute more effectively towards the development of sustainable agriculture practices that are environmentally friendly and socially responsible. I once again express my heartfelt appreciation to all the stakeholders who had participated in the conference, and I look forward to seeing the outcomes and recommendations of the conference being put into practice.

Dr. Mohit Bharadwaj

Chief Editor,
Just Agriculture- the Magazine

MESSAGE FROM SOCIETY PRESIDENT

It gives me immense pleasure to share that **SABSR, Noida** and **Just AgricultureEducation Group** in collaboration with **Shri Guru Ram Rai University, Dehradun (ICAR accredited)** have successfully organized the 8th International Conference on "Recent Trends in Advancement of Agriculture, Horticulture, Livestock and Allied Sciences" (RTAAAS-2024) at **SGRRU, Dehradun** during 21st-22nd November, 2024 in a hybrid mode. I believe that this conference has played an important role in bringing together experts, researchers and practitioners from across the world to exchange ideas, share their experiences and contribute towards the development of the agriculture sector. We have witnessed several innovative approaches, emerging technologies and sustainable practices that have the potential to revolutionize the agriculture sector and create a positive impact on our environment and economy.

The conference has also highlighted the significance of collaboration among different stakeholders including government, academia, industry and farmers. Through constructive discussions, we have identified the key challenges faced by the agriculture sector and the possible solutions to address them. In conclusion, I would like to congratulate the organizing team for the successful organization of the 8th International Conference (RTAAAS - 2024). We look forward to the next edition of this conference and hope to witness more innovative ideas and practices in the field of agriculture. Thank you all for your participation and support.

Dr. Sushila Hooda
President,
SABSR, Noida

MESSAGE FROM CHIEF ORGANIZING SECRETARY

I am delighted to announce that Just Agriculture Education Group and **SABSR, Noida** in collaboration with Shri Guru Ram Rai University, Dehradun (ICAR accredited) has successfully organized two days 8th International Conference on "Recent Trends in Advancement of Agriculture, Horticulture, Livestock and Allied Sciences" (RTAAAS-2024) at **SGRRU, Dehradun** during 21st- 22nd November, 2024. The conference witnessed an impressive gathering of delegates, researchers and practitioners from across the globe, actively engaging in diverse discussion and presentations aligned with the conference theme. The keynote speakers delivered outstanding and thought-provoking speeches, inspiring attendees and sparking new ideas. The presentations were both informative and engaging, fostering lively discussions and constructive debates. Delegates had valuable networking opportunities, forging connections with colleagues from diverse geographical backgrounds, exchanging innovative ideas and exploring potential avenues for collaboration.

The organizing committee deserves tremendous praise for orchestrating a flawlessly organized and impactful event. Their exemplary efforts in planning, coordinating, and executing the conference ensured seamless operations from start to finish. In conclusion, the conference achieved remarkable success, leaving us eagerly anticipating the next edition in the future. We extend our heartfelt gratitude to all those who contributed to making this event possible and for their unwavering dedication and enthusiasm, ensuring a resounding triumph.

Piyush

Dr. Piyush Chaudhary
Vice-President (Branding & Marketing)
Just Agriculture Education Group

TABLE OF CONTENT

STUDY ON SHEEP FLOCK COMPOSITION AND EMPLOYMENT GENERATION OF KENGURI SHEEP FARMERS IN YADGIR, KARNATAKA

Kanakaraja MG[1*], Mahadevappa D Gouri[2], Kartik[3], Chitra Juniwal[4]

*Corresponding Author: MVSc (Livestock Production and Management),

Veterinary College, Hebbal, Bengaluru, KVAFSU, Bidar

RTAAAS/AB/2024/01

The valuable factors regarding Kenguri sheep flock composition and farmers employment generation were computed during the study. From both intensive and extensive rearing systems 20 farms were chosen randomly on accessibility basis from- Northern Eastern dry agro-climatic zone i.e., Yadgir district of Karnataka, India. The analysis was performed from January to February in the year 2022, for a period of 2 months. The main components of this work were tabulated by structured proforma by calculating mean, standard deviation and P-value. The total flock size was more intensive rearing system (270.46) when compared to extensive rearing system (122.15) and the other constituents of sheep flock were better seen in intensive rearing system than that of extensive rearing system. The sheep farmers have spent more time for feeding and watering of adults (1.75 and 1.60) hrs and lambs (1.55 and 1.45) hrs, followed by health care (1.17 and 1.10) hrs in intensive and extensive rearing systems, respectively, than other activities. As the flock size and employment play a major role in socio-economic profile of marginal farmers, so this type of evaluation uplifts the sheep farmers for more such rearing and breeding ventures in coming days.

Keywords: Sheep flock, employment, socio-economic profile, feeding; watering, health care.

Microbe-assisted Nanotechnology for Agricultural Improvement

Shahnaz Anjum

Lovely Professional University, Phagwara, Punjab, India

RTAAAS/AB/2024/02

This novel and cutting-edge approach involving the application of microbe-influenced nanotechnology gives new hope for the increase of crop production while ensuring environmental protection and safeguarding food security. Beneficial microorganisms in particular plant-growth-promoting microbes (PGPMs) have been successfully exploited in the improvement of soil and the plant health. There is a novel engineering discipline called microbe-assisted nanotechnology, which integrates beneficial microbes with nanomaterials. Transporting nanoparticles toward the plant and the soil helps to create a highly targeted therapy where the active substances, such as nutrients, pesticides, and genes may be delivered to the plant and the soil precisely with no waste. This synergy encourages the plant growth, helps to uptake nutrients as well protect from pests and diseases with minimal ecological consequences. Current developments in agriculture highlight the increasing application of nanotechnology in precision farming, controlled-release fertilizers, and nano-pesticides. These revolutions translate into resource efficiency, reduced dependence on toxic chemicals, and crop resilience on climatic stressors. Similarly, biosensors that were advanced using nanotechnology follow the real-time monitoring of soil conditions to give way to data-driven decision making. Further developments of nanomaterials have led to biodegradable and eco-friendly nanomaterials, reducing risks of environmental contamination. Combining the fields of microbiology and nanotechnology opens up transformative potential as it entails innovative approaches for adequately addressing global food production challenges via eco- friendly agriculture practices.

Keywords: Nanotechnology, PGPM, Plant growth, Nano-pesticides, Microbiology.

Identification of Drought-Resilient Rabi Sorghum Genotypes through Field and Germination Studies

Navyashree R[1], U.V. Mummigatti[1], Nethra P[1], Basavaraj Bagewadi[2], N. G. Hanamaratti[3]

[1]Department of Crop Physiology, College of Agriculture,

[2]Department of Molecular Biology and Biotechnology,

[3]AICRP on Sorghum, MARS,

University of Agricultural Sciences, Dharwad. India.

RTAAAS/AB/2024/03

Sorghum is a major staple crop in India and the fifth most important cereal worldwide. Drought significantly impacts sorghum production, leading to reduced growth and yield. Therefore, developing drought-tolerant genotypes is crucial. This study, titled "Drought Tolerance Studies in Rabi Sorghum Genotypes," aimed to identify the most drought-tolerant sorghum genotype through a series of three experiments using genotypes collected from AICRP Sorghum at the College of Agriculture, Dharwad. The initial experiment evaluated germination in sixty genotypes under osmotic stress induced by polyethylene glycol (PEG). Results showed that increasing PEG levels from 0% to 1% reduced germination rates from 77% to 59%. Genotype SPV-486 exhibited the highest vigour index II values at 0.5% and 1% PEG (22.44 and 22.17, respectively), while SVD-1358 showed the highest value at 0% PEG (28.66). Genotype M148-138 recorded the lowest vigour index II (0.80) under 1% PEG. Based on germination performance, twenty genotypes were selected for subsequent field evaluations. Field experiments were conducted over two rabi seasons (2021-22 and 2022-23) under rainfed and irrigated conditions at the Main Agricultural Research Station (MARS), University of Agricultural Sciences, Dharwad. In contrast, M148-138 and Tandur L exhibited the greatest yield decline under rainfed conditions (44.36 and 40.04 g plant-1) compared to irrigated conditions (78.67 and 70.96 g plant-1). Overall, genotypes BJV-44, M-35-1, Phule Annuradha, and Basavan Motti demonstrated drought tolerance, while M148-138, Tandur L, and Chitapur L showed higher susceptibility.

Keywords: Sorghum, Drought Tolerance, Polyethylene Glycol, Physiological Traits and Yield Reduction

Unlocking the Future of Pulse Crops: Strategic Pre-Breeding for Enhanced Genetic Traits

S. Rama Devi,

RARS, Nandyal, Andhra Pradesh.

RTAAAS/AB/2024/04

Pre-breeding activities are foundational to the advancement of pulse crop genetics, serving as critical endeavors in the creation of novel genetic reservoirs and breeding materials. This abstract delves into the multifaceted realm of pre-breeding strategies in pulses, encompassing a spectrum of activities ranging from germplasm exploration to wild relative utilization, trait discovery, and genomic resource development. By harnessing the untapped genetic diversity present in wild and landrace populations, pre-breeding initiatives aim to broaden the genetic base of cultivated pulse crops. This broadening of genetic diversity is essential for enhancing crop resilience against evolving biotic and abiotic stresses, unlocking previously unexplored yield potential, and improving nutritional quality. Furthermore, pre-breeding efforts play a crucial role in facilitating the identification and introgression of desirable traits—such as disease resistance, abiotic stress tolerance, and nutritional attributes—into elite breeding lines. Through an interdisciplinary approach, pre-breeding activities contribute to the sustainable intensification of pulse crop production systems, fostering genetic resilience and addressing the complex challenges posed by changing agricultural landscapes and global food security demands.

"Enhancing Tomato (*Solanum lycopersicum* L.) Yield and Quality through Ethyl Methane Sulfonate Mutagenesis"

Krutika S. Dhondge[1], N. M. Maske[2]

[1]Institute of Biosciences and Technology,

MGM University, Aurangabad

[2]MGM's NK

College of Agriculture, Gandheli, Aurangabad

RTAAAS/AB/2024/05

Tomato (*Solanum lycopersicum* L.) is a worldwide important crop, valued for both its nutritional content and economic significance. They are the second largest grown vegetable in both terms of production and consumption. Enhancing its yield and quality has been a focus of breeding programs, particularly to meet the growing demand for more resilient and nutritionally enhanced varieties. Ethyl Methane Sulfonate (EMS), a chemical mutagen has emerged as a powerful tool for inducing genetic variability offering potential for improving desirable traits such as yield, fruit size, fruit weight, days for 50% flowering, disease resistance and nutrient content. By alkylating guanine bases in DNA, EMS causes mispairing during DNA replication, which leads to point mutations. The resultant plants were screened for phenotypic changes, including increased fruit yield and improved fruit quality parameters such as colour, texture, firmness, juicy texture, and good flavour. Ascorbic acid, TSS, lycopene and titratable acidity contents are commonly considered as fruit quality determining properties in tomato. Preliminary findings suggest that EMS mutagenesis significantly broadened the genetic variation within the treated populations. Mutants exhibiting improved yield and fruit quality were identified and evaluated over multiple generations. Genetic analysis revealed several promising lines with stable and heritable traits, showing potential for future breeding programs. This study underscores the usefulness of EMS mutagenesis in tomato breeding and highlights the potential for creating high-yield, high-quality tomato varieties suited to various environmental conditions. Further research is acceptable to understand the underlying genetic mechanisms driving these improvements and to assess the long-term stability and commercial viability of the identified mutants. The results suggest that EMS-induced mutagenesis can be a valuable tool in accelerating tomato crop enhancement, contributing to sustainable agricultural practices and food security.

Keywords: Mutagenesis, Genetic Variability, Phenotypic Variation.

Application of Artificial Intelligence and Machine Learning for Predicting Soil Fertility

Beerendra Singh[1*] and Jitendra Singh[2]

[1]Asst. Professor-cum-Jr. Scientist (Soil Science), IRS, Bikramganj (Rohtas), BAU, Sabour

[2]Asst. Professor-cum-Jr. Scientist (Soil Science), VKSCOA, Dumraon (Buxar), BAU, Sabour

RTAAAS/AB/2024/06

In India, a majority of farmers are less educated and possess low adaptive capabilities to modern technologies which affects crop production. As the population continues to grow, the demand for food also increases which requires the use of modern technologies such as machine learning, deep learning, real-time analytics, etc. in the field of agriculture. Despite India's extensive industrial history and its significant role in various economic sectors of society, the agricultural sector is still in declining phase. India's economy is largely based on agriculture especially on crops which are the driving force behind its agricultural roots. Agricultural practices include fertilizer selection, water management, crop selection, soil fertility estimation, etc. Artificial intelligence in agriculture offers effective solutions to today's sustainable agriculture challenges. Machine learning, deep learning, and real-time analytics are the key to smart agriculture. Agriculture involves crop selection, crop forecasting, land distribution, water management and many more processes. Machine learning algorithms are used for crop selection and management, deep learning is used for crop selection and crop yield forecasting and time series analysis is used for crop demand forecasting, inventory forecasting, and crop yield forecasting. Time series analysis is a way of studying the characteristics of the response variable concerning time as the independent variable. To estimate the target variable in predicting or forecasting, use the time variable as the reference point. Crops are selected using machine learning and deep learning algorithms based on soil, soil classification, etc. Crop data can be used to classify soil fertility, crop selection and many other machine learning algorithms. Deep learning algorithms can be applied to agricultural data for real-time analysis and crop selection. As the food demand increases due to population growth, crop forecasting is one of the important tasks. Therefore, future crops need to be predicted to overcome food insecurity. Using time series analysis to predict crop yields, leveraging technology and deep learning to make appropriate recommendations will reduce food insecurity in the future.

Keywords: Machine learning, Soil Fertility, Time series, Yield forecasting

ASSESSMENT OF TOMATO GENOTYPES FOR PHOSPHORUS UPTAKE AND USE EFFICENCY UNDER SIMULATED CONDITION

Soumya Patil[1], R.H. Laxman[2], Y. A. Nanja Reddy, K.S. Shivashankara, H.B. Raghupathi

[1]Department of Crop Physiology, College of Agriculture, Dharwad

[2]Principal Scientist of Division basic science, ICAR, IIHR, Hessarghatta, Bangalore

RTAAAS/AB/2024/07

Tomato belonging to family Solanaceae is cultivated across the world. It requires NPK in quite high quantity for growth and development. Phosphorus (P) being important macronutrient is involved in photosynthesis, respiration, energy generation and nucleic acid biosynthesis. Availability of P is one of the major constraints limiting productivity, due to its fixation and binding with other elements in the soil. Plants have adapted through modifications in root morphology, increased organic acids exudation and acid phosphatase activity to utilize bound P. Identification of genotypes having higher P acquisition and use efficiency is highly desirable under P limiting conditions. Hence, twenty-one tomato genotypes and its wild relatives were evaluated under P sufficient and deficient conditions. Based on phosphorus acquisition efficiency (PAE) ten contrasting genotypes were selected for further study and were grown in quartz sand supplemented with modified Hoagland solution to supply two levels of P. The root length, root volume, root P content, root-shoot ratio and activity of acid phosphatase were higher under low P supply and use efficiency was higher in high P supply. The genotypes, Arka Samrat, PKM-1, Solanum arcanum, Solanum galapagense, Solanum pimpinellifolium and Solanum peruvianum with better root characteristics, plant height, total plant P content were superior. They also had higher photosynthetic rate, stomatal conductance, transpiration rate, PSII yield and chlorophyll content. Thus, exhibited better performance under low P supply condition with higher P use efficiency.

STUDY ON THE EFFECT OF NANO UREA, NANO DAP AND MICRONUTRIENTS ON GROWTH AND PHYSIOLOGICAL PARAMETERS OF GERBERA (*Gerbera jamesonii* Bolus Ex. Hooker F.) var. Toro Rosso UNDER SHADE NET CONDITIONS.

K. Siva Subrahmanyam[1], Dr. K. Kaladhar Babu[2], Dr. K. Venkata Laxmi[3],**

Dr. K. Venkata Ramesh[4], Dr. S. Praneeth Kumar[5].

[1*]Department of Floriculture and Landscaping, Post graduate institute for Horticultural Sciences, SKLTGHU, Mulugu, Siddipet.

[2]Assistant Professor (Selection Grade), Department of Floriculture and Landscaping, College of Horticulture, Rajendranagar, Hyderabad.

[3]Associate Professor, Department of Horticulture, College of Horticulture, Malyal. Mahabubabad.

[4]Scientist, Department of Plant Pathology, Grape Research Station, Rajendranagar, Hyderabad.

[5]Scientist, Department of Plant Physiology, Floricultural Research Station, Rajendranagar, Hyderabad.

RTAAAS/AB/2024/08

An investigation was conducted to evaluate the effect of nano urea, nano DAP and micronutrients on growth and physiological parameters of Gerbera (*Gerbera jamesonii* Bolus Ex. Hooker F.) under shade net conditions at College of Horticulture, Rajendranagar, Hyderabad, Sri Konda Laxman Telangana Horticultural University, during the late winter season of the year 2024-2025. This study involved seven treatments in a Completely Randomized Design with three replications. The results from the study concluded that the treatment T 6 75% N + 75% P 2 O 5 +100% K 2 O + nano urea @ 3 ml/L + Liquid micronutrients @ 2.5 ml/L was superior among all the treatments in terms of growth and physiological parameters includes plant height (16.09, 25.21, 31.13 cm), number of leaves per plant (7.26, 11.14, 14.13), leaf length (22.12, 28.20, 34.06 cm), leaf width (6.96, 12.29, 15.44 cm), plant spread in East to West (39.33, 54.24, 62.17 cm) and North to South direction (44.72, 57.05, 66.47 cm) at 30, 60 and 90 days after planting respectively and the maximum number of suckers per plant (3.13), leaf area (186.42 cm 2) and chlorophyll content (spad units) (84.12) at 150 days after planting.

Keywords: Nano particles; Nano urea, nano DAP, liquid micronutrients, foliar application, gerbera.

Nutrient management in Lucerne (*Medicogo sativa*) under Melia dubia based silvipasture system

Lalita Saini and *A. K. Saini

Agroforestry Research Station,

Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar, Gujarat, India

*Center for Natural Resources Management, Sardarkrushinagar Dantiwada

Agricultural University, Sardarkrushinagar, Gujarat, India

RTAAAS/AB/2024/09

A field investigation was conducted during Rabi seasons of 2018-19 to 2020-21 at agroforestry Research Station, Sardarkrushinagar Dantiwada Agriculture University, Sardarkrushinagar, Gujarat to utilizing area between trees through growing fodder crops like Lucerne crop with best nutrient management. Six treatments were evaluated in Randomized block design with four replications which are: 75% RDF (T 1) 100% RDF (T 2), 50% RDF + 5 t FYM/ha (T 3), 75 % RDF + 5 t FYM/ha (T 4), 50% RDF + 5 t FYM/ha + Rhizobium + PSB (T 5) and 75 % RDF + 5 t FYM/ha + Rhizobium + PSB (T 6). The growth metrics, yield parameters and soil properties are all subjected to observation and recording. The results showed that conjunctive application of nutrient through inorganic and organic sources. 75% recommended dose of fertilizer through inorganic and organic source like, 5 t FYM/ha + Rhizobium + PSB significantly enhanced plant growth and growth attributes. Application of 75 per cent RDF (15-60 kg N- P 2 O 5 /ha) + 5 t FYM + Rhizobium + PSB (each 5 ml/kg seed) recorded higher plant height (79.27 cm), green (39.46 t/ha) and dry fodder yield (7.31 t/ha), organic carbon (0.28 %), net return (Rs.86717 /ha) and Benefit cost ratio (2.22) over other combination and sole application of inorganic sources of nutrients.

Keywords: Lucerne, Melia dubia, Nutrient management

Assessing Herbicidal Interventions to Promote Efficient Weed Control in Rapeseed-Mustard (*Brassica* spp.) Production

[1]Radha Upadhyay, [2]M. S. Negi, [2]Anil Shukla, [1]Shubhankar Baliyan and [1]Shilpa Saini

[1]PhD Scholar, [2]Professor, Department of Agronomy,

G. B. Pant University of Agriculture and Technology, Pantnagar

RTAAAS/AB/2024/10

To determine the effectiveness of herbicides in weed management for rapeseed-mustard crops, a field experiment titled Evaluation of Herbicidal Interventions for Optimized Weed Management in Rapeseed-Mustard (Brassica spp.) Cultivation was carried out at N.E.B.C.R.C of G.B. Pant University of Agriculture and Technology, Pantnagar (Uttarakhand) in 2022–23. sand loam with a pH of neutral, medium organic carbon (0.69%), low available nitrogen (196.2 kg/ha), and medium available phosphorus (23.2%) made up the Soil at the experimental location. The PR 20 variety of Indian mustard was used in the experiment, spaced 30×15 cm, and three replications were used, each with seven different weed management treatments: T1: Pendimethalin 1.0 kg a.i./ha (PE); T2: Fluazifop-p-butyl 0.125 kg a.i./ha at 25-30 DAS (PoE); T3: Quizalofop 0.050 kg a.i./ha at 15-20 DAS (PoE); T4: Pendimethalin 1.0 kg a.i./ha (PE)-Fluazifop-p-butyl 0.125 kg a.i./ha at 25-30 DAS (PoE); T5: Pendimethalin 1.0 kg a.i./ha (PE)-Quezalofop 0.050 kg a.i./ha at 15-20 DAS (PoE); T6: Weedy check and T7: Weed free. Different weed management techniques had a substantial impact on seed yield; of all the treatments, weed free plots had the highest plant height (169 cm), silique/plant (307), and seed yield (2232 kg/ha) compared to all other treatments. Different weed management techniques had a substantial impact on seed yield; of all the treatments, weed free plots had the highest plant height (172 cm), silique/plant (312), and seed yield (2134 kg/ha) compared to all other treatments. The weed index also stayed the lowest. According to the current investigation, the combination of Pendimethalin 1.0 kg a.i./ha (PE) and Quizalofop 0.050 kg a.i./ha at 15–30 days produced the significantly largest seed output, silique/plant, maximum weed control efficiency, and least weed index among all the treatments.

Success story of a Farmer Mr. Mansa Singh, a goat rearer who became an entrepreneur under the AICRP on Goat, Black Bengal Field Unit, BAU, Ranchi

Dr. Nandani Kumari[1*], Dr. Sushil Prasad[2], Dr. Dinesh Kumar[3], Dr. Shailendra Kumar Rajak[4], Dr. Dhawal Kant Yadav[5], Dr. Amit Kumar Jha[6] and [7]Dr. Pankaj Kumar

[1]Main and Corresponding Author, Assistant Professor cum Junior Scientist, Dept. of AGB, CoVS, AH, BAU, Ranchi

[2]Dean, CoVS, AH, BAU, Ranchi

[3]Assistant Professor cum Junior Scientist, Dept. of Animal Nutrition, CoVS AH., BAU

[4,5]Assistant Professor cum Junior Scientist, Dept. of LPM, CoVS AH., BAU, Ranchi

[6]Assistant Professor cum Junior Scientist, Dept. of VAHEE, CoVS AH., BAU, Ranchi

[7]Assistant Professor cum Junior Scientist, Dept. of VPHE, CoVS AH., BAU, Ranchi

RTAAAS/AB/2024/11

Goat rearing serves as a crucial source of livelihood for the tribal population in Jharkhand. For goat rearers, it acts like an ATM, providing financial support during both prosperous and challenging times. The net income is reported to be seven thousand per annum per doe, with a gross income of 12000 per doe each year. The flock dynamics studied by the AICRP on goats at four centers like Tiko (Lohardaga), Palojori (Deoghar), Chamguru (Ranchi), and Barabanki (Lohardaga) over five years indicate the significant potential and scope of the project AICRP on Goat, Black Bengal Field Unit, BAU, Ranchi. This study collected data from registered goat rearers across the four designated breeding clusters in Jharkhand. The flock dynamics of 15136 in the year 2023-24, with a mortality percentage of 3.03%, shows an improvement compared to the rates of 3.05%, 3.25%, and 3.36% for the years 2022-23, 2021-22, and 2020-21, respectively. This highlights the importance of timely management practices such as dipping, deworming, and vaccination, alongside farmer meetings and counseling conducted under the AICRP on Goat Improvement. Present abstract emphasizes and documents the journey of Mr. Mansa Singh from Barabanki, East Singhbum, Jharkhand. The training program designed for Human Resource Development at the College of Veterinary Science and Animal Husbandry, BAU led by knowledgeable scientists, was a pivotal moment in his struggle against poverty. His story demonstrates how strong motivation, combined with scientific methods of animal rearing, can lead to remarkable success.

Keywords: Success story, Black Bengal Goats, Flock Dynamics, Mortality

Potato yield response to nitrogen and potassium sprinkler fertigation in loamy sand soil

A.K. SAINI*, C. K. PATEL, LALITA H. SAINI Er. J. J. MAKWANA

Centre For Natural Resources Management

Sadarkrushinagar Dantiwada Agricultural University

Sardarkrushinagar, Gujarat, India

RTAAAS/AB/2024/12

Potato (*Solanum tuberosum* L.) is the world's fourth most important food crop and yields more food calories per unit water than cereals. Compared to other leading food crops, potato grows more rapidly, require less land. These qualities enable this crop to potentially attain the position of third most staple food globally. Fertigation has become a striking method of fertilizer application in modern intensive agriculture system. Application of fertilizer with irrigation water has several inherent advantages over conventional dry-blend fertilization for crop production on course-textured soils, including lower fertilizer inputs, reduced nutrient leaching, and flexibility in scheduling to meet crop demands. A experiment was conducted during 2020-21 to 2022-23 to make out the yield response to nitrogen and potassium sprinkler fertigation at Plasticulture Development Farm of Centre for Natural Resources Management, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar, Gujarat which is situated in semi-arid region of North Gujarat. The yield of tubers/plot was recorded at the end of the experiment, graded in <25g, >25g and expressed into q/ha. Application of 100% RDN and K (treatment F 3) recorded significantly higher tuber yield during all the years of experiments and in pooled. Tuber yield was significantly higher with application of fertilizers in 8 splits rather than 6 and 4 splits. A perusal of data showed that higher total tuber yield was obtained with higher level of input and maximum number of splits. Higher tuber yield 458.5 q/ha was secured with application of 100% RDN and K and 443.5 q/ha with application of fertilizers in 8 splits, in pooled results.

Standardization and Quality Evaluation of Value Added Momos Incorporated with Ragi Flour and Colocasia Leaves Powder

Soumya Sucharita Sahoo[1] and B. S. Agarkar[2]

[1]Ph. D. Research Scholar, Dept. Food Science and Nutrition, SDAU, Dantiwada, Gujarat

[2]Associate Professor, Dept. Food Engineering, VNMKV, Parbhani, Maharashtra

RTAAAS/AB/2024/13

Momo is one of the most preferred street food items because of its desirable sensory attributes, hygienic cooking method and reasonable price in many parts of India and abroad. The present study was conducted as a step to supplement momo with ragi flour and colocasia leaves powder to enhance the nutritional composition. Methods: The maida, ragi flour and colocasia leaves powder incorporated momos among five treatments viz. Co (100:30:00), T 1 (69:30:1), T 2 (68.5:30:1.5), T 3 (68:30:2) and T 4 (67.5:30:2.5) subjected to sensory evaluation using Hedonic rating scale. Proximate and mineral analysis were done by using AOAC (2007) methods and AAS, respectively. The shelf-life study was done by keeping the product in pet jar and LDPE pouch at room, super- chilling (-2±0.5 0 C) and frozen temperature (-18±0.5 0 C) and evaluated at an interval of 3 days.Result: Control and T 3 momos got best acceptance in the studies. T 3 momos were significantly superior in terms of crude fibre (4.92% v/s 4.05%), total ash (1.18% v/s 1.02%), calcium (71.9% v/s 47.4%), phosphorus (84.38% v/s 77.42%), magnesium (35.76% v/s 29.02%), iron (1.24% v/s 1.04%), zinc (0.59% v/s 0.42%), sodium (28.17% v/s 27.72%) and potassium (319.65% v/s 292.33%) than Co. The sensory scores were decreased after 1 day at room temperature, 12 th day in LDPE pouches and 15 th day in pet bottles at super-chilling, after 18 th day and 24 th day for Co and T 3 momos in LDPE pouches and pet bottles in frozen conditions. Conclusion: It can be concluded that the value added momos has high fibre and mineral contents to combat micronutrient deficiencies.

Keywords: Momos, Ragi, Colocasia, Nutrients, Shelf-life

Influence of organic sources of nutrients on soil physical properties, performance, nutrient uptake and yield of rainfed cotton in Vertisols under semiarid condition

Monika S. Bhavsar*, V.V.Gabhane, M.M. Ganvir, R.S.Patode and A.B.Chorey

AICRP for Dryland Agriculture and Department of Soil Science

Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

RTAAAS/AB/2024/14

A field experiment was initiated during 2019-20 at research farm of AICRP for Dryland Agriculture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola (Maharashtra), and the present study was conducted during kharif season of 2023-24 to assess the influence of organic sources of nutrients on soil physical properties, performance, nutrient uptake and yield of rainfed cotton (Gossypium spp.) in Vertisols under semiarid condition. The various organic sources used were FYM, vermicompost and gliricidia green leaves. The nine treatments consisting of various combinations of organic sources of nutrients along with three replications were evaluated in randomized block design. The results revealed that the significantly higher increase in nutrient uptake, seed cotton yield and yield components like height of plant, branches plant -1 , number of bolls plant -1 , length of roots, fresh weight of roots and boll weight were observed with application of 50% N through FYM + 50% N through gliricidia treatment and was at par with application of 50% N through vermicompost + 50% N through gliricidia and recommended dose of fertilizers (RDF), compared to all other treatment combinations. The significant improvement in hydraulic conductivity, mean weight diameter and bulk density was observed with the combined application of 50% N through FYM and 50% N through gliricidia (T 5) and was on par with application of 50% N through vermicompost + 50% N through Gliricidia (T 7).

Keywords: organic sources, soil physical properties, nutrient uptake, yield, Vertisols

Bioefficacy of BAS DC against major sucking pests on Tomato

Kalavathi K K[1], Rakhesh S[2], Jayashree Pattar[1] and Shubha S[1]

[1]Scienstist (Plant Protection) ICAR-Krishi Vigyan Kendra,

University of Agricultural Sciences, Dharwad

[2]Department of Entomology, College of Agriculture, Dharwad,

University of Agricultural Sciences, Dharwad, Karnataka

RTAAAS/AB/2024/15

A bioefficacy trial was conducted on tomatoes at Krishi Vignan Kendra, Dharwad, during the rabi seasons of 2019 and 2020. The trial aimed to evaluate the effectiveness and phytotoxicity of BAS 441 01 I DC against various pests. The study involved three treatments of BAS 441 01 I DC at doses of 33.75, 45.00, and 56.26 g a.i./ha, compared with market- standard chemicals such as Afidopyropen 50 g/l DC, Abamectin 1.9 % EC, Thiamethoxam 12.6 % + Lambda cyhalothrin 9.5 % ZC, and Spiromesifen 22.9 % SC, as well as an untreated control. Results showed that BAS 441 01 I DC at 56.26 g a.i./ha effectively controlled whitefly populations, comparable to Spiromesifen 22.9 % SC, with significant reductions observed after both sprays. Similarly, BAS 441 01 I DC was effective against leafhoppers and mites, showing superior performance over the control treatments. Yield data indicated that BAS 441 01 I DC at 56.26 g a.i./ha produced the highest tomato yields, followed by Spiromesifen 22.9 % SC and other market standards. Predatory population assessments revealed no significant differences among treatments, indicating that the predatory bugs and coccinellids were unaffected. Phytotoxicity observations confirmed that BAS 441 01 I DC, at the tested doses, did not exhibit any adverse effects on the tomato crop, making it a safe option for pest management.

Keywords: Tomato, Bioefficacy, Whitefly, Mites, Phytotoxicity

Mutation breeding: An Approach for crop improvement and induction of variability in Medicinal and Aromatic Plants

Maneesha Singh

Professor, School of Basic and Applied Sciences,

Shri Guru Ram Rai University, Patel Nagar Campus, Dehradun, Uttarakhand, India

RTAAAS/AB/2024/16

Mutation breeding is a valuable approach for inducing variability and genetic improvement in medicinal and aromatic plants, especially those with limited natural genetic diversity. This method involves the deliberate introduction of mutations through techniques like combination breeding, mutagenesis, somaclonal variation, and molecular gene transfer. These induced mutations contribute to genetic dissection and the development of variants with altered secondary metabolic profiles, often referred to as chemical races or chromodemes. The widespread use of induced mutants in plant breeding programme across the globe has led to the release of 3222 plant mutant varieties from 170 different plant species in more than 60 countries throughout the world. Medicinal plants are particularly significant due to their active principles that influence physiological processes. Mutation breeding can lead to the development of variants with enhanced medicinal properties. The use of induced mutants in plant breeding programs has gained global acceptance, resulting in the release of numerous plant mutant varieties across various countries. These varieties contribute to increased biodiversity, providing valuable breeding material for conventional plant breeding and contributing to the conservation and use of plant genetic resources. These varieties address diverse breeding objectives for medicinal and aromatic plants, such as high and stable yield, increased content of desired active compounds, resistance to pests and diseases, tolerance to abiotic stresses (moisture stress, high temperature, soil salinity, and alkalinity), absence of harmful substances, and wider adaptability. The success of any improvement program in medicinal and aromatic plants relies on genetic variability, adaptability, and the evolution of species. Induced mutation plays a crucial role in achieving these objectives, especially in enhancing quantitative traits like yield and yield-related attributes. The study aims to assess the morphological and yield-related characteristics of medicinal and aromatic plants developed through mutagenesis in India Overall, mutation breeding stands as an efficient method to induce heritable changes and improve the genetic makeup of medicinal and aromatic plants with desirable traits under diverse climatic conditions.

Climate smart technologies: A way forward for mitigating the climate change implications on crop productivity.

Vimla Singh[1*] and Ritu Chaudhry[1]

[1]Department of Basic Sciences, College of Horticulture, Anjanthali campus, Maharana

Pratap Horticultural University, Karnal, Haryana

RTAAAS/AB/024/279

Agriculture and trade relations have caused the expansion of civilizations since time mmemorial. With rising industrial growth at a fast rate and alarmingly increasing demand of quality food for exploding population on globe, food security is a great concern. Moreover, global climate change is posing a great challenge in terms of abiotic and biotic constraints for crop productivity and yield. The unpredictable weather fluctuations due to changing climate is drastically affecting crop physiology causing poor pollen yield, poor flowering, fewer seeds and fruit setting and thus poor crop yields. Climate-smart technologies provide an innovative solution for enhancing crop productivity. By adopting precision farming tools, choice of climate-resilient crops, and advanced irrigation systems, the implications of climate change can be diverted from losses to gains. The climate smart technologies allow for adaptation to changes in macro- and microclimate and mitigation for the change. Emphasis on saving water and energy as well as minimizing their environmental impact through Precision Agriculture as a Service (PAaaS) may help to adopt advanced agriculture technology and ensure nutritional food security. Use of solar-powered mobile drip irrigation systems to reduce water usage, and reduce carbon dependencies, Smart Farming app, for knowledge of climate. Using natural molecules, chitin/chitosan, nanotechnological and bio-input formulations can be a promising sustainable alternative for agrochemical for increasing affordability and accessibility. For farmers with heavily reliance on livestock, a digital platform may help to exchange of healthy, vetted animals from off-grid farming communities. Sensor based irrigation system may allow better and precise water and fertigation for desired yield outputs. Artificial intelligence tool is revolutionizing the agriculture as smart technology for precision, adaptation and mitigation.

Keywords: Climate smart technology; adaptation, productivity; mitigation; climate change.

Emerging Threats and Challenges of Phytoplasma Diseases in Agriculture

***Hemavati Ranebennur, Kirti Rawat, Shivani Gupta**

Indian Agricultural Research Institute, New Delhi

RTAAAS/AB/2024/18

Phytoplasmas, a unique group of cell wall-less bacteria restricted to the phloem, have emerged as significant plant pathogens, leading to severe economic losses globally. These pathogens are linked to a variety of diseases affecting key crops like sesame, pulses, legumes, and horticultural plants. The growing global spread of phytoplasma- related diseases presents new challenges in their detection, transmission, and management. Phytoplasmas can infect a diverse range of hosts, including economically valuable crops such as sesame, arecanut, legumes, ornamentals, and trees, complicating efforts to control these diseases. One of the main challenges is detection and diagnostics, as traditional methods such as electron microscopy and DNA-based techniques like polymerase chain reaction (PCR) are both labour-intensive and time-consuming. Advanced technologies like Next-Generation Sequencing (NGS) and whole-genome analysis offer faster and more precise options, but they demand significant expertise and resources. Vector transmission adds another layer of complexity, with phytoplasmas predominantly spread by insect vectors such as leafhoppers, planthoppers, and psyllids. Gaining insights into vector-phytoplasma molecular interactions is critical for developing effective vector control methods. Recent discoveries of phytoplasma infections in various host plants in India, including Cassia fistula, fenugreek, faba bean, moth bean, and Pisum sativum, have expanded the known host range of these pathogens. These findings emphasize the need for enhanced surveillance and diagnostics tailored to phytoplasma diseases. In conclusion, advancing research in genomics, vector biology, and host-pathogen interactions is essential to address the increasing challenges posed by phytoplasmas. Developing sustainable management strategies, such as breeding resistant crop varieties and improving diagnostic methods, will be vital to protect global agriculture from the impact of these pathogens.

Keywords: Candidatus, Identification, nested PCR, diagnostic tools

Pomegranate Bacterial blight and their Management

Dr. Suresh Babu[1] and M. Sekhar[2],

[1]Associate Professor, Department of Plant Pathology, CASAR, BEST IU.

[2]Assistant Professor, Department of Agronomy, CASAR, BEST IU.

RTAAAS/AB/2024/19

Pomegranate (*Punica granatum* L.), so called "fruit of paradise" is one of the major fruit crops of arid region. It is mainly grown in the states of Maharashtra, Karnataka, Andhra Pradesh and Tamil Nadu. Bacterial blight of pomegranate, caused by Xanthomonas axonopodis pv. Punicae, is considered to be a major disease, was reported as bacterial leaf spot in the 1950s. At present this disease is observed on leaf, stem and on fruits, and has been responsible for the removing of many orchards in south India. India is the largest producer of pomegranate in the world with an annual production of 2,442 thousand tonnes grown in area approx. 209 thousand hectares. Its a major constraint of pomegranate cultivation and production. Bacterial blight mostly affects above ground plant parts of pomegranate such as leaves, twigs, and fruits. Initially the water-soaked lesions appear only after 6 to 7 days of infection under favourable environmental conditions and develop into necrotic lesions called blighting. Fruits exhibit isolated water-soaked lesions followed by necrosis with small cracks, leading to splitting of the entire fruit. Precise and early diagnosis of bacterial blight is crucial for active surveillance and effective management of the disease. Symptoms based on disease diagnostic methods are labour- intensive, time-consuming and may not detect disease on asymptomatic plants. Severe disease outbreaks can cause 60 to 80% yield losses. The present investigation was carried out during 2022and 2023, respectively and revealed that sprays with Streptocycline (500 ppm) + copper oxychloride (2000 ppm) were found very effective in reducing the mean disease incidence (25.5%) followed by Bromopal (500 ppm) + copper oxychloride (2000 ppm) (33.3%), when compared with control (78.5%) after the 8 th spray. The maximum mean yield of 9.3 tons/ha was recorded in Streptocycline (500 ppm) + copper oxychloride (2000 ppm) followed by 8.50 tons/ha in Bromopal (500 ppm) + copper oxychloride (2000 ppm. The untreated check yielded 2.9 tons/ha.

Keywords: pomegranate, blight, symptom, yield, quality, management

Neglected Traditional Potential Crops' Integration for India's Sustainable Nutrition Security

H.L. Raiger and Dr GP Singh

ICAR-National Bureau of Plant Genetic Resources, New Delhi

RTAAAS/AB/2024/20

Globally, humanity depends on a very narrow range of crops to meet its food and other requirements. Presently, only 30 crops are reported to feed the world, of which 10 crops provide 75% of the total plant derived energy (calories) intake and rice, wheat and maize provide 60% of the total food requirement. Realizing the significance of the underutilized crops in diversifying agriculture under different strategic situations, an AICRN on Under Utilized and Under Exploited Plants was initiated during 1982 by ICAR and recently rechristened as AICRN on Potential Crops. The network is conducting research on 16 crops through 16 main funded, 10 cooperating and 10 voluntary centres in India. During the last 4 decades, a germplasm holding of over 13,000 accessions of prioritized plant species has been collected/introduced, characterized and conserved in the National Gene Bank. Multi- location evaluation of germplasm/breeding lines has led to identification/release of 79 varieties of 12 Potential Crops and standardization of their cultivation practices for different regions of India. Grain amaranth is replacing wheat and potato in view of water scarcity in Gujarat and area estimated around 12000 ha. The grain market at Palanpur receives about ten thousand tones grains annually. Future strategies are proposed for their popularization for enhanced utilization, to sustain the productivity of fragile and marginal lands, to sustain man's food and his multifarious requirements as well as generate a support system for small and marginal farmers for their livelihood in the times to come.

Keywords All India Coordinated Research Network (AICRN), Genetic Resource, Germplasm, Potential Crops, Underutilized Plants

Hi-tech Horticulture, Horticulture innovations, Food processing and Value addition.

Dr.Gadde. Jyothi, Scientist (Hort.)

Head, Floricultural Research Station, Rajendranagar, Hyderabad,

Sri Konda Laxman Telangana Horticultural University, Hyderabad

RTAAAS/AB/2024/21

India is bestowed with varied soils and agro climatic conditions. Horticulture is a sunrise industry which plays a vital role in enhancing the economic status of our nation by implementing hi-tech practices in production technology, various innovations like fortification and making different value-added products which may directly or indirectly creates employment opportunities in the processing industries, plantation crops estates etc. Hi- tech Horticulture is a technology which includes modern concept, completely not dependant on climate and capital intensive but had capacity to improve productivity and farmer's income. It aims at efficient utilization of resources with precise production techniques so as to generate the income around the year. Presently it has become necessity so as to sustain productivity and economic stability of the Indian farmers. It includes the practices of crop improvement, computerize and automation technology, Nanotechnology, postharvest management, Integrated Pest Management (IPM),Integrated Nutrient Management (INM), Plasticulture, Greenhouse cultivation or protected cultivation, Hydroponics, Micro irrigation and fertigation, precision farming, High density planting, Hi - tech mechanization, Molecular diagnostics, transfer of technology through mobile apps, TV and Radio programmes, Farmer sms portal, Agricultural technology websites etc. for doubling the farmer's income. Horticulture innovations include Robotics, drones, artificial intelligence (AI) and sensor-based solutions (automation) which offers opportunity to meet the current challenges in horticulture. Food processing aims at extending the shelf life of food by enhancing the acceptability in terms of flavor, color and texture so as to generate additional income by the farmers and entrepreneurs. It includes the practices like blanching, drying, (fruit slices) dehydration, (Raisins, okra, carrot etc.) freezing. Value addition is the process of increasing the price of primary product by processing, packing or improving its quality. Horticulture produce is highly perishable and especially during glut there is spoilage of fruits and vegetables which can be be converted into various diversified products like jams, jellies, sauces, chutneys a pickles, canned fruits and vegetables by blending or fortification for long term consumption and can be made available in the market throughout the year and fetch good returns to the growers.

"Unraveling Genetic Correlations and Pathways: A Comprehensive Analysis of Yield and Contributory Traits in Soybean"

[1]Mahesh D Patil*, [2]Dr. B G Kamble, [3]Neha H Patil

[1,2]Department of Genetics and Plant Breeding

[3]Department of Plant Pathology

VNMKV, Parbhani

RTAAAS/AB/2024/22

An experiment entitled "Genetic variability studies for yield and yield contributing characters in soybean crop. (*Glycine max* L.) Merril)." was conducted during Kharif 2023-24 at the experimental farm of the College of Agriculture, Badnapur, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani (M.S). The study utilized a Randomized Block Design (RBD) with 38 genotypes and two replications to analyze the genetic associations and path analysis of yield-contributing traits in soybean germplasm. Genotypic correlation coefficients were found to be higher than phenotypic correlation coefficients, underscoring the genetic potential of key yield attributes. Significant and positive correlations with grain yield per plant were observed for the number of pods per cluster, number of pods per plant, 100-seed weight, harvest index, and number of seeds per pod at both genotypic and phenotypic levels. Path analysis further revealed that traits like the number of pods per plant, 100-seed weight, number of seeds per pod, and harvest index exhibited the highest positive direct effects on grain yield. These findings emphasize the importance of direct selection for these traits in breeding programs aimed at enhancing soybean yield potential.

Keywords: soybean, correlation, path analysis, variability

Understanding the water relations in the cut stem of gerbera flowers

Masanagari Supriya[1*], Tapas Kumar Chowdhuri[2] and Madhumita Mitra Sarkar[2]

[1]Ph.D. Scholar, Department of Floriculture and Landscaping,

PGIHS, SKLTGHU, Mulugu (Telangana), India.

[2]Department of Floriculture and Landscaping,

Faculty of Horticulture, Bidhan Chandra Krishi Viswavidyalaya (West Bengal), India.

RTAAAS/AB/2024/23

Gerbera is the most popular cut flower in the world. After harvesting ornamental flowers, the longevity and quality of those cut flowers largely depend on water balance which is consequently influenced by transpiration and water uptake and the balance of these two processes determines the shelf life of the flowers. The present investigation on Understanding the water relations in cut gerbera flowers (*Gerbera jamesonii* Bolus) cvs Stanza and Rosalin were carried in the laboratory, Department of Floriculture and Landscaping, Bidhan Chandra Krishi Viswavidyalaya during the year 2021- 2022. The results of the present study showed that the vase life was recorded to be 10.93 days in cv. Rosalin and 8.87 days in cv. Stanza while vase life was judged on the basis of 50% discoloration of florets and more than 50 0 stem bending, whichever is earlier. The research finding from initial day to day 13 revealed that among different days of vase life in cvs Stanza and Rosalin, the relative fresh weight, vase solution uptake and water loss increased till day 2 then showed a decreasing trend on each successive day of vase life. In cvs Stanza and Rosalin maximum relative fresh weight (117.17 and 111.95 %), maximum vase solution uptake (0.29 and 0.40 g g -1 FW day1) and maximum water loss (0.22 and 0.32 g g -1 FW day -1) respectively, was recorded on Day 2.

Influence of integrated nutrient management and plant geometry on nutrient uptake of ajowan (*Trachyspermum ammi* L. Sprague) in Southern zone of Telangana

Dr. THUNAM SRIKANTH[1*], Dr. VEENA JOSHI[2], Dr. D. LAKSHMINARAYANA[2], Dr. VIJAYA[2]

[1]Department of Plantation, Spices, Medicinal and Aromatic crops, College of Horticulture, SKLTGHU, Hyderabad, Telangana.

[2]Sri Konda Laxman Telangana Horticultural University, Mulugu, Siddipet, Telangana

RTAAAS/AB/2024/24

An experiment was conducted during late kharif season of 2019-20 at College of Horticulture, Rajendranagar, Hyderabad, to find out influence of integrated nutrient management and plant geometry on nutrient uptake of ajowan (*Trachyspermum ammi* L. Sprague) in Southern zone of Telangana. The experiment was laid out in a factorial randomized block design with 12 treatments, replicated thrice. The treatments include four Integrated nutrient management levels (INM 1 , INM 2 , INM 3 and INM 4) and three plant geometries (S 1 , S 2 and S 3). Results showed that available nitrogen (351.33 kg ha -1), phosphorous (96.94 kg ha -1) and potassium (231.88 kg ha -1) content in soil were found significantly higher in T 3 (INM 1 + S 3) over other treatments where as, T 10 (INM 4 + S 1) recorded the lowest. The nutrient content in plant i.e. nitrogen (1.65%), phosphorous (0.93%), and potassium content (1.20%) in plant was found significantly maximum in T 3 (INM 1 + S 3) while, the minimum was recorded in T 7 (INM 3 + S 1). Regarding nutrient uptake by the crop, nitrogen (87.79 kg ha -1) phosphorous (61.10 kg ha -1) and potassium (61.99 kg ha -1) were found significantly higher in T 1 (INM 1 + S 1), while it was the lowest in T 8 (INM 3 + S 2).

Keywords: Nutrient uptake, integrated nutrient management, soil, late kharif, phosphorous.

Study of genetic variability, correlation and path coefficient analysis in Indian mustard [*Brassica juncea* (L.) Czern

Sharad Kumar Singh Redu*, Tejbir Singh

Department of Genetics and Plant Breeding,

Kisan P.G. College Simbhaoli, Hapur (U.P.), India

RTAAAS/AB/2024/25

Forty genotypes of Indian mustard (*Brassica juncea* L.) were undertaken to assess the genetic variability, correlation and path coefficient analysis for thirteen traits. The present investigation was conducted in randomized block design with three replications during rabi season 2022-2023 and 2023-2024 at research farm, Department of Genetics and Plant breeding, Kisan P.G. College, Hapur (U.P.) under early and late sown conditions. The analysis of variance of pooled data of 4 environments reveled significant difference for all the traits across treatment. Results of present investigation shown that pronounced degree of heritability was found for all traits studied except number of primary branches per plant and length of siliqua. The genotypic coefficient of variation (GCV) and phenotypic coefficient of variation (PCV) were medium to high for traits studied and genetic advance as percent of mean showed low to high values for most of attributes studied. Genotypic and phenotypic correlation indicated that all traits were positively correlated with seed yield per plant except days to 50 % flowering, days to maturity and plant height. The path analysis further illumines that biological yield per plant and harvest index exerted the most substantial positive effects on seed yield per plant. The present study elucidates that selection of mustard genotypes in crop hybridization programme based on these particular traits could lead to a more effective strategy of increasing the mustard yield.

Keywords: Genetic variability, heritability, GCV, PCV, Path analysis

Preliminary evaluation of pesticide spraying with drone in Sugarcane

R. Saritha, G. Kusuma, PVK Jagannath Rao, D. Adilakshmi and M. Visalakshi

Regional Agricultural Research Station, ANGRAU, Anakapalle, Andhra Pradesh, India.

RTAAAS/AB/2024/26

Sugarcane is a tropical and subtropical sugar crop in China and the world. The long growing duration and complex growth environment of sugarcane make it easy to accumulate large number of pathogens and insect sources, which will lead to the outbreak of pests and diseases, but the research and application of mechanization of pest control lag behind (Huang et al. 2018). For a long time, manual sprayer is the main method for field application of chemicals in China, which not only shows low operating efficiency and serious chemical waste, but also endangers the health and safety of operators Sugarcane is a tropical and subtropical sugar crop in China and the world. The long growing duration and complex growth environment of sugarcane make it easy to accumulated large number of pathogens and insect sources, which will lead to the outbreak of pests and diseases, but the research and application of mechanization of pest control lag behind. For a long time, manual sprayer is the main method for field application of chemicals in China, which not only shows low operating efficiency and serious chemical waste, but also endangers the health and safety of operators Sugarcane is a tropical and subtropical sugar crop in China and the world. The long growing duration and complex growth environment of sugarcane make it easy to accumulated large number of pathogens and insect sources, which will lead to the outbreak of pests and diseases, but the research and application of mechanization of pest control lag behind (Huang et al. 2018). For a long time, manual sprayer is the main method for field application of chemicals in China, which not only shows low operating efficiency and serious chemical waste, but also endangers the health and safety of operators Sugarcane (*Saccharum officinarum* L.) is an important commercial cash crop of India. The long growing duration and complex growth environment of sugarcane make it easy to accumulate a large number of pathogens and insect sources, which will lead to the outbreak of pests and diseases, but the research and application of mechanization of pest control lag behind. Generally, manual knap sack sprayer is the main method for field application of pesticides, which not only shows low operating efficiency and serious chemical waste, but also endangers the health and safety of operators. For this, miniaturized unmanned aerial vehicles possess a wide array of benefits that include high efficiency, reduced labor requirement, saving of time and energy, quick response time, and vast

area coverage, as well as environmental safety. DRONE (Dynamic Remotely Operated Navigation Equipment) is a device which can fly either with the help of autopilot and GPS coordinates on the pre-set course or can be operated manually with radio signals using the remote control or smart phone app. In this backdrop, a preliminary evaluation of pesticide spraying with drone in Sugarcane was carried out. The conventional knap sack sprayer was compared to drone with respect to the spray characteristics and bio efficacy against early shoot borer. Results reveal that volume mean diameter (VMD) using drone was 245.6 µm on upper canopy and 227.3 µm on the lower canopy, which was much lesser than in knap sack sprayer where the VMD recorded was 620.0 µm on upper canopy and 582.6 µm on the lower canopy. The number mean diameter (NMD) using drone was 203.8 µm on upper canopy and 172.7 µm on the lower canopy, whereas, in the knap sack sprayer the NMD was 323.2 µm on upper canopy and 296.4 µm on the lower canopy. In drone spraying the droplet size was in the range of medium droplets (150-400 µm), which are more likely to get deposited on the target area and in knapsack sprayer the droplet size was in the range of large droplets (>400 µm) which are more likely to get deposited on the ground, which indicates better droplet deposition and penetration in drone spraying. The deposits per square centimeter (Droplet density) were also very high in spraying with drone (154.3 on upper canopy and 138.6 on the lower canopy) compared to knap sack sprayer (58.2 on upper canopy and 36.7 on the lower canopy). In the drone spraying the NMD to VMD ratio was lower (1.20 for upper canopy and 1.31 for the (lower canopy) compared to the conventional knap sack (1.91 for upper canopy and 1.96 for the lower canopy) indicating more uniform spray coverage in drone spraying. The cumulative incidence of early shoot borer in sugarcane crop was much lower (8.6 per cent) in drone spraying compared to knap sack spraying where the incidence of early shoot borer was 21.3 per cent. These findings were essentially reinstated by higher cane yield of 78.6 tha -1 in drone spraying compared to 61.3 tha -1 obtained in knap sack spraying.

Keywords: Drone, spray characteristics, Sugarcane, number mean diameter, volume mean diameter

DRONE (Dynamic Remotely Effect of drying methods on nutritional quality of dehydrated Bitter Gourd

Varsha Kanojia[1*], Pooja Nikhanj[2] and Sahil Kumar[1]

[1]Department of Processing and Food Engineering, Punjab Agricultural University Ludhiana, Punjab,

[2]Department of Microbiology, Punjab Agricultural University Ludhiana, Punjab,

RTAAAS/AB/2024/27

Bitter gourd is very low in calories but dense with precious nutrients. It is an excellent source of vitamins B complex, vitamin C, proteins, magnesium, folic acid, iron, zinc, phosphorus, manganese, and has high dietary fiber and many other nutrients required in the human diet which are necessary for maintaining proper health. It is reported to be a good source of phenolic compounds, which possess potent antioxidant activity. It has an action similar to insulin, thus helping in glucose metabolism. It purifies blood, activates spleen and liver and is highly beneficial in diabetes. Dried product is preferred because of advantages like reduced mass and lowers packaging requirements. They are also used in cooked, stuffed and fried forms. Because of its restricted availability only in harvesting season, perishable nature and development of rubbery texture, loss of bitterness and development of brown colour after dehydration. The present investigation was conducted to develop dehydrated product from bitter gourd. Dehydrated Bitter gourd were prepared using two drying methods i.e. sun drying and tray drying. Pre-treatments like steam blanching and hot water blanching, and preservative such as KMS were used. Dried bitter gourd was stored in HDPE film packets for shelf life studies at ambient condition. Tray drying of bitter gourd was observed better as compared to the sun drying. Whereas, maximum retention of total phenolic content, Chlorophyll content and carotenoid content was found in pre-treatment of bitter gourd with hot water blanching for 96°c for 3 min and dip in KMS solution (0.2%) for 5 min but vitamin C content was found maximum in steam blanching for 3 min and dip in KMS solution (0.5%) for 5 min.

Keywords: Bitter gourd, tray drying, sun drying.

Impact of Foliar Feeding of Humic Substances on Yield and Nutrient Uptake by Bt Cotton under Rainfed condition

O.S. Rakhonde[1], V.K. Kharche[2], S.D. Jadhao[3], S. B. Deshmukh[4], S. U. Kakade[5], S. H. Ingle[6] and A. V. Zope[7]

[1,4,5,6]Cotton Research Unit, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra

[2,3]Department of Soil Science, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra

[7]Department of Plant Pathology, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra

RTAAAS/AB/2024/28

Humic substances are the components of humus and as such are high molecular weight compounds that together form the brown to black hydrophilic, molecularly flexible, polyelectrolytes. Many of the components of humus are heterogenous, relatively large stable organic complexes. Humic compounds such as humic acid and fulvic acid have been shown to encourage plant growth in terms of increasing plant height, fruiting bodies and enhancing nutrient uptake. Humic acids also contain quinone groups, which act as a growth regulating substances and contributing to the increased yield. The positive effects of plant bio stimulants based on humic substances is an alternative method for improvement in crop production. The present investigation was undertaken at Cotton Research Unit, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, during year 2020-21 to 2022-23. The experiment was laid out in randomized block design with three replications. The treatments comprised of foliar sprays of humic and fulvic acid extracted from compost with three concentrations viz. 0.5 %, 1.0 % and 1.5 % (at 45, 60 and 90 DAS) along with recommended dose of fertilizers. The pooled results of three years revealed that significantly highest seed cotton yield (16.03 q ha -1) recorded with RDF + 1.5 % Humic acid foliar spray and this treatment was found on par with application of RDF + 1 % Humic acid foliar spray. The percent increase over only RDF was 12.76 % and 9.04 % respectively. However, significantly maximum nitrogen, phosphorus and potassium uptake was recorded with RDF + 1.5 % Humic acid foliar spray and this treatment was found at par with RDF + 1.0 % Humic acid foliar spray.

Keywords: Nutrient management, humic acid, fulvic acid and Bt-cotton

Comparative Analysis of Fiber Properties in Water-Retted, Alkali-Treated and Enzyme Treated *Sansevieria trifaciata* Fibres

Bindu Kumari*[1] and Lalita Rani[2]

PhD Scholar[1] and District Extension Specialist[2]

Department of Apparel and Textile Science, I.C. College of Community Science

Chaudhary Charan Singh Haryana Agricultural University Hisar, Haryana, India.

RTAAAS/AB/2024/29

The comparative analysis of the fibre properties of *Sansevieria trifaciata* fibres processed using three different methods: water retting, sodium hydroxide (NaOH) and pectinase enzyme treatment. This study examines the effects of water retting, sodium hydroxide treatment, and enzymatic treatment on *Sansevieria trifaciata* fiber properties, specifically focusing on yield, fineness, bundle strength, elongation, moisture content, and moisture regain. Results indicate that fiber yield slightly declined following sodium hydroxide and enzymatic treatments (from 0.84% to 0.81%). However, both treatments significantly enhanced fiber fineness and bundle strength compared to water-retted fibers. Sodium hydroxide-treated fibers demonstrated the highest fineness (23.51 denier) and bundle strength (47.97 g/tex), compared to both water-retted and enzyme-treated fibers. Whereas, water-retted fibers exhibited the highest elongation (5.13%), while sodium hydroxide-treated fibers recorded the lowest moisture content (0.03%) and the highest moisture regain (0.18%). Hence, sodium hydroxide treatment notably improved the textile properties of *Sansevieria trifaciata* fibers, also suggesting for their greater suitability for advanced textile applications.

Keywords: *Sansevieria trifaciata*, water-retted, sodium hydroxide, pectinase and fibre properties

Impact of INM and Organic on Soil Biological Properties and Yield of Bt Cotton

O.S. Rakhonde[1], V.K. Kharche[2], S.D. Jadhao[3], D.V. Mali[4], S.B. Deshmukh[5], S.U. Kakade[6] and A.V. Zope[7]

[1,5,6]Cotton Research Unit, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra

[2,3,4]Department of Soil Science, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra

[7]Department of Plant Pathology, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra

RTAAAS/AB/2024/30

The economy of agricultural community of Vidarbha is mostly dependent on the cotton. The fertility of soil is highly related with soil organic matter. Organic matter is an important soil constituent influencing a number of constraints linked with crop productivity. The integrated use of organic along with chemical fertilizers and also only use of organic is a promising approach in preserving soil biological activities, which will ultimately show positive impacts on different soil physicochemical properties and nutrient uptake by cotton crop. In this regard the, the present investigation was conducted at Research Farm, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, during year 2017-18 and 2018-19. The experiment was laid out in split plot design with three replications. The main plot treatments comprised of nutrient management viz., INM (75 % RDF + compensation through NPS compost) and Organic (100 % NPK dose through NPS compost). Sub plot treatments consisted of cotton based intercropping systems viz., Cotton + dhaincha (1:1), Cotton + sunhemp (1:1), Cotton + greengram (1:1), Cotton + blackgram (1:1) and Sole cotton. Results revealed that, the use of 75 % RDF + compensation through NPS compost enhanced the soil biological properties (SMBC, DHA, Urease activity and CO 2 evolution). 100 % use of NPS compost, under cotton + dhaincha (1:1) also found beneficial in improving biological properties which was found on par with cotton + sunhump (1:1) based intercropping systems. Integrated nutrient management involving use of organics viz. NPS compost and green manuring with dhaincha, sunhump, greengram and blackgram in conjunction with chemical fertilizers and 100 % RDF through NPS compost was found to be improve nutrient content and uptake of major and micro nutrients by cotton.

Keywords: NPS, SMBC, DHA, Urease activity and CO 2

Enhancing Soil Health and Millet Productivity in Dryland Areas through Sustainable Agricultural Practices

Ragini Kumari, Rajkishore Kumar, Kumar Sanjeev and Suneeta Paswan

Bihar Agricultural University, Sabour

RTAAAS/AB/2024/31

Dryland agriculture faces significant challenges due to soil degradation, water scarcity, and climate variability, which directly impact crop productivity. These harsh conditions necessitate innovative solutions to ensure sustainable agricultural productivity. Millets, known for their resilience to arid environments, low input requirements, and rich nutritional profile, are particularly well-suited for cultivation in dryland regions. This study aims to assess the impact of sustainable soil management practices on soil health and millet yield in these challenging environments. The study will focus on a combination of sustainable practices, including the application of organic amendments (such as compost, biochar, and green manure), reduced tillage, and crop rotation with leguminous crops to enhance soil fertility. These practices are expected to improve soil properties such as soil organic matter content, moisture retention, and nutrient availability, which are crucial for maintaining soil health in dryland areas. The study will employ a systematic approach to monitor changes in soil structure, microbial activity, and nutrient dynamics over multiple growing seasons. Additionally, the research will evaluate millet productivity in terms of yield, grain quality, and resilience to drought stress. By linking soil health improvements to crop performance, this research aims to provide a comprehensive understanding of how sustainable practices can be leveraged to enhance millet production in dryland regions.

"Boosting Cotton Yields: Effective Herbicide Strategies for Weed Control in High-Density Planting system"

T Sanjaykumar[1], R Nageswari[1*], S Somasundaram[1], P Anantharaju[2], M Baskar [3], K Subrahmaniyan[1], S Rathika[3], T Ramesh[1]

[1]Department of Agronomy, Tami Nadu Agricultural University, Coimbatore, India

[2]Department of Plant Breeding and Genetics, Tamil Nadu Agricultural University, Coimbatore, India

[3]Department of Soil Science and Agricultural Chemistry, Tamil Nadu Agricultural University, Coimbatore, India

RTAAAS/AB/2024/32

A field trial was conducted at Cotton Research Station, Veppanthattai during summer season of 2024 to compare and study the effect of different weed management practices of cotton under High Density Planting System (HDPS). The experiment was laid in Randomized Block Design (RBD) with ten treatments and replicated thrice. The treatments consisted of PE Pendimethalin 30% EC @ 1.0 kg a.i. / ha + HW at 45 DAS (T 1), PE Pendimethalin 30% EC @ 1.0 kg a.i. ha -1 + POE Pyrithiobac sodium 10% EC @ 0.075 kg a.i. ha -1 + Quizalofop ethyl 10% EC @ 0.075 kg a.i. ha -1 (T 2), PE Pendimethalin 30% EC @ 1.0 kg a.i. ha -1 + PW at 45 DAS (T 3), PE Pendimethalin 30% EC @ 1.0 kg a.i. ha -1 + Metolachlor 50% EC @ 1.0 kg a.i. ha -1 + HW at 45 DAS (T 4), PE Pendimethalin 30% EC @ 1.0 kg a.i. ha -1 + Metolachlor 50% EC @ 1.0 kg ha -1 + POE Pyrithiobac sodium 10% EC @ 0.075 kg a.i. ha -1 + Quizalofop ethyl 10% EC @ 0.075 kg a.i. ha -1 (T 5), PE Pendimethalin 30% EC @ 1.0 kg a.i. ha -1 + Metolachlor 50% EC @ 1.0 kg a.i. ha -1 + PW at 45 DAS (T 6), PE Pendimethalin 30% EC @ 1.0 kg a.i. ha -1 + PW at 25 and 45 DAS (T 7), PE Pendimethalin 30% EC @ 1.0 kg a.i. ha -1 + Metolachlor 50% EC @ 1.0 kg a.i. ha -1 + PW at 25 and 45 DAS (T 8) with Weed free check as (T 9) and Unweeded control as (T 10). Among the different weed management practices, PE Pendimethalin 30% EC @ 1.0 kg a.i. ha -1 + Metolachlor 50% EC @ 1.0 kg ha -1 + POE Pyrithiobac sodium 10% EC @ 0.075 kg a.i. ha -1 + Quizalofop ethyl 10% EC @ 0.075 kg a.i. ha -1 (T 5) recorded higher weed control efficiency (WCE) of 82.77% at harvest stage and lowest weed index (WI) of 3.03%. The yield parameters viz., number of sympodial branches plant -1 , number of bolls plant -1 , number of bolls meter -2 and boll weight were higher with PE Pendimethalin 30% EC @ 1.0 kg a.i. ha -1 + Metolachlor 50% EC @ 1.0 kg ha -1 + POE Pyrithiobac sodium 10% EC @ 0.075 kg a.i. ha -1 + Quizalofop ethyl 10% EC @ 0.075 kg a.i. ha -1 (T 5) (20.92, 22.40, 89.13, 5.37 respectively) and recorded a seed cotton yield of 2098kg ha -1 . The highest net return and BC ratio were obtained with PE Pendimethalin 30% EC @ 1.0 kg a.i. ha -1 + Metolachlor 50% EC @ 1.0 kg ha -1 + POE Pyrithiobac sodium 10% EC @ 0.075 kg a.i. ha -1 + Quizalofop ethyl 10% EC @ 0.075

kg a.i. ha -1 (T 5). Considering the weed control efficiency, productivity and economic feasibility under the current arena of labour shortages, a weed control method encompassing pre-emergence application of Pendimethalin @ 1.0 kg a.i. ha -1 + Metolachlor @ 1.0 kg ha -1 on 3 DAS followed by post emergence application of Pyrithiobac sodium @ 0.075 kg a.i. ha -1 + Quizalofop ethyl @ 0.075 kg a.i. ha -1 could be the best weed management practice for sown during the summer season (February- July) in irrigated condition under high density planting system (HDPS).

Phytogenics: Nature& Answer to Antibiotic Growth Promoters in Poultry

Rahul Nisanka[1*] and Dr. Sudhanya Nath[2]

[1]BVSc AH, Madras Veterinary College, Tamil Nadu Veterinary and Animal Science University, Chennai, Tamil Nadu

[2]Additional Veterinary Assistant Surgeon, Hemgir, Sundargarh under F&ARD Department, Odisha, India

RTAAAS/AB/2024/33

The use of antibiotic growth promoters (AGPs) in poultry farming has raised serious concerns about antimicrobial resistance and its impact on human health. This has prompted the search for safer, plant-based alternatives known as phytogenic feed additives (PFAs). Phytogenics are botanical extracts rich in bioactive compounds like alkaloids, flavonoids, and essential oils that exhibit antimicrobial, antiviral, and anti-inflammatory properties. Recent studies have demonstrated the efficacy of PFAs in enhancing broiler performance, improving immunity, and reducing the risk of metal toxicity without any side effects. Unlike synthetic AGPs, phytogenics are residue-free and sustainable. However, the efficacy of PFAs depends on factors like plant species, extraction methods, and dosage. While the use of AGPs is still prevalent in the Indian poultry industry, the government is pushing for the judicious application of these drugs and exploring safer alternatives like probiotics, organic acids, and PFAs. Ongoing research is focused on optimizing the performance of various herbal extracts as poultry feed additives. As a cost- effective and eco-friendly solution, the adoption of PFAs holds promise in addressing the health and environmental concerns associated with the overuse of AGPs in the Indian poultry sector.

Keyword: Antibiotic Growth Promoters (AGPs), Phytogenic Feed Additives (PFAs), Antimicrobial Resistance, Poultry Nutrition, Herbal Extracts, Sustainable Poultry Farming

"IMPACT OF ORGANIC CARBON SOURCES COMBINED WITH NANO ZINC AND SEAWEED EXTRACT FOLIAR SPRAY ON GROWTH AND YIELD OF RED BHENDI"

N. SENTHILKUMAR*, P. POONKODI* AND S. VENKATESAN **

*Department of Soil Science and Agricultural Chemistry, **Department of Horticulture

Faculty of Agriculture, Annamalai University, Annamalai Nagar

Tamil Nadu, India.

RTAAAS/AB/2024/34

Okra, *Abelmoschus esculentus* (L.) Moench, is a member of malvaceae family. It is an annual vegetable crop in tropical and subtropical parts of the World. It is one of the most important nutritious vegetable crops grown around the year in India. In red fruited okra, reddish purple coloration is mainly due to accumulation of anthocyanin, which is present in combination with chlorophyll. A field experiment was conducted at farmer's field in Sivapuri village, Chidambaram taluk, Cuddalore District, Tamil Nadu with red bhendi variety Kashi Lalima (VROR 157) as a test crop during January to April, 2023. The treatments consisted of application of organic carbon source with foliar spray (nano zinc and seaweed extract) in different combinations. The treatments were T 1 - Control, T 2 - 100% Recommended dose of fertilizer (100: 50: 50 N: P 2 O 5 : K 2 O kg ha -1), T 3 - 100% Recommended dose of fertilizer + Nano zinc @ 0.1% (3 times as FS), T 4 - 100% Recommended dose of fertilizer + Seaweed extract @ 2.5% (3 times as FS), T 5 - 100% Recommended dose of fertilizer + Organic Carbon source @ 2.5 t ha -1 , T 6 - 100% Recommended dose of fertilizer + Organic Carbon source @ 5.0 t ha -1 , T 7 - T 5 + Nano zinc @ 0.1% (3 times as FS), T 8 - T 6 + Nano zinc @ 0.1% (3 times as FS), T 9 - T 5 + Seaweed extract @ 2.5% (3 times as FS), T 10 - T 6 + Seaweed extract @ 2.5% (3 times as FS). The experiment was laid out in randomized block design (RBD) and replicated three times. The experimental plots received the fertilizers according to the treatment schedule. The results of the experiment clearly revealed that the application of 100% recommended dose of fertilizer + organic carbon source @ 5.0 t ha -1 + nano zinc @ 0.1% (3 times as FS at 30 th , 45 th , 60 th DAS) (T 8) registered the maximum growth, yield, quality, nutrient uptake and the post-harvest soil nutrient status of red bhendi. However, it was found to be on par with application of 100% recommended dose of fertilizer + organic carbon source @ 2.5 t ha -1 + nano zinc @ 0.1% (3 times FS at 30 th , 45 th , 60 th DAS) (T 7).

(**Keywords**: RDF, Organic Carbon source, Nano zinc, Growth and Yield)

Impact evaluation on productivity and profitability of Rapeseed-mustard under Cluster Front Line Demonstration in Chandel district, Manipur

Khumlo Levish Chongloi[1*] A. Ameeta Devi[1] and A.K Singha[3].

[1]ICAR-Krishi Vigyan Kendra, Chandel, Research Complex for NEH Region, Manipur Centre

[3]ICAR-Agricultural Technology Application Research Institute, Zone VII, ICAR-Research Complex Umiam

RTAAAS/AB/2024/35

Krishi Vigyan Kendra, Chandel, ICAR-Manipur Centre, carried out the study, which aimed to maximize the productivity of mustard var. NRCHB-101 under rice fallows on 80 hectares of land with 200 demonstrations in the farmers field of Chandel district of Manipur state under Cluster Front Line Demonstration during Kharif 2019 to 2023. Following the Kharif rice harvest in the northeastern states, rapeseed-mustard has a lot of potential when left in residual moisture. In Manipur's rainfed regions, it is a significant source of revenue, particularly for marginal and small farmers. According to the findings, farmers' practices yielded 7.25 q/ha, whereas enhanced technology achieved a mean yield of 9.54 q/ha, 23.96% higher. The range of the yield increase percentages using demonstration practices compared to farmer practices was 21.79% to 27.09 percent during 2019 and 2023, the technological or yield gap ranged from 3.85 to 5.05 q/ha, while the extension gap ranged from 1.95 to 2.75 q/ha. during the study period of 2019 to 2023. Similarly, over the study period, the technological index decreased from 36.07% to 27.50%, the benefit-cost ratio under demonstrations ranged from 1.92:1 to 2.41:1, whereas under farmer practices, it ranged from 1.56:1 to 1.86:1 during the study period of 2019 to 2023 respectively. In order to use the rice fallow areas for boosting cropping intensity as well as crop output and productivity, it is necessary to spread the improved technology among farmers through efficient extension techniques including training and demonstrations. Farmers should be urged to implement the suggested set of procedures in order to increase their profits.

Keywords: Cluster Front Line Demonstration, Impact evaluation, Rapeseed-mustard, Rice fallow.

Management of Web blight disease in Mung bean using different fungicides

Sunita Behera[1], Pavitra Mohan Mahapatra[2], Ipsita Odisi Priyadarsini Mishra[3] and Prasant Kumar Panda[4]

Nutri Crops Research Station (O.U.A.T), Berhampur, Odisha

RTAAAS/AB/2024/36

Mung bean (Vigna radiate (L.) Wilczek) is a short season legume crop and belongs to the family Leguminaceae. It contains about 25% of protein. In India total area under mung bean is 47.55 lakh ha with an annual production of 24.55 lakh tonnes with 516 kg/ha productivity. Due to various biotic and abiotic stresses the production and productivity has been lowered down. Among different diseases web blight caused by Rhizoctonia solani Kuhn is one of the major constraint which leads to 33 to 40% loss in grain yield . To evaluate the efficacy of different fungicides, an experiment on "Management of Web blight disease in Mung bean using different fungicides " has been conducted at Nutri Crops Research Station, Berhampur under Odisha University of Agriculture and Technology during 2023-24. Eight treatments were tested including untreated check in the experiments T1-Azoxystrobin 23% SC @ 1ml/l, T2-Tebuconazole 25.9% EC @1ml/l, T3-Propiconazole 25% EC @ 1ml/l, T4-Tebuconazole 50% + Trifloxystrobin 25% WG @ 0.75gm/l , T5-Hexaconazole 5% EC@ 1 ml/l, T6-Trichoderma viride 1.0% WP @ 10g/l , T7-Pseudomonas fluorescens 1.0% WP @ 10g/l , T8- Control. Basal application along with soil drenching at the time of sowing and twice at 30 and 45 days after sowing done in each treatments. Data on percent disease severity , yield and B:C ratio were recorded 60 and 75 DAS. All the treatments for the management of web blight in mung bean were statistically significant with each other. The lowest percent disease index (19.32%), highest grain yield (8.70 q/ha) and B:C ratio (1.68:1) was found in the treatment T4-Tebuconazole 50% + Trifloxystrobin 25% WG @ 0.75gm/l followed by T1-Azoxystrobin 23% SC @ 1ml/l with (20.50%) disease index , (8.52 q/ha) yield and (1.65:1)B:C ratio.

A study on perceived drudgery of women involved in agricultural activities in Assam

Maitrayee Dutta[1*], Pallabi Bora[2]

[1*]Ph.D. Scholar, Department of Extension Education, Assam Agricultural University, Assam, India

[2]Assistant Professor, Department of Extension Education, Assam Agricultural University, Assam, India

RTAAAS/AB/2024/37

Agriculture holds a crucial position in our country's economy, with the role of women in farming being of immense importance. This research aims to bring attention to the often-overlooked contributions of farm women, acknowledging their selfless acceptance of challenges, their resilience in undertaking demanding tasks, and their ability to endure both mental and physical hardships with humility. Given the demanding nature of the tasks undertaken by farm women, this purposive and randomly sampled investigation utilized a pre-tested schedule administered through a personal interview. The primary objective of this study was to assess the perceived level of drudgery among farm women in Jorhat District of Assam, which involved a sample of 120 women respondents. The participants were selected randomly, with the criteria that they should be above 18 years old and possess a minimum of 3 years of experience in farming activities. The study also revealed that 49.16% and 70.00% of them received a medium level of physical and mental support, respectively. Furthermore, it was found that they possessed a modest level of knowledge on paddy cultivation. Concerning the level of physical exertion, it was noted that a majority of farm women perceived transplanting, harvesting, weeding, and carrying loads on their heads as tasks involving a "great extent of physical burden," deeming them "most painful" and "very exhaustive."

Economics of Wheat Production in India: Evaluating Cost, Efficiency, and Profit Across Six Trienniums

Dr. Vijay Kumar

District Extension Specialist (Farm Management),

Chaudhary Charan Singh Haryana Agricultural University (CCSHAU),

Krishi Vigyan Kendra, Uchani, Karnal (Haryana)

RTAAAS/AB/2024/38

This study offers an in-depth economic analysis of wheat production in India, focusing on cost structures, efficiency, and profitability across six triennial periods from 2004-05 to 2021-22. Drawing on comprehensive data from the Directorate of Economics and Statistics, Ministry of Agriculture, the research examines key cost components, such as cultivation and production expenses, value of main and by-products, material and labor inputs per hectare, and both operational and fixed costs. These metrics enable a detailed profitability assessment, calculated as the difference between the total production value and total cultivation cost per hectare. Findings reveal significant fluctuations in profitability across trienniums, with the highest profitability achieved in the second triennium at Rs. 59,031.07 per hectare, and a sharp decline observed in the fourth triennium, where profits dropped to Rs. 7,104.22. The analysis also highlights variations in input efficiency, with the first and last trienniums demonstrating maximum efficiency in resource use, indicating more effective input utilization during these periods. Labor productivity shows a consistent upward trend, reflecting gains in yield per labor input unit over time, likely due to improvements in labor allocation and mechanization. Furthermore, a strong positive yield-cost correlation of 0.812 was found, suggesting that while higher input costs often correspond with increased yields, profitability is highly sensitive to changes in cost components, such as labor and materials. Sensitivity analysis illustrates that a 15% reduction in material costs could significantly enhance profitability, particularly in the final triennium, emphasizing the importance of cost management for sustaining income levels. This study's findings underscore the need for policies focused on efficient resource use, improved labor productivity, and cost optimization to stabilize wheat farming profitability. By addressing these factors, policymakers, agricultural economists, and farmers can better navigate the economic challenges within the wheat sector, fostering a resilient, sustainable, and profitable agricultural framework in India.

Keywords: wheat production, cost efficiency, profitability, input efficiency, labor productivity, yield-cost correlation.

Optimization of Tulsi essential oil-based chitosan coating for fresh cut cucumber

Pooja Nikhanj and Radhika Dhawan

Department of Microbiology

Punjab Agricultural University, Ludhiana, Punjab

RTAAAS/AB/2024/39

In this paper, the sensible heat transfer characteristics have been modelled as Nusselt equations in the form of Cobb Douglas models for film heat transfer coefficients and in Box Wilson models for overall heat transfer coefficient. Least square means and ANOVA with two-way interactions for overall heat transfer coefficient with reference to true scraped surface heat transfer coefficients (based on temperature jump method) have indicated that for working liquid of Sweetened condensed milk (SCM WL), mass flow rate significantly affected overall heat transfer coefficient at P 0. ≤ 01 and d s /d t and T s at P ≤ 0.05 but V c at P≤ 0.10. The true scraped surface film heat transfer coefficient varied from 476 to 2851W/m 2 K in large rotor having d s /d t as 0.51 and 339 to 2634 W/m 2 K in small rotor assembly having d s /d t as 0,16. From the box Wilson model, the optimum values of scraper blade speeds were evaluated as 3.69 to 5.40 rps for considering the flow rate of SCM WL as 50 to 200 litres per hour at Ts of 127°C under pressure of 1.5 to 1.7 Kg/cm 2 . The effects of independent variables on temperature rise ratio were determined in an ANOVA with interactions for SCM WL, which indicated that the effects of scraping speed, M f , d s /d t , V c, P c and M f x V c increased the outlet temperature. The large rotor with d s /d t of 0.51 has effective use with SCM WL in comparison to water. Higher rotor speed beyond optimum value produced the intensity of mixing which caused back mixing and reduced the plug flow characteristics. The optimum speed for maximum temperature rise was estimated using maxima- minima calculus principle as 2.966 rps when the mass flow rate of 0.0231 kg/s (i.e 75 litres /hour) was selected in large rotor assembly with SCM W. The temperature rise modelling for SCM WL was made at inlet temperature of 50°C with outlet temperature of 120 °C was estimated from the developed model at a steam condensing temperature of 133.2 °C which corresponds to steam pressure of 303.56 KPa (i.e. 2.06 kgf/cm 2 gauge). The ANOVA indicated that d s /d t , M f , and V c were affecting significantly (P ≤ 0.01) but steam pressure affects less significantly at P , 0.05 for SCM WL.

Wood quality assessment of indigenous fast-growing trees to foster sustainable harvests for pulping

[1]Pavin Praize Sunny

[1]Department of Forest Products and Utilization, College of Forestry, Kerala Agricultural University, Thrissur

RTAAAS/AB/2024/40

The current scenario in our country for wood consumption is on a downswing due to various social and economic aspects but the demand for wood is always on an ascent. Wood is inexorable to meet the need of structural, non-structural and paper products. Fast growing species has its relevance which are ideal for pulp production due to their ability to mature quickly and yield a high volume of fiber suitable for paper and other products. Taking these aspects into account, indigenous fast growing tree species like Melia dubia, Ailanthus triphysa and Macaranga peltata were considered avoiding the comparatively popular and generally used exotic trees like eucalyptus, poplar, acacia, casuarina etc. due to studies revealing their ecological incompatibility which causes damage to native species. Planting the indigenous tree species supports the ecosystem, protects biodiversity, preserves water and soil resources, and contributes to the resilience and stability of the environment. These trees are chosen for their high growth rate, fibre quality, and suitability in specific climates, making them key players in sustainable pulp production. Pulp is an essential raw material derived from wood, plants, or recycled paper, primarily used in producing paper and other cellulose-based products. Adopting indigenous fast-growing tree species in forestry and land management is a strategic approach that balances the demand for resources with the need for sustainability. Indigenous fast-growing trees are essential to contemporary forestry and sustainable development because they provide a renewable resource, boost rural economies and aid in ecological restoration. For a number of other environmental, economic, and social reasons, they are also essential, such as lowering deforestation and the strain on natural forests, halting climate change, promoting the production of renewable energy, restoring soil and preventing erosion, establishing windbreaks and shelterbelts and generating income for rural communities.

Keywords: wood, pulp, paper, fibre, sustainability

EVALUATION OF INDIGENOUS ENDOPHYTES AGAINST ROOT KNOT NEMATODE (Meloidogyne incognita) IN BRINJAL (Solanum melongena)

Zakir Hussain

Ph.D Scholar, Department of Nematology, Assam Agricultural University,

Jorhat-13, Assam

RTAAAS/AB/2024/41

Fifteen bacterial and nineteen fungal endophytes were isolated from roots of Solanum spp. viz., S. violaceum, S. torvum, S. melongena, S. nigrum and S. khasianum from Jorhat, Sonitpur, Nagaon, Darrang, Karbi Anglong and Morigaon districts of Assam. An in-vitro experiment was conducted to study the efficacy of endophytes on mortality of Meloidogyne incognita J 2 at different concentrations viz., 25%, 50%, 75% and 100% of culture filtrates and at 24hrs, 48hrs, 72hrs and 96hrs of exposure. Among the bacterial endophytes, maximum juvenile (J 2) mortality of Meloidogyne incognita was observed in isolate BBEK1 (52.25%) followed by the isolate BBED2 (50.91%). Among the fungal endophytes maximum juvenile (J 2) mortality was recorded in isolate BFEM1 (35.96 %) followed by the isolate BFEK1 (33.52%). The promising isolates were identified at molecular level and found to be Bacillus cereus (BBEK1) B. proteolyticus (BBED2), Trichoderma asperellum (BFEM1) and Fusarium begoniae (BFEK1).

Two promising bacterial endophytes B. cereus isolate BBEK1 and B. proteolyticus isolate BBED2 were applied as seed treatment and soil drenching alone and in combinations keeping appropriate checks in brinjal cv. Pusa Purple Long (PPL) infecting M. incognita under pot conditions. After 60 days of transplanting, observations on plant growth parameters and nematode multiplications were recorded in various treatments. Among the treatments with endophytes, seed treatment with Bacillus cereus isolate BBEK1 @ 1x10 9 cfu/ml + seed treatment with Bacillus proteolyticus isolate BBED2 @ 1x10 9 cfu/ml + soil drenching with Bacillus cereus isolate BBEK1 @ 10 ml / plant + soil drenching with Bacillus proteolyticus isolate BBED2 @ 10 ml / plant showed maximum increase in plant growth parameters (Plant height, fresh weight of shoot and root, dry weight of shoot and root) with minimum nematode infection (number of galls and egg mases per root system and final nematode population in soil).

Microbial analysis and characterization of traditional organic preparations viz., Jeevamrutham and Panchagavya

K. Sudheer[1*], S. Triveni[1], P. C. Latha[2], and T. Uma maheswari[3]

[1]Department of Agricultural Microbiology and Bioenergy, PJTS Agricultural University, Rajendranagar, Hyderabad, Telangana.

[2]Principal Scientist, ICAR-IIRR, Rajendranagar, Hyderabad, Telangana.

[3]Department of Entomology, College of Agriculture, Rajendranagar, Hyderabad, Telangana.

RTAAAS/AB/2024/42

An experiment was conducted on traditional organic preparations to the analysis of microbial diversity to know the best period of its use in crop production and to characterize the traditional organic preparations. The microbial population of total bacteria, PSB, KRB, Actinomycetes, and Yeast analysis showed significant influence during storage. In Jeevamrutham, the total bacteria, PSB, and KRB population increased as the storage period increased. The maximum population was observed on the 10 th day after preparation but except for bacteria, other microbial populations were decreased as aging of the preparation. Yeast population was found to maximum on the day of preparation, later which was decreased as the storage period increased. Actinomycetes population was found maximum on 4 th day after preparation later on it was also decreased. In Panchagavya, total bacteria and PSB population were increased as aging of the preparation and found to the maximum value (120 × 10 6 CFU mL -1 and 200 × 10 6 CFU mL -1) on the 24 th day after preparation and later on decreased as the storage period was increased. KRB, actinomycetes, and yeast population increased with the aging of the preparation. The total N, P, K, total sugar, reducing sugars, and non-reducing sugars of Panchagavya were slightly highest than that in Jeevamrutham. Both the preparations recorded more or less similar pH, EC, and OC content. The biochemical properties i.e., GA and ascorbic acid content were found higher in Jeevamrutham compared to Panchagavya. While IAA content was found maximum in Panchagavya than in Jeevamrutham. The higher beneficial microbial load would mobilize more plant nutrients and provide plant growth-promoting substances and also other micronutrients required by the plants.

Centrally Sponsored Agricultural Schemes: A Quantitative Assessment with empirical evidence

Asha Elizabeth Jose[1], Dr. V. S. Tekale[2], Dr. B. Ganesh Kumar[3]

[1]Young Professional II, ICAR-NAARM, Hyderabad

[2]Associate Dean, College of Agriculture, Mul., Chandrapur, Dr. PDKV, Akola

[3]Principal Scientist and Head, HRM Division, ICAR-NAARM

RTAAAS/AB/2024/43

The study entitled "Centrally Sponsored Agricultural Schemes: A Quantitative Assessment with empirical evidence" was purposively conducted in Amravati and Buldhana districts of Vidarbha region in Maharashtra state. thus, for the three schemes, a total of 360 beneficiary farmers were selected. It was observed that majority of the middle-aged respondents (61.11%) having secondary school level of education (39.44%) received low level of training (59.00%), but PKVY beneficiaries received high level of training (73.33%). Majority of the respondents had small land holdings (40.28%) with up to 0.50 ha. Of irrigation potential (41.39%) having biseasonal cropping system (96.94%). Beneficiary farmers had sound financial background with 35.83 per cent of PKVY respondents with annual income in the range of Rs. 2,07,901 to 3,35,300/-, 56.67 per cent of PMKSY respondents in an annual income range of Rs. 2,86,962 to Rs. 4,77,753/-, and 40.83 per cent of SHC respondents in the range of Rs. 2,10,101 to 3,29,700/- annual income respectively. In overall beneficiaries of centrally sponsored agricultural schemes, 63.89 per cent of the respondents had medium level of social participation, source of information (65.00%), innovativeness (58.33%), economic motivation (47.50 %) and benefits accrued (43.06%). More than half (55.83%) of the PKVY beneficiaries, 54.17 per cent of the PMKSY beneficiaries and 47.78 per cent of the overall beneficiaries belonged to moderately favourable level of attitude whereas 43.33 per cent of the SHC beneficiaries belonged to less favourable level of attitude. The before and after composite effectiveness index calculated were 52.04 and 75.23 respectively. Thus, the per cent change in effectiveness index was 44.56. Majority (56.56%) of the overall beneficiaries belonged to medium category of effectiveness.

Keywords: Effectiveness, Paramparagat Krishi Vikas Yojana (PKVY), Pradhan Mantri Krishi Sinchayee Yojana (PMKSY), Soil Health Card Scheme

In vitro evaluation of different fungicides and bio-agents against *Rhizoctonia bataticola* causing soybean root rot

Neetu Badhala

Department of Plant Pathology, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola.

RTAAAS/AB/2024/44

Root rot of soybean is an important disease caused by *Rhizoctonia bataticola* (Tabb.) Butler (Synonym: *Macrophomina phaseolina*), that is observed all over the world and causes considerable yield losses. An experiment was conducted in 2023-24 in which the efficacy of seven different fungicides and four bioagents against *Rhizoctonia bataticola* was evaluated in vitro. Fungicides was evaluated by poisoned food technique and bioagents evaluated by dual culture technique. Among these tested fungicides, Carboxin 17.5%+ Thiram 17.5% at 0.05%, 0.1% and 0.15% concentrations, Metalaxyl 4% + Mancozeb 64% at 0.1% and 0.15% concentrations, Carbendazim 50% WP at 0.1% and 0.15% concentrations and Mancozeb 75% WP at 0.15% concentration showed 100 per cent inhibition of the mycelial growth of R. bataticola. Whereas the rest of the 3 fungicides Captan 50%WP, Azoxystrobin 23% SC and Thiophanate methyl also inhibited the mycelial growth of R. bataticola in the range of 70.95% to 90.20% at 0.05%, 0.1% and 0.15% concentrations respectively. Among the four antagonists evaluated against *Rhizoctonia bataticola*, the significant maximum inhibition of mycelial growth was noticed in case of *Trichoderma harzianum* which is 80.25 per cent followed by T. asperellum 66.26 per cent. The lowest inhibition of mycelial growth was recorded in P. fluorescens and Bacillus subtilis exhibiting 63.02 per cent and 56.75 per cent respectively.

Keywords: Soybean, root rot, efficacy, fungicides, bioagents

Plant extract as a tool for weed management in millets

***Gurubasavaswamy, B. M.[1] and Geetha, K. N.[2]**

[1]Ph.D. Scholar, Department of Agronomy,

University of Agricultural Sciences, Raichur, Karnataka, India

[2]AICRP-Weed Management, University of Agricultural Sciences,

GKVK, Bengaluru, Karnataka, India

RTAAAS/AB/2024/45

Plant extracts have emerged as a promising alternative for weed control, offering a more sustainable and eco-friendly approach compared to synthetic herbicides. These extracts often possess phytotoxic properties that can inhibit seed germination and disrupt the growth of target weeds while being less harmful to the environment and non-target species. Commonly studied extracts, such as those from neem, eucalyptus, and certain essential oils, have shown effectiveness in suppressing various weed species. We have included cucumber and Ageratum conyzoides plant extracts as a part of investigation. With the aim of finding the allelopathic effect of these two plant extracts an experiment was carried out at Research Institute of Organic Farming field unit, University of Agricultural Sciences, Gandhi Krishi Vignan kendra, Bengaluru during Kharif of 2021 and 2022 to evaluate organic weed management methods in kodo millet (*Paspalum scrobiculatum* L.) for two consecutive years. From two years study we can conclude that spraying ageratum conyzoides extract @ 100 ml/l, one at 2-4 leaf stage and another spray at tillering stage reduced (23% reduction) the grassy weed density compared to other treatments. Whereas two sprays of cucumber leaf extract @ 100 ml/l controlled broad leaf weeds (20% reduction) at early stages of crop growth. This was due to allelopathic effect of cucumber and Ageratum conyzoides at earlier days due to managing weed flora with the help of natural allelochemicals Ageratum -coumarin, Cucumis –sisymbrifolin. Hence we need to exploit the allelopathic nature of various plant extracts. Plant extracts can also influence soil microbial communities, promoting beneficial microbes that support crop growth while suppressing those that favor weed development. When used as part of an integrated approach, plant extracts can complement other weed control methods, reducing the reliance on synthetic herbicides and contributing to more sustainable agricultural practices.

Successful callus development from explants of Anthurium andraeanum cv. Xavia

Rashmita Toppo[1*], Sashikala Beura[2] and Payal Priyadarshini[3]

[1]College of Agriculture, Bhawanipatna, Orissa University of Agriculture and Technology

[2,3]Department of Floriculture & Landscaping, College of Agriculture, Orissa University of Agriculture and Technology, Bhubaneswar, Odisha, India

RTAAAS/AB/2024/46

Acknowledging the growing demand for Anthurium planting materials, a study was carried out in 2018-2023, with the objectives to standardize surface sterilization and the media supplements for in-vitro callus development from various explants of *Anthurium andraeanum* cv. Xavia. For standardization of surface sterilization, the leaf lamina, petiole and spadix explants subjected to different time of exposure with 0.1% HgCl2, 1.5% NaOCl and 70% ethyl alcohol along with distilled water serving as the control. To standardize the optimum combination of bio-regulators for callus formation, the concentrations of BAP (3, 4 and 5 mg/l) in combination with 2,4-D (4, 5 mg/l) or TDZ (0.6- 1.0 mg/l) for leaf explants, the combination of BAP (1, 1.5, 2 and 2.5 mg/l) and 2, 4-D (0.5 mg/l) or NAA (2mg/l) for petiole explants, a concentration of BAP (0.5 and 1.0mg/l) or TDZ (0.5 and 1.0 mg/l) in combination with 2,4-D (0.6, 0.8, 1.0 mg/l) for both petiole and spadix explants were were supplemented into MS media for callus induction. The cv. Xavia produced creamy white good size callus from leaf explants treated for 5 min with 0.1% HgCl 2 , in MS + BAP (4 mg/l)+ 2,4-D (5 mg/l). The petiole explants treated for 8 min with 0.1% HgCl 2 and cultured in MS + TDZ (0.6mg/l) and treating the young petiole explants for 7 min with 0.1% HgCl2 followed by dipping in 1.5% (v/v) NaOCl for 1min then cultured in MS + 2,4-D (1.0mg/l) +TDZ (1.0mg/l) produced yellowish white good size callus. The spadix explant of *Anthurium andraeanum* cv. Xavia creamy white and yellowish white coloured fragile callus which were surface sterilized by 7minutes with 0.1% HgCl2 and 1minute with 1.5% NaOCl following culture in MS+2,4-D (0.8mg/l) +BAP (1mg/l) and MS+2,4-D (0.8mg/l) +TDZ (1mg/l).

Organic cultivation of traditional rice varieties

***Gurubasavaswamy, B. M.[1] and Desai, B. K.[2]**

[1]Ph.D. scholar, Department of Agronomy, University of Agricultural Sciences, Raichur,

[2]Director of Research, Directorate of Research, University of Agricultural Sciences, Raichur

RTAAAS/AB/2024/47

Rice is an important food grain crop and is consumed by majority of the human population globally. Nutrient management is an important aspect in rice to be given pivotal importance so as to attain sustainability of grain yield production. The introduction of newly evolved high yielding rice varieties have enhanced the rice yield to a great extent, but no or little emphasis has been given to evaluate the cooking and eating characteristics of traditional rice varieties. These cultivars ensure several health benefits such as reducing the risk of developing type II diabetes, obesity and cardiovascular diseases by lowering the glycemic index and insulin response. Traditional rice varieties are even though poor yielders but responsive to organic production management practices. Hence an experiment was carried out during kharif of 2023 at Agricultural Research Station, Dhadesugur (Tungabhadra irrigation command) under University of Agricultural Sciences, Raichur, Karnataka to evaluate several traditional rice varieties for their yielding potential and to verify nutritional importance under organic farming practices. The experiment was laid out using randomized complete block design with 9 treatments (varieties), replicated thrice. The treatments includes 8 traditional varieties like Chinnaponni, Siddasanna, Navara, Gandhasale, Chittimuthyalu, Hasada, Narikela, Sindhoora madhusale and one modern variety RNR-15048 which is used for comparision. Farmyard manure was applied to all the varieties equivalent to 100% RDN 15 days before transplanting. Among nine varieties, siddasanna recorded higher growth and yield attributes which finally contributed to 18% increase in grain yield compared to other varieties but 9% less than RNR-15048 (HYV). It is mainly due to its genetic potential and responsive nature to organic nutrition practices. Apart from yield soil properties also improved due to addition of manures and biofertilizers. Organic carbon buildup was noticed which further increased the population of beneficial microorganisms which favoured better post-harvest soil fertility implies to sustainable agriculture.

"Microencapsulation in spices"

V.J. Kelaskar[1], P.C. Mali[2], R.C. Gajbhiye[3], Y.S. Saitwal[4] and S.B. Thorat[5]

[1]Ph.D. Scholar, Department of Plantation, Spices, Medicinal and Aromatic Crops, College of Horticulture, D. B. S. K. K. V., Dapoli

[2]Associate Dean, College of Horticulture, Mulde, D. B. S. K. K. V., Dapoli

[3]Professors (CAS), College of Horticulture, Dapoli, D. B. S. K. K. V., Dapoli

[4]Assistant Professor, Department of Vegetable Science, College of Horticulture, D. B. S. K. K. V., Dapoli.

[5]Assistant Professor, Department of Plantation, Spices, Medicinal and Aromatic Crops, College of Horticulture, D. B. S. K. K. V., Dapoli.

RTAAAS/AB/2024/48

Microencapsulation presents promising opportunities for enhancing the preservation, functionality and applicability of spices in various food and beverage formulations, offering a potential avenue for innovation and value addition in the spice industry. Microencapsulation techniques are employed mainly to protect bioactive compounds of spices found in oleoresins and essential oil against degradation and promote a better release and improve their shelf life and stability. When milled spices are stored, their essential oils evaporate over time. Microencapsulation preserves these valuable flavours and aroma. The process is suitable for a variety of spices. According to the data presented by the grand view research database, black pepper, cinnamon, ginger, capsicum and turmeric are considered the main raw material of oleoresins in the global market. The techniques for microencapsulation include spray drying, spray chilling and cooling, coacervation, freeze drying and emulsification. Selecting the appropriate microencapsulation technology and the suitable carriers is determined by the product's specific application and the associated processing conditions. This advanced technology enhances stability, boosts bioavailability, masks bitter taste, facilitates controlled release, preserves functional characteristics and finally improves handling practices. Microencapsulation in spices serves as a pivotal technology that addresses several challenges in the spice industry. It offers numerous benefits, such as protection from oxidation, heat and temperature. It allows for the controlled release of flavors and active compounds, enhancing the sensory profile, improve the stability and shelf-life of spices improving the overall appeal of the product.

"Sustainable Vegetable Waste Management: Converting Waste to Valuable Products"

V.V. Tendulkar[1], A.R. Kakade[2] and V.J. Kelaskar[3]

[1]M.Sc. Department of Vegetable Science, College of Horticulture, D. B. S. K. K. V., Dapoli

[2]Ph.D. Scholar, Department of Fruit Science, College of Horticulture, D. B. S. K. K. V., Dapoli

[3]Ph.D. Scholar, Department of Plantation, Spices, Medicinal and Aromatic Crops,

College of Horticulture, D. B. S. K. K. V., Dapoli

RTAAAS/AB/2024/49

Vegetable waste, primarily generated from markets, processing industries and households, contributes to environmental pollution, greenhouse gas emissions and resource depletion. Conventional waste disposal methods such as landfilling and composting have limitations and drawbacks. Therefore, alternative strategies are necessary to manage vegetable waste sustainably. Vegetables are the most utilized commodities among all horticultural crops and they are consumed raw or processed, with the growing population and changing diet habits, the production and processing of horticultural crops have been increased very significantly to fulfil the increasing demands, significant losses and waste in the fresh and processing industries are becoming a serious nutritional, economical and environmental problem. The organic waste generated from vegetable market has no proper disposal and hence dumped in open grounds which ultimately results in various forms of environmental pollution, and to overcome this problem we need to adopt various waste management practices to convert organic waste into valuable products. By using conventional and emerging application in vegetable waste management, we can produce various value added products like biogas, bioethanol, vermicompost, livestock feed etc. Apart from this various bioactive compounds and natural pigment derived from by-product of vegetable waste can be used in preparation of functional/nutraceutical food. Vegetable waste and by products can be utilized for production of bio plastics in food packaging systems. Collaborative efforts, advancement in waste to energy technology, expansion of processing facilities and establishment of cold storage facilities will not only reduce waste generation but will also help in better utilization of waste.

Keywords: Vegetable waste management, bioactive compounds, bio-plastics.

Growth, yield and economics of banana crop as influenced by organic and inorganic mulches

R. S. Wankhade[1*], Y. D. Charjan[2], Sonal Nage[3], P.N. Magare[4] and A.S. Lawhale[5]

* 1 Assistant Professor, Agriculture Research Station, Dr. P.D.K.V., Achalpur Dist. Amravati,.

2 Associate Professor, 3 Assistant Professor, 4 SRA and 5 JRA, Agriculture Research Station, Dr. P.D.K.V., Achalpur

RTAAAS/AB/2024/50

An experiment was conducted at Agriculture Research Station, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Achalpur (M.S.), India to evaluate the effect of various organic and inorganic mulches on banana crop. Maximum plant height, stem girth, total number of leaves, length of fruit, girth of fruit, number of fruits bunch -1 , fruit weight, bunch weight and 114.69 t yield ha -1 were noticed in banana by mulching of black polyethylene (50 µ) followed by dry grass. However, significantly minimum plant height, stem girth, number of leaves, number of fruits, weight of fruit, length of fruit, girth of fruit and bunch weight and 94.47 t yield ha -1 were recorded with the no mulching treatment. Maximum gross return, net profit and B: C ratio ha -1 (Rs. 931283, Rs. 600534 and 2.82) were obtained under treatment black polyethylene (50 µ) inorganic mulch followed by dry grass (Rs 882563, Rs. 560584 and 2.74) organic mulch.

Keywords- Mulching, Straw, Polyethylene, Banana plant parts

Major Diseases Affecting Grapes in Tamil Nadu during 2023–2024 Across Different Growth Stages Post-Pruning

Vijayasamundeeswari. A.*, C. Muthiah, S. Muthulakshmi, S. Saraswathy, K. Sundaraiya, J. Rajangam, S. Muthuramalingam, C. Rajamanickam, M. Gnanasekaran, S. Prabhu and C. Sankar.

[1]Horticultural College and Research Institute, Periyakulam

RTAAAS/AB/2024/51

Grape cultivation in Tamil Nadu, India, particularly in the Cumbum Valley of Theni district, is recognized for its distinctive production system, which allows five crops to be harvested within a two-year cycle. This intensive system results in varied growth stages of grapevines being present year-round, creating a conducive microclimate that, combined with prevailing weather conditions, supports the severe incidence of fungal diseases. Among these, downy mildew and powdery mildew are notable limiting factors, significantly impacting yield and fruit quality. A roving survey conducted from 2023 to March 2024 highlighted the prevalence and timing of these diseases in relation to growth stages following forward pruning. Downy mildew incidence was prominent between the 25th and 90th day post-pruning, with peak severity occurring from days 31 to 60, coinciding with the emergence of new shoots and inflorescence formation. The incidence of downy mildew during this period ranged from 6.42 to 45.00 PDI (Percent Disease Index), and further increased during days 61 to 90, affecting young berries with an incidence range of 0.00 to 34.10 PDI. Powdery mildew primarily impacted the vines between days 45 and 60 after pruning, with a sharp increase in severity observed from days 61 to 90, where it reached up to 46.26 PDI. As leaves matred, the incidence continued through days 91 to 140, with values ranging from 10.83 to 43.75 PDI. Downy mildew infection during the 70th to 85th day was especially detrimental to young bunches, often leading to premature drying and fruit loss. This study underscores the critical need for timely disease management strategies aligned with the crop's phenological stages to mitigate yield losses and ensure consistent grape production.

Keywords: Grapes, survey, Tamil Nadu, downy mildew, powdery mildew, phenological Stages

Green manuring crops-A potential crops potions for natural farming

Amit Anil Shahane

[1]Assistant Professor, College of Agriculture, (Central Agricultural University, Imphal), Kyrdemkulai, Meghalaya

RTAAAS/AB/2024/52

The natural farming is getting ground in India at present as an environmentally friendly and in- situ management of soil, water and plant with very less dependence on other ex- situ resources. The definition of natural farming is consisting of terms such as indigenous farming system, agro-ecology and diversification with combination of crops, trees and animal component. This indicated that the inputs for crop nutrition, plant nutrition, material for enhancing soil microbial population and functional diversity and also for stress management (pest and abiotic stress) need to be produced in the field itself. Hence forth identification and evaluation of potential options for above mentioned inputs need to be produced in the field itself along with the economic crop production. Therefore there will be trade-off between in-situ input production enterprises and the economic enterprises in natural farming. The options which support maximum input function and produce economic output will be worthy. The green manure crops is one such option with contribution to soil health plant nutrition, diversification, fodder production of animals, large biomass production with supporting agroecology principles. The green manure crops can be grown with a time window of 40-50 days with average production of biomass of 8 to 20 t/ha and being leguminous it is rich in the nitrogen and also pump the phosphorus from deeper depth. The off season rainfall utilizations, suitability to grow under marginal land less input requirement, efficiently utilize the rock phosphate a mineral resource with compatibility under natural farming (zeolithic farming) suitable for intercropping and mixed cropping, best options for weed management in perennial crops and report of reducing the nematode infestation are additional advantages of green manuring crops. Therefore the range of green manurring crops such as sesbania, sunhemp, green gram, cowpea, cluster bean will be considered as a best crop option for selection. Besides that, green leafing manuring will be also possible by growing Gliricidia, neem, mahua, pongamia, etc. along the border of field or uncultivated area. All the above discussed suitability and positive effect are universal without any location bias. Therefore green manuing practice will have capacity to justify all the possible criteria of identifying the suitable crop or group of crops for natural farming and need to be given higher priority for them in natural farming

Keywords: Natural farming, soil health, nutrient management; brown manuring.

ORGANIC NUTRIENT MANAGEMENT IN COLOUR COTTON

Y. D. Charjan[1], R. S. Wankhade[2], S. M. Nage[3], P. N. Magare[4] and A. S. Lawhale[5]

Agriculture Research Station, Achalpur, Dist Amravati, Maharashtra

RTAAAS/AB/2024/53

A field experiment was conducted at Agriculture Research Station, Achalpur, Dist. Amravati under Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola during the season kharif 2022-23. The topography of the field was fairly uniform and levelled. The soil was medium black cotton belonging to order Vertisol with slightly alkaline in reaction (pH-7.9). Among nutrient status it ranged medium in organic carbon, low in available nitrogen174.3 kg ha -1 , very low in available phosphorus 12.21 kg ha -1 and very high in available potassium412.74 kg ha -1. The number of picked bolls (34.14) plant -1 , boll weight (2.80 g), and seed cotton yield plant -1 (32.93 g), and lint yield plant -1 (10.93 g) along with seed cotton, lint and stalk yield of colour cotton hectare -1 of colour cotton was observed significantly higher with treatment T 3 - Vermicompost @ 2.5 t ha -1 + Sunhemp in 2:1 proportion at 60 cm spacing (Green manuring of sunhemp 40 DAS) + Jeevamrut 10% at 50 DAS over all other treatments. The seed cotton equivalent yield of colour cotton 1775 kg ha -1 was observed significantly higher with treatment T 6 - Vermicompost @ 2.5 t ha -1 + Black gram in 2:1 proportion at 60 cm spacing (Mulching of black gram after picking of pods) + Jeevamrut 10% at 50 DAS (1775 kg ha -1). The available NPK status (210.49, 17.45 and 430.14 kg ha -1) and bacterial (36.53 x 10 -4 cfu g -1), fungal (15.22 x 10 -4 cfu g -1) and Actinomycetes population (17.33 x 10 -4 cfu g -1) in soil at flowering stage of colour cotton was significant with treatment T 3 - Vermicompost @ 2.5 t ha -1 + Sunhemp in 2:1 proportion at 60 cm spacing (Green manuring of Sunhemp 40 DAS) + Jeevamrut 10% at 50 DAS over all other treatments.

Standardization of the gluten-free flour by researching the physicochemical characteristics of different cereal grains.

Rajkumar[1], Kanika Pawar[2*], Rakesh Gehlot[1], Roohi[2] and Vijay Kumar[3]

[1]Centre of Food Science and Technology, College of Basic Sciences and Humanities
CCS Haryana Agricultural University, Hisar, Haryana

[2]Regional Research Station, CCS Haryana Agricultural University, Karnal, Haryana

[3]Krishi Vigyan Kendra, CCS Haryana Agricultural University,
Regional Research Station, Karnal, Haryana

RTAAAS/AB/2024/54

The increasing prevalence of gluten-related disorders, including celiac disease and gluten sensitivities, has led to a heightened demand for gluten-free (GF) products with comparable functional and nutritional qualities to wheat-based options. To create standardized GF flour blend, this study investigates the physicochemical and functional properties of various GF cereal grains, specifically rice, maize, sorghum, oats, and millet. Key parameters analyzed include moisture content, protein, fat, ash, and fiber composition, all of which contribute to the fundamental structure and functionality of GF flour. Additionally, functional properties such as water absorption, swelling power, gelation behavior, and pasting characteristics were assessed using tools like the Rapid Visco Analyzer (RVA) to determine their impact on GF flours' texture, stability, and baking performance. Thermal properties were also analyzed to understand the gelatinization and retrogradation behaviors, which are crucial for maintaining desired textures in GF products. Nutritional profiling was conducted to evaluate the balance of macro- and micronutrients in the final blend, ensuring an enhanced nutritional profile. The study reveals distinct variations in physicochemical attributes across the selected grains, with each grain contributing unique characteristics affecting the consistency, shelf stability, and sensory qualities of GF flours. Insights from these analyses recommended optimized flour blends and fortification strategies, aiming to produce nutritionally balanced GF flour with desirable baking qualities. This research establishes a foundation for the standardization of GF flours, which will support manufacturers in improving product consistency, enhancing consumer satisfaction, and providing clearer labeling for gluten-sensitive individuals.

Keywords: Gluten-free flour, Cereal grains, Physicochemical properties, Standardization, Nutritional Composition

Organic Agriculture as a Climate Change Adaptation, Mitigation in Indian Agriculture

C Raajkiran[1]

[1]PG Scholar, Department of Agronomy, Faculty of Agriculture,

Annamalai University, Chidambaram, Tamil Nadu, India.

RTAAAS/AB/2024/55

Climate change significantly impacts crop yields, soil health, water resources, and pest behavioural pattern. To combat these effects, various adaptation strategies are being implemented, including the development of heat and water-stress-resistant crop varieties, the introduction of new resilient crops, enhanced agronomic practices, improved water use efficiency practices, conservation agriculture, and better pest management strategies. Additionally, improved weather forecasting and climate services aim to reduce risks associated with climate change. Organically managed agricultural systems offer a notable opportunity for climate change mitigation, particularly through careful nutrient management that can lower N 2 O emissions from soils. Organic farming also holds significant potential for carbon sequestration in soils. In India, the agriculture sector accounts for 14% of the country's greenhouse gas emissions. To mitigate these emissions, changes in land-use practices and improved input efficiency are crucial. Research indicates that methane emissions from lowla rice fields can be reduced by 40–50% using methods such as alternate wetting and drying (AWD), growing shorter-duration rice varieties, and applying neem- coated urea based on soil health cards and leaf color charts. Moreover, adopting dry direct-seeding techniques for rice, which avoids prolonged soil submergence, can lead to a reduction of methane emissions by 70–75%. Carbon sequestration in agricultural soils can be enhanced through the application of organic manure, crop residues, and balanced nutrient use. India has proactively addressed climate change in agriculture, recently committing to a 45% reduction in greenhouse gas emission intensity by 2030 and aiming for net-zero emissions by 2070. Emphasizing adaptation and mitigation strategies rooted in organic agriculture can leverage established practices and provide sustainable livelihood options across various climate zones. With fore mentioned concern this paper explores the significant impacts of climate change on agriculture and outlines potential adaptation and mitigation strategies, thereby promoting climate-friendly farming practices on a global scale.

Keywords: Adaptation, climate change, mitigation, organic agriculture.

Population fluctuation of major pest of chilli and their natural enemies under western Vidarbha condition

Sonal Nage, Y. D. Charjan, R. S. Wankhade, P. N. Magare and V. D. Mohod

Agriculture Research Station, Achalpur

(Dr. PDKV, Akola), Dist. Amravati (MS), India

RTAAAS/AB/2024/56

Population fluctuation of major pests of chilli viz., thrips, aphid, mites and fruit borer with natural enemies such as lady bird beetle, spider etc. were studied at Agriculture Research Station, Achalpur (Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola) during Kharif 2018-19 and 2019-20. The results of two years study revealed that the aphid population was observed from 33rd MW (0.28 and 3.20, respectively) throughout the whole growing season for both the year and it attained its initial peak during 44 th and 45 th MW, respectively. During the low rainfall year non-significant positive correlation (0.410) was recorded. However, in next year significantly higher and positive (0.645) correlation was recorded with rainfall. The maximum population of thrips was observed at 39 th MW (6.20 per leaf) and 44 th MW (10.30 per leaf), the correlation between thrips population and rainfall was positively non-significant (0.389 and 0.033) for Kharif 2018 and 2019, respectively. The mites population were reached at its peak during 39 th MW (2.70 per leaf) and 40 th MW (2.15 per leaf) during both the year, respectively. The correlation studies for both the years revealed that, the mite's population showed positively non-significant correlation with rainfall. The incidences of fruit borer commenced from 38 th and 37 th i.e. 0.80 per larvae per plant for both the year. The fruit borer population exhibited a negative non-significant correlation with rainfall during Kharif 2018 and vice-versa during Kharif 2019. The lady bird beetle population was commenced from 31st with a mean population 0.30 per plant in Kharif 2018 and 0.10 per plant in Kharif 2019. The correlation studies between the population of lady bird beetle and rainfall was negatively non-significant for both the seasons. In case of spider, it attained its peak during 37 th and 50 th (0.40 and 0.60 per plant), respectively for both the season. The correlation studies between spider and rainfall were revealed that the population was negatively non-significant with rainfall during Kharif 2018 and 2019.

Keywords: Sucking pest, Fruit borer, Seasonal incidences, Chilli and Natural enemies

Effect of pressmud and foliar application of NPK, zinc and iron on soil nutrient status, yield and economics of sugarcane crop

ROOHI[1*], KIRAN KHOKHAR[2], VIJAY KUMAR[2] AND KANIKA PAWAR[1]

Regional Research Station, CCS Haryana Agricultural University, Karnal, Haryana

Krishi Vigyan Kendra, CCS Haryana Agricultural University, Karnal, Haryana

RTAAAS/AB/2024/57

Pressmud is the valuable by-product produced during sugarcane processing and known as a good source of fertilizer. Due to continuous decline in the soil nutrient status i.e., micro as well as micronutrient, this research was carried out to study the effect of organic compost (Pressmud) and the foliar application of NPK and micronutrient (Zinc and Iron) on sugarcane crop and soil nutrient status during 2022-23 and 2023-24 on clay loam soils of Research farm of Regional Research Station, CCS Haryana Agricultural University, Karnal, Haryana. The experiment was laid out under randomized block design consisting of seven treatments with three replications. The results revealed that soil pH, EC, organic carbon was not affected by the application of Pressmud, NPK and micronutrient, but soil available phosphorus and potassium were increased significantly with application of 125% RDF + foliar spray of 2% NPK (19:19:19) + 0.5% ZnSO 4 + 1% FeSO 4 + pressmud @7.5 t/ha over control and 100 % RDF. Similarly, there was no significant changes in the micronutrient status with the application of pressmud and foliar application of NPK, Zinc and Iron. The significantly higher number of millable cane (93.8 '000/ha), cane weight (1151 g) and cane yield (104.31 t/ha) was recorded in the treatment receiving 125% RDF + foliar spray of 2% NPK (19:19:19) + 0.5% ZnSO 4 + 1% FeSO 4 + pressmud @7.5 t/ha over 100 % RDF. Higher benefit cost ratio (2.41) was found where 100% RDF + foliar spray of 2% NPK (19:19:19) + 0.5% ZnSO 4 + 1% FeSO 4 was applied. Thus, two-year study revealed that application of pressmud @7.5 t/ha with foliar spray of NPK (`19:19:19), zinc and iron could significantly improve the soil nutrient status and cane yield.

Keywords: Pressmud, soil nutrient status, micronutrient and cane yield

Vegetable Grafting: A Multidimensional Approach for Crop Management in Vegetable Crops

Bhavana Mandvi

Department of Horticulture, RVSKVV, College of Agriculture, (M.P.) India

RTAAAS/AB/2024/58

Grafting is the combination of two identical formulation plants which grow as one plants. stress, drought and flooding, contamination by persistent organic pollutants and low soil temperature and high among vegetable growers worldwide. Initially the technique was for controlling soil borne diseases which is still Grafting in vegetables is a comparatively recently popularized approach of much importance in today's intensive agriculture. But with modification in grafting approaches and other related researches, this has now become a multifaceted approach being used for several purposes. Grafting is an important integrated pest management strategy to manage soil borne pathogens and other pests of solanaceous and cucurbitaceous crops using suitable rootstocks. Important diseases managed by grafting are caused by fungus such as Verticillium and Fusarium; oomycetes like Phytophthora; bacteria, particularly Ralstonia and root knot nematodes. Grafted seedlings are much favored in hydroponics where the chances of rapid spread of noxious diseases, once infected, is high. Due to limited availability of arable land and the high market demand for vegetables around the world, vegetables are frequently cultivated under unfavorable soil and environmental conditions like thermal soil salts, especially under protected cultivations where successive cropping or continuous farming is routinely practiced. One way to reduce losses in production caused by such abiotic stresses in vegetables would be to graft them onto rootstocks capable of reducing the effect of external stresses on the shoot through vigorous attainment of soil nutrients, avoidance of infection by soil pathogens and tolerance of abiotic stresses. Vegetable grafting has also been safely adapted for the production of organic as well as environmentally friendly produce and minimizes uptake of undesirable agrochemical residues. The quality characteristics like firmness, texture, flavor and health compounds might be affected by grafting as a result of the translocation of metabolites associated with fruit quality to the scion through the xylem and modification of the physiological processes of the scion. The crop way successfully will be grow ie, Cucurbitaceae: Muskmelon, Watermelon, Cucumber, Squash Solanaceae: Brinjal, Pepper & Tomato for sustainable development in the field of vegetable production.

Health care management practices of organic poultry farming adopted in Non- TSP and TSP area of Rajasthan

Hitesh Muwal, Lokesh Gupta and Vinod Bhateshwer

Department of Animal Production, Maharana Pratap University of Agriculture and Technology, Udaipur, Rajasthan, India

Department of Livestock Production Management, Shree Karan Narendra Agriculture University, Jobner, Jaipur, Rajasthan, India

RTAAAS/AB/2024/59

The current study deals with the health care management practices of organic poultry rearing in research area of Non-TSP and TSP area of southern region of Rajasthan. An analytical study of organic poultry farming was conducted on 240 randomly selected poultry farmers of 16 villages in 08 tehsils of 04 districts of Non-tribal and Tribal area of southern Rajasthan to identified the different type of health care practices adopted by the respondents in rearing of poultry farming. The data pertaining to health management practices revealed that majority of the respondents practice self-treatment of sick birds, don't follow vaccination of chicks, attack by predator was the main cause of mortality, coryza was the major disease encountered at their farm, don't follow deworming programme, reported non-availability of veterinary facilities and don't use antibiotics/growth promoters for poultry with 43.33 and 41.67%; 85.00 and 92.50%; 60.00 and 61.67%; 55.00 and 60.00%; 79.16 and 90.83%; 94.16 and 96.67% and 100 and 100%, respectively in Non-TSP and TSP area. Majority of respondents throw the dead birds in the open, don't use lime/quick lime for disinfection for poultry shed, cull the birds due to sickness, use herbal medicine, clean water trough weekly, reported 15- 20 per cent mortality and report monsoon season is major seasonal incidence of disease with 85.40 and 91.67%; 85.84 and 95.84%; 50.83 and 53.33%; 85.00 and 79.16%; 60.00 and 64.16%; 55.00 and 50.00% and 62.50 and 67.50%, respectively in Non-TSP and TSP area.

Keywords-Organic poultry, Respondents, Health, Vaccination, Non-TSP and TSP.

Studies on Floral Biology and Pollination Behaviour of Wild Pear (*Pyrus pashia* Buch. & Ham.) under Bharsar region of Uttarakhand

Ayushi Tripathi, Dr. Manju, Dr. Deepak Mewar, Shikhar Semwal

RTAAAS/AB/2024/60

The present investigation was conducted at the Fruit Nursery, College of Horticulture, Veer Chandra Singh Garhwali, Uttarakhand University of Horticulture and Forestry, Bharsar, Pauri Garhwal, from February to March 2024. The study focused on the floral morphology and pollination behavior of *Pyrus pashia* (Wild Pear). The laboratory experiment followed a Completely Randomized Design with three replications and sixteen treatments. Floral biology and pollination-related parameters were systematically recorded. Results revealed that the inflorescence of *Pyrus pashia* was corymbose, borne on lateral branches. The flowers were complete, white, and hermaphroditic. The flowering period spanned from the third to the last week of March, with peak anthesis and dehiscence occurring between 10:00 a.m. and 12:00 p.m. Freshly collected pollen exhibited maximum viability at 100%. The highest pollen germination rate (60.26%) and pollen tube length (389.62 μm) were observed in 20% sucrose solution with 0.3% boric acid after 24 and 72 hours of incubation, respectively. Conversely, the lowest pollen germination was recorded in controlled condition after 24 hours and lowest tube length were recorded in 0.2% boric acid after 6 hours of incubation. Stigma receptivity peaked on the day of anthesis, and cross-pollination resulted in higher fruit set in Pyrus pashia. These findings provided important insights into optimal conditions for flower initiation, pollen storage, germination, and pollination in wild pear trees, offering potential to improve fruit yield and quality in horticultural practices.

CRISPR-Cas9: Revolutionary Gene-Editing Technology and its Ethical Frontiers

Dr. Sandeep Kumar Chouhan

Amar Singh College, Lakhaoti, Bulandshahr (UP), India

RTAAAS/AB/2024/61

The Nobel Prize in Chemistry in 2020 was awarded to Emmanuelle Charpentier from France and Jennifer A. Doudna from the United States for their pioneering development of the CRISPR-Cas9 gene-editing tool in 2012. This breakthrough technique was based on the defence mechanism of the bacterium Streptococcus pyogenes against viruses. The CRISPR-Cas9 system allows scientists to make highly targeted edits to DNA—adding, removing, or altering specific genes. This breakthrough offers transformative applications across biology, medicine, and agriculture, potentially addressing genetic disorders, enhancing crop yields, and even aiding species revival. Despite its promise, the technology raises ethical and social concerns, particularly around its application to human embryos and potential ecological impacts. The CRISPR-Cas9 system acts like a tool on DNA. Scientists use the Cas9 protein to target specific genetic sequences, cutting the DNA at precise locations. During natural repair, a modified sequence can be introduced, resulting in a permanent edit. However, its application in human gene editing stirred global debate when Chinese scientist He Jiankui revealed in 2018 that he had used CRISPR-Cas9 on embryos to prevent HIV transmission, resulting in the birth of genetically modified children. His work, conducted without approval, violated international regulations and highlighted the need for stringent oversight. CRISPR's advantages include the potential to eliminate genetic disorders, confer immunity to infections, and improve agricultural resilience. It may even aid in de- extinction efforts, such as reviving the woolly mammoth. However, there are significant risks: unintended mutations, potential ecological disruption, and the danger of genetic modifications enhancing social inequality. Ethical concerns also arise around irreversible alterations to future generations and the threat of market-driven eugenics. Though CRISPR technology is progressing in precision and safety, the full extent of its capabilities is yet to be realized. With rigorous regulation and ethical frameworks, CRISPR-Cas9 could drive positive change, yet its impact will ultimately depend on responsible use to avoid unforeseen consequences.

"Revolutionizing Agriculture: The Role of AI in Modern Plant Breeding"

Tapas Paul[1] and Sandip Debnath[2]

[1,2]Department of Genetics and Plant Breeding, Institute of Agriculture,

Visva-Bharati University, Sriniketan, West Bengal, India

RTAAAS/AB/2024/62

The integration of Artificial Intelligence (AI) in plant breeding is transforming traditional agricultural practices, enhancing the efficiency and effectiveness of developing new crop varieties. There are multifaceted applications of AI technologies in plant breeding, focusing on data analysis, predictive modelling, and decision support systems. By leveraging vast datasets, including genomic, phenotypic, and environmental information, AI algorithms can identify patterns and relationships that may not be evident through conventional methods. Machine learning models, particularly, are employed to predict plant traits, optimize breeding strategies, and accelerate the selection process. One of the significant advantages of AI in plant breeding is its ability to process and analyse large volumes of data quickly, enabling breeders to make informed decisions in real time. AI techniques such as deep learning and computer vision are utilized to assess plant health, predict yield, and to evaluate resistance capacity of plants to pests and diseases. Furthermore, AI facilitates the integration of precision agriculture, allowing for the tailoring of breeding programs to specific environmental conditions and consumer preferences. The implementation of AI-driven tools not only enhances the speed of breeding cycles but also supports the development of crops that are more resilient to climate change and less resource- intensive. As a result, AI is playing a crucial role in addressing global food security challenges. However, the adoption of AI in plant breeding also raises ethical and practical considerations, including data privacy, the need for interdisciplinary collaboration, and the potential socio- economic impacts on farming communities. In short, the use of AI in plant breeding represents a paradigm shift that promises to revolutionize the agricultural landscape, offering innovative solutions to enhance productivity, sustainability, and resilience in food systems worldwide.

Keywords: Plant Breeding, Artificial Intelligence (AI), AI algorithms, Machine learning.

Stock Status of *Sartoriana spinigera* (freshwater crab) from Kanwar Lake – The Ramsar site, Begusarai, Bihar, India

Bharti Sahu[1], Kamlesh Kumar Dhritlahre[2*]

[1]College of Fisheries, Dr. Rajendra Prasad Central Agricultural University, Dholi, Muzaffarpur, Bihar,

[2]Fisheries Polytechnic, Dau Shri Vasudev Chandrakar Kamdhenu Vishwavidyalaya, Anjora, Durg, Chhattisgarh

RTAAAS/AB/2024/63

The kanwar lake located in bengusarai district of Bihar, India. It is a residual oxbow lake, formed due to meandering of Burhi Gandak river, a tributary of Ganga river. The Sartoriana spinigera a freshwater crab with a broad, deep, and robust carapace. A stock population is a subset of a species that lives in a specific area and has similar growth and mortality parameters. The study, conducted at Kanwar Lake from September 2022 to August 2023, aimed to assess the stock status of the freshwater crab Sartoriana spinigera. Crab was collected from Kanwar Lake every fortnightly using traditional boats, Jaal (Chatti Jaal/ Phasa Jaal), and traps (Jangha/badi). Data were analyzed by using FiSAT software. Parameters like total mortality (Z=F+M) and exploitation level (E=F/Z) estimated by using scientific formulas. Mortality analysis revealed a natural mortality (M) rate of 0.99 yr -1 , Fishing mortality (F) of 0.97 yr -1 , Total mortality (Z) of 0.02 yr -1 , and Exploitation level (E) of 48.70 yr -1 . The over-exploitation level indicates that the *Sartoriana spinigera* population in Kanwar Lake is currently unsustainable, suggesting very high fishing pressure. This study provides crucial baseline data on the mortality rates, and exploitation levels of *Sartoriana spinigera* in Kanwar Lake. These findings are essential for effective resource management and conservation strategies, particularly for species in ecologically significant areas like Ramsar sites.

Keywords: Kanwar Lake, Ramsar site, Exploitation level, Stock status, Conservation.

Sustainable Crop Production in the Challenged Agro-Ecosystem of North-Western Himalayan States of India

Raman Jeet Singh*, Trisha Roy, Uday Mandal, Rama Pal, Abimanyu Jhajhria, Mudit Mishra and M. Madhu

ICAR-Indian Institute of Soil and Water Conservation, Dehradun

RTAAAS/AB/2024/64

Agro-ecosystem can be defined as, "the ecosystems in which humans have exerted a deliberate selectivity on the composition of the biota i.e., the crops and the livestock maintained by the farmer, replacing to a greater or lesser degree the natural flora and fauna of the site. Issues of conservation have assumed importance in view of widespread resource degradation and the need to reduce production costs, increase profitability and make agriculture more competitive. North-Western Himalayan Region which comes under Agro- Ecological Region- 14 (Warm sub humid to humid with inclusion of per humid eco-region with brown forest and podzolic soils) has several production constraints like low yield due to traditionally cultivating cereals, inadequate capital formation, low investment, inadequate irrigation facility, and uneconomic size of the holdings, small size and scattered land holdings, difficult terrain, unfavourable climatic conditions for some crops, inadequate availability of improved inputs and technology, and lack of credit and marketing facilities and especially very severe wildlife menace. Depending on the specific farming situation and agro-ecological conditions, the actual soil and water conservation practices has to be validated locally. Especially, the farmers friendly economical crop and crop rotations involving horticultural crops, in situ residue recycling, vital combination of integrated farming systems and watershed management has to be revealed and decided upon by the farmers in a given location. Opportunities for future research on conservation agronomical practices in horticultural crops, agri-voltaic system, augmenting water supply and recycling of surplus water by inter-watershed water transfer, biomass production in degraded lands for bio-ethanol extraction, use of biochar, irrigation scheduling with geo-line tanks, development of package of practices of natural farming, development of handy agriculture machineries, etc. are required in the context of successful crop production in the North-Western Himalayan states of India.

Keywords: Agriculture; Hills; Horticulture; Soil; Water; Watershed

"POLYMER COATED FERTILIZERS AND THEIR SCOPE IN MODERN AGRICULTURE"

G.Rajitha,

PhD Scholar, Department of Agronomy, College of Horticulture,

Rajendranagar, PJTAU.

RTAAAS/AB/2024/65

Control release fertilizers are coated fertilizers that release nutrients over an extended period of time at a rate driven primarily by temperature and moisture of the root zone. It has been estimated that slow-release fertilizers comprise only 8- 10% of the total fertilizers used in Europe, 1% in the USA and only 0.25% in the World. Dew scientists reported that in Japan 70% of polymer coated controlled- release fertilizers are used in rice. Polymer coated fertilizers are a type of control release fertilizers, which are solid or other nutrient core, coated with various polymers. Fertilizer use efficiency can be increased by the application of polymer coated fertilizer compared to common fertilizers due to very less nutrient losses. Most common three marketed products are Nutricote, Osmocote and Polyon. The polymer-coated fertilizers are not straight nitrogen fertilizers but NPK fertilizers, particularly when containing secondary and micronutrients, the rate of release of the different nutrients such as nitrogen, phosphorous, potassium, sulphur, calcium, Magnesium and micronutrients, are generally slow, controlled-release and stabilized fertilizers not stated. There are three phases of nutrient release through polymer coating. First is that the soil moisture penetrates the polymer coating within a week and activates the encapsulated nutrients. No nutrient is released (Lag Phase). Second is that the nutrients slowly diffuse through the polymer coating over the next several months when triggered by soil temperature and the final phase is the polymer coating microbially decomposes into naturally occurring soil elements after complete release of nutrients. In conclusion, the application of polymer coated fertilizers delays the cumulative nitrogen release and thereby improves the plant nutrient uptake and increases the yields. Under submerged conditions, nitrogen use efficiency is found to be increased up to 70% through application of polymer coated fertilizers. These polymers coated fertilizers also helps in reducing the leaching losses and enhance the fluid starter response of phosphorous fertilizers.

Keywords: Coated fertilizers, fertilizer use efficiency, leaching, microbes, yield.

Enhancing crop productivity in pulses through foliar application of micronutrients

Simran Kumari

RTAAAS/AB/2024/66

Pulses occupy a unique position in Indian agriculture. They are rich source of plant protein, vitamins, minerals and carbohydrates. In order to fight global hunger caused by micronutrient deficiency in Indians population due to over dependence on cereal centric diet, various health activists are shifting focus from calorie intake to more nutrition intake which can be solved by crops like pulses that are rich source of protein and vitamins. Pulses respond positively to micronutrients application, particularly during reproductive stages (Pandey et.al., 2024). Soil application of nutrients is not enough to meet the growing demands of the crop alone; hence it is hypothesized that foliar nutrition in supplementation with soil application with prevailing weather particularly rainfall would be beneficial. For pulses like red gram, horse gram, black gram, green gram, foliar nutrition can be applied. Due to enhanced level of nutrients availability in root zone through foliar application, there is significant increase in plant height, number of branches per plant, better vegetative growth, with taller plants and efficient nodulation (Dass.et.al,2022) From the investigation of Rawat et.al. 2023 reported that the foliar application of Zinc @0.5%+Boron@2%+Iron @0.1% exhibited positive impact on growth and yield attributing characters The treatments also significantly increased B:C ratio. Kumar et.al. 2023 concluded that integration of 0.5% Zinc and 0.1% Boron though foliar application increased the chlorophyll content and produced 26.47% higher seed yield than control. In conclusion, incorporation of micronutrients through foliar application, the farmers can potentially unlock higher yields and increase profitability. Thus, it is imperative for farmers to integrate this practice into their agricultural strategies to harness its benefits and optimize their agricultural production.

Keywords: Micronutrient deficiency, Pulses, Foliar application, Soil fertility, Yield

Effects of Amoxicillin, Synbiotic and Thyme Essential Oil on Haematological Parameters of Broiler Chickens

A.A Bhat*, R.K Sharma, J. Palod, Shive Kumar, S.K. Singh, R. Huozha, Maansi and S. Adil

Department of Livestock Production Management, College of Veterinary and Animal Sciences

Govind Ballabh Pant University of Agriculture and Technology, Pantnagar, Uttarakhand, India

RTAAAS/AB/2024/67

A feeding trial was conducted to investigate the effects of amoxicillin, synbiotic and thyme essential oil as feed additives on hematological parameters in broiler chickens. A total of 200 Cobb broiler chicks of one week of age were randomly distributed into 5 dietary treatment groups: T0 (Basal diet only); T1 (Basal diet + amoxicillin @200mg/kg); T2 (Basal diet + symbiotic @100mg/kg), T3 (Basal diet + thyme essential oil @2ml/kg); T4 (Basal diet + symbiotic @50mg/kg + thyme essential oil @1ml/kg). Each group contained 4 replicates with 10 birds for 35 days period. The results revealed a significant increase in the parameters like RBC, haemoglobin, haematocrit, and lymphocytes in T4 treatment group as compared to control group (T0). In antibiotic (amoxicillin) supplemented group T1 there was a drastic decrease in RBC, haemoglobin, PCV, total WBC, lymphocytes and increase in monocytes, eosinophils than control group (T0). In conclusion, supplementation of synbiotic, thyme essential oil alone or in combination can be beneficial in broiler chickens.

Keywords: Antibiotic, Broilers, Essential oil, Haematological, Synbiotic.

Sodium Hypochlorite Wash of Nagpur Mandarin Fruits reduces Blue Mould and Sour Rot Diseases under Ambient Storage

Ashwini M. Charpe[1] * and G.K. Giri[3]

1 Professor CAS (Pl.Path.), AICRP on PHET, Dr. PDKV, Akola

2 Ex. Professor CAS (Pl.Path.), Dept. of Plant Pathology, Dr. PDKV, Akola

RTAAAS/AB/2024/68

Post harvest diseases are mainly controlled by using various fungicides registered under category 'Regarded as safe' for restricted use under post harvest storage conditions. Recently, many of these fungicides are removed from market due to economic, environmental as well as due to their ill effects on living beings. Among eco-friendly control measures post harvest chlorination of fruits provides a promising alternative when combined with proper postharvest handling practices. Chlorination is not only inexpensive but it posses less threat to human health and environment. About 55 to 70ppm of chlorine concentration at pH 7.0 with a water temperature of 40°C is reported to sanitize most fruits and vegetables. Research has been published on post-harvest efficacy and proper management of chlorination mostly for tomato, citrus, potato, apple and pear. Few reports are also available for avocado, carrots, yam, sweet potatoes, strawberry, peach, iceberg lettuce, asparagus, cucumbers, peppers, sweet corn, celery and minimally processed fresh vegetables. As only few reports are available for using chlorination for reducing post harvest rots of citrus fruits this experiment was formulated to standardize the doses and exposure time of Sodium Hypochloride (NaOCl) sanitization to restrict two major diseases of Nagpur Mandarins in India i.e. Penicillium and *Geotrichum* rots in Mrug Bahar. In this study Nagpur mandarin fruits pre-inoculated with P. *digitatum* and G. *candidum* were exposed to NaOCl solution at 3 concentrations and 4 exposure times followed by application of 6% Vegetable/Citracine wax and the observation for disease development were recorded for 5 time intervals on every third day upto 15 th day of storage under ambient condition. Results indicate that among all the treatments 10 min. exposure at 1.0% concentration of NaOCl followed by 20 min. exposure at 0.5% NaOCl & 20 min. exposure at 1.0% NaOCl followed by application of 6% Vegetable/Citracine wax gave significantly superior results in controlling Penicillium rot disease. In case of Geotrichum rot, 5 min. exposure at 0.5% NaOCl followed by 10 min. exposure at 0.5% NaOCl followed by application of 6% Vegetable/Citracine wax was found to give significantly superior results.

Keywords: Blue Mould, Citrus reticulata, Nagpur Mandarin, Sodium hypochlorite, Sour Rot.

Detection of Plant Diseases by the use of Machine Learning

Dinesh Kumar Meena[1*], Shailesh Godika[1], Jitendra Singh[1], Pankaj Kumar Sharma[1]

[1]Department of Plant Pathology, SKN College of Agriculture, SKNAU, Jobner

RTAAAS/AB/2024/69

Plant diseases are a major threat to agricultural productivity worldwide, causing significant economic losses and threatening food security. Timely and accurate diagnosis of these diseases is crucial to preventing their spread and mitigating crop damage. Traditional methods of disease detection, which rely on visual inspection by experts or laboratory-based tests, are often time-consuming, labour-intensive, and prone to error. Artificial Intelligence (AI) offers a promising alternative, providing automated, efficient, and accurate systems for plant disease Detection, machine learning (ML) in revolutionizing plant disease detection. AI-driven plant disease detection systems leverage image processing, computer vision, and machine learning algorithms to identify disease symptoms in plants. These systems typically rely on large datasets of labelled images of healthy and diseased plants. Through supervised learning, models such as Convolutional Neural Networks (CNNs) are trained to recognize patterns and features in the images that are indicative of specific diseases. The advantage of using AI is its ability to analyse vast amounts of data at high speed, enabling real-time or near-real-time diagnosis of plant diseases with high accuracy. Researchers have developed CNN models that can classify diseases in crops like tomatoes, apples, and wheat with accuracy rates exceeding 90%. These models are often trained on publicly available datasets such as the Plant Village dataset, which contains thousands of images of healthy and diseased plants. The power of CNNs lies in their ability to automatically extract features from images without the need for manual feature engineering, making the process of disease detection faster and more scalable. AI also enables predictive disease modelling by analysing environmental factors such as humidity, temperature, and soil conditions alongside visual symptoms. This allows for early detection and even prevention of disease outbreaks by identifying conditions that are conducive to disease development.

Post Harvest Rottening of Nagpur Mandarins under Ambient Storage Conditions can be Reduced by using Propiconazole

Ashwini M. Charpe[1*], M.N. Ingole[2] and Geetanjali Kamble[3]

[1]Prof. (Pl.Path.), AICRP on PHET, Dr. PDKV, Akola

[2]Assoc. Prof. (Pl.Path.), AICRP on Pulses, Dr. PDKV, Akola

[3]Asstt. Prof. (Microbiology), AICRP on Pulses, Dr. PDKV, Akola

RTAAAS/AB/2024/70

Citrus reticulata having a GI-tag as Nagpur Mandarins belong to Rutaceae family. It is an important fruit crop of Vidarbha region of Maharashtra, India. Nagpur Mandarins are observed to face great losses due to post harvest rottening caused by various fungal pathogens. Prolonging shelf life of fruits of Nagpur Mandarins by reducing these storage losses can make it possible to supply the produce to foreign markets so as to improve rural economy in Mandarin growing tracts of India. For controlling post harvest decay of fruits some fungicides with restricted use have been registered. But development of resistance observed in post harvest pathogens for fungicides like benzimidazole and dicarboximide (that are still in use) makes it necessary to explore newer fungicides for post harvest decay control. Apart from this to raise consumer confidence it is necessary to find alternatives with reduced environmental and health risks. Some methods are reported to be promising but none alone are as effective as fungicides. Results show that chemical treatment followed by application of edible wax was effective in controlling the storage diseases i.e. Anthracnose caused by Colletotrichum gloeosporioides, Trichoderma rot caused by T. viride, Black mould caused by Aspergillus niger and sour rot caused by Geotrichum candidum. Results showed that the treatment Propiconazole 0.1% followed by application of 6% Vegetable/ Citracine wax was the most effective in controlling Colletotrichum rot, Trichoderma rot and Aspergillus rot upto 15 days and Geotrichum rot upto 6 days in ambient storage condition. Analysis of pesticide residues showed that the residue levels of the Propiconazole were far less than the maximum residue limits set by Codex Alimentarius Commission, USA, Canada and Australia.

Keywords: Citrus reticulata, Nagpur Mandarin, Propiconazole, Storage Rots.

EFFECT OF NPK AND SULPHUR ON GROWTH, YIELD AND QUALITY OF CAULIFLOWER (*Brassicaoleracea* var. botrytis L.)

Mr. Gurpreet singh, Dr. Krishan Kumar Singh*, Dr. Rattan Singh, Dr. Manju Kumari,

Dr Harshit Bansal, Dr. Himani Punia,

Bhai Gurdas Degree College, Sangrur, Punjab-India.

RTAAAS/AB/2024/71

A field experiment was conducted at Horticulture Farm, Bhai Gurdas Degree College, Sangrur, Punjab-India between 2022 and 2023 during Rabi season. The experiment was comprised of 16 treatment combinations with four levels of NPK (0, 75, 100 and 125 % RD of NPK) and Sulphur (0, 20, 40 and 60 kg ha -1). The recommended dose of NPK for cauliflower is 120 kg, 80 kg and 80 kg per ha. The present experiment consisting of the 16 treatment combinations will be carried out in Randomized Block Design (RBD). The maximum plant height at 30, 60 DAT and at harvest was (30.83, 46.57 and 58.25 cm in F3, leaf area was (868.30 cm 2) F 3 , average weight of curd (449.84 g) F 3 S 3. curd yield per plot (5.95 kg) 60 kg S ha -1 ,which was statistically at par with 40 kg S ha -1 . While minimum (3.43 kg) was recorded under control, yield of curd per plot (7.20 kg) F 3 S 3 , Nitrogen content (3.46 %) 125 per cent recommended, sulphur content in curd (1.27 %) was recorded under 125 per cent recommended dose of NPK (F 3), potassium content in soil (142.53 kg ha -1) was recorded under 125 per cent recommended dose of NPK (F 3), net return (365016) was recorded under the treatment combination F 3 S 3 , maximum number of leaves per plant at 30, 60 DAT and at harvest (13.00, 18.22 and 24.96, respectively) was recorded under F 3, chlorophyll content was (1.42 mg g -1) recorded under 125 per cent recommended dose of NPK (F 3), average weight of curd (371.68 g) was recorded under F 3, yield of curd per plot (5.95 kg) was recorded under F 3 followed F 2 (5.74 kg), followed F 1.

Keyword: NPK, Harvest, Dose, Chlorophyll, Treatment

Response of nitrogen, phosphorous and potassium on quality parameters and economics analysis of Indian mustard (*Brassica juncea* (L.) Czern and Coss.)

Adarsh Sharma

RTAAAS/AB/2024/72

A field experiment on different fertilizer levels viz., 3 levels of nitrogen (80, 100 and 120 kg N/ha), 2 levels of phosphorous (40 and 50 kg P2O5/ha) and 3 levels of potassium (15, 30 and 45 kg K2O/ha) carried out during Rabi season 2019-20 at Agricultural Research Station Ummedganj, Kota, Rajasthan revealed that application of 120 kg N/ha was recorded significantly higher protein content, protein yield, oil content, oil yield, net return and B: C ratio over 80 kg N/ha however, it was remained at par with 100 kg N/ha. The non-significant differences was recorded between 40 and 50 kg P2O5/ha for all quality parameters except oil yield, significantly higher net return was obtained with 50 kg P2O5/ha. The application of 45 kg K2O was produced significantly higher oil content, protein content, net return and B:C ratio over 15 kg K2O/ha however, it was remained at par with 30 kg K2O/ha. Hence, application of 100 kg N/ha, 50 kg P2O5 and 30 kg K2O/ha was found most remunerative treatment combination for getting maximum net return.

Keywords: Indian mustard, net return, oil content, protein content

Organic Farming for Sustainable Agriculture

Bomma Amrutha varsha,

RTAAAS/AB/2024/73

Organic farming is a sustainable agricultural system that emphasizes ecologically based pest controls and biological fertilizers derived largely from animal and plant wastes and nitrogen-fixing cover crops. In organic farming system use of fertilizers, pesticides, and genetically modified organisms (GMOs) are avoided. Organic farming practices Improve soil health, conserve water, and reduce pollution. Organic farming has a long history, with its concepts being developed in the early 1900s by Sir Albert Howard, F.H. King, Rudolf Steiner, and others who thought use of animal manures, cover crops, crop rotation, and biologically based pest controls will result in a better farming system. This farming system was developed against environmental harm caused by the use of chemical pesticides and synthetic fertilizers in conventional agriculture, and it has numerous ecological benefits. Organic farming methods include the use of compost, crop rotation, intercropping, and biological pest control. Organic farming can be practiced on a small or large scale, and it is suitable for a wide range of crops, including millets. It is also a popular approach to growing millets. Millets can be grown on low fertility soils such as acidic, saline, and sandy soils, and do not require chemical fertilizers, making them ideal for organic farming. Organic farming has numerous benefits, including: Environmental benefits include organic farming uses fewer pesticides, reduces soil erosion, decreases nitrate leaching into groundwater and surface water, and recycles animal wastes back into the farm, Health benefits such as organic foods are free from synthetic pesticides and fertilizers, and are often fresher and more nutritious than conventionally grown foods, economic benefits like Organic farming can be more profitable than conventional farming, especially for small-scale farmers.

Keywords- Organic farming, sustainable agriculture, pest control, crop rotation, benefits.

Selling Price and Output Response of Major Food Crops in West Bengal: A case study of Nadia District

Mridul Mondal[1], Sourakanti Sarkar[1,2], Bimal Bera[1]

[1]Department of Agricultural Economics, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia, West Bengal, India

[2]Department of Agricultural Economics, School of Agriculture, Seacom Skill University, Bolpur- Santiniketan, Kendradangal, Saturia, West Bengal

RTAAAS/AB/2024/74

In agricultural economics, the price and production response of food crops is a crucial topic as it describes how the amount of food grains provided reacts to shifts in market pricing. This study examines the price elasticities and surplus ratios for rice, lentils, and grams in West Bengal's Nadia area. In order to gather data on socioeconomics, marketable surplus, selling price, and other topics, 200 farmers were interviewed in several communities around the area. Additionally, the Raja Krishanan model and the elasticity model have been used. According to the results, the marketable surplus ratio for rice is 16.27%, the net marketed surplus ratio is 55.46%, and the gross surplus ratio is 69.59%. While net marketed and marketable surpluses rise as farm size increases, the gross marketed surplus ratio falls as farm size declines. The average marketable surplus for lentils is 35.30%, while the gross and net marketed surplus ratios are 66.64% and 65.57%, respectively. Larger farms surpass this average with ratios of 82.19% and 83.18%, whereas marginal gram farmers have a gross marketed surplus ratio of 80.33%, which is just lower than the general average of 81.12%. For rice, output elasticities are positive and slightly below unity (0.85) for small farms, but above unity (1.03) for marginal and big farms, respectively. Across all farm sizes, the average elasticity for rice is 1.12. For big and marginal farms, the lentil output elasticities are likewise positive and more than unity (1.00 and 1.07, respectively); but, for medium farms, they dip below unity at 0.78, with an average of 0.91. Across all farm sizes, the gram production elasticities average 1.09 and are continuously positive and above unity. The Janvry and Kumar (1981) technique of estimating price elasticity shows that rice has a high positive elasticity (0.91), gram has a strong negative elasticity (-0.87), and lentil has a minor positive elasticity (0.03).

Keywords: Selling Price, Marketed surplus, Price elasticity, Food grains, Agricultural Production

Evaluation of suitable crop for limited irrigated condition under rabi cropping

Y. D Charjan, R. S Wankhade, P. N. Magare* and S.M. Nage

Agriculture Research Station, Achalpur Dr. PDKV, Akola, Maharashtra,

RTAAAS/AB/2024/75

Climate change adversely affected agriculture production and become more serious concern for developing country like India water is one of the precious and costly input used in agriculture hence an experiment was conducted at Agriculture Research Station, Achalpur Dist. Amravati under Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, situated at 21° 18' North latitude and 77° 30' to 77° 35' East longitudes with a subtropical climate. The topography of experimental plot was levelled and the soil was black in colour, fairly deep, well drained clayey in texture, low in available nitrogen and phosphorus, high in available potash. The experiment was designed in split plot design with three replications and three levels of irrigation as main plot treatments i.e. I 1 – No Irrigation, I 2 – One Irrigation (40-45 DAS) and I 3 – Two Irrigation (20-25 and 60-65 DAS) with four cropping treatments as subplot treatment i.e. C 1 – Wheat – Cv. Phule Samadhan, C 2 – Safflower – Cv. SSF – 708, C 3 – Sorghum – Phule Suchitra and C 4 – Gram – Phule Vikram, respectively. Application of two irrigation (20-25 and 60-65 DAS) and chickpea crop recorded highest wheat equivalent grain yield 29.76 and 36.53 q/ha with highest benefit: cost ratio (2.98)

Keywords: Suitable crop, limited irrigated, rabi cropping

Assessing Soil Microbial Properties in Northwestern Himalayan Forests: Implications for Forest Health and Stability

L.Chanu Langlentombi[1] and D.R. Bhardwaj[2]

[1]ICAR Research Complex for NEH Region, Manipur Centre, Lamphelpat, Imphal West

[2]Dr YS Parmar University of Horticulture and Forestry, College of Forestry, Nauni, Solan

RTAAAS/AB/2024/76

The forests of the northwestern Himalaya are biodiversity hotspots that play a crucial role in ecosystem stability. This study investigates the functional roles of soil microbes in representative forest types of the Kunihar Forest Division of Himachal Pradesh. Soil samples were collected from different forest types. Microbial parameters, such as microbial biomass, activity, and microbial count were assessed to evaluate the forest stability and health. Results revealed significant variations in microbial properties across forest types, with northern dry mixed deciduous forests exhibiting higher microbial biomass and count compared to other forests. These findings highlight the essential role of soil microbial communities in nutrient cycling and carbon sequestration in the Himalayan forests, providing a baseline for future research and conservation efforts. Understanding the microbial dynamics in these ecosystems can inform sustainable forest management practices aimed at enhancing soil health and maintaining ecosystem resilience in the face of climatic and anthropogenic pressures.

Performance analysis of cumin export from India

Rohlupuii

[1a]PhD Research Scholar

Punjab Agricultural University, Ludhiana, Punjab

RTAAAS/AB/2024/77

This study attempts to present the performance of cumin in India, selected study for the period of 15 years from (2008-09 to 2022-23). The secondary data was collected from Spice Board of India, India stat and ITC Trade Map. The study revealed that Indian production were the major factors influencing the export of cumin from India, Nominal protection coefficient was found to be more than one indicates the non-profitability of cumin export during the last two years. The results of the transitional probability matrix indicated that Bangladesh was the most stable market among the importers of cumin followed by Brazil and UAE. On the other hand, USA, Nepal and Saudi Arabia has shown 'zero' probability of retention, indicating that these countries were unstable importers of cumin. India has comparative advantage in cumin export with Bangladesh, Nepal and Brazil. In order to face competition and increase India's market share in the world market India need to consistently supply variety of quality cumin at competitive prices.

Keywords: Cumin, comparative advantage, National Protection Coefficient, Markov Chain analysis.

Evaluation of IPM module for effective control of major insect pests in Onion cultivation

ARULKUMAR. G[1*] and S. MANISEGARAN[2]

[*1]Senior Research Fellow (Agric. Entomology), Tamil Nadu Agricultural University, Coimbatore-03

[2]Retd. Professor and Head, Department of Agricultural Entomology,

Agricultural College and Research Institute, Killikulam

RTAAAS/AB/2024/78

Onion thrips, Thrips tabaci, Beet armyworm, *Spodoptera exigua*, IPM and Yield Onion (*Allium cepa* L.) is a key crop in India, highly valued for its culinary, dietary, and medicinal properties. This bulbous plant is rich in bioactive compounds, including flavonoids, alkenyl cysteine sulpoxides, vitamins, and minerals, which contribute to heart health and overall wellness. However, onion crops face significant threats from various pests, including insects and diseases. Thrips tabaci (thrips) and *Spodoptera exigua* (beet armyworm) are major insect pests, and potentially causing 50-90% crop loss. Given the economic impact of pest infestations, this study was conducted to evaluate the efficacy of different Integrated Pest Management (IPM) modules in controlling major onion pests. The investigation involved field experiments conducted with the CO 5 onion variety at Thadagoundanpatti in Madurai, Tamil Nadu. Three pest management approaches were tested: IPM module (M 1), farmers' practice (M 2), and botanicals (M 3), with a control group for comparison. ETL based application of spinosad 45 SC, imidacloprid 17.8 SL and profenofos 50 EC. M 1 demonstrated superior effectiveness, recording the lowest thrips population (7.10 thrips / plant) and reduced beet armyworm damage (3.37%) compared to untreated control plots (37.72 thrips / plant and S. exigua damage 28.11%). Additionally, M 1 yielded the highest bulb yield (17.14 t/ha) with an incremental cost-benefit ratio of 4.51, indicating its cost-effectiveness. The farmers' practice (M 2), which involved synthetic insecticides like dimethoate 30 EC and cypermethrin 25 EC, lambda-cyhalothrin 5 EC achieved a moderate reduction in thrips (13.68 per plant) and beet armyworm damage (9.91%). The botanical approach (M 3), using natural extracts such as neem, tulsi, and pongamia oil, also showed significant pest control, achieving 47.86% reduction in thrips populations and 42.97 percent reduction in S. exigua damage. The findings suggest that the IPM module (M 1) is the most effective and economically viable approach for managing major pests in onion cultivation, offering a promising solution for sustainable pest control in India.

Integrated nutrient Management and mulching effect on yield and growth of Tomato (*Solanum lycopersicum* Mill.)

Reemashree Das, Juman Das

Department of Horticulture,Faculty of Agriculture, Assam Agricultural University, Jorhat

RTAAAS/AB/2024/79

Tomato (*Solanum lycopersicum* Mill.) is a herbaceous, annual and perennial. The species of Tomato is originated from Western Southern America. Tomato contains high rate of nutritions and its medicinal value is also high. The productivity is very low despite of its wide range of cultivation. Very less attention is paid to the scientific cultivation of Tomato. So, an experiment was conducted to increase the yield and growth of Tomato. The Integrated Nutrient Management and types of mulching have been used during the cultivation of Tomato. The experiment was held in Zaid season of the year 2021-22 on the Crop Research Farm, Center for Agriculture and Farmer's development, Laxmipur, Sahaspur, Vikasnagar, Dehradun, Uttarakhand, 248197, India. The objective was to find the effect of Integrated Nutrient Management on yield and growth of the crop Tomato. Four Integrated nutrient Management with four types of mulches were paired and applied. 16 treatment combinations are made with 3 number of replications. Total number of plots were 16. The morphological data of 30, 60 and 90 days after transplanting of plant are recorded. Days to 50 percent flowering, Plant height(cm), Number of flowers per plant, Fruit weight(g), Days to first harvesting, Days to last harvesting, Number of fruits per plant, and Total yield(q/ha) are recorded. The result is found that the yield and growth are best found by applying the Integrated Nutrient Management and mulching. The treatment which contain bio- mulch paddy straw (M3) and RDF and vermicompost (D2) results in the highest plant height, maximum gross returns and maximum yield over the rest of the treatments.

Keyword- Tomato, mulching, vermicompost

Chingari Chila – A novel fast fortified food through intervention of chingari (Small Prawn)

Kamlesh Kumar Dhritlahre[1*], Tameshwar[1], Dr. N. Sarang[1]

[1]Fisheries Polytechnic, Dau Shri Vasudev Chandrakar Kmdhenu Vishwavidyalaya,

Anjora, Durg, Chhattisgarh, India

RTAAAS/AB/2024/80

Chila is a traditional food of Chhattisgarh which is the most common breakfast in the morning in the Chhattisgarh state. Chila is prepared by rice flour batter with salt. A fortified food is a food that has additional nutrients added or enhance to it, or nutrients that are not normally present in the food. The food that can be served very quickly is called fast food. Small prawn is locally known as chingari in Chhattisgarh. Chingari is abundant in the pond, river, canal etc in Chhattisgarh. It is caught by chingari fanda (A traditional wooden fishing gear). Chingari is also consumed in the form of dried and smoked form. and in this study it was utilised to improve the protein quality of chila. Chingari chila is considered as FFF (Fast Fortified Food). To prepare chingari chila take rice flour in a bowl and add salt to it, add water to smoothen the paste and make a batter (Rice flour: water). Wash the smoked chingari (250gm) with hot water and mix it in the batter along with coriander, tomato, and chillies pieces. Heat a pan and apply oil with a paper towel. Take the mixture in a large spoon and spread it in a thin round layer on the pan. Pour drops of oil around the layer and cook on medium flame for 1-2 minutes. Flip the chila and let the other side cook for half a minute. Chingari chila is ready to be served in a plate with tomato chutney. It is very tasty, soft, and good for human consumption health.

Keywords: Chhattisgarhi Chila, Small Prawn, Value Addition, Chingari Chila

Effect of pre-harvest spray of putrescine, salicylic acid and calcium chloride on physical quality attributes of plum cv. Satluj Purple

***Gunjan Joshi[1], Omveer Singh[2], D. C. Dimri[3], Rajesh Shukla[4], Pratibha[5], Deepti Shankhdhar[6]**

[1, 2, 3, 4, 5]Department of Horticulture, G. B. Pant University of Agriculture and Technology Pantnagar, Uttarakhand, India,

[6]Department of Plant Physiology, G. B. Pant University of Agriculture and Technology Pantnagar, Uttarakhand, India,

RTAAAS/AB/2024/81

Plum is an important stone fruit, mainly grown in the temperate or cool subtropical regions of the world. Fruit pulp is sweet in taste, juicy with a smooth skin surrounding the seed. Fruits are rich source of bioactive compounds such as phenolic acids, anthocyanin's, carotenoids, organic acids, minerals, vitamins, etc., which influence the human health and preventing the occurrence of many diseases. Fruits can be eaten fresh, dried to make prunes, used in preparation of jams, jellies, nectar, etc. Fruits with good quality attributes provide the good marketable acceptability with maximum profits. Keeping all these points in consideration an experiment was conducted at Horticulture Research Centre, Pattharchatta, G. B. Pant University of Agriculture and Technology, Pantnagar, during 2022-2023. The experiment was conducted to study the effect of different chemicals (viz. putrescine, salicylic acid and calcium chloride) on physical quality attributes (viz. fruit length, width, weight, etc.) of plum fruits. The experiment was laid out in randomised block design with thirteen treatments and one replication in each. The result revealed that all treatments were reported superior in compare to control. Thus it can be concluded that the application of these chemicals significantly influences the physical quality attributes of plum.

Keyword: plum, vitamins, putrescine, salicylic acid, calcium chloride, etc.

QSAR modeling of a novel series of methoxylated chalcones as antioxidant agents

Dr. Neerja Shukla

Department of Chemistry,

Nari Shiksha Niketan PG College,

Mona Chandrawati Gupta Marg,

Kaiserbagh, Lucknow, UP, India

RTAAAS/AB/2024/82

Quantitative structure–activity relationship (QSAR) analysis of a series of twenty-one chalcones is done to design small-molecule antioxidant agents. For this, a novel series of 2, 4, 5-trimethoxy chalcone derivatives with high biological significance, synthesized using the Claisen-Schmidt condensation reaction was taken. All the newly prepared compounds were tested for their antioxidant potential, specifically through DPPH free radical scavenging activity, against Staphylococcus aureus. QSAR analysis is performed using various physicochemical parameters and relevant indicator variables. The study revealed that parameters such as connectivity indices (x 4 and x 5), ADME descriptors, molecular weight, molar refractivity, density, and Log P showed significant correlations with biological activity. Multiple regression analysis yielded the best results, with different models achieving strong R-squared values, indicating robust predictive performance.

Performance of Different Local Rice (Oryza Sativa L.) Landraces of West Bengal in Water Stress Condition at Different Agro-Climatic Zones in West Bengal

S. Panja[1*], H. S. Garg[2] and C. Bhattacharya[3]

[1]Department of Genetics & Plant Breeding,

School of Agriculture Allied Sciences, The Neotia

University, Sarisha, D.H. Road, South 24 Parganas, West Bengal, India

[2,3]Department of Genetics & Plant Breeding, Bidhan Chandra Krishi Viswavidyalaya,

Mohanpur, Nadia, West Bengal, India

RTAAAS/AB/2024/83

Drought is the major abiotic stresses influencing crop productivity, and it is the major constraint for higher yield production and yield stability in rice. This makes it necessary to develop rice varieties which are well adapted to drought stress especially at reproductive stage. In this context, the present study was conducted to screen and identify the rice genotypes having high yield potential and yield stability under water stress condition by analyzing the drought tolerance indices especially in the reproductive phase under the red and laterite agro-climatic zone of West Bengal in eastern India. Laterite Zone of West Bengal in Kharif-2019. The genotypes were assessed for genetic variability parameters and several drought tolerance indices i.e., YI (yield index), TOL (tolerance intensity), SSI (stress susceptibility index), STI (stress tolerance index), MPI (mean productivity index), DTE (drought tolerance efficiency) and REI (relative efficiency index). High magnitude of GCV was estimated for the character root to shoot ratio and relative water content in both the hydrological regimes in two locations. High heritability coupled with high genetic advance was observed for the characters root to shoot ratio and relative water content in water stress and irrigated condition in both the locations. Bhadui, Bohurupi, Kerala Sundari and Dular possessed high level of drought tolerance as these varieties exhibited high YI, REI, DTE, STI, MPI value and low value for SSI, STI and TOL compared to the check varieties at both locations. The characters root to shoot ratio and relative water content could be selected for improving the grain yield in rice breeding programs targeting development of lines adaptable to rainfed area maintaining high economic yield. Results from the experiment highlighted that the landraces Bohurupi, Bhadui, Kerala Sundari and Dular could be selected for further hybridization with elite parents for breeding of high yielding drought tolerant lines.

Keywords: rice; drought; landraces; genetic variability; heritability, drought tolerance indices

Impact of Tillage Practice and Crop Management on Soil Erosion of Indian Himalayan Region

Uday Mandal*, N K Sharma, Raman Jeet Singh, Trisha Roy, Rama Pal, Anand K Gupta, J S Deshwal, Mudit Mishra, R K Singh, and M Madhu

ICAR- Indian Institute of Soil and Water Conservation Dehradun, Uttarakhand, India

RTAAAS/AB/2024/84

Agricultural sustainability in the Indian Himalayan Region (IHR) is a major concern owing to soil erosion and degradation. The region's unique topography, fragile ecosystem, and monsoon-driven weather patterns exacerbate soil loss, making it essential to adopt sustainable farm management. The present study was carried out to evaluate the different tillage practices and crop cover on runoff and soil erosion in the foothills of the North-West Himalayan. Experiments were carried out as split-plot designs at 2% land slope under rainfed conditions during 2017- 2022 at Selaqui Research Farm (561 meters above mean sea level) of ICAR-IISWC Dehradun, Uttarakhand, India. 3-tillage practices namely; conventional tillage (CT), reduced tillage (RT), and zero tillage (ZT) along with 4-crop cover (Maize+ Sunhemp; Maize+ Cowpea; Paddy+ Sesbania; Paddy+ Cowpea). 2-Crop cycles, Maize-Wheat (2017 to 2019) and Paddy-Wheat (2020 to 2022) cycle was completed during study period. Six-year data were analyzed and found ZT produced lowest average runoff and soil loss i.e., 22.77% and 5.23 t/ha (Maize) and 3.60% and 0.90 t/ha (Paddy), respectively. It may be due to the less soil disturbance leading to better soil aggregates. Interestingly, it was found that during the maize-wheat system, RT generates more runoff (39.51%) than CT (32.05%); however, for the paddy-wheat system, CT produces more runoff (32.40%) than RT (19.05%) which might be due to the modification of the soil environment through puddling, resulting the blockage of micro-pore and infiltration process. CT resulted in higher soil erosion than the other two tillage practices in both crop cycles. Results also suggested that the runoff and soil erosion are less in ZT, irrespective of the cropping cycle. Overall, the study concluded that adopting conservation practices could significantly reduce runoff and mitigate soil erosion, improving the resilience of both farming systems and the surrounding ecosystem.

Keyword: Conservation agriculture; Indian Himalayan Region; Runoff; Soil erosion; Tillage practices

Arbuscular Mycorrhizal Fungi: Ecofriendly Relation With Ornamental Plants

T. ALEKHYA[1] C N R Santhoshini[2] V. PRIYANKA[3]

[1]Post graduate, Department of Floriculture and Landscaping, College of Horticulture, Rajendranagar, SKLTGHU, Hyderabad, Telangana,

[2]Assistant Professor, Department of Floriculture and Landscaping, College of Horticulture, Rajendranagar, SKLTGHU, Hyderabad, Telangana,

[3]Post graduate, Department of Floriculture and Landscaping, College of Horticulture, Rajendranagar, SKLTGHU, Hyderabad, Telangana,

RTAAAS/AB/2024/85

The demand fr ornamental plants is increasing due to urban greening and rural construction, while the growing environment of plants, especially the soil environment, is deteriorating. Hence, sustainable methods of ornamental plant cultivation need to be developed quickly. The application of arbuscular mycorrhizal fungi (AMF) to ornamental plants can be one of the eco-friendly ways to achieve the objective. Soil AMF establishes mycorrhizal symbiosis with roots of ornamental plants, which can develop a marvelous mycorrhizal mycelium network in the rhizosphere to stimulate nutrient and water acquisition of host plants. Numerous researches have proven that AMF improved the quality of ornamental plants, like fruit yield, height, biomass, seed quality, the size and number of flowers, leaf, and root. In addition, mycorrhizal fungi also improve nutrient uptake and endogenous hormone balance of host plant. Also Mycorrhizal inoculation determines beneficial effects on plants that can translate in economic advantages for flower growers. They are also suitable for greenhouse and field cultivated ornamental plants as they are able to establish a kind of symbioses.

Keywords: Potted plants, Nursery, Commercial aspect, sustainable cultivation, Mycorrhizal symbiosis, Endogenous hormone balance.

PATHOGENESIS OF PYOMETRA IN QUEEN: DIAGNOSIS AND TREATMRNT

Kartik[1*], Vinayaka MN[2], Kanakaraja MG[3], Sunil Kumar[4]

* Corresponding author- Kartik, Department of Animal Reproduction Gynaecology and Obstetrics, Veterinary college Bidar, KVAFSU, Bidar, India.

RTAAAS/AB/2024/86

Pyometra refers to an acute or persistent suppurative inflammation of the uterine wall. A six-year-old Persian cat was admitted to Pet Hospital, with history of anorexia and chronic emaciation. During abdominal examination, the uterus felt larger and firmer than usual. Then ultrasonography examination was done and it revealed anechoic multiple pus pockets. Blood analysis showed that the level of AST, ALT, urea, creatinine increased, and PCV and Hb% decreased. All the findings confirmed that cat had suffering from pyometra. After confirmation, it was decided to do ovariohysterectomy under general anaesthesia. The suture was removed after fourteen days. The cat had a complete recovery without any complication.

Keywords: Queen, Pyometra, Ultrasonography, Ovariohysterectomy

Efficacy of Botanical Treatments Against Root-Knot Nematode (*Meloidogyne incognita*) in Okra Plants

Raju Dhayal, Dr. H. K. Sharma, Dr. M.K. Sharma and Parwati

Department of Nematology, Rajasthan College of Agriculture, MPUAT, Udaipur

RTAAAS/AB/2024/87

Okra (*Abelmoschus esculentus*), a key vegetable crop from the Malvaceae family, is widely cultivated, especially during the summer and rainy seasons. One of the main strategies for managing plant-parasitic nematodes is the use of nematicides; however, these chemicals are known to pose environmental hazards. A promising alternative is the use of microorganisms that are antagonistic to plant-parasitic nematodes. The experiment was conducted in pots to test the efficacy of botanicals [Chirchita, Periwinkle, Aak, Parthenium, Eucalyptus, Chrysanthemum, Creeping day flower, Lantana, Black night shade, Datura, Marigold, Bougainvilla] against the root-knot nematode, M. incognita on okra. Botanicals were used as soil application 5g per plant at time of sowing. The experiment was harvested 45 days after sowing, and observations were recorded on plant growth parameters (shoot length, shoot weight, root length, and root weight) and nematode reproduction (number of galls per plant, egg masses per plant, eggs per egg mass, and eggs and larvae per 200 cc of soil). The results showed that lantana leaves at 5 g per plant were the most effective treatment for improving plant growth characteristics and significantly reducing root-knot nematode reproduction on okra plants. This was closely followed by parthenium and eucalyptus leaves, which had a similar impact on plant growth an nematode reproduction parameters

Keywords: Root-knot nematode, Meloidogyne incognita, Okra, Botanicals.

Evaluating weed control treatment effects based on their weed control efficiency

Yogita

Assistant Professor, Faculty of agriculture, Maharishi Markandeshwar (Deemed to be) University, Mullana, Ambala, Haryana

RTAAAS/AB/2024/88

The experiment was conducted at Research Farm of the Department of Vegetable Science, CCSHAU, Hisar, Haryana during Rabi season of 2022-23 and 2023-24 to evaluate the potato variety 'Kufri Bahar' across thirteen different weed control treatment combinations. The density and dry matter accumulation of weeds 50 DAP was found maximum in earthing up, which was statistically at par with metribuzin 70% WP (0.525 kg ha -1) + rice straw (6 t ha -1) as pre-emergence. The maximum weed control efficiency among different weed control treatments at 50 DAP was observed in weed free treatment followed by earthing up and metribuzin 70% WP (0.525 kg ha -1) + rice straw (6 t ha -1) as pre-emergence. The maximum gross return was obtained from weed free treatment, which was followed by earthing up, metribuzin 70% WP (0.525 kg ha -1) + rice straw (6 t ha -1) as pre-emergence and metribuzin 70% WP (0.525 kg ha -1) as pre-emergence. The maximum benefit to cost ratio was recorded in earthing up, which was followed by metribuzin 70% WP (0.525 kg ha -1) as pre- emergence, weed free and metribuzin 70% WP (0.525 kg ha -1) + rice straw (6 t ha -1) as pre-emergence.

Keywords: Potato; dry matter of weed; weed management; weed control Efficacy of Botanical

Treatments Against Root-Knot Nematode (*Meloidogyne incognita*) in Okra Plants

Raju Dhayal, Dr. H. K. Sharma, Dr. M.K. Sharma and Parwati

Department of Nematology, Rajasthan College of Agriculture, MPUAT, Udaipur

RTAAAS/AB/2024/89

Okra (Abelmoschus esculentus), a key vegetable crop from the Malvaceae family, is widely cultivated, especially during the summer and rainy seasons. One of the main strategies for managing plant-parasitic nematodes is the use of nematicides; however, these chemicals are known to pose environmental hazards. A promising alternative is the use of microorganisms that are antagonistic to plant-parasitic nematodes. The experiment was conducted in pots to test the efficacy of botanicals [Chirchita, Periwinkle, Aak, Parthenium, Eucalyptus, Chrysanthemum, Creeping day flower, Lantana, Black night shade, Datura, Marigold, Bougainvilla] against the root-knot nematode, M. incognita on okra. Botanicals were used as soil application 5g per plant at time of sowing. The experiment was harvested 45 days after sowing, and observations were recorded on plant growth parameters (shoot length, shoot weight, root length, and root weight) and nematode reproduction (number of galls per plant, egg masses per plant, eggs per egg mass, and eggs and larvae per 200 cc of soil). The results showed that lantana leaves at 5 g per plant were the most effective treatment for improving plant growth characteristics and significantly reducing root-knot nematode reproduction on okra plants. This was closely followed by parthenium and eucalyptus leaves, which had a similar impact on plant growth and nematode reproduction parameters

Keywords: Root-knot nematode, Meloidogyne incognita, Okra, Botanicals.

Management of cashew stem and root borer with different insecticides

G. M. Golvankar*[1], V. S. Desai[2] and P. M. Talha[3]

[1]Research Associate, Regional Fruit Research Station, Vengurla

[2]Professor (CAS), Regional Fruit Research Station, Vengurla

[3]Senior Research Assistant, Regional Fruit Research Station, Vengurla

RTAAAS/AB/2024/90

Field experiment was carried out at the Regional Fruit Research Station, Vengurla, Maharashtra with an aim to find out effective insecticides products for their efficacy in curative control of cashew stem and root borer (CSRB) after extraction of pest stages. The results revealed that for curative management of CSRB, the treatments T 2 Chlorpyriphos 20 EC @ 0.2% recorded 93.33 per cent trees without reinfestation followed by T 4 Chlorpyriphos 20 EC @ 0.1% (80.00%), T 1 Carbaryl 50 WP @ 1% recorded (73.33%), T 3 Monocrotophos 36 EC @ 0.2% (66.66%) and T 5 Effective treatment in prophylactic trail swabbing neem oil @ 5% during the months of Oct.- Nov., Jan. – Feb. and April-May (53.33 %) trees without reinfestation. Whereas, the reinfestation was found to be maximum in T 6 mechanical control (66.67%). Total 90 trees were treated with different treatments for curative management of CSRB. Out of which 30 trees were found reinfested and 60 trees were found without reinfestation after application of different treatments. The data on physical parameters of reinfested and without reinfested trees were observed that the infested trees having the stem girth 80-100 cm were more prone to CSRB reinfestation (14.44%). The infested trees having the age, more than 15 years were more prone to CSRB reinfestation (33.33%). The collar + root zone was found to be more preferred by CSRB for reinfestation. The trees having removal of <25 per cent bark were prone to CSRB attack (13.33%). Yellowing of canopy was observed only in 3.33% reinfested trees.

Keywords: Cashew stem and root borer, CSRB, Curative methods, Post extraction prophylaxis management.

Bio-efficacy of insecticides against major sucking pests infesting cashewnut

V. S. Desai*[1], G. M. Golvankar[2] and P. M. Talha[3]

[1]Professor (CAS), Regional Fruit Research Station, Vengurla

[2]Research Associate, Regional Fruit Research Station, Vengurla

[3]Senior Research Assistant, Regional Fruit Research Station, Vengurla

RTAAAS/AB/2024/91

An experiment was conducted at Regional Fruit Research Station, Vengurla, Maharashtra to study the bio-efficacy of insecticides against major sucking pests infesting cashewnut orchards. The experiment was laid in Randomized Block Design with eight treatments and four replicates. Results revealed that among the insecticidal treatments, the treatment T 4 Buprofezin 25 SC @ 2 ml/lit recorded significantly lowest incidence of tea mosquito bug on shoot (0.048) and panicle (0.048) stage and superior over rest of the treatments. Whereas, the treatment T 7 λ cyhalothrin 5 EC @ 0.6 ml/lit found second best treatment for management of tea mosquito bug on shoot (0.071) and panicle (0.081) stage. While, the incidence of thrips in the treatment T 2 Thiamethoxam 25 WG @ 0.2 g/lit recorded the lowest incidence of thrips (0.067) thirty days after third spray on nut development stage and significantly superior over rest of the treatments.

Keywords: Tea mosquito bug, Thrips, Cashewnut, Bio-efficacy.

"Unlocking the Potential of Edible Flowers: Nutritional, Medicinal, and Environmental Benefits"

Madhuma S. Kadam[1], K. V. Malshe[2], R.C. Gajbhiye[3], S.B. Thorat[4], and Y.S. Saitwal[5]

[1]Ph.D. Scholar, Department of Floriculture and Landscape Architecture, College of Horticulture, D. B. S. K. K. V., Dapoli

[2]Agronomist, Regional Coconut Research Station, Bhatye, Dist. Ratnagiri, D. B. S. K. K. V., Dapoli.

[3]Professors (CAS), College of Horticulture, Dapoli, D. B. S. K. K. V., Dapoli

[4]Assistant Professor, Department of Plantation, Spices, Medicinal and Aromatic Crops, College of Horticulture, D. B. S. K. K. V., Dapoli.

[5]Assistant Professor, Department of Vegetable Science, College of Horticulture, D. B. S. K. K. V., Dapoli.

RTAAAS/AB/2024/92

Flowers, besides its cultural significance were being consumed since ancient times in many cultures around the world. They were used in different culinary preparations or in various dishes as garnish or trimmings. In recent years, interest in consumption of fresh flowers has been renewed due to their nutritional value and medicinal properties. Edible flowers also serve as a potential source of several bioactive compounds like phenolics, flavonoids and pigments etc. which exert very high antioxidant activity. Dry flowers in floriculture have been gaining impetus with the rapidly growing floriculture industry in India. Techniques like vermicomposting, dyes extraction, extraction of essential oils, making of Holi colours and bio-gas generation can be used. Consumers are increasingly choosing food products containing natural ingredients due to concerns about the adverse health effects of synthetic compounds. Edible flowers bring interesting elements to culinary and dietary habits. Edible flowers have also nutraceuticals significances. Fresh flowers and foliage are perishable and delicate in nature and cannot retain their beauty and fresh look for long period of time. Drying of flowers is a method of preservation of flowers. They can be used to prepare various value-added products. The floral waste management approach will lead to a closed-loop environmental management through waste reduction and reutilization. Thus, it can be promoted as a potential mechanism to maintain the environmental sustainability at wider scales.

Keywords: Edible flowers, Floral waste, Dry flowers.

Restoring Our Mother Lands: Innovative Approaches to stop Degradation

Venkatesan V.G[1], G. Muhilan[1],

[1]PG Scholar, Department of Soil Science and Agricultural Chemistry,

Pandit Jawaharlal Nehru College of Agriculture and Research Institute, Nedungadu, Karaikal, U.T of Puducherry.

RTAAAS/AB/2024/93

The land is an essential non-renewable resource and it is principal basis for human well- being and livelihood as it provides us with food, shelter, and multiple other ecosystem services. Land degradation is one of the major problems all over the world as it reduces agricultural productivity, causes severe impact over environmental problems, leading to biodiversity loss, and can reduce food security as well as water security. Approximately, around 30% of the geographical area of India are under degradation (Statista Research Department, 2019). Day by day land is getting degraded by major factors like natural, anthropogenic and climatic factors. Degradation occurs in the form of deforestation, desertification, rapid changes in climatic conditions, water logging, salinization, erosion, and loss of organic matter components, etc. Land degradation is a reduction of land capability of production and reduction creates stress among living organism due to non- availability of required resources, so risk arises in survival of organisms. It is possible to manage land from degradation by identifying sustainable land management practices and by adopting a precise methodology for assessing land degradation. Further, this area should be considered for research purposes because the land is important in all aspects and indirectly involved in maintaining the health of humans and other living creatures and directly involved in survivability of micro and macro-organisms. Different strategies should be adopted in avoiding degradation by reforestation, afforestation, reduction of mining, sustainable land and water management, implementing organic farming practices, making policies to promote sustainable land use and conservation, adopting innovative technologies and soil conservation strategies.

Keywords: Land degradation; soil erosion; soil conservation strategies; afforestation; organic farming.

"First Report on the Occurrence of the Lesser Coconut Weevil, *Diocalandra frumenti* (Fab.) on Coconut (*Cocos nucifera*) in North Karnataka"

1* Sadashiva Tippimath, 1 Sharanabasappa S. Deshmukh, 1 Rajashekharappa, K.,

1 Prashantha, C., 2 Ramesha, B and 3 Srivijay S. Malipatil

1 Department of Entomology, College of Agriculture, Shivamogga

2 Department of Agricultural Entomology, Kerala Agricultural University, College of Agriculture, Padannakkad, Kerala, India

3 Department of Genetics and Plant Breeding, College of Agriculture, Shivamogga

Keladi Shivapppa Nayaka University of Agricultural and Horticultural Science, Navile, Shivamogga.

RTAAAS/AB/024/280

The world's agriculture frequently faces new dangers from seemingly unimportant and underestimated viruses, weeds, and insect pests. All of them demand quick attention and cooperative action to control the menace. Among the various insects of coconut, the lesser coconut weevil, *Diocalandra frumenti*, is one of the most detrimental economic pests on coconut and other palm trees. Here, we report the first instance of D. frumenti on a coconut tree in North Karnataka (Rajapur, 16° 25:39; N, 74° 82:39;E, Gokak, Belagavi), The elytra of the adult weevil were brilliant yellowish-brown to blackish-brown, with four large yellowish-brown markings. Female adult weevils were bigger than the males.] Adult males were shorter than females and the total length was 3.90 mm [head with 1.10 mm including rostrum (0.87 mm), thorax with 1.0 mm and abdomen with 1.77 mm]. Adults of D. frumenti often bore through tissue, with the most obvious damage observed on the fruits and trunks, typically indicated by oozing sap from the infested parts. During the survey, a combined attack of D. frumenti and shothole borer was noticed, resulting in the complete death of the coconut tree. In Karnataka, Belagavi is a major producer of sugarcane; therefore, an in-depth investigation is needed to better understand the biology, synergistic effects with other pests especially in sugarcane and the extent of damage to coconuts and other hosts.

'Compatibility Potential of *Steinernema bicornatum* with Insecticides in Laboratory Condition'

Dnyaneshwar Babanrao Ingole

Ph.D. Scholar, Department of Entomology, College of Agriculture, D. B. S. K. K. V.,

Dapoli

RTAAAS/AB/2024/95

The present investigation was studied under the title Compatibility potential of *Steinernema bicornatum* with insecticides in laboratory condition" and the work was undertaken in the Post Graduate laboratory of Entomology Section, College of Agriculture Nagpur during 2020-21 with aim of this research is to test the compatibility of CIB registered insecticides with entomopathogenic nematode *Steinernema bicornatum* used against *Spodoptera litura*. The survivors of infective juveniles were tested for pathogenicity against the target pests *Spodoptera litura* and laboratory host Galleria mellonella. The compatibility of Steinernema bicornatum with combination of Thiamethoxam 25% WG, Diafenthiuron 50% WP, Imidacloprid 17.8% SL, Chlorantraniliprole 18.5% SC, Indoxacarb 14.5 %SC, Cypermethrin 10% EC, Chlorpyriphos 20% EC with double the recommended dose was found compatible with all treated insecticides except Cypermethrin 10% EC and Chlorpyriphos 20% EC was found incompatible with S. bicornatum. The pathogenicity of treated EPNs were tested against S. litura and G. mellonella @ 50 IJs/larva after 48 and 72 hrs exposure with insecticides. The result showed that all treated treatment reduces their pathogenicity as compare to untreated control except Imidacloprid 17.8% SL was found more superior than other treatments. And also found that G. mellonella was found more susceptible than S. litura. The effect of insecticides on reproduction rate was observed that progeny production of S. bicornatum reduced up to fourth generation. And also observed that population recovery in G. mellonella higher than S. litura.

Keywords – Compatibility, Spodoptera litura, Galleria mellonella, Insecticides

Climate adaptive nutrient management for soil and crop health

Shruti Kumari* and Vikas Abrol

Department of Soil Science and Agricultural Chemistry, SKUAST- Jammu

RTAAAS/AB/2024/96

A field experiment was conducted to investigate the integrated effect of N And K Loaded Nanobiochar Fertilizers on Soil Properties and Maize (*Zea Mays*) Yield Under Rainfed Conditions at research farm of Advance Research Centre for Rainfed Agriculture, Rakh Dhainsar for two consecutive years of 2022 and 2023. Effect of Nitrogen and Potassium Loaded Nanobiochar on Soil Properties and Performance of maize. The soil of the experiment was sandy loam in texture, slightly acidic in pH (6.6), low in organic carbon (0.32%) and available nitrogen (161 kg ha-1) but medium in available phosphorus (14.5 kg ha-1) and potassium (87.4 kg ha-1). The field experiment was laid out in randomized block design with three replications, comprising of twelve treatments. The results revealed that in among all the treatments under study T12 (75% N + 75% K + 6Kg NBN + 3 Kg NBK + P) and T4 (100 % NPK + 4 ton B), recorded higher content which was noticeably better than any other treatments compared to the recommended dose of fertilizer (T2). The microbial biomass carbon and soil enzyme activity including dehydrogenase were found to be highest in T12 and followed a declining trend under rest of the treatments. The data pertaining to nutrient uptake of N, P and K in grain and stover were recorded highest under treatment T12 and exhibited significantly higher response than that of the T1 (control). The study concluded that T12 and T4 improved the soil properties, crop growth and yield of maize as compared to sole application of recommended dose of fertilizers through mineral fertilizers.

Keywords: Nanobiochar, fertilizer, maize, soil fertility, carbon

Characterization of Diverse Biomass Feedstocks for Pyrolysis-Derived Bio-oil and Its Application in Lubricative Bio-Grease

***Tarannum Jahan[1], and Ashok Kumar Verma[2]**

[1,2]Department of Biochemistry, College of Basic Sciences and Humanities, G.B. Pant University of Agriculture and Technology, Pantnagar, U.S. Nagar, Uttarakhand, India

RTAAAS/AB/2024/97

This research aims to investigate the potential of diverse biomass feedstocks for producing high-quality bio-oil through pyrolysis and its subsequent application in the formulation of sustainable and eco-friendly lubricative bio-grease. Various biomass was systematically characterized through proximate and ultimate analysis to assess their suitability for pyrolysis. Pyrolysis of biomass was carried out in a semi-batch reactor in a temperature range of 479–555 °C to produce bio-oil. Chemical characterization of bio-oil was conducted using Fourier Transform Infrared (FTIR) spectroscopy and gas chromatographic/mass spectroscopy (GC/MS). The pine needle bio-oil used as base oil to formulate bio-grease. Gear-oil (mineral-oil) was replaced by bio-oil as base oil and animal fat was used as a thickener. The TGA and DTG curves of grease samples were showed that grease sample A (Na-based with mineral oil) having the highest thermal decomposition as compared to sample B (Na-base with bio-oil) and sample C (Li-based with bio-oil). The better dropping point (192ºC) and oxidation stability (136min) were found higher in grease sample C compare to A and B. Cone penetration and copper corrosion values were the same for all the samples showing its liquid consistency and metal protecting nature. The highest value of cone penetration due to the high moisture content in all samples. In grease samples B and C, iron (Fe), Copper (Cu) and Lead (Pd) were found in higher concentration. The additives Ca, Mg, Zn and P were found in very low amount in the grease samples. The ferro graphical analysis was found very few wears and contaminations in grease samples (A, B and C), indicating a better behaviour of grease. This research contributes to the development of sustainable and environmentally friendly alternatives to traditional lubricants, promoting a circular economy and reducing reliance on fossil fuels.

Keywords: Bio-oil, Pyrolysis, Bio-grease dropping point, cone penetration.

Seasonal incidence of Maize stem borer, Chilo partellus (*Crambidae*; Lepidoptera) infestation in Medziphema, Nagaland

Martha Chakruno[1] and Imtinaro L.[2]

[1]Ph.D. Scholar, Department of Entomology, School of Agricultural Sciences (SAS), Nagaland University, Medziphema Campus, Nagaland, India, Email id:

[2]Professor, Department of Entomology, School of Agricultural Sciences (SAS), Nagaland University, Medziphema Campus, Nagaland, India,

RTAAAS/AB/2024/98

A total of fifteen maize cultivars, including fourteen local varieties and one hybrid, were chosen to study the seasonal incidence of the maize stem borer, *Chilo partellus*. The highest level of leaf injury was recorded in the cultivar Medziphema Local-1, with infestations of 8.67% in 2020 and 8.00% in 2021, while the lowest was observed in *Zarsi Socunoma* Local, with infestations of 3.00% and 2.67% in the respective years. For dead heart damage, Khuzama Local and Medziphema Local-1 showed the highest infestation rate of 12.23% in 2020, while *Zarsi Socunoma* Local had the lowest at 5.84%. In 2021, Khuzama Local recorded the highest dead heart damage with an infestation of 11.69%, and the lowest was again noted in *Zarsi Socunoma* Local at 5.27%.

Keywords: Maize, Maize stem borer, Cultivars, Seasonal incidence, Infestation

"To study the survival and development of spotted bollworm on Bt cotton hybrids at different events"

D.G. Ingale[1] and V.K. Bhamare[2]

[1]Ph.D. Scholar, Department of Agricultural Entomology,

College of Agriculture, D. B. S. K. K. V., Dapoli

[2]Associate Professor (CAS), Department of Agricultural Entomology,

College of Agriculture, Latur, V. N. M. K. V., Parbhani

RTAAAS/AB/2024/99

The investigation was carried out to study the survival and development of spotted bollworm on Bt cotton hybrids at different events. The survival and development of bollworm larvae was observed instar wise on squares and bolls of different Bt cotton hybrids (AJEET-155 BG-II, BHAKTI NCS-245 BG-II, JAY BG-II, YUVA 7215-2 BG-II, Dr. BRENT MRC-7347 BG-II, RCH-2 BG-II and non-Bt NHH-44 as control) at 90, 120 and 150days old crop. The different survival and developmental parameters like larval mortality, larval weight, pupation, pupal weight, adult emergence, growth and survival indices of the survived larvae after releasing on different plant parts of different Bt cotton hybrids at pre-determined intervals were recorded. The results indicates that, the mortality of early larval instars of *Earias vittella* fed on squares and bolls of different Bt cotton hybrids was higher than the later instars. Exposure of later instar larvae to different plant parts of different Bt cotton hybrids also exhibited adverse effects on the growth and development such as reduced larval weights, prolonged larval developmental period, reduced pupation, formation of small pupae with less weight, reduction in adult emergence with low growth and survival indices for *Earias vittella*. The growth and survival index values were low for the larvae reared on squares compared to bolls of different Bt cotton hybrids.

Keywords: Cotton, Spotted bollworm, growth, development.

Role of Integrated Child Development Service (Icds) Scheme in Achieving Sustainable Development Goals (Sdg)

M.Vasanthi[1], Dr. T. Supraja[2], Dr. M. Preethi[3], Dr.K. Aparna[4], Dr. D. Srinivasa Chary[5] Dr.Amtul Waris[6]

[1]Research Scholar, Department of Extension Education and Communication Management,

College of Community Science, Professor Jayashankar Telangana State Agricultural University

RTAAAS/AB/2024/100

The Integrated Child Development Service (ICDS) scheme, India's flagship program for early childhood care and development, plays a crucial role in addressing multiple Sustainable Development Goals (SDGs) set by the United Nations. This study examines the contribution of ICDS in achieving key SDGs, particularly those related to poverty alleviation, zero hunger, good health and well-being, quality education, gender equality and partnership for goals. The research employs a mixed-methods approach, combining quantitative analysis of ICDS program data and qualitative insights from stakeholder interviews. The study evaluates the scheme's impact on child nutrition, immunization coverage, preschool education, and women's empowerment across various states in India. The findings suggest that ICDS has achieved substantial progress in decreasing malnutrition (SDG 2), improving child health outcomes (SDG 3), and improving access to early childhood education (SDG 4). The program's emphasis on maternal health and nutrition has played a role in advancing gender equality, as outlined in Sustainable Development Goal 5. In addition, the ICDS has indirectly contributed to poverty reduction efforts (SDG 1) and effective policy implementation (SDG-16) by providing additional nutrition and employment possibilities. However, challenges persist, including uneven implementation across states, resource constraints, and the need for improved monitoring and evaluation systems. The study identifies areas for enhancement, such as strengthening community participation, improving the quality of services, and better integration with other government initiatives. This research underscores the vital role of ICDS in India's pursuit of the SDGs and highlights the importance of holistic, integrated approaches to early childhood development. The findings offer valuable insights for policymakers, program implementers, and researchers working towards sustainable development in the context of child and maternal welfare.

Keywords: ICDS, Sustainable Development Goals, child development, nutrition, education, gender equality and India

Evaluating efficacy of some plant growth regulators for enhancing fruit retention and yield in mango (*Mangifera indica* L.) cv. Banganpalli under hot and humid climate of Eastern India

Deepa Samant*, Kundan Kishore, Suchitra Behera and Gobinda Chandra Acharya

ICAR-IIHR-Central Horticultural Experiment Station, Bhubaneswar, Odisha, India

RTAAAS/AB/2024/101

Mango experiences a long period of abiotic stress in the form of high soil and atmospheric temperature, low atmospheric humidity, and reduced soil moisture regime during flowering and fruiting. This natural period of stress is one of the major causes for heavy fruit drop and low yield of substandard quality as abiotic stress not only interferes with the various factors of pollination, viz., stigma receptivity, pollen production, pollen viability, and pollen germination but also, triggers hormonal imbalance (low auxins and gibberellins, high ethylene and abscisic acid) in the plant. Stress-induced hormonal imbalance in mango leads to fruit shedding at various stages of fruit growth and development through forming a separation layer in the abscission zone and by reducing its photosynthetic efficiency and carbohydrate influx to developing fruit. Foliar application of plant growth regulators during flowering and fruit development stages could be useful for reducing the problem of fruit drop in mango. Therefore, the present investigation was carried during 2021-23 to study the effects of naphthalene acetic acid (NAA), gibberellic acid (GA 3), and triacontanol (TRIA) on fruit retention and yield, in mango cv. Banganpalii employing randomized block design with 10 treatments (NAA: 10, 20, and 30 ppm; GA 3: 25, 50, and 75 ppm; TRIA: 1, 3, and 5 ppm; water spray as control). Treatments were foliar sprayed thrice at panicle initiation, pea, and marble stage of fruit growth. None of the PGR treatments showed significant variation for flowering intensity, hermaphrodite flower intensity, and no. of flowers per panicle, however, application of triacontanol at 3-5 ppm yielded a significant improvement over control for panicle size, fruit retention, and yield. Plants sprayed with 5 ppm triacontanol produced the longest (28.80 cm) and the widest (18.07 cm) panicles (29.17 cm × 18.07 cm) and recorded the maximum value for fruit retention (68.93, 53.38, 39.41, 32.88, 26.54, 20.46, and 16.58 % at 15, 30, 45, 60, 75, 90, and 105 days after pea stage, respectively), number of fruits/tree (104.72), and yield (38.95 kg/tree).

Effect of ZnO and TiO 2 Nanoparticles on Growth, Yield and Quality Trait Responses in *Lycopersicon esculentum* L.

Bimal Das[a*], and Dipak Kumar Murmu[b]

[a]Department of Genetics and Plant Breeding, College of Agriculture (Extended campus),

Uttar Banga Krishi Viswavidyalaya, Majhian Dakshin Dinajpur, West Bengal,

[b]Regional Research Station (OAZ), Uttar Banga Krishi Viswavidyalaya, Majhian Dakshin Dinajpur, West Bengal,

RTAAAS/AB/2024/102

In the present scenario, the application of nanoparticles in the agriculture area showing the potential effect on the improvement of plant growth in terms of yield and safety at a very emerging phase. Nanoparticles have the potential to improve growth and yield of tomato. The main objective of this study was to perform the effect and generational transmission of ZnO and Anatase-TiO 2 nanoparticles on yield attributing and biochemical traits of tomato. Response to nanoparticle to induce optimum economic yield was variable. Higher concentrations of ZnO (20 ppm) was found comparatively significant for most of the characters except number of cluster plant -1 and 50% flowering, however lower concentration of TiO 2 (20 ppm) treatment had optimum effect on characters primary branches, plant height, number of fruits plant -1, number of cluster plant -1, fresh plant weight, lycopene, B-carotene and fruit yield plant -1. Considering all the treatment an increased 50.08% (25 ppm ZnO) and 52.57% (20 ppm TiO 2) of fruit yield were recorded maximum by application of NPs. In second generation, higher concentrations of nano ZnO have shown optimum response to enhance economic yield while lower concentrations of TiO 2 induced similar result. Generational differences in response to different concentration may be due to differential accumulation of nanoparticles from seed to root and its translocation to plant parts.

Keywords: Nanoparticles, ZnO, TiO 2, tomato.

Development of Colorimetric Indicator using Anthocyanins Extracted from Butterfly Pea Flower via Ultrasound for Chicken Freshness Monitoring

Arshi Siddiqui[1]*, N. C. Shahi[2]

[1]*Ph.D. Scholar, [2]HOD

Department of Post Harvest Process and Food Engineering, College of Technology, G. B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand

RTAAAS/AB/2024/103

Butterfly pea flower (*Clitoria Ternatea* L.) is a rich source of anthocyanins that are highly sensitive towards any change of pH, making them suitable to be used as pH indicator. Colorimetric indicator is a tool that are used in intelligent food packaging that provide information of the food contained inside through color changes that are visible to naked eyes. Anthocyanin from butterfly pea flower provides an option of natural and organic colorimetric indicator that utilizes pH indicator to assess the freshness of the food by measuring the change of pH that the product undergoes. Ultrasound assisted extraction (UAE) is a green extraction technology that offers various advantages such as shorter processing times, lower energy consumption, and higher extraction yields when compared to traditional approaches. This study aims to determine the effect of ultrasonication in extraction of bioactive compounds from butterfly pea flowers and to optimize the process by using Box-Behnken design (BBD) of response surface methodology (RSM). Analysis of variance (ANOVA) was used to evaluate the data. The results showed that the process parameters had significant (p<0.05) effect on all the responses. The maximum TAC (59.34 mg CE/g DW), TPC (47.63 mg GAE/g DW), TFC (65.15 mg QE/g DW) and antioxidant activity (71.94 %) was observed under optimal condition (solid-solvent ratio of 1:33.43 g/ml, ultrasound power intensity of 72.16 W/cm 2 and sonication time of 24.23 min). The extract also showed high colour change sensitivity in different pH values, indicating its potential as a good pH indicator. The biodegradable intelligent film was developed utilizing anthocyanin pigment extracted from butterfly pea flower that could be used as colorimetric indicator for monitoring the freshness of chicken samples. During the storage of chicken samples for 3 days at room temperature (30 ^{0}C) and 6 days at refrigeration conditions (4 ^{0}C), the colour of the film changed from purple to green which is a clear indication of spoilage of food material.

Keywords: Ultrasound assisted extraction (UAE), Anthocyanins, Butterfly Pea Flower, colorimetric indicator, intelligent food packaging

Edible Flowers Potential in Food Industry

S Priyanka[1] C N R Santhoshini[2]

[1]Post Graduate, Department of Floriculture and Landscaping, Post Graduate Institute of Horticultural Sciences, SKLTGHU, Hyderabad, Telangana,

[2]Assistant Professor, Department of Floriculture and Landscaping, College of Horticulture, Rajendranagar, SKLTGHU, Hyderabad, Telangana,

RTAAAS/AB/2024/104

Floriculture sector is becoming a new bloom in agriculture industry as the platform is being diversified from just cultivation and selling of flowers as a raw commodity into dry flower technology, perfumery industry, beauty industry, exports of flowers, organic edible flowers cuisines etc., in this way flowers are being processed or the cultivation practices are modified a bit and new diversified outcomes are being produced. In these modern days people started consuming flowers for their nutritional properties, pharmaceutical benefits, antioxidants, bioactive compounds etc. Back in those days people used to use flowers for increasing the aesthecity of the dish or for flavour purpose only, but now day's tides have changed. Scientific & technical information regarding the nutritional, therapeutic & chemical natures of edible flowers are studied, reviewed, discussed their benefits in human diet are being compiled.

Keywords: Floriculture, Raw commodity, Antioxidants, Therapeutic.

Perception of Farm Women Towards Climate Change and Its Impact on Farm Activities in Ranga Reddy District of Telangana State

L. Bangari[1], Dr. M. Prasuna [2]

[1]Ph.D. Scholar, Department of Extension Education and Communication Management,
Professor Jayashankar Telangana State Agricultural University, Hyderabad, Telangana, India.

[2]Professor, Department of Extension Education and Communication Management
Professor Jayashankar Telangana State Agricultural University, Hyderabad, Telangana, India.

RTAAAS/AB/2024/105

Climate change has been recognized globally as the most pressing critical issue affecting Mankind's survival. It is expected to have serious environmental, economic, and social impacts on Indian agriculture. The perception of the farmers is also changing with climate change. Many studies discovered that climate change has more negative impacts than positive impacts. Hence, a study entitled "Perception of Farm Women towards Climate Change in Telangana State" was formulated to study the perception of farm women on climate change. The Ex-post facto research design was used for the study and a total sample of 30 farm women were selected from Ranga Reddy district of Telangana State. Results of the study revealed that the majority (4.40) of the women farmers had highly perceived that decrease in crop yield due to climate change and most of them heavily agreed that (4.33) increase in expenses in farming due to climate change followed by cropping practices have changed (4.20), the climate is becoming favorable for insect (4.17), The availability of irrigation water has decreased due to climate change (4.10), decrease in groundwater level due to climate change (4.06), the time of harvesting of crops has changed (4.00) The time of ripening of crop or fruits has changed (3.80), Extinction of various crop & animal species due to climate change (3.70), Change in flowering & fruiting time of crop (3.46), There is less use of traditional crop varieties (3.33) new varieties of pests/diseases have emerged (3.03). And also found that the majority (73.3) of the respondents had a high level of perception towards the adverse effects of climate change followed by medium (26.7%), and high (13.3%).

Keywords (Climate change, Perception, Farm women, Farm activities and Impact)

Impact of biofertilizers and humic acid on growth of ornamental coleus

M. Sai Avinash[1], M. Sreenivas[2], P. Prasanth[3], C.N.R. Santhoshini[4] and S. Praneeth Kumar[5]

[1]M.Sc. Scholar, Department of Floriculture and Landscaping, Post Graduate Institute of Horticultural Sciences, SKLTGHU, Mulugu, Siddipet, Telangana.

[2]Assistant Professor, Department of Plantation, Spices, Medicinal and Aromatic Crops, College of Horticulture, SKLTGHU, Rajendranagar, Hyderabad, Telangana.

[3]Associate Dean, Department of Floriculture and Landscaping, College of Horticulture, Rajendranagar, SKLTGHU, Hyderabad, Telangana.

[4]Assistant Professor, Department of Floriculture and Landscaping, College of Horticulture, SKLTGHU, Rajendranagar, Hyderabad, Telangana.

[5]Scientist, Crop Physiology, Floriculture Research Station, SKLTGHU, Rajendranagar, Hyderabad, Telangana.

RTAAAS/AB/2024/106

The study titled “Impact of biofertilizers and humic acid on growth and quality of ornamental coleus” was conducted during the summer of 2024 at the College of Horticulture, Rajendra Nagar, Hyderabad. The experiment was conducted in the Factorial Completely Randomized Design with three replications. The experiment consisting of ten treatment combinations comprising of two factors. Biofertilizer treatments included: B 1 (Bio NPK @ 20 ml per pot), B 2 (Bio NPK @ 40ml per pot), B 3 (AMC @ 5ml per pot), B 4 (AMC @ 10ml per pot), and B 5 (19:19:19 @ 2g per pot). Humic acid levels were: H 1 (humic acid @ 5ml per pot) and H 2 (humic acid @ 10ml per pot). B 5 (19:19:19 @ 2 g per pot) showed the highest plant height (15.76,20.93,23.54 cm), leaf dry weight (1.38,1.44,4.91 g), shoot dry weight (1.60, 1.93, 4.28 g) at 30,60 and 90 DAP and AGR for height (0.087 cm/day -1) and AGR for dry matter (0.301 g/day -1) CGR (1.651 g/m2/day) for 60-90 DAP. Among humic acid treatments, H 2 (humic acid @ 10ml per pot) shows maximum plant height (14.76,18.75,20.45 cm), leaf dry weight (1.14, 1.30, 3.70 g), and shoot dry weight (1.41,1.64,3.76 g) at 30,60,90 DAP and AGR for height (0.057 cm/day -1) and AGR for dry matter (0.202 g/day -1) CGR (1.107 g/m 2 /day) for 60- 90 DAP. The best interaction was seen in B 5 H 2 (19:19:19 @ 2g + Humic Acid @ 10ml per pot), which recorded the highest plant height (15.74, 21.13, 24.89 cm), leaf dry weight (1.46, 1.54, 5.70 g), shoot dry weight (1.73, 2.00, 4.59 g), root dry weight (2.58, 2.75, 3.03 g) at 30,60,90 DAP. AGR for height (0.125 cm/day -1), AGR rate for dry matter (0.202 g/day -1), CGR (2.434 g/m 2 /day) at 30-60, 60-90 DAP.

Keywords: Ornamental coleus, bio NPK, 19:19:19, AMC, humic acid, absolute crop growth rate, crop growth rate

Assessment of genetic variability of Wood apple genotypes (*Feronia limonia* L.) based on quantitative and qualitative traits in Awadh region of Uttar Pradesh

Usha Shukla[1a*] and Rubee Lata[2a]

[1]Research Scholar, [2]Assistant Professor

Department of Horticulture, School of Agricultural Sciences and Technology, Babasaheb Bhimrao Ambedkar University (A Central University), Lucknow

RTAAAS/AB/2024/107

The uncultivated, nutritionally potential monotypic wood apple (*Feronia limonia* L.), a member of the Rutaceae family, is a monotypic tree species in the genus Feronia. Considering a wide genetic diversity in wood-apple, 29 genotypes were assessed by the prepared set of qualitative and quantitative traits from Awadh region of Uttar Pradesh, presented in this study during 2021- 23. Fruit shape indicated that there were three different types of fruit shapes: round, oval, and flattend. Of the 29 genotypes, 11 were flattend, 13 were round, and 5 were oval. Pulp colors were found to be yellowish, light yellow, white, brown, and brownish white. The leaf shape of the 29 different genotypes of wood apple showed oblong, no variation in shape, with length and width ranging from (2.11-4.24 cm) and (1.14-2.32 cm). Fruit weight ranged between (113.26-258.86 g), while fruit length, width, and diameter varied between (5.33-9.43 cm, 5.57-9.46 cm), and (5.60-9.50 cm), respectively. The average values for these parameters were determined: seed weight per fruit (28.38 g), seed length (6.23 mm), seed width (3.07 mm), number of seeds per fruit (309.62), and shell thickness (0.28 mm). The study's findings showed that there was a wide range of variability in the qualitative characters of all the genotypes examined, including total soluble solids (10.22-18.11 0 Brix), acidity (2.10-6.11%), ascorbic acid (1.54-2.39 mg/per100 g), reducing sugars (0.85-1.30%), non-reducing sugars (0.68-1.20%), total sugars (1.54-2.39%), pectin content (1.03-2.08 %), and tannins (0.96-1.10 %). The obtained results were subjected to multivariate statistical analysis, using cluster analysis were formed into 5 clusters.

Keywords- Genotype, Variability, Wood apple, Cluster analysis etc.

Innovative approach for enhancing the Farmers income Mushroom cultivation: A sustainable source of alternate livelihood and women empowerment

Ch. Ruth[1], K. Swarajyalakshmi[2]

[1]Department of Plant Pathology, Dr. YSR Horticultural University,
College of Horticulture, Anantharajupeta, Annamayya dt., Andhra Pradesh

[2]Department of Post Harvest Management, Dr. YSR Horticultural University,
College of Horticulture, Anantharajupeta, Annamayya dt., Andhra Pradesh

RTAAAS/AB/2024/108

Training was provided to rural women and youth in villages on establishing mushroom units during the year 2021 to 2023 in Annamayya district of Andhra Pradesh. They learned about cultivation of the white oyster (*Pleurotus djamor*), pink oyster (*Pleurotus oeus*), Ashy white oyster (*Pleurotus ostreatus*) and milky mushrooms (*Calocybe indica*), value addition and sale of quality mushrooms. The mushroom cultivation is a sustainable source of income for rural women, farmers and youth on establishing mushroom units. It had a profound impact on women empowerment. By utilizing available sanitized rooms, they successfully grew different types of mushrooms. This initiative not only enhanced their nutritional security but also provided them with a new source of income. As a result, their economic stability improved and they enjoyed better health through access to fresh, homegrown mushroom produce. The College of Horticulture, Anantharajupeta conducted awareness programme in mushroom cultivation to women beneficiary's self-help group members and explained the procedure on cultivation of mushrooms in adopted villages. Established mushroom units in adopted villages under Mana Gramam- Mana Viswavidyalayam Program. The rural women learnt about the prospects and opportunities in mushroom cultivation through Dr. YSRHU -College of Horticulture, Anantharajupeta. A harvest provides an average of 750 gm of mushroom from one kg of paddy straw. The harvested mushrooms are fresh and fetch Rs. 250-300 per kg in the local market. This milky mushroom has a good shelf life. They learned about co-ordination in execution of various activities like cultivation of white oyster (*Pleurotus ostreatus*), pink oyster (*Pleurotus djamor*) and milky mushroom (*Calocybe indica*), sale of quality mushrooms and increased their income.

Keywords: Mushroom cultivation, women empowerment, village adoption

Hastened Surgical Wound Healing Using Autologous Prf in a Sheep

A.K. Tiwari[1*], S.A. Chauhan[1] and Swethasri P. T.[2]

[1]Department of Veterinary Surgery & Radiology, KNPCVS, Shirwal, Satara, Maharashtra.

[2]Department of Veterinary Medicine, CVSc, GADVASU, Ludhiana, Punjab.

RTAAAS/AB/2024/109

The growing applications of autologous platelet-rich fibrin (PRF) across a wide variety of medical fields aims at regenerating, enhancing, or replacing damaged or missing soft tissues. PRF is a 2 nd -generation platelet concentrate containing WBCs, macrophages and various growth factors required for wound healing. The present paper clinically evaluates the effect of autologous PRF application to hasten surgical wound healing. A 2.5 years-old male Madgyal sheep (71.2 Kg) was presented with head-shaking, soft and gradually increasing swelling on the concave surface of right ear pinna with purulent ear discharges for two weeks. Aspiration of the contents was done twice by the owner but condition recurred. The condition was diagnosed as aural hematoma secondary to Psoroptes cuniculi infestation. Clinical and haemato-biochemical parameters were normal. Right ear was prepared aseptically and the animal was restrained in left lateral recumbency and sedated with inj. triflupromazine @0.1mg/kg and inj. Diazepam @0.2mg/kg body weight IV. The contents were drained by S-shaped incision and the fibrotic tissue lining the cavity was scrapped off. Autologous PRF was placed in the wound and over the incision line to accelerate wound healing. Through and through sutures were placed using nylon to obliterate the dead space and to prevent recurrence. Pressure bandaging of the ear was done after antiseptic dressing. Post operatively inj. Streptopenicillin @1.25g and inj. Meloxicam @1mg/kg were administered for 5 days with alternate day wound dressing. Inj. Ivermectin @ 0.2mg/kg SC was given on 1 st and 7 th days post-op. Excellent healing of the surgical wound was evident on the 3rd day post-op. Wound healing was further appreciated on 7 th , 10 th , 15 th and 21 st day post-op and revealed minimal scar tissue and no-recurrence of the condition when followed for eight months post-op. The currently available literature supports the clinical effect of hastened soft- tissue wound healing using autologous PRF discussed in this paper.

Nutritional Impacts of Root Knot Nematode and Cercospora Leaf Spot on Mungbean Plant

Priyadarshini Srivastava, Hari S. Gaur[1], Saleem Siddiqui

Department of Life Science, Sharda School of Basic Science and Research.

Sharda University, Greater Noida, Uttar Pradesh, India

[1]Distinguished Professor, School of Agriculture, Galgotias University, Greater Noida, Uttar Pradesh, India

RTAAAS/AB/2024/110

This study examines the impact of root-knot nematode (*Meloidogyne incognita*) and Cercospora leaf spot (CLS) on the nutrient content of mungbean (*Vigna radiata* L.) roots and shoots. Experiments were conducted using different nematode inoculum levels (0, 400, 800, and 1600 J2/plant) in the presence and absence of CLS. The results revealed significant reductions in key nutrients under combined stress conditions. Nitrogen content in the roots increased progressively with higher nematode inoculum levels, reaching the highest at 1600 J2/plant. Nitrogen content in shoots decreased by up to 49.92% at the highest inoculum level when CLS was present, indicating severe impairment of nutrient assimilation. Phosphorus content increased with rising nematode inoculum levels, peaking at 1600 J2/plant, showing 67.04% increase in the absence of CLS. Phosphorus content in shoots was also notably reduced, with an 80.32% decline under the highest nematode and CLS stress. Potassium levels in shoots dropped by 50.27% under combined stress, reflecting disruptions in water regulation and stomatal function. Micronutrients such as zinc, iron, and manganese showed marked reductions, with iron content in shoots decreasing by up to 27.08% at the highest stress level. Molybdenum content, crucial for nitrogen fixation, was reduced by 33.05% in roots under combined stress. These findings highlight the compounded detrimental effects of root-knot nematode and CLS on mungbean nutrition and plant health, emphasizing the need for integrated pest management (IPM) strategies to mitigate these impacts. The study provides critical insights into the synergistic interactions of biotic stresses and their effects on crop nutrient dynamics, paving the way for more resilient mungbean cultivation practices.

Keywords: Mungbean, Cercospora Leaf Spot , Nutrient Content.

Effects of Nutrients Foliar Spray on Mulberry Growth and its effect on the Rearing of *Bombyx mori* L. Silkworms.

Sapna Devi[1], Nentia Chib[2]and R S Bandral 2

[1]PhD scholar, Divsion of Sericulture, [2]PhD scholar, Division of Plant Pathology, [3]Professor,

Division of Sericulture, Faculty of Agriculture, SKUAST- Jammu, Jammu and Kashmir, India.

RTAAAS/AB/2024/111

The impact of nutrients on mulberries in field conditions was investigated through a field experiment. The growth and yield of silkworms and mulberries were evaluated in this study using various nutritional combinations. Numerous mulberry growth and yield characteristics were significantly impacted by foliar spraying leaves with zinc, iron, calcium, and magnesium for plant parameters. For (Zn@0.4%), the highest values were recorded for the longest branch length, average branch length, fresh weight of 100 leaves, leaf yield, and moisture content of (120.110 cm), (102.880 cm), (1020), (439.117 g), (78.653 %), and (17.719 %) in the spring and (123.333 cm), (105.333 cm), (785), (596.550 g), (5.216 kg), (76.060%), and (16.072%) for the fall. Larvae of silkworms were fed treated leaves and all biological and economic parameters were recorded. The results showed that numerous rearing parameters were significantly impacted by foliar spraying of Zn, Fe, Ca, and Mn. In Zn@0.4%, the maximum weight of 10 mature larvae, cocoon yield/10000 larvae by number, pupation rate, single cocoon weight, single shell weight, and shell ratio percentage were recorded with values of 55.670g, 9110, 91.720%, 2.16g, 0.47g, and 22.38 %, respectively. It also showed that Zn@0.4% had the highest average filament length, raw silk percentage, and denier values, measuring 1100 m, 15.271%, and 2.895, respectively. Numerous mulberry and raising factors were significantly impacted by foliar spraying leaves with Zn, Fe, Ca, and Mn. Increased leaf production and improved rearing parameters were the results of foliar spraying Zn@0.4%, indicating that using zinc @ 0.4% in combination could lead to a larger cocoon crop. With a high leaf moisture retention percentage of 93.94, the application of zinc @ produced the best growth and yield characteristics among the treatments, including plant height (198 cm), number of shoots (14 plant-1), number of leaves (646 plant-1), leaf area (101146 cm 2 plant-1), and leaf yield (1218.369 g plant-1). Larval weight, effective rate of rearing by number, effective rate of rearing by weight, single cocoon weight, single shell weight, and number of cocoons per kilogram were among the silkworm yield characteristics that were higher than those of the other treatments.

Keywords: Mulberry, foliar spray, micronutrients, rearing, yield

Scope of Fodder Resources under Fodder Tree based Agroforestry systems in Karnataka

Girish Shahapurmath[1*], Inamati, S. S[1] and Akshay Madiwalar[1]

[1]Assistant Professor, College of Forestry, UASD, Sirsi Uttara Kannada District, Karnataka, India.

RTAAAS/AB/2024/112

Fodder shrubs and trees play a significant role in farming systems, where they are protected as fallow species, and in livestock production. The importance of browse increases with increasing aridity and is generally most essential in the dry seasons, when most other feed resources depreciate in quality and quantity. Generally, trees occupy a significant niche in the farming systems and overall way of life in animal production. The leguminous trees and shrubs are often higher in crude protein and other nutrients and play a vital role as dietary supplements of low-quality grasses in dry seasons. The need for increased cultivation and integration of fodder trees (leguminous) into local farming systems through agroforestry is imperative in order to promote livestock production and also support the rural livelihoods. The fodder requirement in India is 883.95 Mt of green fodder and 583.66 Mt of dry fodder whereas, the estimated fodder production is 664.73 Mt of green fodder and 355.93 Mt of dry fodder. Hence to minimize the existing gap of 218.22 Mt of green fodder and 227.73 Mt of dry fodder, adequate policy and research level initiatives have to be taken to strengthen the existing fodder resources. In most parts of our country after the end of rainy season, animals suffer badly due to lack of protein rich diet since availability of fodder become scarce. The situation becomes serious during the dry season under rainfed conditions, when generally no crop can be grown and natural pasture, grasses, and weeds become unproductive. Farmers either feed their animals with the low-quality hay of the stored crop residues or they travel long distances to gather green grasses or fodders. In such circumstance, shrubs and fodder trees are able to withstand the drought, stay green, and provide a nutritious fodder for livestock. At present agroforestry meets almost half of the demand of fuelwood, 2/3rd of the small timber, 70-80 per cent wood for plywood, 60 per cent raw material for paper pulp and 9-11 per cent of the green fodder requirement of livestock, besides meeting the subsistence needs of households for food, fruit, fiber, medicine, timber, etc. However, current biomass productivity per unit area and time is less than 2 t/ha/y. Agroforestry practices have demonstrated that this could be safely enhanced to 10 t/ha/y by carefully selecting tree-crop combinations. In Western highlands of Kenya, the leafy biomass yields of hedges maintained at a height of 0.5m were compared for *Leucaena leucocephala*, *Calliandra calothyrsus* and

Sesbania sesban. In the establishment year the fresh yields were 11.2, 17.2 and 20.3 t/ha respectively. However, in the next 8 months Calliandra had the highest yield (36.7 t/ha) followed by Leucaena (24.3 t/ha). Sesbania had the lowest yield (10.8 t/ha) due to the death of the trees as a result of pruning stress. Sanchez and Sanchez (2002) opined that the total biomass yield increased as the pruning interval was delayed, but the proportion of edible biomass declined with age. Tree survival was negatively affected by frequent pruning. The pruning interval has to be at least 4 months to maintain the productivity at an acceptable rate in such systems. The palatability trial by Cafeteria method suggested that L. *leucocephala* was mostly preferred by sheep and goats and consumption of tree leaves was 24.41±0.67 and 33.90±3.27g DM/kg. In both sheep and goat, palatability of *Leuceana leucocephala* and Inga dulce were ranked first and second respectively. The Study concluded that leaves of L. *leucocephala* could serve as a better tree fodder for small ruminants. This could be due to the presence of secondary plant metabolites such as Beta-carotene and Xanthophyll in Leucaena. The study revealed that Albizia lebbeck was least preferred tree fodder in goats and *Gliricidia sepium* in sheep thus indicating that these fodders could be fed first followed the most palatable tree fodder to improve / increase the dry matter intake. Rawat and Vishvakarma concluded that nearly 89.44 per cent required as annual fodder for total 267 households (five villages) at Kullu and Lahaul valleys (Himachal Pradesh) came from agroforestry, kitchen garden, cultivated grassland, horticulture, grass from forest and forest trees. The remaining 10.56 per cent was procured from external sources. He also opined that the arrangement of different tree species under indigenous agroforestry systems, meets seasonal needs for food, fodder, fuelwood and other subsistence requirements. The lopping period varied from species to species. There is a great variation in fresh herbage mass yield of popular fodder trees in mid hills districts of Nepal. *Artocarpus lakoocha* (Badahar), *Litsea polyanthus* (Kutmiro) and *Ficus lacor* (Kabro) were the most popular and promising fodder species. Biomass production was positively related with the age of the fodder tree species in the traditional management system indicating the higher biomass potential varied as per species. This also suggest the need to develop appropriate lopping practice. The research studies revealed that fodder trees and shrubs play a significant role within the farming system. The potential of leguminous fodder trees can be seen for their multipurpose nature and their ease of integration into existing farming systems. Leguminous fodder trees can be used for the improvement of both crop and livestock production and thus offer a means of linking livestock production with arable crop production. They are therefore immensely suitable for the improvement of farming systems through soil fertility maintenance (for crop production) and increased availability of high-

protein feed for livestock. The potentials of fodder trees and shrubs remain vital in the support of rural livelihoods and food security. Hence, the inclusion of leguminous trees in tropical land use systems offers many advantages at minimum expense.

Keywords: Tree fodder, farming systems, total biomass, pruning interval, indigenous agroforestry systems, leguminous fodder trees, kitchen garden, lopping period.

Effect of Humic Acid, Micronutrients and Growth Regulators on the Performance of Bhendi.

R. Bhuvaneswari*, S. Srinivasan[1], S. Suganthi[2], R. Nageswari, P. Rajarathinam and R. Arul Ananth

*Tamilnadu Rice Research Institute Aduthurai,

[1]-Annamalai University - AC&RI –Vazhavachanur

Department of Soil Science and Agricultural chemistry

RTAAAS/AB/2024/113

A field experiment was conducted to study the effect of humic acid micronutrients and growth regulators on bhendi at Guddampatti village near Errabaiyahalli taluk, (80:40:40),T 2- Humic acid @ 30 kg soil application,T 3 - Humic acid + Micronutrients mixture (Cu, Zn, Mn, Fe, Mo, B) @ 50 ppm,T 4 - Humic acid + Growth regulator1 (Gibberellic acid @ 50 ppm)T 5 – Humic acid + Growth regulator2 (Indole-3 Butyric acid @ 50 ppm),T 6 - Humic acid + Growth regulator3 (Naphthalene acetic acid @ 50 ppm),T 7 - Humic acid + Micronutrients mixture @ 50 ppm + Growth regulator1 (Gibberellic acid @ 50 ppm),T 8 - Humic acid + Micronutrients mixture @ 50 ppm+ Growth regulator2 (Indole-3 Butyric acid @ 50 ppm) ,T 9 - Humic acid + Micronutrients mixture @ 50 ppm+ Growth regulator3 (Naphthalene acetic acid @ 50 ppm) Each treatment was replicated thrice. The results of the field experiment revealed that combined application of HA @ 30 kg ha -1 + micronutrients mixture @ 50 ppm + growth regulators1(Gibberellic acid @ 50ppm) (T 7) was recorded highest growth parameters viz., plant height (138.8 cm), number of leaves plant -1 (33.9), number of branches plant -1 (3.16),leaf area index (6.71), day taken to first flowering (40.55 days), Chlorophyll content (3.51 mg g -1) and dry matter production (16.13 t ha -1), yield attributes viz., number of fruits plant -1 (23.24), stem girth of plants(4.43 cm), fresh fruit weight per plot (23.50 g), fruit length (21.35 cm), fruit yield (28.98 t ha -1) and stover yield (11.74 t ha -1) and quality parameters viz., Titrable acidity in fruit sample (0.73 percent), Ascorbic acid content (14.73 mg 100 g -1) crude fiber content (14.56 percent), crude protein content in fruit sample (13.42 percent) and Total soluble solids of fruit sample (5.05 percent) were recorded significantly increased with the application of HA @ 30 kg ha -1 + Micronutrients mixture @ 50 ppm + Growth regulators1 (Gibberellic acid @ 50 ppm) (T 7) and concluded that combined application of humic acid @ 30 kg ha -1 along with micronutrients @ 50 ppm and growth regulators1 (Gibberellic acid @ 50 ppm) increased growth, yield, and quality characters of bhendi.

Keywords: humic acid, micronutrients, growth regulators, growth and yield

Evaluate the spatiotemporal climate variability across the three-decade Haryana wheat cultivation period (1990-2020)

Suresh[1*], Ram Niwas[1] and M.L. Khichar[1]

[1]Department of Agril. Meteorology, CCS HAU HISAR, Harayana, India

RTAAAS/AB/2024/114

The wheat plant, scientifically known as *Triticum aestivum* L., belonging to the Gramineae (Poaceae) family, plays a significant role in India's agriculture. India ranks third globally in wheat production, cultivating over 31.1 million hectares in 2020-21 and yielding] 109.6 million metric tons at a rate of 3521 kilograms per hectare [2]. In Haryana, wheat cultivation covered 2.35 million hectares, yielding 11.40 million metric tons at a rate of 4687 kilograms per hectare [3]. This study highlights the adverse impact of climate change on wheat yields, especially due to temperature fluctuations during various growth stages. Warmer temperatures shorten vegetative crop duration, resulting in sparse tillering, poor growth, and premature heading during the early vegetative phase, and forced maturity during grain filling [4]. The study examined the spatio-temporal variability of climate on wheat cultivation from 1990 to 2020, utilizing long-term climatic data on maximum temperature, minimum temperature, and rainfall. The data, processed in a GIS environment and converted into TIFF format, revealed that districts Panchkula and Yamuna Nagar had the lowest average annual maximum temperature at 28°Cover the thirty-year period. An inverse relationship between air temperature and wheat yield was observed, indicating that higher temperatures during the growing season led to lower yields. The study emphasizes the combined impact of climate factors in reducing wheat yield.

Keywords: Wheat, climatic variability, GIS Analysis.

Variation in standard Carnation varieties for growth, flowering and vase life under polyhouse

Ritika[1*], Bijender Singh[1] and Arvind Malik[2]

[1]Dept. of Horticulture, MHU, Karnal

[1]Dept. of Horticulture, MHU, Karnal

[2]Dept. of Horticulture, CCSHAU, Hisar

RTAAAS/AB/2024/115

The present study entitled "Evaluation of Carnation (*Dianthus caryophyllus* L.) varieties for growth, flowering and vase life under polyhouse" was carried out at Agri-Tourism Centre and laboratory experiment in Department of Horticulture, at Chaudhary Charan Singh Haryana Agricultural University, Hisar during the year 2023-2024. The experimental results showed that var. Baltico attained maximum plant height (68.07 cm), Length of internodes (10.59 cm), leaf area per plant (2391.97 cm 2) and number of flowers (6.67). However, maximum number of shoots (6.20), number of leaves (169.13), cut stem length (66.33 cm) and stalk length (78.53 cm) were observed in var. Bizet. Minimum days (133.67) to initiate first bud and first flower harvesting stage (143.33 days) along with best duration of flowering (80.33 days) were taken by var. Kiro. Var. Kloe presented maximum vase life of 7 days. Therefore, this can be concluded that varieties showed significant difference among different vegetative, flowering and vase life characters which might be due to genotypic differences.

Keywords: Carnation, Genotypic, Polyhouse, Stalk length and Vase life

Effects of Agroecological Farming Systems on Soil Carbon Pools and Biodiversity in a Maize-Wheat Cropping System

Shobhana Singh[1*], D. K. Singh[2], Subhash Chandra[3], Sumit Chaturvedi[4] and Suranjana Biswas[5]

[1*]Ph.D. Scholar, Department of Agronomy, College of Agriculture,
GB Pant University of Agriculture Technology, Pantnagar, Uttarakhand, India,
[2]Proffesor, Department of Agronomy, College of Agriculture,
GB Pant University of Agriculture Technology, Pantnagar, Uttarakhand, India,
[3]Chief Scientist, Department of Agronomy, College of Agriculture,
GB Pant University of Agriculture Technology, Pantnagar, Uttarakhand, India,
[4]Proffesor, Department of Agronomy, College of Agriculture,
GB Pant University of Agriculture Technology, Pantnagar, Uttarakhand, India,
[5]Ph.D. Scholar, Department of Agronomy, College of Agriculture,
GB Pant University of Agriculture Technology, Pantnagar, Uttarakhand, India,

RTAAAS/AB/2024/116

Agroecological practices play a critical role in enhancing soil health, biodiversity, and system resilience, which are fundamental to sustainable agricultural development. This study explores the relationship between agroecology and biodiversity through a two- year experiment (2022-2024) conducted at the Organic Block Norman E. B., Crop Research Centre, G.B Pant University of Agriculture and Technology, Pant Nagar. Organic farming led to the highest levels of microbial diversity, highlighting its role in promoting beneficial soil microorganisms essential for ecosystem resilience. Conversely, system productivity was highest under ICM with botanical pesticides, which achieved results comparable to those of ICM with chemical pesticides, suggesting that both strategies can effectively sustain crop yields. The findings underscore the potential of organic and natural farming systems to enhance soil carbon dynamics and biodiversity, while also illustrating the effectiveness of ICM practices in maintaining productivity. This research emphasizes the importance of integrating agroecological principles into agricultural practices to foster sustainable and resilient farming systems. Overall, the study contributes valuable insights into the interplay between farming practices, soil health, and biodiversity, reinforcing the need for diversified agricultural approaches.

Keywords: Organic farming, Carbon fractions, System productivity, Soil health

Export-related Issues for Organic Farming

Vamsi Boddu *

PhD (Vegetable Science),

Dr. Y.S.R. Horticultural University, COH, Venkataramannagudem

RTAAAS/AB/2024/117

Exporting organic agricultural products presents several complex challenges for farmers aiming to access international markets. These challenges include the divergence of certification standards across different countries, high costs associated with organic certification, and the need for extensive documentation and traceability to meet export requirements. Market access is often impeded by tariffs, trade restrictions, and bureaucratic elays, while countries with a preference for locally produced organic goods may limit foreign competition. Additionally, pesticide residue testing, supply chain logistics, and the perishable nature of organic products create additional hurdles for exporters. Currency fluctuations, pricing pressures, and varying consumer demand further complicate the financial aspects of organic trade. Intellectual property and branding issues, along with climate change- induced production variability, add to the difficulties in establishing strong market presence. Trade agreements, such as Brexit, and shifting policies on organic imports exacerbate uncertainties in global organic trade. Furthermore, ethical considerations related to fair trade, labor rights, and sustainability are increasingly influencing market expectations. To overcome these challenges, organic farmers must strategically navigate regulatory frameworks, invest in sustainable practices, and ensure compliance with certification requirements to successfully engage in global markets. This highlights the need for proactive planning, robust supply chains, and continuous adaptation to dynamic trade conditions.

Keywords - Organic farming, export challenges, certification standards, market access, tariffs, pesticide residue testing, supply chain logistics.

Assessing Chickpea Response to Foliar Micronutrients: PDKV Grade X

Swati N. Thakre[1], Padmaja H. Kausadikar[2], Ommala D. Kuchanwar[3], R. N. Katar, Associate Dean[4]

[1]PG scholar, Soil Science Section, College of Agriculture, Nagpur.

[2]Assistant Professor, Soil Science Section,

College of Agriculture, Nagpur.

[3]Associate Professor, Soil Science Section,

College of Agriculture, Nagpur.

[4](Lower Agricultural education),

College Of Agriculture, Akola.

RTAAAS/AB/2024/118

The present investigation entitled “Evaluating chickpea response to PDKV foliar micronutrient grade X" was conducted during the rabi season of 2023-2024 at Net House, Soil Science Section, College of Agriculture, Nagpur. The experiment was carried out using pot culture method. It was framed in Completely Randomized Design with eight treatments comprises T1: Water spray at 25 DAS, T2: Water spray at 50 DAS, T3: 5 ml L-1 at 25 DAS, T4: 5 ml L-1 at 50 DAS, T5: 7.5 ml L-1 at 25 DAS, T6: 7.5 ml L-1 at 50 DAS, T7: 10 ml L-1 at 25 DAS, T8: 10 ml L-1 at 50 DAS with three replications. PDKV foliar micronutrient grade X provides Fe (2.5%), Zn (5.0%), B (0.5%), and Mo (0.1%). The application of foliar grade X micronutrient 7.5 ml L-1 at 50 DAS treatment significantly resulted in the highest number of branches plant-1, with 4.13 branches at 50 DAS and 6.97 branches at 60 DAS. Additionally, the number of nodules plant-1 peaked at 4.50, marking a 24 per cent improvement over control. The significant increases in iron (60.27 mg kg−1), manganese (24.05 mg kg−1), zinc (12.30 mg kg−1), copper (8.66 mg kg−1) and boron (10.27 mg kg−1) concentrations observed with 10 ml L−1 foliar grade X at 50 DAS.

Keywords: Foliar application, PDKV Micronutrient grade X, Chickpea, Pot culture

Productivity and weed dynamics under herbicidal weed management in Onion

Perna Hinge*, A. P. Karunakar and V. V. Goud

Post Graduate Institute, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra

RTAAAS/AB/2024/119

A present investigation entitled, "PRODUCTIVITY AND WEED DYNAMICS UNDER HERBICIDAL WEED MANAGEMENT IN ONION", was carried out at All India Co-ordinated Research Project on Weed Management, Department of Agronomy, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, during Rabi season of 2023 and 2024 for two years. The experiment was carried out to study the relative efficacy of herbicides on weed control in onion as well as to study its effect on growth and yield of onion. The experiment was laid out in Randomized Block Design with three replication and eight treatments. The treatments comprised of oxyfluorfen 23.5% EC at 0.100 kg/ha PE (0-5 DAT) (T 1), oxyfluorfen 23.5% EC at 0.100 kg/ha PE (0-5 DAT) fb quizalofop-ethyl 4% + oxyfluorfen 6% EC at 0.100 kg/ha (RM) PoE (2-3 leaf stage of weed) (T 2), oxyfluorfen 23.5% EC at 0.100 kg/ha PE (0-5 DAT) fb propaquizafop 5%+ oxyfluorfen 12% EC at 0.148 kg/ha (RM) PoE (2-3 leaf stage of weed) (T 3), pendimethalin 38.7% CS at 0.677 kg/ha PE (0-5 DAT) (T 4), pendimethalin 38.7% CS at 0.677 kg/ha PE (0-5 DAT) fb quizalofop-ethyl 4% + oxyfluorfen 6% EC at 0.100 kg/ha (RM) PoE (2-3 leaf stage of weed) (T 5), pendimethalin 38.7% CS at 0.677 kg/ha PE (0-5 DAT) fb propaquizafop 5%+ oxyfluorfen 12% EC at 0.148 kg/ha (RM) PoE (2-3 leaf stage of weed) (T 6), Farmers practice (Hand weeding at 20, 40 & 60 DAT) (T 7) and Weedy check (T 8) respectively.The soil of experimental field characterized as clayey in texture, having slightly alkaline pH (7.9), moderate organic carbon status (0.46%), low nitrogen content (182.0 kg/ha), medium available phosphorus content (17.30 kg/ha), high potassium status (264.0 kg/ha). Onion (Akola safed) was transplanted at 10 x 10 cm spacing with 100:50:50:30 NPKS kg/ha.In the experiment field, observed predominant weed flora were *Cyperus rotundus* L., *Commelina benghalensis*, *Parthenium hysterophorus*, *Digitaria sanguinalis*, *Dactyloctenium aegyptium*, *Portulaca oleracea* L., *Phyllanthus niruri* L, Ipomea sp., *Digera arvensis*, *Argemone mexicana*, *Echinochloa colonum*, etc.The weed density, weed dry matter accumulation and weed management efficiency varied significantly with the stages of the crop. Considering the weed management strategies significantly minimum weed density, weed dry matter accumulation, weed index and relatively maximum weed control efficiency were recorded in Farmers practice (Hand weeding at 20, 40 and 60 DAS) followed by oxyfluorfen 23.5% EC @ 0.100 kg/ha pre-emergence (0-5 DAT) fb propaquizafop 5%+ oxyfluorfen 12% EC @ 0.148 kg/ha (RM) post-

emergence (2-3 leaf stage of weed) due to integrated weed management. Among the herbicidal treatments, application of oxyfluorfen 23.5% EC @ 0.100 kg/ha pre-emergence (0-5 DAT) fb propaquizafop 5%+ oxyfluorfen 12% EC @ 0.148 kg/ha (RM) post-emergence (2-3 leaf stage of weed) produced higher plant height, dry matter accumulation, polar and equatorial diameter of onion bulb, dry weight of bulb (g), bulb yield (t ha -1). While Farmers practice i.e. Hand weeding at 20, 40 and 60 DAS in onion recorded highest GMR. However, maximum NMR and B:C ratio in onion was obtained with application of oxyfluorfen 23.5% EC @ 0.100 kg/ha pre- emergence (0-5 DAT) fb propaquizafop 5%+ oxyfluorfen 12% EC @ 0.148 kg/ha (RM) post-emergence (2-3 leaf stage of weed).

Calendula officinalis – A Potent Herb

Aishwarya R. Ingole[1], Aniketkumar. L Bijewar[2],

[1,2]Ph. D Scholar

Department of Floriculture and Landscape Architecture,

Post Graduate Institute, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola

RTAAAS/AB/2024/120

Calendula officinalis is one of the most commonly used medicinal plant in India, China, Europe and US. Calendula is known as pot marigold belongs to family Asteraceae, is an annual herb growing about 80 cm tall, having corymbosely branched stem, long tap root with numerous secondary roots, alternate and sessile leaves. The plant has yellow to orange flowers. The plant species has been reported to contain a variety of phyto- chemicals, including carbohydrates, phenolic compound, lipids, steroids, tocopherols, terpenoids, quinones and carotenoids with different health benefits. The major active constituent includes triterpendiol esters, saponins and flavonoids. The orange colour flower contains high carotenoids. Flower extract showed 15 free amino acid, fatty acid and lipids also. Due to presence to of compound like saponin, resins and essential oil calendula extract widely used in cosmetics. Calendula is versatile therapeutic agent effective against burn, eye care, chronic ulcer, jaundice, fever, skin disease, wound healing, rashes and gastrointestinal issues. Calendula flower petals are edible use in salad, cookies, tea, cupcakes and squash. Besides its health benefits calendula find application in the pharmaceutical, dye, painting, food and cosmetic industries. The dried flower heads have been used for antipyretic, anti-tumor effect. Currently, this plant is used in registered homeopathic drugs. Calendula petal powder is an economical substitute for saffron because its coloring and flavoring aided in food products in early times. Various study showed that calendula have highly effective anti-bacterial, anti-fungal, anti-helminthic, anti-molluscal, antioxidant, anti-microbial, anti-tumor and anti-inflammatory with zero toxicity. It is promising plant which can be used for various health benefits.

Keywords- Calendula, medicinal use, chemical composition, disease, health benefit.

Foliar application of Irradiated Chitosan formulation prevents the grapevine downy mildew disease infection and improves the yield

KHATAL. M. P*[1]., NARUTE T. K[1]., V. K. BHALERAO[1]., SONAWANE R. B.[2] and DALVI S. G.[3]

[1]Department of Plant Pathology and Agricultural Microbiology, Post Graduate Institute, MPKV, Rahuri, Maharashtra, India

[2]Onion and Grape Research Station Pimpalgaon Basawant, Nashik, M.S. India

[3]Tissue Culture Section, Vasantdada Sugar Institute, Manjari, Pune M.S. India

RTAAAS/AB/2024/121

Background and Aims: Chitosan, a chitin deacetylated derivatives, is biopolymer able to elicit the plant defense machinery against a variety of pathogens. In crop protection, chitosan is used as ecofriendly molecules to prevents the various pathogen. In this study, the efficacy of a new irradiated chitosan formulation evaluated in grapevine against downy mildew infection. Methods and Results: Different field treatment of chitosan nanoparticle in combination with *Bacillus subtilis* and *Trichoderma viridae* in different concentration and mixed with fungicide and given the alternative spray. In present studies, disease severity was maximum (43.83%) PDI in untreated treatment and lowest disease severity was recorded in chemical treatment Cymoxanil 8 % + Mancozeb 64 % WP @ 0.2% i.e. (14.16%) with 67.69% PDC. After the chemical treatment, Chitosan @ 150 ppm +B. subtilis @ 0.4 % was found best eco-friendly effective with 17.16% PDI with 60.84% PDC.

Conclusions: The irradiated Chitosan in combination with bio-agent prevents grapevine downy mildew infection with improve the yield quality and residue free production of grapevine. Significance of the Study: The possibility of using chitosan nanoparticle in combination with bio-agents in crop protection deserve particular attention because of their low environmental impact eco-friendly approach and their ability to improve efficacy of bio-agents ability and quality of grapevine bunches.

Unlocking Potential: Assessing the Constraints and Opportunities for Self-Help Groups in Rural Uttarakhand

Ruchi Rani Gangwar[1], Somya Tewari[2]

Assistant Professor[1], MSc Student[2], Department of Agricultural Economics, College of Agriculture, G.B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand

RTAAAS/AB/2024/122

Self-help groups (SHGs) play a vital role in promoting socio-economic development in rural areas, including in Uttarakhand. However, these groups face several challenges that hinder their growth and long-term sustainability. Key constraints include limited access to financial resources, inadequate training, weak market linkages, and governance issues. Financially, SHGs in the hill regions often struggle to secure adequate credit, receiving 20-30% less loan support than those in the plains, largely due to perceived credit risks and lack of collateral. This limitation reduces their ability to scale income-generating activities. Furthermore, a study by Sharma & Rana (2022) highlighted that about 62% of SHG members lack essential skills in financial management, market access, and basic business practices. Such gaps in training and skill development compromise the groups' operational efficiency and income potential. Another significant challenge is limited market access. According to the Uttarakhand State Rural Livelihoods Mission (2023), nearly 48% of SHGs struggle to establish consistent and stable market linkages, especially those focused on unique local products like handicrafts and organic farm produce. This disconnects from profitable markets negatively impacts their income and economic sustainability. Additionally, social, and institutional factors like irregular attendance, internal conflicts, and governance issues hinder the cohesiveness and productivity of SHGs. Research by Joshi et al. (2021) indicates that over 35% of SHGs in Uttarakhand face difficulties in maintaining active participation and holding regular meetings, which weakens group dynamics and effectiveness. Addressing these constraints through improved financing options, targeted training programs, stronger market integration, and institutional support is essential to empower SHGs and enhance their impact on sustainable livelihoods in rural Uttarakhand.

Optimizing Seed Rates and Organic Soil Health Practices to Enhance Soil Fertility and Productivity in Blackgram Cultivation

Suranjana Biswas[1*], V. K. Singh[2], Rohitashav Singh[3], D. K. Shukla[4] and Shobhana Singh[5]

[1]Ph.D. Scholar, Department of Agronomy, College of Agriculture,
G. B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand, India,
[2]Professor, Department of Agronomy, College of Agriculture,
G. B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand, India,
[3]Professor, Department of Agronomy, College of Agriculture,
G. B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand, India,
[4]Junior Research Officer, Department of Agronomy, College of Agriculture,
G. B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand, India,
[5]Ph.D. Scholar, Department of Agronomy, College of Agriculture,
G. B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand, India,

RTAAAS/AB/2024/123

Sustainable agricultural practices that prioritize soil health are essential for enhancing crop productivity, especially in leguminous crops like blackgram (*Vigna mungo* L.). Blackgram, known for its role in nitrogen fixation, has the potential to enhance soil fertility naturally; however, optimizing seed rates and integrating organic amendments are crucial to maximizing both yield and soil health benefits. This study explores the impact of different seed rates and soil health management practices, including organic fertilizers and biofertilizers, on the growth and productivity of blackgram while improving soil health. Field experiments were conducted at N.E.B. Crop Research Centre, G. B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand during Kharif seasons of 2022 and 2023, involving two seed rates (Normal and 125% Normal) and six soil health treatments: recommended dose of fertilizers (RDF), humic acid (HA), plant growth-promoting rhizobacteria (PGPR), RDF + HA, RDF + PGPR, and RDF + HA + PGPR, resulting in 12 treatment combinations. Results showed that the use of optimum seed rates along with integration of soil health management practices, particularly combinations of RDF, HA, and PGPR, significantly improved soil organic matter, soil structure and microbial activity, contributing to enhanced soil fertility and resilience, besides improving blackgram yield. This approach supports long-term soil fertility, providing farmers with a low-input, environmentally friendly strategy for improving productivity within legume-based cropping systems.

Keywords: Blackgram, Humic acid, PGPR, seed rate, soil health, organic fertilizer

Market Linkage Strategies for Millets in Karnataka: Enhancing Market Accessibility for Farmers

Punith Kumar[1*], Hanumantappa Jamanal[2] and Adithya Bikkannavar[3]

[1]Management Trainee (Marketing), Rastriya Chemicals and Fertilizers Limited, Vijayawada, Andhra Pradesh

[2]Teaching assistant Kousali institute of management studies KU Dharwad Karnataka

[3]Research Scholar, Department of resource Management and Counsumer Science, College of Community Sciences, UAS Dharwad, Karnataka

RTAAAS/AB/2024/124

Millets, once a staple grain in India, are experiencing a resurgence due to their resilience, nutritional benefits, and low input needs. Karnataka, a leading millet producer, contributes significantly to India's output, but limited consumer acceptance and market linkages hinder income potential for millet farmers. This study explores strategies to strengthen market linkages for Karnataka's millet sector, examining the roles of Farmers Producer Organizations (FPOs), contract farming, government initiatives, entrepreneurship, and exports. FPOs provide structure for small farmers, facilitating value addition and greater market reach. Contract farming offers farmers stable incomes and a guaranteed market, while government programs like the Public Distribution System (PDS) and Mid-Day Meal schemes expand millet accessibility, particularly for vulnerable groups. Startups and private entities are innovating millet-based products to capture health-conscious consumers and explore export opportunities. The recommended strategy integrates FPO aggregation, contract farming, government support, and entrepreneurial efforts to create a sustainable millet supply chain that serves both local and international markets. These models enhance production efficiency, secure demand, and elevate income potential for farmers. With supportive policies, infrastructure improvements, and consumer awareness, Karnataka's millet framework can expand consumer access to this valuable grain, benefitting both agriculture and public health.

Keywords: Millets, Market Linkage, Karnataka, Farmers Producer Organizations, Contract Farming

Studies on performance of rose (*Rosa spp*.) under different growing condition.

Siddhi R. Patil

(Assistant professor, DYP, College of Agriculture, Talsande)

RTAAAS/AB/2024/125

A study on different growing conditions in rose cv. Gladiator was carried out at College of Horticulture, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli during the year 2018-19 and 2019-20 in randomized block design with three treatments of growing condition viz., Open field, Polyhouse condition and Shadenet condition, it was undertaken by considering the commercial importance of rose to maximize the production of farmer throughout the year. The result revealed that, the significantly maximum plant spread (44.17), leaf area (8393.67 cm 2), days taken for tight bud stage (39.16), was recorded in treatment T 2 i.e. polyhouse. Bud length (4.23 cm), bud diameter (3.44 cm), flower diameter (9.84 cm), stem diameter (1.78 cm), number of petals per flower (50.07), fresh weight of fully open flower (20.43 g), was recorded in treatment T 1 i.e. open.

Keyword- Rose, diameter, growth, weight, condition

Unearthing Resilience: Root-Shoot Morphology Insights for Enhancing Drought-Resistant Rice (*Oryza sativa* L.) Yield.

Saurabh Samdarshi[1], Sampoornanand Jha[2], M.B. Sharma[3] and Pankaj Saha[4]

[1]M.Sc. (Ag.) scholar, Department of Genetics and Plant Breeding, SAS, Nagaland University.

[2] Associate Professor, Central Department of Biotechnology, Tribhuvan University, Kirtipur, Kathmandu.

[3]Professor, Department of Genetics and Plant Breeding, SAS, Nagaland University, Medziphema.

[4]Associate Professor, Department of Genetics and Plant Breeding, SAS, Nagaland University, Medziphema.

RTAAAS/AB/2024/126

In a first-of-its-type study in the Nagaland region, 28 upland local landraces of rice were evaluated for drought resistance using root characteristics. The results showed that Longkhum Tsuk (SARS-2) exhibited the highest root length and volume, making it an ideal genotype for drought-prone areas. High genotypic and phenotypic coefficients of variation were observed for the root shoot ratio, root dry weight, root length, number of tillers per plant, effective spikelet per panicle, and grain yield per plant, with broad-sense heritability and genetic advance being high for root fresh weight, root dry weight, and root volume. Correlation and path analyses revealed positive associations between grain yield and root fresh weight, root dry weight, number of tillers per plant, effective spikelet per panicle, and 1000-grain weight, with root fresh weight, root dry weight, root length, and 1000-grain weight exhibiting positive direct effects on grain yield. These findings provide valuable insights for breeders in selecting traits for developing drought-tolerant rice varieties, highlighting the potential of root characteristics as key selection criteria for improving rice productivity in water-limited environments.

Keywords: Drought, Grain yield, Nagaland region and Root characters

Assessment of Physico-chemical Properties of Soil from Different Blocks of Gariyaband District, Chhattisgarh, India

Deepika Devdas*, L. K. Srivastava, V. N. Mishra and Gaurav Jatav

Department of Soil Science and Agricultural Chemistry, IGKV, Raipur (C. G.), India

RTAAAS/AB/2024/127

A study was carried out on assessment of physico-chemical properties of soil from Different Blocks of Gariyaband District, Chhattisgarh, India. The Physico-chemical study of soil is based on various parameters like pH, electrical conductivity, soil organic matter, available nitrogen, phosphorus, potassium, Calcium, Magnesium and Sulphur. The pH showed significant positive correlations with available P (r=0.208*), available Ca (r=0.226*) and available Mg (r=0.228*) in Inceptisols. Similar results also found with Alfisols and Vertisols, where pH showed significant positive correlations with EC (r=0.212*), available N (r=0.325*), available P (r=0.223*) and available Ca (r=0.232*) in Alfisols. Similarly, pH showed positive correlations with OC (r=0.147), available N (r=0.139), available P (r=0.134), available K (r=0.161), available Ca (r=0.200*), available Mg (r=0.186) and available S (r=0.064) in Vertisols. A Significant positive correlation of available N, available P, available K and available S was also observed with organic carbon. The corresponding r-value was 0.617**, 0.304**, 0.298** and 0.227* respectively in Inceptisols of Gariyaband District. Similar results were also found with Alfisols and Vertisols, where a significant positive correlation of available N and available K was observed with organic carbon in Alfisols. The corresponding r-value was 0.605** and 0.242*, respectively. Similarly, OC also showed significant positive correlations with available N (r=0.747**), available P (r=0.412**), available K (r=0.461**), available Ca (r=0.243*), available Mg (r=0.349**) and available S (r=0.225*) in Vertisols. Organic carbon also showed non-significant positive correlation with other nutrients. Therefore, it is suggested that there is a growing recognition of the importance of enhancing both macronutrients and micronutrients in the soil to support soil health and ensure proper plant nutrition. This is essential for achieving optimal economic yields and maintaining soil suitability for diverse crops.

Keywords: Physico-chemical properties, Macronutrients, Micronutrients, Soil, Gariyaband district, Chhattisgarh, etc.

Effect of macro and micronutrient doses on flowering attributes of mango (*Mangifera indica* L.) under medium density planting.

Kuldeep[1], A.K. Singh[2]

[1]Ph.D. Research Scholar, Professor[2], Department of Horticulture (Fruit Science), G.B. Pant University of Agriculture & Technology, Pantnagar, Uttarakhand, India

RTAAAS/AB/2024/128

The present investigation was carried out at Horticulture Research Centre, Pattharchatta, G. B. Pant University of Agriculture and Technology, Pantnagar, district, Udham Singh Nagar, Uttarakhand during the year 2023-24. The experiment was laid out in RBD (Randomized Block Design) with 10 treatments and 3 replications. The results showed that the foliar application of macro and micronutrients exhibited improvement in flowering attributes. The investigation has shown that the application of RDF (500 g N: 375 g P: 500 g K) + (two foliar sprays of 0.50% Ferric sulfate + 0.50% Calcium chloride + 0.50% Zinc sulfate + 0.10% at just before flowering and marble stage) was found very effective for reduces the Date of start of flowering (12-February to 20- February), Date of full bloom (24- February to 4- March), Duration of flowering (23.33 days) Increasing flowering intensity (48.56 %). Thus, it is concluded that the foliar application of RDF (500 g N: 375 g P: 500 g K) + (two foliar sprays of 0.50% Ferric sulfate + 0.50% Calcium chloride + 0.50% Zinc sulfate + 0.10% at just before flowering and marble stage) may be adopted for improving flowering attributes of mango cv. Dashehari.

Keywords: Duration of flowering, Experiments, Flowering intensity, Macro and Micronutrients.

Assessment of Climatic Variability and Trends Using Statistical Method

Shivani Mainwal, P V Singh and Anil Kumar

RTAAAS/AB/2024/129

Climatic variability, particularly rainfall, air temperature and wind has received a great deal of attention worldwide. The magnitude of the variability or fluctuations of these variables varies according to location. In the present study the variability and trend of these climate variables have been examined for Rajkot (Gujarat) during the period of 35 years from 1979 to 2013. The variability of these climatic variables has been analyzed using statistical parameters while trend analysis has been studied using non-parametric approaches such as Mann-Kendall and Sen's slope estimator test. Statistical and trend analysis has been done for various time scale i.e. monthly, seasonal (pre-monsoon, monsoon, post-monsoon and winter) and annual basis. The average minimum and maximum value of daily rainfall, maximum temperature, minimum temperature and wind were found as 0.00mm and 22.77mm, 26.60 0 C to 43.61 0 C, 11.37 0 C to 27.63 0 C and 1.98 m/s to 5.68 m/s. For rainfall there was an increasing trend from February to June and December and decreasing trend for the month January and July to November on monthly basis. The seasonal rainfall shows an increasing trend for winter and pre-monsoon season and decreasing trend for post- monsoon and monsoon season while it shows an increasing trend on annual basis. For maximum temperature there was an increasing trend from January to March, July, August and December and decreasing trend for April to June and September to November on monthly basis. The seasonal maximum temperature shows an increasing trend for winter and annual season while there was a decreasing trend for pre-monsoon, monsoon and post-monsoon. The minimum temperature showed an increasing trend from January to April and December and decreasing trend for May to November on monthly basis. The seasonal minimum temperature shows an increasing trend for pre-monsoon, winter and annual season while there was a decreasing trend for monsoon and post-monsoon. For wind showed an increasing trend from January to March and September to December and decreasing trend for April to august on monthly basis. The seasonal wind showed an increasing trend for pre monsoon, post monsoon and winter season while there was a decreasing trend for monsoon and annual season.

Application of Fermentation Technology in Jamun: A transition for doubling farmer's Income

Kuntal Satkar[1], S. G. Bharad[2] and Suman Rawte[3]

[1]Assistant Professor, Department of Fruit Science, College of Agriculture and Research Station, Gariaband,

[2]Head, Department of Fruit Science,College of Horticulture,

Dr.Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra

[3]Assistant Professor, Department of Genetics and Plant Breeding,

College of Agriculture and Research Station, Gariaband, Chhattisgarh

RTAAAS/AB/2024/130

Jamun wine production is an alternative for deployment of highly seasonal (May to June), highly perishable underutilized jamun fruits with short storability (upto 2-3 days under ambient temperature). The exploitation of underutilized fruits of jamun can provide a solution to nutrition, livelihood and economic security of tribals by using available traditional wisdom as well as modern processing technology. Setting up of fruit wineries could result in the economic upliftment of the tribals by generating employment opportunities. Keeping this scenario in view an investigation was undertaken for preparation of jamun wine at Department of Fruit Science, College of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola with objectives to prepare the wine from jamun fruit juice with the wine yeast (*Saccharomyces cerevisiae* var. ellipsoideus) as a transition for Doubling Farmer's Income. Amongst the combination tried for different levels of yease and fermentation duration treatment combination S 1 F 3 (*Saccharomyces cerevisiae* var. ellipsoideus inoculated at 0.20 g/l @ 21 days of fermentation) was found best in respect of TSS, Anthocyanin content, ethyl alcohol and anti-oxidant activity. Considering the findings of investigation and highest net monitory returns (5.86 B:C ration) obtained jamun wine production it could be concluded that, the appropriate combination of levels of yeast and fermentation duration is the needed for quality jamun wine production.

Keywords– Jamun, Wine, Yeast, Fermentation duration.

Erodibility Ranking and Mapping of a Himalayan Watershed Using TOPSIS and SAW Approaches

Mallika Joshi, Pravendra Kumar, Anil Kumar and P V Singh

RTAAAS/AB/2024/131

Soil erosion has a very intense impact on human activities through a decline in productivity of soils in the watershed of the Eastern Nayar watershed in Pauri district of Uttarakhand. Therefore, evaluation of these erodible areas is of utmost importance so that the preventive measures can be taken accordingly. It assessed the sub-basins in the basin using morphometric parameters and several multi-criteria decision-making models, such as Simple Additive Weighting (SAW) and Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), . Utilizing Advanced Space Thermal Emission Radiometer (ASTER) data and a 30 m Digital Elevation Model (DEM), morphometric parameters were extracted and analyzed. To test the MCDM methods, percent and intensity of change indices were adopted. TOPSIS ranked into four-categories low, moderate, high, and very high, SAW model gave three categories as moderate, high and very high. In general, the morphometric parameters were effective for identifying erosion-prone areas. The TOPSIS approach was slightly better in terms of predictive accuracy than the other model.

Entrepreneurial Behavioral Profile of Shg Entrepreneurs

Dr. Prerana Dhumal 1 and Mrs. Nilima V. Patil 2, Asst. Prof. Home Science, Krishi Vigyan Kendra
(Dr. P.D.K.V., Akola)

RTAAAS/AB/2024/132

Entrepreneurial behavior of women is an important element for success of any enterprise undertaken by women self-help groups. Research was conducted with the specific objectives to study and analyze the entrepreneurial behavior of SHG entrepreneurs. Entrepreneurial behavior is too complex phenomena to be explained by single factor. The fifteen factors to SHG women behavior combined to express in terms of SHG women entrepreneur behavior. The study was conducted in Chandrapur district of Maharashtra. Pretested structured interview schedule was administered for data collection. The statistical analyses were carried out by using SPSS 18.0 Software. The findings of the study revealed that the woman SHG member of the area possess the low level of risk-taking ability and decision-making ability, while problems solving attitude, time management skill and strong will power are on moderate level attributes important to become a successful entrepreneur. The innovativeness, flexibility, self-esteem, leadership ability of the women SHG members is of moderate level. The majority women SHG members of the area display low level of knowledge of legal aspects of business, commercial aspect of business, achievement motivation, need for influencing other. While moderate level of optimism attribute. Overall, it is concluded from the results that SHG entrepreneur of the area display moderate level of entrepreneurial characteristics (9 attributes out of 15).

Keywords- Entrepreneurial behavior, Self Help Group Women, Entrepreneurship,

Optimizing Horticulture Crop Production Using IoT-Driven Smart Indoor Plant Cultivation Systems: Advancements in Resource-Efficient and Sustainable Cultivation Technologies

Mahesh R. [a*], Hasan M.[a], Parvathy Nayana N.[a], Manabraj Manna[a]

[a]Division of Agricultural Engineering, ICAR-Indian Agricultural Research Institute, New Delhi

RTAAAS/AB/024/133

The Internet of Things (IoT) is transforming agriculture by enabling precise control over environmental and nutrient factors, resulting in enhanced crop quality and yield. This study evaluates an IoT-based smart indoor plant cultivation system designed to optimize pak choi (cv. Choko) cultivation using advanced sensors and automation. The system features a smart fertigation unit equipped with pH, electrical conductivity (EC), ultrasonic, and water temperature sensors, which automatically monitor and adjust nutrient delivery to meet optimal conditions. A climate control system, including CO_2, temperature, light intensity (lux), and relative humidity (RH) sensors, provides real- time environmental adjustments, while smart lighting systems further promote ideal growth. Data from these sensors is processed through the Cyberlative platform, allowing real-time monitoring on mobile devices and computers, with IFTTT-based alerts to notify users if parameters fall outside target ranges. Our results indicate that pak choi grown in the IoT-enabled indoor plant cultivation system showed substantial improvements in quality and yield. Glucosinolate content reached 3.10 μmol g^{-1}, total soluble proteins were 2.37 mg g^{-1} dry wt., and plant fresh and dry weights were 142 g and 9.91 g, respectively. Notably, nitrate levels were reduced to 1.01 mg g^{-1} dry wt., indicating enhanced produce quality compared to conventional methods. Furthermore, we tested specific LED light spectra with varying red-to-blue ratios to assess their impact on pak choi growth and biochemistry. The red-to-blue ratio of 2:1 produced the highest biomass, plant height, and glucosinolate levels (4.31 μmol g^{-1} aliphatic glucosinolates) and significantly improved antioxidant enzyme activities and leaf gas exchange, leading to a 52.21% increase in yield compared to white light. Though initially cost-intensive, this IoT-based cultivation system demonstrates significant long-term benefits by enhancing resource efficiency and crop quality, offering a scalable and sustainable solution for the future of agriculture.

Uncovering Drought Tolerance-Associated Agronomic Traits in Rice through Genome-Wide Association Analysis

Suman Rawte[1*], Ritu R. Saxena[2], and Kuntal Satkar[1]

[1]College of Agriculture and Research Station Gariaband (CG), IGKV, [2]Department of Genetics and Plant Breeding, IGKV, Raipur (CG)

RTAAAS/AB/2024/134

The development of rice varieties adapted to water stress conditions relies heavily on genetic resources to enhance productivity. In this study, a set of 152 SSR markers covering all chromosomes/linkage groups was used to analyse genetic associations among sixty rice accessions. A total of 436 alleles were identified, revealing substantial molecular diversity within the population. Markers RM 431, RM 212, RM 201, and RM 515 showed associations with multiple traits under all three conditions, suggesting possible linkage or pleiotropic effects. In contrast, marker DREB-2B displayed pleiotropic effects specifically under water stress conditions. These markers, showing pleiotropic and stable associations, highlight the robustness of functional DNA markers in this study, paving the way to improve and develop drought-resistant rice varieties for yield and related traits under both water stress and non-stress conditions using marker-assisted backcross breeding strategies. This investigation provides valuable alleles for breeding germplasm that adapts to climate resilience. Markers with pleiotropic and consistent associations with grain yield and related traits under rainfed and TSD conditions emerge as strong candidates for marker-assisted breeding aimed at high yield and drought resistance in rice. The results suggest that the identified genes may be causal for the observed trait variations, underscoring the effectiveness of association mapping for discovering genes and QTLs with pleiotropic effects. The pleiotropic markers identified in our study offer potential for marker-assisted improvement of yield and its component traits in rice under both stress and non-stress conditions.

Harvesting and Post-Harvest Handling of Fruits.

Tarun Sonkar[1], Dr. Ghanshyam Das Sahu[2],

Dr. Prabhakar Singh[3] and Shubham Verma.

[1]M.Sc. (Ag.) Department of Fruit Science, Research Scholar at CoA, Raipur, Indira Gandhi Krishi Viswaidyalaya.

[2]Professor, Department of Fruit Science, Research Scholar at CoA, Raipur, Indira Gandhi Krishi Viswaidyalaya.

[3]Professor and Head of Department of Fruit Science, Research Scholar at CoA, Raipur,
Indira Gandhi Krishi Viswaidyalaya.

[4]M.Sc. (Ag.) Department of Fruit Science, Research Scholar at CoA, Raipur, Indira Gandhi Krishi Viswaidyalaya.

RTAAAS/AB/2024/135

This review focuses on the importance of proper harvesting and post-harvest handling practices for fruits to ensure optimal quality and shelf life. The timing of harvest is critical, as it affects the ripening process, storage life, and overall quality of the produce. Different fruits have specific maturity indices, such as changes in colour, texture, and sugar content, which indicate the ideal harvest time. The review discusses various harvesting methods, including manual and mechanical harvesting, and highlights the importance of using sharp cutting tools to prevent damage to the produce. Post-harvest handling practices, such as cleaning, grading, and storage, are also discussed, with an emphasis on maintaining a controlled atmosphere to slow down ripening and prevent spoilage. The review concludes that understanding the optimal harvest time and employing proper post-harvest handling practices are crucial for maintaining the quality and freshness of fruits.

Keywords - fruit, post- harvest, maturity indices, harvesting, storage.

Comparison of *Trichogramma chilonis* host preference ability on *Corcyra cephalonica* and *Philosamia ricini*

Kritika Sharma[1] and Kamlesh Bali[2]

[1]Ph. D scholar, Division of Sericulture, Sher-e- Kashmir University of Agricultural Sciences and Technology of Jammu, Chatha, India

[2]Professor, Division of Sericulture, Sher-e- Kashmir University of Agricultural Sciences and Technology of Jammu, Chatha, India

RTAAAS/AB/2024/136

The host preference of *Trichogramma chilonis* for eggs of *Corcyra cephalonica* (rice moth) and *Philosamia ricini* (eri silkworm) was evaluated through no-choice and dual- choice experiments to determine the viability of eri silkworm as an alternative host for mass production of Trichogramma. Under no-choice conditions, *Trichogramma chilonis* emerging from *Corcyra cephalonica* showed a higher preference for eri silkworm eggs compared to *Corcyra cephalonica* eggs. In dual-choice experiments, when both *Corcyra cephalonica* and eri silkworm eggs were simultaneously available, *Trichogramma chilonis* emerging from rice moth eggs recorded a significantly higher parasitisation rate on *Corcyra cephalonica* compared to eri silkworm eggs. The results indicate that while Trichogramma *chilonis* shows a distinct preference for *Corcyra cephalonica* eggs, eri silkworm eggs can serve as a viable alternate host, particularly in environments where rice moth eggs are limited. This research highlights the potential for *Philosamia ricini* eggs to be utilized as a supplementary host in Trichogramma rearing programs, enhancing biological control strategies and supporting sustainable insectary practices for integrated pest management.

Keywords: choice test, parasitisation, eri silkworm.

Medicinal Orchids

C N R Santhoshini[1] V. Priyanka[2]

[1]Assistant Professor, Department of Floriculture and Landscaping,
College of Horticulture, Rajendranagar, SKLTGHU, Hyderabad, Telangana,
[2]Post Graduate, Department of Floriculture and Landscaping, Post Graduate
Institute of Horticultural Sciences, SKLTGHU, Mulugu Telangana

RTAAAS/AB/2024/137

Orchids are one of the largest groups of Angiosperms belonging to the family orchidaceae. They are extremely popular as ornamental plant and lesser is the known about their ethnomedicinal uses. Since from the primitive periods, medicinal plants including orchids have occupied a distinct place in human's life for treatment of variety of ailments. Some plants like *Dendrobium crumenative*, *Eulophia campestris*, *Orchis latifolia*, *Vanda roxburghii* and *Vanda tessellata* have been documented for their medicinal values. Phytochemically some orchids have been reported to contain alkaloids, triterpenoids, flavonoids and stilbenoids. Ashtavarga (group of eight medicinal plants) is vital part of Ayurvedic formulations like Chyvanprasha and four plants viz, Riddhi, Vriddhi, Jivaka and Rishbhaka have been discussed as possible members of family Orchidaceae. Recently there has been tremendous progress in medicinal plants research; however, orchids have not been exploited fully for their medicinal application. The article reviews medicinally important orchids.

Keywords: orchids, medicinal values, ethno medicinal, alkaloids, triterpenoids, flavonoids, stillbenoids, Ayurveda.

Emerging Trends in the Ornamental Plant Industry

C N R Santhoshini[1] and J Srinivas[2]

[1]Assistant Professor, Department of Floriculture and Landscaping,
College of Horticulture, Rajendranagar, SKLTGHU, Hyderabad, Telangana,
[2]Assistant Professor, Department of Vegetable Science,
College of Horticulture, SKLTGHU, Mojerla

RTAAAS/AB/2024/138

The decorative plant sector has seen considerable changes as a result of shifting customer preferences, environmental concerns and advances in horticultural technology. This looks at developing trends that are transforming the sector, including the growing desire for sustainable and low-maintenance plants, the impact of urbanization on plant selection and sales and the importance of digital technologies in manufacturing and distribution. Consumers are increasingly interested in indoor plants that improve air quality, while the appeal of native species promotes biodiversity and resistance to local climates. Vertical gardening, hydroponics and automation help to streamline production, improve plant quality and manage labour shortages. Furthermore, e-commerce and social media have become critical channels for market expansion, linking farmers with new audiences. As the sector adjusts to these trends, it is prepared to cater to them.

Keywords: Ornamental plants, Sustainable gardening, Low maintenance plants and Consumer preferences.

Dairy enterprise as a high potential agribusiness venture: A marketing and value addition perspective from Assam

Rizwan Ahmed[1], S. Basanta Singh[2] and Ram Singh[3]

[1]Assistant Professor, Assam down town University, Panikhaiti, Guwahati, Assam

[2]Principal Scientist, ICAR RC for NEH Region, Umiam, Meghalaya

[3]Professor and Head, School of Social Sciences, College of Post Graduate Studies in Agricultural Sciences (CAU-Imphal), Umiam, Meghalaya, India

RTAAAS/AB/2024/139

Animal husbandry has been an integral component of agriculture in India since ages due to its numerous contributions to the rural society in the form of food products, draught power, income and employment. Dairying is the most important livestock enterprises as it's an essential source of additional income for millions of rural families in the country. In the North Eastern Region (NER) of India, Assam is the highest milk producing state with 982,000 tonnes of milk produced in 2022-23 accounting for 60 per cent of the share in NER (NDDB, 2023). For the present study, secondary data was collected from various publications of Government of Assam and other reliable sources. Primary data was gathered through interview from a sample of 60 market intermediaries. The analytical tools like marketing costs, marketing margin, producer's share, marketing efficiency were used to achieve the above mentioned objectives. In the study area, four marketing channels were identified. Channel I (Producer-Consumer) was found to be the most efficient channel in each market with maximum producer's share in consumer rupee. The price spread was found to be maximum in case of ghee and minimum in case of curd. The study suggests need to focus on setting up of co-operative societies to restrict milk flow through the unorganized sector.

Keywords: Dairy, Value Chain, Milk, Ghee, Assam

Optimizing Horticulture Crop Production Using IoT-Driven Smart Indoor Plant Cultivation Systems: Advancements in Resource-Efficient and Sustainable Cultivation Technologies

Mahesh R.[a*], Hasan M.[a], Parvathy Nayana N.[a], Manabraj Manna[a]

[a]Division of Agricultural Engineering, ICAR-Indian Agricultural Research Institute, New Delhi

RTAAAS/AB/2024/140

The Internet of Things (IoT) is transforming agriculture by enabling precise control over environmental and nutrient factors, resulting in enhanced crop quality and yield. This study evaluates an IoT-based smart indoor plant cultivation system designed to optimize pak choi (cv. Choko) cultivation using advanced sensors and automation. The system features a smart fertigation unit equipped with pH, electrical conductivity (EC), ultrasonic, and water temperature sensors, which automatically monitor and adjust nutrient delivery to meet optimal conditions. A climate control system, including CO_2, temperature, light intensity (lux), and relative humidity (RH) sensors, provides real-time environmental adjustments, while smart lighting systems further promote ideal growth. Data from these sensors is processed through the Cyberlative platform, allowing real-time monitoring on mobile devices and computers, with IFTTT-based alerts to notify users if parameters fall outside target ranges. Our results indicate that pak choi grown in the IoT-enabled indoor plant cultivation system showed substantial improvements in quality and yield. The indoor cultivation system accommodated 384 plants, a planting density 10 times greater than the field cultivation. Yield from this indoor cultivation method was 46 kg which is 12 times higher than the yield in soil- based systems (3.8 kg). Glucosinolate content reached 3.10 μmol g^{-1}, total soluble proteins were 2.37 mg g^{-1} dry wt., and plant fresh and dry weights were 142 g and 9.91 g, respectively. Notably, nitrate levels were reduced to 1.01 mg g^{-1} dry wt., indicating enhanced produce quality compared to conventional methods. Furthermore, we tested specific LED light spectra with varying red-to-blue ratios to assess their impact on pak choi growth and biochemistry. The red-to-blue ratio of 2:1 produced the highest biomass, plant height, and glucosinolate levels (4.31 μmol g^{-1} aliphatic glucosinolates) and significantly improved antioxidant enzyme activities and leaf gas exchange, leading to a 52.21% increase in yield compared to white light. Though initially cost-intensive, this IoT-based cultivation system demonstrates significant long-term benefits by enhancing resource efficiency and crop quality, offering a scalable and sustainable solution for the future of agriculture.

"Enhancing Farm Income through Post-Harvest Technology: Reducing Losses, Adding Value, and Expanding Market Access"

Diksha Bansal

UG Student, College of Agriculture,

CCS Haryana Agriculture University, Hisar

RTAAAS/AB/2024/141

Minimizing losses, improving quality and value-added products, and thereby strengthening the agricultural value chain are all indispensable parts of increasing incomes to farmers that post-harvest technology plays. An estimated millions of tons of agricultural produce is lost annually due to improper handling after harvesting, inadequate storage facilities, and poor processing techniques. Use of technology can greatly minimize these losses which can result in food productivity, farmers gaining profit and overall improve food security. Key challenges in such practices are reducing spoilage, quality maintenance and market access. Cold storage, modified atmosphere packaging and other new developments help preserve the quality of perishable goods over long-distance transit, while mechanized drying and pest control provide additional preventative methods to limit waste. Furthermore, converting raw produce into consumables like juices and dried fruits and fortifying food are examples of value-added processing that can significantly raise market value and revenue. Through incorporating digital technologies into supply chains and utilizing e- commerce platforms, farmers may reach a wider audience and interact with customers directly, avoiding middlemen. To ensure widespread adoption, post-harvest technology can be further improved by farmer training programs and government initiatives. Lastly, post- harvest technological strategy, policy assistance, and digital integration can all be used to sustainably boost farm income, lower losses, and strengthen the agricultural sector's resilience. This strategy emphasizes that post-harvest systems require ongoing innovation and investment as a vital means of attaining agricultural sustainability.

Keywords: Post-harvest technology, Farm income enhancement, Value-added agriculture, Crop storage solutions, Food processing techniques, Agricultural supply chain, Loss reduction, Cold chain logistics, Market access, Digital agriculture

"Smart Technologies in Horticulture: Advancing Sustainable and Precision-Based Crop Management for the Future"

Muskan

UG Student, College of Agriculture,

Chaudhary Charan Singh Haryana Agricultural University, Hisar

RTAAAS/AB/2024/142

A paradigm shift in the cultivation, management, and harvesting of crops has resulted from incorporating cutting-edge technologies into horticulture. Innovative, technology- driven solutions that guarantee efficient and sustainable agriculture methods are becoming more and more necessary as the world's food needs rise in tandem with environmental concerns. Smart technologies including remote sensing, artificial intelligence (AI), machine learning (ML), and the Internet of Things (IoT) can play a great role in such management. Real-time data gathering on vital parameters including soil moisture, temperature, humidity, pH levels, and nutrient content is made possible by IoT-based sensors placed in fields and greenhouses. Machine learning models can identify patterns in crop growth and health, helping predict potential yield outcomes or detect early signs of disease or nutrient deficiencies. Precision agriculture that applies under the direction of Geographic Information Systems (GIS) and drone technology has also greatly enhanced crop monitoring and control. Farmers may evaluate crop health by using multispectral photography from drones. It allows them to pinpoint problematic regions and provide targeted treatments, minimizing resource waste and environmental effects. Although using these technologies has many advantages, there are drawbacks as well, especially for small-scale farmers, in terms of initial investment, technological literacy, and scalability. In addition to highlighting successful case studies and pilot programs, obstacles to broader adoption such as the requirement for reliable infrastructure and data privacy issues are also needed to be considered. Thus, smart horticultural technologies are a big step toward a more resilient, productive, and sustainable agricultural future that can feed the world's expanding population when limitations are also considered.

Keywords: Smart Agriculture, Internet of Things (IoT), Artificial Intelligence (AI), Precision Agriculture, Sustainable Farming, Crop Management, Machine Learning (ML), Remote Sensing, Pest Management, Data-Driven Agriculture, Geographic Information Systems (GIS), Drones, Sustainable Crop Production, Agricultural Innovation, Climate-Smart Horticulture, Resource Efficiency, Yield Optimization,

Biodiversity conservation and Utilization of Samolus valerandi subsp. Parviflorus (Raf.)

P. Subramaniyan

Ph.D Research Scholar,

Dept. of Horticulture,

Central University of Tamil Nadu, Thiruvarur

RTAAAS/AB/2024/143

Plant conservation is crucial as many plant species face threats from habitat loss, climate change, pollution, invasive species, and overharvesting. Plant conservation is the effort to protect and restore plant species and their habitats to ensure their survival and the ecological balance they support. In the present investigation mainly focus on Samolus valerandi subsp. parviflorus (Raf.), commonly known as "Seaside Brookweed" or "Water Pimpernel" chromosome number 2n=26 and the Primulaceae (primrose) sub-family of Theophrastoideae. In the Samolus valerandi subsp. parviflorus (Raf.) does not have a widely documented and conservation status specific to India. The native of North and South America, especially in wet or marshy areas along coasts, rivers, and wetlands. Samolus valerandi subsp. parviflorus (Raf.) is a small flowering shrub, often clustered raceme, white to pale pink flowers with five petals. Whereas, Glossy, bright green leaves that are often basal (growing close to the ground). Furthermore, the species-specific conservation of lesser- known plants like Samolus valerandi subsp. parviflorus (Raf.), there is a need for research, habitat monitoring and public awareness to ensure that preserved within natural habitats in wetlands and moist ecosystems, which may face threats from pollution, habitat fragmentation and climate change.

Keywords: Conservation, Climate change, Raceme, Samolus valerandi subsp. Parviflorus and Wetlands

Agri-Entrepreneurship: Transforming Farming through Innovative Practices

Kanika*[1], Swarnima Paliwal[2] and Arunima Paliwal[1]

[1]College of Hill Agriculture, Chirbatiya, VCSG Uttarakhand University of Horticulture and Forestry, Camp at: Ranichauri, Tehri Garhwal, Uttarakhand, India

[2]School of Management and Commerce, Dev Bhoomi Uttarakhand University (DBUU), Dehradun, Uttarakhand, India

RTAAAS/AB/2024/144

The practice of bringing novel concepts, methods and approaches to agricultural or other industries in an effort to boost output and financial gains is known as Agripreneurship with the main goal as sustainability. Agroforestry, regenerative agriculture and organic farming are some methods that lower the release of greenhouse gases, preserve biodiversity and preserve soil health. These strategies show that financial gain and responsibility for the environment may coexist by improving long-term production and advancing global climate goals. India's path to economic expansion and food security depends on modernizing its agriculture industry with smart technologies and innovation. Using technology that provides resilience, accuracy and foresight is crucial since the climate issue is endangering our food supply. These developments will enable us to better anticipate and manage the difficulties of the present as well as the uncertainties of the future. Depending on how the difficulties are solved, innovations are essential for entrepreneurs and start-ups to expand. Farmers and young entrepreneurs must actively invent, test, adapt, and introduce agricultural technologies. Many extension institutions and small-scale farmers are aware that unless farmers adopt more entrepreneurial farming practices, they have little chance of surviving. Blockchain and digital platforms are also improving supply chain transparency, helping farmers receive fair pricing and customers track food quality. Agri entrepreneurship is essential to the growth of the agricultural sector in developing countries since the majority of the population is employed in this sector of agriculture. Giving the agribusiness ecosystem the necessary impetus for its comprehensive growth is crucial for both national prosperity and general economic growth. Over the past few years, the Indian government has been actively promoting entrepreneurship among young individuals through a range of sector-specific initiatives.

Keywords: Agri-entrepreneurship, Entrepreneurs, Innovations, agribusiness, IoT

Enhancement of shelf life and quality parameters of Litchi fruits using aloe vera based composite edible coatings

Gopal Mani, Dr. Omveer Singh, Dr. Ratna Rai

Department of Horticulture (Fruit Science), College of Agriculture, Govind Ballabh Pant University of Agriculture and Technology, Pantnagar (U.S. Nagar), Uttarakhand

RTAAAS/AB/2024/145

Litchi (Litchi chinensis Sonn.) is a significant evergreen fruit in the sub-tropical regions, belonging to the Sapindaceae family. It is celebrated for its delicious taste, excellent flavor, pleasant fragrance, appealing appearance, and high nutritional value. Martina (1655) referred to litchi as the king of fruits." It is cultivated in tropical and warm sub-tropical regions worldwide, where it's unique climatic and geographical requirements are met, making it a crucial contributor to the local economy. Globally, India ranks as the second-largest producer of litchi, following China. As a non-climacteric fruit, litchi has a short shelf life, with its quality deteriorating rapidly after harvest. Postharvest decay and pericarp browning are significant challenges that limit the industry's growth in litchi-exporting countries. Edible films or coatings provide a thin, consumable layer that serves as a barrier against agents like water vapor, oxygen, and moisture, thereby enhancing the quality and extending the shelf life of fresh and processed foods. This study aimed to extend the shelf life and improve the post-harvest quality of litchi fruit through the application of integrated treatments, including Aloe vera gel (at concentrations of 10%, 20%, and 30%), ascorbic acid (1%), and hydrogen peroxide (1%) combined with Passive Modified Atmosphere Packaging (MAP). The fruits underwent various quantitative and qualitative analyses, which were documented at five-day intervals over a 40-day storage period under refrigerated conditions at 2ºC. The study demonstrated that Aloe vera gel (10%) combined with 1% ascorbic acid coatings effectively preserved the quality, extended the shelf life, and enhanced the marketability of litchi fruits for a longer duration. It can be concluded that the 10% Aloe vera gel with 1% ascorbic acid treatment was the most effective, not only prolonging the shelf life of litchi fruits but also reducing post-harvest losses and maintaining fruit quality.

Keywords: Litchi; Aloe vera; Coating; Hydrogen peroxide; Shelf- life.

Recent Trends in Organic Farming and Vertical Farming

Anita Bhawariya

University of Rajasthan Jaipur

RTAAAS/AB/2024/146

Advancements in the field of science and technology along with the global urbanization are the major factors driving the course and evolution of agricultural research. Rise in per capita income in developing nations, occupational changes and global linkages have changed the food preferences. These trends along with the increase in population pose a challenge to agriculture for producing more & better food. Increase in the productivity of agriculture by employing techniques of conventional (20th century) agriculture is posing a limitation. The threat to environment, due to dependence on chemical fertilizers and pesticides for increasing productivity and pest management respectively is major constraint affecting the global food production. These trends suggest that new innovations in agriculture are inevitably needed and these innovations should be integrated with the main stream agriculture (the big agriculture as we may call). Vertical Farming is a novel method of growing crops by artificially stacking plants vertically above each other either in skyscrapers or by using the third dimension of space. Which aims to optimize plant growth, and soilless farming techniques such as hydroponics, aquaponics, and aeroponics. In addition, this technique is well suited for the rapidly growing global urban population as the demands of food supply can be met from within the cities and thus reducing the transportation cost and environment deterioration caused by fuels in the process. Organic farming on the other hand is based on the principles of minimization of the chemical inputs in the agriculture and hence is environment friendly. Thus, these techniques can be utilized for increasing the production and productivity to meet the growing food demands.

Keywords: organic farming, technology, vertical farming, agriculture.

Role of Information Communication tools in dissemination of information among farmers in Nagaland

[1]Sentinungshi and [2]Mary N. Odyuo

[1]Research Scholar, Department of Rural Development Planning,

SASRD, Nagaland University. Medziphema

[2]Assistant Professor,

Department of Rural Development Planning, SASRD, Nagaland University. Medziphema

RTAAAS/AB/2024/147

Information and communication technology (ICT) refers to the devices, services, and applications that use technology to transmit information. ICTs essentially facilitate the creation, management, storage, retrieval, and dissemination of any previously processed and altered data, knowledge, and information. Data was collected from January to March 2024. A total of 360 respondents were drawn from six districts. The current investigation included two blocks from each district. A structured interview schedule was created, and a multistage sampling technique was used for the study. ICT tools provide farmers with information on market prices, weather patterns, crop management techniques, and pest and disease prevention strategies. Through these tools the farmers can improve agricultural modernization by boosting yield, efficiency and grower profits. From the study it was revealed that majority (65.28%) were middle aged, majority (61.94%) were male, majority (87.22%) belonged to nuclear family, majority (72.50%) belonged to medium family size and majority (60.56%) had medium level of annual income. The study also revealed that mobile phone was the most reliable source in information dissemination (62.50%) followed by you- tube (58.06%) and radio (41.94%). Print media's viz., local newspapers, magazines etc. ranked the least (24.44%) among all the sources of information.

Exploring Wild Varieties of Mushrooms in Tripura

***Prerana Chowdhury[1], Dr. Lopamudra Sahoo[2], Joydeep Datta[2], Soham Hazra[3]**

[1]B. Sc (Ag) Students, Department of Agriculture, Brainware University, Kolkata

[2]ICAR-NEH Region, Tripura Centre, Lembucherra, West Tripura

[3]Head of the Department, Department of Agriculture, Brainware University, Kolkata

RTAAAS/AB/2024/148

Tripura, a Northeastern state of India, is rich in biodiversity and offers a unique landscape for the exploration of wild mushroom varieties. Due to its tropical and subtropical climate, dense forests and high humidity, Tripura provides an ideal environment for the growth of numerous fungal species.Through an extensive field surveys and sample collection, we cataloged multiple mushroom species, includes Psathyrella corrugis, Marasmiellus candidus, Schizophyllum commune, Amanita bisporigera, Trametes suaveolens, Exidia crenata, Microporus affinis, Lentinula edodes, Lentinus tigrinus, Russula amoenolens, Lepiota clypeolaria, Russula emetic, Microporus xanthopus, Psathyrella longicauda, Phlebopas xanthopus, Marasmius Siccus, Leucoagaricus erythrophaeus, Crepidotus epibryus, Macrocybe gigantea, Rhodofomes cajanderi, Leucocoprinus cepistipes, Pleurotus ostreatus, Macrolepiota procera, Calocybe indica, Tricholoma columbetta, Panaeolus foenisecii, Panaeolus foenisecii, etc. identifying both edible and non-edible varieties. This study aimson exploring, documenting and analyzing the different wild mushroom species found in Tripura which plays a significant role in local ecology, cuisine and traditional medicine. Additionally, the study assesses potential risks associated with foraging, as certain mushrooms in the region are toxic. This research contributes valuable insights for biodiversity conservation, sustainable harvesting, and awareness of the region's mycological resources. Further, studies are recommended to explore the biochemical properties of these wild mushrooms and their possible applications in pharmaceuticals and nutraceuticals.

Keywords: Biodiversity conservation, Exploring, Documenting, Mycological resources, Northeastern state, Nutraceuticals, Pharmaceuticals, Subtropical climate, Sustainable harvesting.

Optimizing Closed Nutrient Loops for Sustainable Crop Production

Moinuddin* and Priyanka Bankoti**

*Associate Professor (Agronomy), Shri Guru Ram Rai University Dehradun, Uttarakhand

** Professor (Agronomy), Shri Guru Ram Rai University Dehradun, Uttarakhand

RTAAAS/AB/024/149

Conventional agriculture, heavily reliant on synthetic fertilizers, faces increasing challenges related to environmental degradation, resource depletion, and climate change. To address these issues, circular agronomy emerges as a promising approach. By mimicking natural cycles, circular agronomy aims to optimize resource use, minimize waste, and enhance the overall sustainability of agricultural systems. This abstract explores the principles and benefits of closing nutrient loops through composting, vermiculture, crop rotation, and intercropping. It also delves into the role of technology, such as precision nutrient management and data tracking, to optimize nutrient cycles. Case studies of successful circular agronomy initiatives from various regions illustrate how nutrient recycling practices contribute to long- term soil fertility and ecological balance, offering a pathway toward sustainable crop production. In a circular agronomy system, various agricultural practices are employed to ensure that nutrient flows are maintained within the agricultural ecosystem. This involves a series of practices, including crop rotation, intercropping, composting, and the use of organic fertilizers, which help to retain and recycle nutrients rather than allowing them to leach away into the environment.

Keywords: Crop rotation, Sustainable farming, Nutrient cycling, composting, vermiculture, precision nutrient management, case studies, ecological balance

Understanding Knowledge Barriers and Adoption Pathways for Makhana (Euryale Ferox Salisb) Growers in Bihar

Kumar Sonu[1], K.K. Jha[2] and Saurabh Sharma[3]

[1]M.Sc. Scholar, Department of Agricultural Extension Education, Nagaland University, School of Agricultural Sciences, Medziphema Campus, Nagaland,

[2]Professor, Department of Agricultural Extension Education, Nagaland University, School of Agricultural Sciences, Medziphema Campus, Nagaland,

[3]Associate Professor, Department of Agricultural Extension Education, Nagaland University, School of Agricultural Sciences, Medziphema Campus, Nagaland, India

RTAAAS/AB/2024/150

This paper examined the knowledge gap and adoption level of improved Makhana cultivation in Bihar. The study utilized descriptive research design and focused on four districts with four blocks viz., Purnea East from Purnia, Barari from Katihar, Bahadurpur from Darbhanga, and Jhanjharpur from Madhubani. From these blocks, eight villages were selected purposively. The selected villages were Pipra and Birpur from Purnea block, Mirzapur and Lachhmipur from Barari block, Ballupur and Kishunpur from Bhadurpur block, and Chanuraganj and Simra from Jhanjharpur block. The study included 120 respondents, with fifteen respondents being randomly selected from each of the eight villages. Finding revealed that plant protection (diseases and pest management), secured highest mean knowledge gap with 61.88 per cent. and the most of respondents had medium knowledge level with a mean knowledge index of 24.10 and adoption with an average adoption index of 19.33 improved makhana cultivation. adoption level was highly influenced by the income of makhana (-3.833) exerting maximum direct effect in negative direction.

Keywords: Makhana, Knowledge Gap, Knowledge Level, Adoption, path analysis

Complex octonion formalism for quark fluxtube and meson fluxtube

Arun Kumar Rathore* and B. C. Chanyal**

Department of Physics, G. B. Pant University of Agriculture and Technology,

Pant Nagar, Uttarakhand, India

RTAAAS/AB/2024/151

In this study, we have derived the connection between complex octonions with quark fluxtube. We have discussed the interaction of quark and anti-quark flavors in triplet complex octonion spaces. This study can give the idea of the quark fluxtube in generalized complex octonion spaces. We have discussed the quark fluxtube for each complex-octonion space. We have also discussed meson fluxtube, color fluxtube, or color string in complex- octonion space.

Keywords: Interaction, Complex octonion space, Quark, Isospin, Fluxtube

Exploring the potential of bioactive peptides from dairy products

***Anamika Das**

*Associate Professor, Dept. of Dairy Chemistry, SGIDT,

Bihar Animal Sciences University, Patna

RTAAAS/AB/2024/152

Bioactive peptides are produced from milk proteins during digestion in GI tract, during fermentation or by the action of enzymes on the milk proteins.. In milk, bioactive peptides may either be present in their natural form or released from their parental proteins due to enzymatic action. There are many bioactive peptides derived from casein and whey proteins such as casokinins, casomorphins, casoxins, α-lactorphin, β-lactorphin, β-lactotensin, serorphin, albutensin A and lactoferricin. Dairy based bioactive peptides imparts therapeutic effect and has lesser side-effects as compared to medicines.. Bioactive peptides can be delivered to the consumers through conventional foods, dietary supplements or functional foods. These bioactive peptides possess very important biological activities and functionalities, including antimicrobial, antihypertensive, antioxidative, anticytotoxic, immunomodulatory, opioid, and mineral-carrying activities. Therefore, realizing the significance of bioactive peptides from dairy products may draw interest towards commercialization of bioactive peptides.

Keywords – bioactive peptides, dairy, enzymatic action, fermentation

Effect of foliar application of Gibberellic Acid and Cycocel on Flowering parameters of different varieties of Lilium spp. under Hi-tech Polyhouse conditions

Pawan Kumar[1*] and Arvind Malik[2]

[1]Deparmrnt of Horticulture, Maharana Partap Horticultural university, Karnal, India

[2]Department of Horticulture, CCS Haryana Agricultural University, Hisar, India.

RTAAAS/AB/2024/153

A field experiment was conducted to study the growth responses of Lilium spp. to Gibberellic acid and Cycocel treatments at Agritoursim center, ccshau Hisar during 2022-23 and 2023-24. The treatments composed of different concentration of GA 3 and CCC viz. control, 50 ppm GA 3 , 75 ppm GA 3 , 100 ppm GA 3 , 250 ppm CCC, 500 ppm CCC and 750 ppm CCC. The experiment was carried out in Factorial randomized block design with three replications. The observation on number of flowering bud and flower size was recorded at the flower harvesting stage. The number of flowering buds per plant (7.86 and 7.71) was found maximum during both the seasons with the application of 100 ppm GA 3 and Lilium var. Pavia was having maximum number of flowering buds per plant (7.48 and 7.27). Maximum flower diameter (16.31 cm and 16.08 cm) was recorded with the application of 500 ppm Cycocel (CCC) and Variety Pavia performed among all the varieties during both the seasons. With respect to minimum number of flowering buds per plant at harvest and flower diameter it was observed that treatment controll gave the minimum results during both the seasons 2022-23 and 023-24 respectively. From these interpretations it can be concluded that GA 3 , particularly at a concentration of 100 ppm, significantly enhances the number of flowering buds per plant across all Lilium varieties, while Cycocel when applied 500 ppm, effectively increased the flower diameter. The effectiveness of GA 3 in hastening flower opening is due to its role as a growth hormone that promotes cell elongation, stem growth, and flowering in plants. Higher concentrations of GA 3 likely enhanced these physiological processes more effectively than lower concentrations, leading to higher number of flowering buds per plant while CCC is effectively increased flower diameter due to its potential to improve the carbohydrate accumulation due to changes in mporphogenesis, photosynthetic capacity and phytohormonal balance..

Keywords: Lilium, Plant growth regulators, GA 3, CCC, Polyhouse, flower diameter, flowering buds.

Performance of okra (*Abelmoschus esculentus* (L) moench) cultivars under Rabi season

S. Neeraja[1], J. Srinivas[2], Veena Joshi[3], B. Sai Krishna Nikhil[4] and G. Sathish[5]

[1]M.Sc. Scholar, Department of Vegetable Science, SKLTSHU, Mojerla, Telangana

[2]Assistant Professor, Department of Vegetable Science, SKLTSHU, Mojerla, Telangana

[3]Associate Professor, Department of Fruit Science, SKLTSHU, Mulugu, Siddipet, Telangana

[4]Assistant Professor, Department of Genetics and Plant Breeding, SKLTSHU, Vegetable research station, Rajendranagar, Hyderabad

[5]Assistant Professor, Department of Agricultural Statistics, SKLTSHU, Mulugu, Siddipet, Telangana

RTAAAS/AB/2024/154

The present experiment was conducted on study of performances in Okra (Abelmoschus esculentus L.). The experiment was carried out during Rabi season, in October month, in the year 2021-22. The study was under taken on 37 genotypes of okra using randomized block design (RBD) with three replications. On the basis of mean performance, two genotypes IC42470, IC42484 was found superior over the check variety Arka Anamika for fruit yield per plant. Genotype IC42470 recorded superior for plant height, number of branches per plant, internodal length, number of fruits per plant, test weight, vigour index I, chlorophyll content which contribute to yield and seed quality traits.

Effect of water stress on Biochemical parameters of sorghum genotypes under pot culture

[1*]Pawar Sujata B

Agriculture Research Station, Badnapur V.N.M.K.V Parbhani Maharashtra, India

RTAAAS/AB/024/155

An experiment was conducted to evaluate the effects of water deficit on biochemical parameters on sorghum during rabi season (September 2014) in Maharashtra. The treatment combinations consisted of four moisture regimes viz. M 1 , M 2 , M 3 and M 4 upto harvest and six genotypes viz. Phule Yashoda, RSV-1006, Phule Chitra, Phule Vasuda, Phule Anuradha, Phule Maulee.The study revealed that,RSV-1006 and Phule Chitra genotypes had maximum total soluble sugar content. The proline content increased with a decrease in the soil moisture content in all the genotypes with predominance in Phule Maulee, Phule Chitra and Phule Anuradha which also reported positive correlation of proline accumulation. The degree of reduction in protein content as a function of water stress was less in Phlule Maulee, Phule Chitra and Phule Anuradha respectively. The genotypes Phlule Maulee, Phule Chitra and Phule Anuradha had lowest nitrate reductase activity under moisture regime M 1 . The present study revealed that genotypes Phule Chitra and Phule Maulee are more suited under limited soil moisture condition. Irrespective of moisture regime Phule Yashoda and RSV-1006 found better than rest of genotypes. Therefore, these genotypes are well suited for medium soil under stress as well as non-stress conditions.

Keywords: Sorghum, moisture regimes, biochemical parameters, pot culture

Assessment of Genetic Divergence in Rice (*Oryza sativa* L.) Germplasm using D 2 analysis

Vinayak. v. Thakare

Department of Genetics and Plant Breeding, Sam Higginbottom university of Agriculture Technology and Sciences, Prayagraj, U.P, India.

RTAAAS/AB/2024/156

The present investigation was conducted to examine the genetic diversity existing among 41 genotypes of rice, during kharif-2023 under randomized block design with three replications. The data was recorded for thirteen quantitative characters to obtain estimates of variability, heritability, genetic advance and genetic divergence. Significant differences were observed among the genotypes for all the characters studied. This study concluded that from the genotypes the highest grain yield was observed in (VASUMATI) 38.9 followed by (DHAN 69) 34.33 on the basis of mean performance at Prayagraj region. The higher magnitude of PCV and GCV coefficient of variation was recorded for number of total tillers per plant. The present investigation registered high heritability along with high genetic advance as percent of mean for days to 50% flowering, days to maturity, plant height, flag leaf length, flag leaf width, number of total tillers per plant, number of productive tillers per plant, panicle length, number of spikelets per panicle, biological yield, grain yield per plant and harvest index. The largest cluster was cluster I followed by cluster II, III, IV, V, VI (1 genotype each). The inter cluster distance was maximum between cluster IV and VI (247.17). Highest contribution in manifestation of genetic divergence was exhibited by grain yield per plant (22.82) followed by biological yield (21.28) and test weight (g) (12.56)

Keywords: Rice, variability, D 2 analysis.

Dyeing Study – Annona squamosa Linn. Leaf Extract and Natural Mordants for Cotton Dyeing

Dr. Ashvini Shankar Bedre

Teaching Associate, College of Community Science, VNMKV, Parbhani

RTAAAS/AB/2024/157

The German Consumer Goods Ordinance with preventive consumer protection in mind was amended in 1994; to prevent any potential health risk from textiles dyed with stuffs based on Cleavable carcinogenic amines with this aspect of consumer safety, selection of greener ways to dye clothes with natural dyes is the sustainable ideal choice., as they are nontoxic, non-allergic and biodegradable in nature. Hence the awareness towards the natural dyes should be increased. Taking this into consideration present study was undertaken to dye 100% bio-degradable cotton with leaf extract of Annona squamosa linn. Four natural mordants (viz. Banana bark, pomegranate rind, lime juice and babul bark) and three mineral mordants (alum, tin and iron) were used for mordanting. Catechu as a natural mordant was used 1% as a common mordant for each sample dyed with Annona squamosa linn. leaf extract. During dyeing 19 tints and shades were obtained which falls in the yellow region when L* a* b* c* h* values were assessed. Good to very good wash and perspiration fastness were noted whereas good dry rubbing and moderate wet rub fastness were observed. Light fastness showed satisfactory results.

Keywords – Cotton Fabric, Annona squamosa linn. Leaf extract, Natural mordants, mineral mordants assessment of fastness properties and assessment of L* a* b* c* h* values.

Efficacy of Biorationals for the management of citrus rust mite in Acid lime

L. Ranjith Kumar

ICAR-AICRP (Fruits), Citrus Research Station, Dr.YSRHU, Tirupati, Andhra Pradesh.

RTAAAS/AB/2024/158

Citrus rust mite (CRM), Phyllocoptruta oleivora (Ashmead) (Acari: Eriophyidae), infests plants of genera Citrus and Fortunella (family Rutaceae). CRM infests leaves, branches and fruits causing fruit rind russeting resulting in loss in yield and fruit quality making them unfit for export. CRM infestation may lead to 40% fruit yield loss and nearly 25% reduction in fruit volume. The rust mite appears to be severe in citrus growing areas of Nellore and Tirupati district and there is lack of effective management strategy. Judicious of insecticides and Biorational management technologies ensure favourable economical and ecological as a part of IPM programme is need of hour. In this view, the present study was conducted during 2022-23 at Citrus Research Station, Petlur, Tirupati, Andhra Pradesh to evaluate the efficacy of bio-rationals against citus rust mite (Phyllocoptruta oleivora). The experiment was conducted in RCBD with six treatments viz. T 1 -Azadirachtin 1% EC (2ml/lit); T 2 -Azadirachtin 0.3 % EC (5ml/lit); T 3 -Horticultural Mineral Oil (10 ml/lit); T 4 -Lecanicillium lecanii (1 x 10 8 CFU's/gm) (5g/lit); T 5 -Beauveria bassiana (1 x 10 8 CFU's/gm) (5g/lit) and T 6 -untreated control (water spray) . Two sprays were carried out at pea and marble stage of crop growth and observations on per cent fruit infestation were recorded at harvest along with fruit yield . Among the treatments the fruit infestation due to rust mite was low in T1 (3.10 %) and T2 (2.80 %) followed by T3 and T4 which recorded fruit infestation of (3.90 and 4.10 %) which were onpar witheach and lowest fruit inefstation was recorded in T2 (4.52) . Highest yield was recorded in T1 (21.10 t/ha) followed by T3 (20.28 t/ha) which were onpar with eachother and differed significantly with rest of the treatments and lowest yield was recorded in T2. The treatments Azadirachtin 1% EC (2ml/lit) and T 3 -Horticultural Mineral Oil (10 ml/lit) found be most effective in reducing the rust mite infestation with increase in the marketable fruit yield. So, bio-rationals help in reducing inputcost with environmental sustainability.

Keywords: Acid lime, Bio-rationals, Citrus rust mite, Horticultural Mineral Oil, Beauveria bassiana

Study on the diversity of insect visitors of pumpkin in Nagaland

Bendangsenla Longkumer, Dr. Hijam Shila Devi

Department of Entomology,

Nagaland University, School of Agricultural Sciences (NU: SAS)

Medziphema campus, Nagaland, India

RTAAAS/AB/2024/159

A field experiment was conducted to "Study on the diversity of insect pollinators on pumpkin in Nagaland" during the year 2022 and 2023 at the experimental cum research farm, Department of Entomology, School of Agricultural Sciences, Nagaland University, Medziphema Campus. The experiment was laid out in Randomized Block Design with four replication and six treatments viz., Apis mellifera, Apis cerana, Tetragonula iridipennis, Lepidotrigona arcifera, open pollinated and control. The study revealed that during pumpkin bloom, a total of fourteen species of insect pollinators visited the flowers, out of which nine species belong to order Hymenoptera, three from Coleoptera and two from Dipterans. Major visitors on floral comprises of hymenopteran such as Apis cerana, Apis mellifera, Tetragonula iridipennis, Lepidotrigona arcifera, Apis florae, Apis dorsata, Xylocopa tenuiscapa, Xylocopa fenestrate and Lasius niger, followed by coleoptera, Aulacophora foveicollis, Aulacophora atripennis, Aulacophora nigripennis, dipterans, Bactrocera dorsalis and Musca sp. were observed. The relative abundance was found to be highest in Apis cerana as compared to other pollinators. During 2022 and 2023, diversity index of pollinators was calculated to be 1.64 and 1.61 respectively. The result from the study indicates that amongst the insect pollinators, hymenopterans are the most abundant frequent visitors.

Keywords: Insect, Cucurbita moschata, treatments, pollinators, diversity.

Elucidating the Morphological, Cultural and Pathogenic Diversity of Alternaria spp. And Assessing Resistance Mechanisms in Marigold Genotypes to Alternaria Blight

Shorya Sharma *, Reeta Bhatia Dey, Amrita Das, Kanwar Pal Singh, Akshay Talukdar, Bharti and Ankita Singh

Division of Floriculture and Landscaping

ICAR-Indian Agricultural Research Institute, New Delhi

RTAAAS/AB/2024/160

Integrated Disease Management (IDM) has emerged as a comprehensive framework, promoting sustainable practices that enhance crop health and minimize ecological impact. It is a holistic approach that combines multiple eco-friendly strategies, such as resistant plant varieties, biological controls, and cultural practices, to effectively manage plant diseases while minimizing environmental impact. A cornerstone of IDM is the deployment of resistant plant varieties, which play a crucial role in minimizing reliance on chemical treatments. The strategic incorporation of resistant germplasm within IDM not only bolsters crop resilience against diseases but also aligns with the principles of organic farming, offering a holistic approach that supports both environmental sustainability and agricultural productivity. By prioritizing these natural methods, farmers can reduce chemical inputs, enhance soil health, and cultivate crops that thrive in harmony with the ecosystem. Hence, present study, conducted at ICAR-IARI, New Delhi is aimed at finding Alternaria spp. associated with Alternaria blight under Delhi conditions and getting insights into resistance mechanism of marigold genotypes through a dual screening approach. Isolation and microscopic identification revealed significant differences among isolates in terms of colony and conidial characters. Two media viz. Potato Dextrose Agar (PDA) and Host-extract media (prepared from marigold leaves) were used in this study. In order to assess virulence of isolates, a pathogenicity test was conducted and isolate '7M1' was found to be most virulent. This isolate was employed for screening both under in vitro and in vivo conditions. This integrated approach offered the benefits of identifying true resistance through in vitro screening, along with a comprehensive assessment of disease progression under field conditions. Popular varieties like Pusa Basanti Gainda, Pusa Bahar etc. were found to be highly susceptible while genotypes AMS-48, AMS-123, Pusa Parv and Pusa Utsav were found moderately resistance. The results of the dual screening strategies not only validate each other's conclusions but also offer valuable insights into disease dynamics, enhancing the accuracy of disease control measures.

Keywords: IDM, Alternaria blight, PDA, Pusa Basanti Gainda Pusa Bahar.

Vetiver Grass: A Tool for Sustainable Agriculture

Niru Kumari, Ragini Kumari, Rajeev Padbhushan, Seema and Santosh Kumar Chaudhary

Bihar Agricultural University, Sabour/Bhagalpur

RTAAAS/AB/2024/161

Vetiver grass (Chrysopogon zizanioides) has emerged as a vital tool for sustainable agriculture due to its unique structural and ecological properties. This perennial grass, native to India, is recognized for its robust, deep-rooted system, reaching depths of up to 4 meters, which enables it to stabilize soil, control erosion, and retain moisture in areas prone to soil degradation. Its non- invasive nature, drought tolerance, and capacity for heavy metal absorption have made it an attractive choice for various agricultural and environmental applications. This study explores vetiver's multifaceted role in sustainable agriculture, emphasizing its contributions to soil conservation, water management, and environmental remediation. In regions with sloping landscapes and high erosion potential, vetiver grass acts as a natural barrier that prevents soil and nutrient loss, thereby enhancing soil fertility over time. When planted in hedgerows, vetiver slows down water runoff, facilitating greater water infiltration into the soil profile, which is especially beneficial for dryland farming systems. Additionally, vetiver's biomass contributes to soil organic matter, supporting microbial diversity and improving soil structure. Vetiver grass also supports climate resilience by protecting agricultural lands from extreme weather events, such as intense rainfall or prolonged drought. Due to its heavy metal tolerance, it is employed in phytoremediation to absorb and stabilize contaminants, improving soil quality in degraded or polluted areas. Overall, vetiver grass represents a promising natural solution for enhancing agricultural sustainability. Its use aligns with the goals of soil health, water conservation, and climate adaptation, making it a practical and impactful choice for farmers and environmentalists alike. Integrating vetiver grass into agricultural practices could significantly improve soil stability, water availability, and land productivity, supporting sustainable and resilient food production systems worldwide.

Assessment of Genetic variability, heritability and genetic advance for yield and yield attributing traits in Winged Bean [Psophocarpus tetragonolobus (L.) DC.]

Jarman Gadi[1], Professor Kigwe Seyie, Dr. Pankaj Shah, Zafar Imam[2]

[1]Department of Genetics and Plant Breeding, School of Agricultural Sciences, Nagaland University, Medziphema

[2]Department of Genetics and Plant Breeding, Bihar Agricultural University, Sabour Bhagalpur

RTAAAS/AB/2024/162

Winged beans [Psophocarpus tetragonolobus (L.) DC.] is an underutilized crop having a significant potential to improve food and nutrition security, but this potential is often hindered by limited genetic improvement efforts. A major challenge to establishing effective breeding programs is the insufficient data on the genetic variability within winged bean germplasm. To bridge this gap, a study evaluated forty- winged bean accessions for genetic diversity using sixteen quantitative traits. In this study 40 genotypes of winged bean were evaluated at the research farm SAS, Nagaland University Medziphema, India. Recruited from different locations of Nagaland and IIVR- Varanasi and sown in three different dates. The experiment was conducted during summer 2022-23 and 2023-24, respectively. The environment provided were Timely Late and Very Late conditions which was conducted using (RCBD). In the present study Analysis of variance indicated significant genetic variability for the traits under study in all three environments. A wide range of genetic variability was present among the genotypes for yield and yield-related traits constituting of tuber weight, pod yield per plant, days to first flowering, days to 50% flowering, days to maturity, days to pod to maturity and seed yield per plant. A high GCV is present for tuber length, tuber weight, seed yield per plant, number of pods per plant and pod yield per plant under all conditions. Also, high heritability and genetic advance as percent of mean was present in tuber weight, seed yield per plant, tuber yield per plant, days to pod initiation and dry pod weight. High yielding genotypes viz., VRWB-17, VRWB-20, Local Wokha-2, VRWB-26 and VRWB-36 could be further evaluated by selection techniques.

Keywords – Winged Bean, underutilized legume, ANOVA, Genetic Variability, Heritability, Genetic advance, PCV, GCV.

"Studies on the effect of plant growth regulators on growth and economy of sapota [Manilkara achras (Mill.) Forsberg] cv. Cricket Ball under Agro-climatic condition of Chhattisgarh plains

Roshan Lal Sahu*, Prabhakar Singh, Hemant Kumar Panigrahi and Gangaram Rana

Department of Fruit Science, IGKV Raipur, (C.G.)

RTAAAS/AB/2024/163

The current study was conducted at the Horticulture Instructional Farm Experimental Field, Department of Fruit Science College of Agriculture, IGKV, Raipur (C.G.) in the years 2020–21 and 2021–22. The experiment involved applying foliar sprays of several amounts of plant growth regulators at 50% flowering and the pea stage of fruit growth to twenty-year-old sapota cv. Cricket Ball trees. Using a Randomised Block Design, the trial included 25 reatments with three replications. Physical characteristics of the fruit viz., fruit weight (126.36 g), fruit volume (121.59 ml), fruit diameter (6.69 cm), fruit length (6.92 cm) and pulp weight (112.61 g) of sapota fruits were increased considerably with the treatment GA 3 @ 150 ppm, while, the peel weight (8.79 g) was reduced under the same treatment. The specific gravity (1.045 g/ml) was recorded maximum under the treatment ethrel @ 1000 ppm. However, a reduction in number of seeds per fruit (4.50) and seed weight (4.38 g) was observed by the foliar feeding of NAA @ 100 ppm treatment. When treated at 50% flowering and pea stage of fruit development, the treatment NAA 200 ppm provided a significantly higher yield in terms of both economics and yield (22.72 qt/ha), gross realization (159045.90 Rs./ha) and net realization (114977.89 Rs./ha) in contrast to the remaining treatments being examined in this study. The maximum benefit: cost ratio (2.81) was noticed under the treatment NAA @ 100 ppm, while minimum in case of treatment T 0 (control).

Keywords: Benefit: cost, CCC, GA 3 , gross realization, NAA, Physical parameters

Investigation of Farm Women's Perception Regarding Nutrigarden Practices

Basavanagowda M.G[1,2*], Rangaswamy B.E.[3]

[1]Research Scholar, Department of Biotechnology, Bapuji Institute of Engineering and Technology, Davanagere, Karnataka-India.,

[2]Scientist (Horticulture), ICAR-Taralabalu Krishi Vigyan Kendra, Davanagere

[3]Registrar, Visvesvaraya Technological University, Belagavi, Karnataka,

RTAAAS/AB/2024/164

In order to fight malnutrition, community and nutrition gardens can help improve food security and dietary diversity on a nationwide level. Nutrigardens helps to provide the fresh vegetable with good nutrition content, which in turn helps the consumers in getting better health. The study was conducted under the organic farming scheme Paramparagat Krishi Vikas Yojana of Davanagere District of Karnataka State. Fifty farm families were selected for the study, and the perception of the farmwomen regarding the benefit of nutrigarden was studied through the questionnaires. Hundred percent of the respondents strongly agree that vegetables from the nutrigarden are fresh and healthy, and the nutrigarden helps in effective utilization of space near home. Regarding per capita availability of fruits and vegetables is increased due to Nutri-Garden 70 percent of the respondents agreed and 13 percent disagreed. 94 percent of the respondents agreed that Nutrigarden helps to grow vegetables as per the needs of family members. During the study, it was identified that 38 percent of the respondents belong to the medium perception level, 36 percent have a high perception level, and 26 percent remain for low perception. The nutrition garden provided that all individuals had access to a healthy diet and increased economic value at their doorstep.

Formulation and Nutritional Assessment of a Milk-Based Nutri-Mix Enriched with Millets

Kajal Srivastava

Research Scholar, Dairy Science and Technology, SOA, IGNOU, New Delhi, India.

RTAAAS/AB/2024/165

The increasing interest in functional foods that provide enhanced nutritional benefits has led to the exploration of traditional grains and dairy products as foundational ingredients. This study explores the creation of a milk-based nutri-mix enriched with millets, offering a nutrient-dense option for all age groups. Minor Millets like Kodo and Little millet were chosen for their high fiber, protein, and mineral content, which support heart health, diabetes management, and digestion. Milk powder, rich in calcium and protein, complements the mix by promoting bone health and growth, while jaggery enhances flavor and adds iron. Millets were cleaned, soaked, germinated, dried and converted into a malt to enhance digestibility and bioavailability of nutrients and blending them with milk powder and sweeteners to ensure a balance of nutrition and taste. Nutritional analysis of the product revealed high protein, calcium Iron, phosphorus, and fiber content, making it especially beneficial for children, teens, and adults with metabolic or dietary needs. Sensory evaluation was conducted with a panel of semi-trained to assess the colour, taste, colour, texture, flavour, and overall acceptability of the nutri-mix. Sensory evaluation showed strong approval for the mix's mild sweetness and smooth texture. This millet-enriched nutri-mix provides a wholesome alternative to conventional food, aligning with growing interest in functional foods. With potential for commercialization, future improvements could include adding other millets and new flavors to boost appeal and nutritional value further. Also, such products help us in advocating cultivation millets which are more climate resilient than conventional grains.

Influence of Nutritional status on quality of life of elderly

Sapthagiri T V[1], Prema B. Patil[2] and Lata Pujar[3]

[1]Ph.D. Scholar, Department of Human Development and Family Studies, College of Community Science, University of Agricultural Sciences, Dharwad, Karnataka,

[2]Professor and Head, Department of Human Development and Family Studies, College of Community Science, University of Agricultural Sciences, Dharwad, Karnataka,

[3]Professor, Department of Human Development and Family Studies, College of Community Science, University of Agricultural Sciences, Dharwad, Karnataka, India

RTAAAS/AB/2024/166

The nutritional status of elderly individuals is a key determinant of their overall quality of life, influencing their physical health, cognitive functioning, emotional well- being, and social engagement. Aging is often accompanied by physiological, sychological, and social changes that can lead to nutritional deficiencies, which in turn adversely affect the quality of life. Institutionalized elderly, in particular, face additional challenges such as limited autonomy, reduced social interaction, and inadequate access to personalized nutrition, which can further impact their health and well-being. This study investigates the relationship between nutritional status and quality of life among 180 elderly individuals, equally divided into institutionalized and non-institutionalized groups, using a cross-sectional differential design. Tools such as the Quality of Life Scale and Mini Nutritional Assessment Scale were employed to evaluate their well-being. The results showed that non-institutionalized elderly had significantly higher quality of life (122.61) and nutritional status (51.51) compared to institutionalized elderly (100.84 and 40.91, respectively). Correlation analysis revealed a positive correlation between better nutritional status and improved quality of life (r = 0.52**), while poor nutritional status negatively impacted quality of life (r = -0.28**). The findings highlight the importance of addressing the nutritional needs of the elderly to enhance their quality of life, emphasizing the need for targeted dietary interventions, regular nutritional assessments, and improved living conditions, particularly for those in institutional care.

Keywords: Quality of life, nutritional status, institutionalized elderly, non- institutionalized elderly.

Exploring the Future of Aviation with Sustainable Aviation Fuel (SAF) and benefits in agriculture economy

Raj Kumari Sharma[1], Ashish Sharma[2],

[1]BSc. Hons. Agriculture, MSc. Scholar in Agriculture Economics and

Farm Management Rajasthan college of Agriculture MPUAT.

[2]B. Tech Aeronautical, Post Graduate Diploma Operation Management, Fleet

Engineer at CAE simulation training pvt. ltd.

RTAAAS/AB/024/167

Sustainable Aviation Fuel (SAF) and biofuel adoption represent a transformative shift in the aviation industry towards reducing its carbon footprint and mitigating climate change. SAF, derived from renewable sources such as waste oils, agricultural residues, and non-food crops, offers a significant reduction in lifecycle greenhouse gas emissions compared to conventional jet fuel. The adoption of biofuels by airlines is driven by regulatory pressures, environmental goals, and the pursuit of operational sustainabilityThe International Air Transport Association (IATA) and other industry bodies are actively promoting initiatives that support research and development, aiming to scale production and lower cost. Furthermore, partnerships between airlines, fuel producers, and research institutions are fostering innovation and accelerating the deployment of these fuels. The on-going research and development, coupled with policy incentives, are crucial to overcoming these barriers. As the aviation sector strives for net-zero emissions, the have adoption of SAF and biofuels is a pivotal strategy in achieving a sustainable and environmentally responsible future. Sustainable Aviation Fuel (SAF) can significantly benefit the agricultural economy in various ways. Creating New Markets for Agricultural Products, Enhancing Rural Development, Promoting Sustainable Farming Practices, Increasing Farm Income and Environmental Benefits. Government and private sector investments in R&D for SAF can lead to innovations in crop production and feedstock processing, benefiting the agricultural sector. By integrating SAF into the agricultural economy, there is a potential for a mutually beneficial relationship where the agricultural sector supports the aviation industry's sustainability goals, while also gaining economic and environmental advantages. This synergy can play a crucial role in driving both industries towards a more sustainable future.

Integrated Disease Managerment of Fusarium Wilt of Tomato

(*Solanum lycopersicum* L.)

Nentia Chib, Sapna Devi, S.K. Singh

Division of Plant Pathology, Sher-e- Kashmir University of Agricultural Sciences and Technology of

RTAAAS/AB/2024/168

Fusarium wilt caused by Fusarium oxysporum f. sp. lycopersici, is a devastating disease affecting tomato (Solanum lycopersicum L.) crops worldwide. The disease leads to significant yield losses due to wilting, vascular discoloration, and plant death. Integrated disease management (IDM) provides a holistic approach to managing Fusarium wilt by combining cultural practices, biological control, chemical treatments, and the use of resistant varieties. Cultural methods such as crop rotation, soil solarization, and proper sanitation reduce the pathogen load in the field. Biological control agents, including Trichoderma spp. and Bacillus spp., suppress the pathogen by competing for resources, producing antifungal compounds, or inducing systemic resistance in plants. Chemical treatments, such as fungicides and soil fumigants, can be used judiciously to reduce disease severity, although their long-term use poses risks of resistance development and environmental harm. Resistant tomato cultivars offer a sustainable solution but are often limited by the emergence of new pathogen races. Combining these strategies in an integrated manner reduces reliance on a single control method, enhances overall disease suppression, and promotes sustainable tomato production. Future research should focus on optimizing IDM practices, identifying novel biocontrol agents, and developing multi-race resistant varieties to address the dynamic challenges posed by Fusarium wilt.

Keywords: Fusarium, IDM, Treatments, Biocontrol.

Effect of Packaging Materials and Chemicals on Shelf-Life of Ber (*Zizyphus Mauritiana* Lamk.) Cv. Gola Under Zero Energy Cool Chamber and Ambient Storage

Madhu Lata Bhasker, Technical Assistant

Agriculture University, Kota

RTAAAS/AB/024/169

An investigation utilizing calcium chloride and calcium nitrate along with Packaging materials of polyethylene and paper bag was undertaken under Zero Energy Cool Chamber and ambient storage to observe the efficacy of the treatment in extending the shelf-life of the fruits at the Department of Horticulture, College of Agriculture, SKRAU, Bikaner. The fruits were treated with 1 and 2% concentration of calcium chloride and calcium nitrate, kept in polyety and paper bag and placed under Zero-Energy-Cool-Chamber as well as ambient storage condition. The treatment combination of 1 and 2% calcium nitrate and calcium chloride under polystigirbag under Zero-Energy-Cool-Chamber were observed effective in extending storability of the fruits. At the end of the storage period of 20 days. the minimum PLW (0.27%), minimum spoilage (32%), maximum organoleptic score (5.06/10) minimum TSS (21.33%), maximum total sugar (13.43%), maximum reducing sugar (4.36%), maximum non- reducing sugar (5.41%), maximum acidity (0.253 mg/100 g. pulp) and maximum ascorbic acid (50.23 mg/100 g pulp) were noted in contrast to 66.77% PLW, 79.60% spoilage, 26.33% TSS, 10,60% total sugar, 3.60% reducing sugar, 3.30% non-reducing sugar, 0.215% acidity and 25.55 mg/100 g pulp ascorbic acid under control,

Keywords: zero energy cool chamber, reducing, non-reducing maximum, minimum,

Effect of Sulphur and Weed Management on Growth, Yield and Quality of

Soybean (Glycine max L. Merrill)

Kamal Kishor Kumawat[1], Dr. Rekha Yadav[1]

[1]Deapartment of Agronomy, School of Agricultural Sciences, Nagaland University, Nagaland, India

[2]Assistant Professor, Deapartment of Agronomy, School of Agricultural Sciences, Nagaland University, Nagaland,

RTAAAS/AB/2024/170

A field experiment was conducted during rainy season of 2023 at the Agronomy farm at School of agricultural sciences, Nagaland University to evaluate the effect of sulphur and weed management on growth, yield and quality of soybean [Glycine max (L.) Merrill]. The sixteen treatment combinations comprising 4 sulphur treatments (S 0 , S 15 , S 30 , and S 45 kg ha -1) and 4 weed management treatments (weedy check, two hand weeding at 20 and 40 DAS, pendimethalin @ 0.75 kg ha -1 and sodium acifluorfen + clodinafop propargyl @ 200 g ha -1). All the weed management treatments significantly enhanced straw yield and grain yield of soybean over weedy check. Among the weed management treatments two hand weeding at 20 and 40 DAS produced significantly higher seed (3015.43 kg ha -1) and straw (6073.76 kg ha -1) yields compared to weedy check. Among the herbicidal treatment sodium acifluorfen + clodinafop propargyl @ 200 g ha -1 produced significantly higher seed (2775.68 kg ha 1) and straw (5738.77 kg ha 1) yields compared to pendimethalin @ 0.75 kg ha -1. Increasing rate of sulphur application up to 45 kg ha -1 resulted in significantly increased seed yield (3223.18 kg ha -1), straw yield (6178.68 kg ha -1), protein yield (1441.33 kg ha -1) and oil yield (734.48 kg ha -1) of soybean.

Keywords: Soybean, Sulphur, Weed management, pendimethalin, sodium acifluorfen + clodinafop propargyl, Yield.

Impact of NGF gene polymorphism on growth traits in Black Bengal goats

Rakesh Kumar[1*], Shanker Dayal[1], Rajni Kumari[1], P.C. Chandran[1],

A. Dey[1], P. K. Ray[1], Jyoti Kumar[1], M. K. Tripathi[1], S. K. Ahirwal[1], and Kamal Sarma[1]

[1]Division of Livestock and Fisheries Management, ICAR-Research Complex for Eastern Region, Patna, (Bihar)

RTAAAS/AB/2024/171

The expression of the nerve growth factor (NGF) gene in skeletal muscle tissue is linked to an autocrine action that influences the proliferation of myotubes and the development of myoblasts. Therefore, this study was carried out to explore the genetic variations within the NGF gene and their association with growth traits in Black Bengal goats. We utilized PCR- RFLP to identify polymorphic locus i.e., SNP: g.705A>G-MboII and investigated their association with growth parameters in the examined breed. The PCR-RFLP analysis reveals that the NGF gene's SNP: g.705A>G-MboII locus is characterized by two distinct genotypes: GG and AG. The frequencies of the G and A alleles in the examined goat breed were found to be 0.92 and 0.08, respectively. The polymorphic loci exhibited a state of Hardy-Weinberg disequilibrium in the analysed goat breed (P<0.05). In the examined breed, the GG genotype exhibited slightly higher values for certain biometric traits than the other genotypes; however, none of the traits demonstrated a significant correlation (P<0.05). Thus, the GG genotype may act as a promising marker for improved growth traits in the studied goat breed. However, further research with larger sample sizes and different breeds will be necessary to validate and implement these findings.

Keywords: NGF gene, Goat, Growth trait, Polymorphism

Assessment of the effectiveness of the predatory mite Blattisocius mali (Acari:Mesostigmata) in relation to the acarid mite Tyrophagus putrescentiae infesting cucumber plant under the semi-natural condition

Manoj Kumar Jena[1*], Katarzyna Michalska[1] and Marcin Studnicki[2]

[1]Department of Plant Protection, Institute of Horticultural Sciences, Warsaw University of Life Sciences, Nowoursynowska, Warsaw, Poland

[2]Department of Biometry, Institute of Agriculture, Warsaw University of Life Sciences, Nowoursynowska, Warsaw, Poland

RTAAAS/AB/2024/172

The predatory mite Blattisocius mali Oudemans (Acari: Blattisociidae) is a potential biological control agent of the mould mite Tyrophagus putrescentiae Schrank (Acari: Acaridae). Its ability to control insect pests of stored products was recently assessed under laboratory conditions. Still, its ability to control the pests of crop plants has not been tested so far. This study evaluated whether B. mali can control T. putrescentiae on cucumber plants under semi-natural conditions. Blattisocius mali required about two and five days to achieve the reduction of the T. putrescentiae population on cucumber plants when 18 B. mali were released on the cucumber plant infested with 120 (combination T 1) and 600 motiles of T. putrescentiae per plant (combination T 2), respectively. In combination T 1 , the mean number of eggs and motiles of T. putrescentiae per cucumber plant found two days after the predator's release was significantly lower in the treatment (1.38eggs/plant and 3.75motiles/plant) than in the control (14.25eggs/plant and 83.38motiles/plant). Similarly, in combination T 2 , the mean number of eggs and motiles of T. putrescentiae per cucumber plant five days after the predator's release was significantly lower in the treatment (0eggs/plant and 2.12 motiles/plant) than in the control (12eggs/plant and 396.88motiles/plant). The biological control's effectiveness, estimated using a two-factor generalized linear mixed model (GLMM) suggested by Piepho et al. 2024, was 95.50% for combination T 1 and 99.48% for combination T 2 at the end of the trial. Hence, it is concluded that B. mali is highly efficient in reducing the population of T. putrescentiae on cucumber plants under semi-natural conditions.

Keywords: Biological control, Blattisociidae, Crop plant, Efficiency, Mould mite

Enhancing the production of sericulture through effective management

Harshita Thakur

Department of Entomology, Sam Higginbottom University of Agriculture,

Technology and Sciences, Prayagraj, Uttar Pradesh, India

RTAAAS/AB/2024/173

Sericulture is the art and science of silk production. Silk is called as the queen of all fabric materials over thousands of years. Sericulture involves the cultivation of silkworms (Bombyx mori) and the careful management of mulberry plantations which provide primary feed for the larvae. As a labor-intensive industry, sericulture faces numerous challenges, including fluctuations in silkworm health, pest management issues, climate variations, and inefficient production techniques. For achieving sustainable growth in sericulture requires efficient management strategies to enhance productivity, ensure high- quality silk production, and address challenges such as pest management, climate variations, and labor constraints. By adopting integrated pest management (IPM) and eco- friendly techniques can minimize the use of chemicals, ensuring both environmental sustainability and improved silk quality. Sericulture plays a crucial role in the economic development of many countries, especially in Asia where it supports millions of livelihoods and contributes significantly to rural development. One of the most promising innovations in sericulture is the adoption of technology-driven solutions such as automated rearing systems, climate-controlled environments, and the use of data analytics for farm management. These technologies can significantly improve the consistency and scale of production while reducing the labor requirements and resource wastage. Additionally, genetic improvements in silkworm strains, including the development of disease-resistant and high-yielding varieties, are essential to enhancing the resilience and efficiency of sericulture farming. By focusing on ecological balance and natural pest control, IPM can help protect silkworms from diseases and pests, leading to healthier crops and more consistent harvests. Sustainable sericulture practices, such as organic mulberry cultivation, also contribute to the long-term viability of the industry by reducing chemical inputs and improving soil health. Farmer training and capacity-building are critical components of successful sericulture management. The establishment of better infrastructure, such as silk processing units and cold storage facilities, can enhance post-harvest handling, ensuring higher-quality silk and reducing waste. The efficient management of sericulture involves a multi-faceted approach that incorporates technological advancements, sustainable farming practices, and enhanced farmer education.

Advancing Sustainability: Insights into Organic Farming Practices and Benefits

Ritika Sankhyan

Department of Vegetable Science,

Dr. Y S Parmar University of Horticulture and forestry, Nauni, Solan, Himachal Pradesh

RTAAAS/AB/2024/174

Organic farming is a cornerstone of sustainable agriculture, offering an eco-friendly alternative to conventional farming practices. By prioritizing natural processes and avoiding synthetic chemicals, organic farming enhances soil fertility, promotes biodiversity, and reduces environmental pollution. Organic farming has enabled many smallholders to improve their income by lowering input costs and securing higher market prices. However, these benefits depend on the availability of markets for organic products. Additionally, organic farming has supported smallholding households in meeting their food and nutritional needs, provided they adopt effective farm management practices and attain yields similar to those of conventional farming. Organic farming and conventional farming differ significantly in terms of productivity, economic viability, and environmental impact. While conventional farming often achieves higher yields due to the use of synthetic fertilizers and pesticides, organic farming can close this gap through effective management practices and crop diversification. Economically, organic farming offers higher profit margins for farmers due to reduced input costs and premium market prices for organic products, although these benefits depend on access to organic markets and efficient certification systems. From an environmental perspective, organic farming excels by enhancing soil health, increasing biodiversity and reducing pollution from chemical runoff, whereas conventional farming often leads to soil degradation, water contamination and greenhouse gas emissions. Residue-free production through organic farming relies on natural inputs, crop rotation, composting and biological pest control to maintain soil fertility and manage pests effectively. By eliminating the use of synthetic chemicals such as pesticides and fertilizers, organic farming minimizes the risk of chemical residues in food, aligning with the growing consumer demand for clean and natural produce. This approach not only prioritizes soil health and ecological balance but also reduces environmental contamination, safeguarding water and biodiversity. By shedding light on the transformative potential of organic farming we can underscores its pivotal role in advancing sustainability and shaping the future of agriculture.

"Nano-Fertilizers: An Approach to Boosting Agricultural Efficiency and Sustainability"

Jenio Lotha

Ph.D Scholar, Department of Soil Science, SAS, Nagaland University, Nagaland.

RTAAAS/AB/2024/175

The global population is expected to reach 9.7 billion by 2050, driving the need for a 50-70% increase in food production. Fertilizers, which account for up to 40% of crop productivity, are vital in meeting this demand. However, conventional fertilizers have significant limitations, with low nutrient use efficiency (NUE): nitrogen (30-40%), phosphorus (15-20%), potassium (60- 80%), and sulfur (8-12%). These inefficiencies lead to environmental issues such as leaching, volatilization, and soil fertility depletion. To address these challenges, nano-fertilizers, developed through advancements in nanotechnology, offer precision nutrient delivery, reduced losses, and enhanced productivity. Nano-fertilizers provide superior performance due to their high surface- area-to-volume ratios, controlled-release mechanisms, and tailored nutrient formulations. Studies have shown that nano-nitrogen fertilizers achieve a NUE of 75% compared to 27% for conventional formulations, while nano-phosphorus doubles the efficiency of traditional sources. In peanuts, nano-zinc fertilizers increased germination rates to 99% and pod yields by over 25%. Nano-potash formulations improve water retention and nutrient availability, making them highly effective for crops like rice and wheat. Additionally, nano-fertilizers promote microbial activity and enzymatic functions in the rhizosphere, contributing to improved soil health and crop resilience. Despite their potential, the widespread adoption of nano-fertilizers is hindered by high costs, limited farmer awareness, and insufficient infrastructure. Addressing these challenges through education, policy support, and targeted research can enable nano-fertilizers to play a pivotal role in achieving sustainable agricultural intensification and ensuring global food security.

Keywords: Nano-fertilizers, nutrient use efficiency, sustainable agriculture, food security, precision nutrient delivery, controlled-release fertilizers, crop productivity, soil health.

Ecological Importance and Conservation Strategies for Tecomella undulata

Vijay Daneva

Assistant Professor, Jagannath University, Chaksu, Jaipur

RTAAAS/AB/2024/176

Tecomella undulata, commonly known as the Desert Teak, is an endangered tree species native to arid and semi-arid regions of India and Pakistan. Known for its valuable wood, medicinal properties, and ecological significance, this species plays a critical role in maintaining the health and stability of desert ecosystems. However, due to over-exploitation, habitat degradation, and climate change, T. undulata populations have dwindled, leading to its inclusion in the endangered category of the IUCN Red List. The ecological importance of T. undulata lies in its ability to stabilize soil, support local biodiversity, and provide shelter and nourishment for various species, especially in arid landscapes. The tree's deep roots and drought-tolerant nature make it an essential component of desert restoration projects. This paper explores the ecological significance of Tecomella undulata within its native habitat, focusing on its role in desert ecosystems and its potential for ecological restoration. Additionally, the paper examines the main threats facing the species, including deforestation, overharvesting, land use changes, and climate fluctuations. To mitigate these threats, the study highlights several conservation strategies, such as habitat protection, reforestation initiatives, community-based conservation efforts, and the promotion of sustainable harvesting practices. Furthermore, the development of ex-situ conservation techniques, including seed banking and botanical garden cultivation, is discussed as a complement to in-situ conservation efforts. The paper concludes by stressing the importance of collaborative efforts between local communities, government agencies, and conservation organizations to ensure the survival of Tecomella undulata for future generations.

Keywords: Valuable, Biodiversity, Drought, Deforestation, Conservation

Innovative Strategies and Approaches for Developing Gluten-Free Beer

Malhar Shukla[1] and Kajal Srivastava[2]

[1]M.Sc. Food Technology, Doon (P.G.) College of Agriculture Science and Technology,

[2]Assistant Professor, Doon (P.G.) College of Agriculture Science and Technology,

RTAAAS/AB/2024/177

Beer is one of the most widely consumed alcoholic beverages across the world. The classic method of brewing beer relies on four primary ingredients: water, malted barley, hops, and yeast. However, traditional beer contains a high gluten content. Gliadin and glutenin are the primary components of gluten, which is a composite assemblage of heterogeneous proteins. Grains like rye, barley and wheat are rich in gluten content. It can trigger an autoimmune response that damages the small intestine, leading to inflammation in the small intestine, specifically targeting villi. This leads to damage in the hair-like structures of the villi, causing them to flatten. This inhibits the normal functioning of the villi in nutrient uptake, a condition known as villous atrophy. There are several symptoms of this immune response such as bloating, diarrhoea, obesity and abdominal pain. Unaddressed celiac diseases in long term can cause malnutrition and osteoporosis. The only cure to the celiac disease to date is consumption of the Gluten-free diet. Although there are several gluten free products available in the market but are reported to be more costly and having lesser nutritional values. This problem can be addressed incorporating different techniques to remove gluten from beer without changing its flavour and other organoleptic aspects. The enzymes like Prolylendopeptidase (PEP) obtained from A. niger can be employed for removing the gluten content. The other method is by substituting gluten-containing cereals with alternatives like green lentils. The use of a pseudo-cereals which are gluten-free like sorghum instead of malt can be made for gluten-free beer production. The third method which can be applied for the production of gluten-free beer is based on the Japanese products, by using the yeast as a source of nutrition, hops for adding flavour, caramel for colour, corn, pea and soyabean for protein.

Growth and Yield Characteristics of Capsicum (Capsicum annuum L.) cv. Orobelle in Response to Different Growing Media and Plant Spacing under Protected Conditions

Bijeta*, Kuldeep Singh Thakur, Sandeep Kansal, Ashwini Kumar Sharma and A K Sharma[1]

Department of Vegetable Science, Dr. Y.S. Parmar University of Horticulture and Forestry, Nauni, Solan, Himachal Pradesh, India *Corresponding author, [1]KVK Dhakrani

RTAAAS/AB/2024/178

An experiment was conducted in naturally ventilated polyhouse at Vegetable Research Farm of Department of Vegetable Science, Dr. Y. S. Parmar University of Horticulture and Forestry, Nauni, during 2015 and 2016 to find out the most suitable growing media and plant spacing for growth and yield of the capsicum cv. Orobelle in the mid hills of Himalayas. The media consisting of Soil + Cocopeat + Vermicompost + FYM (2:1:0.5:0.5) proved to be statistically superior over rest of the growing media for almost all the aspects under investigation. All the attributes were better or at par when the plants were spaced at the wider plant spacing (45 x 60 cm). Therefore it can be inferred that incorporation of Cocopeat, Vermicompost, and FYM led to the better soil properties and nutrient supply to plants, whereas appropriate crop spacing created suitable micro environment for proper plant competition.

Keywords: Capsicum, Growing media, Spacing, Orobelle

ECONOMETRIC ANALYSIS ON PRICE BEHAVIOUR OF MULBERRY COCOONS IN INDIA

G R Halagundegowda, P Kumaresan, J Pallavi, Y Prathap Reddy and S Manthira Moorthy

Central Silk Board, Bengaluru.

RTAAAS/AB/2024/179

The study aims to analyze the trend, seasonality, and instability components of time series data for both prices and arrivals of mulberry cocoons. The monthly time series data on the prices and arrivals of both bivoltine and crossbreed cocoons from 2005-06 to 2023-24 in major Government Cocoon Markets (GCM) of South India such as Ramanagaram (both bivoltine and cross breed), Sidlaghatta (cross breed only), Hindupuram (both bivoltine and cross breed) and Dharmapuri (bivoltine only) were used for the analysis. The result indicates, the bivoltine cocoon arrivals exhibited a positive upward trend characterized by a cubic pattern, while crossbreed arrivals displayed a negative declining trend across all cocoon markets. Further, bivoltine prices illustrated seasonal fluctuations from December to June, whereas crossbreed prices tended to be higher from December to April. The arrivals of bivoltine cocoons in the Hindupur and Dharmapuri markets recorded higher instability values compared to ther markets, while crossbreed cocoon arrivals in the Hindupur market exhibited significant instability. Prices for both bivoltine and crossbreed cocoons demonstrated moderate instability across all markets.

Optimization and Quality Assessemnt of Harad- Aonla - Ber Blended Powder

Ankita Chib, Jagmohan Singh, Anju Bhat and Shivani Verma

Post Harvest Management, Sher-e-Kashmir University of Agricultural Sciences and technology, Chatha, Jammu

RTAAAS/AB/2024/180

The study focuses on the optimization and quality assessment of a blended powder composed of Harad (Terminalia chebula), Aonla (Emblica officinalis) and Ber (Ziziphus mauritiana) over a six-month storage period. Using a mixture design approach, the optimal blend ratios of these three fruits were determined to maximize antioxidant content, flavor, and nutritional value. The powders were stored in moisture-resistant packaging at ambient conditions, with quality parameters evaluated monthly, including moisture content, water activity, total phenolic content, vitamin C levels, and antioxidant activity. Results indicated that, over six months, there was a gradual decline in the antioxidant activity and vitamin C levels, with moisture and water activity showing slight increases, affecting the shelf life and overall quality. The study concluded that careful optimization of the blend, along with controlled storage conditions, can preserve the functional properties of the powder blend, making it a viable, nutrient-rich product for prolonged storage.

In Vitro Evaluation on Efficacy of Bioagents and Plant Extracts Against Early Blight of Tomato (Alternaria alternata)

***Sairam K[1], Gopal K[2], Ruth Ch[3]**

[1]PhD Scholar, Department of Plant Pathology, Dr.Y.S.R Horticultural University, Venkataramannagudem, A.P

[2]Honorable vice chancellor, Dr.Y.S.R Horticultural University, Venkataramannagudem, A.P.

[3]Department of Plant Pathology, College of Horticulture, Anantharajupeta, Andhra Pradesh.

RTAAAS/AB/2024/181

A trial was conducted in plant pathology laboratory at HRS Venkataramannagudem, Dr. Y.S.R. Horticultural University, Venkataramannagudem, during 2022.The efficacy of bioagents were tested against isolates for radial growth inhibition on suitable media using dual culture technique under in vitro conditions. The poisoned food technique was followed to evaluate the efficacy of botanicals in inhibiting the mycelial growth of test pathogen. Early blight disease of tomato caused by Alternaria alternata is an economically important disease causing huge losses throughout Country. In the present investigation total nine bioagents ands four plants extracts were tested against Alternaria alternata under in vitro. Results revealed that among the nine antagonists tested against A. alternata maximum reduction in colony growth of A. alternata was observed in A10 (T. asperellum) (69.50%) and significantly superior over all other bioagents tested. Total four plant extracts tested against A. alternata, onion bulb extract (44.07%) which was found superior to all other tested botanicals.

Keywords: Tomato, Bio control agents, Alternaria alternata, Trichoderma asperellum, onion bulb extract

Agro Textile – The Farmer's Aide

Dr. Sirisha Deepthi Sornapudi

Department of Apparel and Textiles, College of Community Science

PJTAU, Saifabad, Hyderabad.

RTAAAS/AB/2024/182

Textiles have been an integral part of agriculture, so much so that they can be the backbone for agriculture. Their use in agriculture ranges from protection, containment, storage and transportation of agricultural produce. With the advancement in technology, and production processes, a group of textiles have been specifically produced for the agriculture sector, termed as 'Agro Textiles'. Agro textiles such as shade nets, thermal screens, crop covers, mulch mats, root ball net, bird protection nets, fruit covers, anti-hail nets, grow sticks etc. can become farmer's aide. Use of agro textiles in agricultural practice will provide noticeable benefits to the farmers by providing protection against extreme environmental conditions, improved crop yield and improved soil condition and helps in promoting sustainable agricultural practice, especially when bio based agro textiles are used. Agro textiles play a major role in weed management. Use of crop covers and mulches will supress the weed growth by blocking the sunlight, inhibits the seed growth and also reduces the usage of pesticides and chemicals and also promotes the organic and sustainable farming. It not only controls the weed and but also helps to maintain moisture and plant growth. Perceived benefits for farmers by using agro textiles include reduced labour cost, increased yield and act as a sustainable solution to agricultural practices. Agro textiles are also designed to enhance soil fertility especially soil covers and crop covers help to retain moisture and nutrients for plant growth. It helps to stabilize the soil surface, reduces the soil erosion and prevents loss of organic matter. Use of bio degradable materials as soil covers will break down and enrich the organic matter and enhances the nutrition content. Kerosene coated coir fibre and its role in strengthening of soil was recently studied. Kerosene coated on coir prevented it from moisture induced degradation and also to imparted strength and stress strain to coir. It was found that using kerosene as a protective coating significantly reduced the water absorption capacity of coir by up to 170%. The reinforcement also proved to be effective with 52% of increased strength compared to non-reinforcement. The soil elastic modulus increased by up to 78%. Hence such agro textiles aid in soil strengthening and soil fertility enhancement.

Keywords: Agro textiles, crop yield, soil strengthening, soil fertility, weed management.

Study of dynamics of genes involved in biosynthesis and accumulation of scopoletin at different growth stages of Convolvulus prostratus Forssk

Rutulkumar Vallabhbhai Rafaliya

RTAAAS/AB/2024/183

The scopoletin one of the major bioactive components of Convolvulus prostratus Forssk known to have a role in acetylcholinesterase inhibitor, memory enhancer, antimicrobial, antioxidative etc. properties are investigated in the present study. The concentration of scopoletin in C. prostratus is investigated in leaf, stem and root at different growth stages of plant development viz., 30, 45, 60 and 90 days after sowing (DAS). A highly sensitive LC- MS method was developed to quantify the scopoletin even at low concentration with LOD and LOQ of 8 and 24 ng/ml, respectively. The highest quantity of scopoletin was recorded in stem (732 µg/g dry weight) and leaf (650 µg/g dry weight) collected 90 DAS whereas lowest was recorded at 45 DAS in leaf (90.00 µg/g dry weight) and Stem (110 µg/g dry weight). Based on the highest and lowest concentration of scopoletin in stem and root tissues at 45 and 90 DAS were selected for transcriptome study. Differential gene expression analysis revealed the differential expression of genes involved in scopoletin biosynthesis. Seven genes viz., phenylalanine ammonia-lyase (PAL), 4-coumarate CoA ligase (4CL), trans-cinnamate 4-monooxygenase (TCM), shikimate O- hydrox- ycinnamoyl transferase (C3'H), 5-O-4-coumaroyl-D-quinate 3'-monooxygenase (HCT), caffeoyl-CoA-O- methyltransferase (CCoAOMT) and feruloyl-CoA 6'-hydroxylase (F6'H) were identified in the phenyl prop- anoid pathway. Expression of the novel enzyme F6′H showed down regulation in both tissues at 45 DAS. Real- time PCR showed a correlation with the expression of this F6′H genes with the accumulation of scopoletin at 90DAS. This indicated that the growth stage of plant and expression of F6′H control the scopoletin accumulation in Convolvulus. The results of present investigation may useful in pharmaceutical, drug and cosmetic industries that the harvesting of plant part especially stem of C. prostratus at 90 DAS to get maximum quantity of scopoletin. Also, the novel gene F6′H need to be further characterized to understand its expression dynamics so that scopoletin content can be increase at the highest.

Organic Farming: A Sustainable Pathway to Resilient Agriculture and Environmental Harmony

Poonam Sharma

Department of Vegetable Science,

Dr. Y S Parmar University of Horticulture and Forestry, Nauni, Solan, Himachal Pradesh,

RTAAAS/AB/2024/184

The global agricultural sector is facing unprecedented challenges, including soil degradation, loss of biodiversity, water scarcity and climate change. These challenges necessitate the adoption of sustainable farming practices that prioritize environmental health and long-term productivity. Organic farming is a holistic approach to agriculture that prioritizes environmental sustainability, social equity and economic viability. Organic farming avoids the use of synthetic fertilizers, pesticides and genetically modified organisms (GMOs). Instead, it relies on natural inputs such as compost, green manure and biological pest control, fostering soil fertility and ecosystem balance. This approach not only sustains crop yields but also mitigates greenhouse gas emissions by sequestering carbon in soil, thus contributing to climate change mitigation. Additionally, organic practices encourage the preservation of traditional farming knowledge and promote local resource utilization, reducing dependency on external inputs. The emphasis on crop rotation, cover cropping and organic amendments enhances soil structure, increases water retention and promotes microbial diversity. Organic farming contributes to local economic development by creating jobs, stimulating local economies and preserving rural heritage. From a consumer perspective, organic products are valued for their safety and nutritional quality, free from harmful chemical residues. The increasing demand for organic food highlights its role in ensuring food security while addressing public health concerns. Despite its many advantages, organic farming faces challenges, including higher production costs, limited market access and lack of policy support. However, innovative solutions, such as precision agriculture, digital extension services and value chain development, can help address these constraints. Adopting and promoting organic practices is vital for shifting towards a resilient and sustainable agricultural model, fostering a healthier environment and a food-secure tomorrow.

Breeding Strategy for Management of Powdery Mildew in Vegetable Cowpea in Bundelkhand Region

Kalyan Singh[1] Neetu[2], D.K. Singh[3], Anurag Singh[4], Mohit Kumar[5]

Ph.D. Research Scholar, [1]Assistant Professor[2,3], PG Research Scholar[4,5]
Banda University of Agriculture Technology, Banda

RTAAAS/AB/2024/185

Vegetables cowpea is a most important legume mainly grown for its green pods, seed and as a fodder crop in Bundelkhand region. Cowpea is a very nutritious vegetable in respect to protein content and dietary fiber that fulfill the requirements of protein and fiber content in daily human diet systems of mainly marginal and poverty line farmers of such region. In vegetable cowpea the serious problems is management of powdery mildew that causes heavy yield and economic losses. Therefore, for effective management of such biotic stress in these crops and region such breeding strategy is developed by breeder that overcomes the fungicide uses and minimizes the cost and yield losses through eco- friendly breeding approaches. For such point of view, screening of large number and different types of genotypes, local accession and their wild species in natural field condition along with infector lines for proper spread of inoculums. After phenotypic observation on ratting scale, we will categorised the accessions into different category and make hybridization between resistant and susceptible accession. The diverse and resistant parent are uses further in breeding programmes for development of resistant cultivar against powdery mildew and recommended of such varieties for farmers.

Keywords: Accessions, Eco- friendly, Inoculums etc.

Pre-breeding: Link between plant genetic resource and vegetable crop improvement

Amit Kumar[1], Priyanka[2], Syedah Asma Andrabi[3], Chetna Mahajan[4], and Priyanka[5]
Department of Veterinary Surgery and Radiology, College of Veterinary Science,
Rampura Phul Guru Angad Dev Veterinary and Animal Science University, Ludhiana

RTAAAS/AB/2024/186

Plant genetic resources (PGR) form the foundation of food and nutritional security. The effective utilization of PGR in vegetable improvement depends mainly on systematic characterization and evaluation to identify elite germplasms. Domestication creates genotypes tailored to human needs, resulting in a narrow genetic base due to the founder effect and reproductive isolation, which limits better adaptation under changing climate conditions or biotic and abiotic stresses This can be done by utilizing FIGS (Focused Identification of Germplasm Strategy), conducting gap analysis, or exploring core or mini-core collections. However, wide hybridization followed by backcrossing to develop introgression libraries is a daunting task due to pre- and post-fertilization barriers, along with the expression of hybrid sterility. These hurdles can be overcome by stigma treatment, the mentor pollen approach, in vitro fertilization (to overcome pre- fertilization barriers), embryo rescue technique, immature seed culture (to overcome post-fertilization barriers), and the development of colchiploids (to overcome hybrid sterility). The development of chromosome substitution lines (CSLs), advanced backcross lines, backcross inbred lines (BILs) and multiparent advanced inter-cross (MAGIC) populations through marker-assisted selection enables both the genetic analysis of traits found in crop wild relatives and the creation of genetically defined elite lines. These lines can be seamlessly integrated into breeding programs. The developed introgression lines can be used in AB-QTL analysis to discover and transfer valuable QTL alleles from unadopted donor lines. Pre-breeding helps to develop new variations that are not found in cultivated varieties. The utilization of advanced pre-breeding lines in breeding programs will facilitate the creation of high-yielding varieties with wider adaptation to biotic and abiotic stresses.

Integrating Seaweed Extracts into Organic Farming for Sustainable Crop Management

Kashish Chaudhary
Department of fruit science, Dr. YS Parmar University of Horticulture and Forestry, Nauni

RTAAAS/AB/2024/187

Seaweed extracts derived from marine macroalgae, offer valuable biostimulatory properties that support sustainable organic farming. Unlike traditional fertilizers, seaweed extracts enhance plant growth and resilience without providing nutrients at conventional fertilizer levels. Rich in bioactive compounds such as carbohydrates, amino acids, phytohormones and osmoprotectants, these extracts help improve plant tolerance to abiotic stresses, including drought, heat, salinity, and freezing, while boosting nutrient absorption, growth, and crop yield. Seaweed extracts are typically obtained through physical and chemical methods, with alkaline extraction under high pressure being a common approach. This method effectively extracts key components but may degrade certain hormones. In organic farming, seaweed extracts align with Integrated Crop Management strategies, which focus on reducing chemical inputs and promoting natural defenses. Seaweed biostimulants improve disease resistance, enhance crop quality and reduce the need for synthetic pesticides. Integrating seaweed extracts with organic inputs can reduce chemical pesticide use by up to two-thirds while increasing crop productivity, thus supporting environmentally friendly farming practices. Seaweed biomass is a renewable resource with diverse applications beyond agriculture, including pharmaceuticals and construction, promoting sustainability and a circular economy. Integrating these extracts into farming systems offers an eco-friendly and sustainable approach to enhancing crop production, reducing environmental impact and advancing sustainable agricultural practices.

Effect of Gamma Rays on Quantitative Traits in M 2 Generation of Sesame (*Sesamum indicum* L.)

D.H. Sarang[1*], and E.R. Vaidya[2]

[1]Department of Genetics and Plant Breeding, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani (M.S.),

[2]Department of Genetics and Plant Breeding,

Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola (M.S.), India.

RTAAAS/AB/2024/188

In the present investigation, the mutagenic effect of various gamma ray doses viz., 400Gy,500Gy,600Gy, and 700Gy on three sesame (Sesamum *indicum* L.) genotypes namely GT-10, TKG-22, and Gophya Local was studied in M 2 generation on various quantitative traits. The mean for days to 50% flowering decreased in 400Gy and 500Gy gamma rays doses in GT-10 cultivar compared to GT-10 control. While, in TKG-22 and Gophya Local genotype the mean for days to 50% flowering decreased in 400Gy,500Gy, and 600Gy gamma-ray doses compared to their control. In cultivar GT-10, days to maturity were delayed in 600Gy and 700Gy doses, but dose 400Gy and 500Gy doses showed early maturity compared to its control. Days to maturity were delayed only in 700Gy dose in cultivars TKG-22 and Gophya Local, but doses 400Gy,500Gy and 600Gy showed early maturity as compared to control in both the cultivars. 700Gy dose showed a maximum decrease in plant height compared to control in all three cultivars but in 400Gy dose, 500Gy dose and 600Gy dose showed increased plant height. In GT-10 and Gophya Local genotype, capsule length and number of seeds per capsule were higher in 400Gy,500Gy and 600Gy as compared to their respective controls. While, in the TKG-22 cultivar number of seeds per capsule was higher only in 400Gy and 500Gy doses as compared to its control. 1000 seed weight was found to be increased slightly in all three cultivars. Seed yield per plant was recorded mean value in both positive and negative directions compared to controls. In Gophya Local genotype all the doses showed increased oil content over the respective control. Mutagenic treatments increase genetic variability, which can be utilized for selection and improvement of sesame plants.

Keywords: Gamma rays, M 2 generation, Quantitative traits, Sesame, Yield.

Studies on optimization of bael (*Aeglemarmelos* [l.] Corr.) incorporated ice cream premix

Sharvi G B*, Deepa Terdal and Arun Kamble****

*M.Sc, Scholar, **Assistant Professor, University of Horticultural Sciences, Bagalkot

RTAAAS/AB/2024/189

Bael powder ice cream premix was included at a level of 0–40%. Among the treatments, (T 3 : 10% bael powder + 49% sugar + 34% SMP + 6.4% corn flour + 0.2% CMC + 0.2% GMS + 0.2% gelatin) showed superior physical parameters viz., overrun (48.72%), melting rate (42.18g/min), fat destabilization (29.80%), viscosity (-3.33 g/S), hardness (27.64 N) and also biochemical compositions viz., moisture (3.37%), ash (4.03%), protein (8.50%), crude fibre (2.52%), fat (6.80%), CHO (77.78%), calorific value (400.36 Kcal/100g), minerals such as Ca (3.17), Mg (3.14), Fe (0.054), Zn (0.024), K (10.52), P (0.16) per mg/g and phenols (16.68mgGAE/100g), total flavonoids (2.54mg/100g), antioxidant activity (78.33%), carotenoids (4.55mg/100g). Also, had good overall acceptability (7.74 score) and shelf-life qualities up to 3 months storage in an ambient condition. From the current study it was concluded that the incorporation of 10 per cent bael fruit powder in ice cream premix found most acceptable for sensory and nutritional qualities.

Physico-Chemical Characterization of Persimmon-Peach Blended Healthy and Nutritious Nectar

Shivani Verma, Jagmohan Singh, Neeraj Gupta,
Ankita Chib
Division of Post-Harvest Management,
Sher-e-Kashmir University of Agricultural Sciences and Technology, Chatha, Jammu

RTAAAS/AB/2024/190

This study evaluates the physico-chemical attributes of persimmon-peach blended nectar during a six month storage period. The nectar was prepared by blending different proportions of persimmon-peach pulp and was stored under ambient conditions to assess changes in its quality over time. The physico-chemical parameters includes total soluble solids (TSS), titratable acidity (TA), colour, microbial stability and bioactive compounds including antioxidants, phenolic compounds, carotenoids and vitamin C were monitored at 0, 2, 4 and 6 months. TSS values showed minimal variation reflecting consistent sweetness. Titratable acidity increased slightly over time, contributing to the overall flavor profile. Colour analysis demonstrated only slight fading in the orange hue with no significant loss in visual appeal. Microbial analysis confirmed the safety and stability of the product with no contamination detected during the six months storage period. Sensory evaluation revealed that the nectar maintained its taste, aroma and overall acceptability with minor changes in flavour intensity. In case of bioactive compounds, the antioxidant capacity measured by DPPH, showed only a slight decline till the six months of storage. Phenolic content and carotenoid levels also exhibited minimal degradation, suggesting good stability of these compounds in the nectar. The vitamin C content however, decreased slightly by reflecting its natural sensitivity to degradation over time. Overall, the study demonstrates that persimmon-peach blended nectar is maintaining its health-promoting potential and a promising option for functional beverages with extended shelf life thus making it a viable option for long-term commercial production.
Keywords: Persimmon, Peach, Blended Nectar, Bioactive Compounds, Storage
Keywords: Cropping system, Irrigation, Sowing window, number of pods and pod yield

ORGANIC FARMING WITH RESIDUE-FREE PRODUCTION

Nida

Research scholar

Department of Vegetable Science

Banda University of Agriculture and Technology, Banda, Uttar Pradesh

RTAAAS/AB/2024/191

Organic farming is a production management system excluding of all synthetic off-farm inputs but rely upon on-farm agronomic, biological and mechanical methods like crop rotations, crop residues, animal manures, off-farm organic waste, mineral grade rock additives and biological system of nutrient mobilization and plant protection, etc which promotes and enhances biodiversity, biological cycles and agro-ecosystem health. This is a method of farming that works at grass root level preserving the reproductive and regenerative capacity of the soil, good plant nutrition, and sound soil management, produces nutritious food rich in vitality which has resistance to diseases. The key principles of organic farming include crop rotation, composting, natural pest management, and the use of organic inputs such as manure and biological controls. Organic farming promotes transparency and consumer trust by offering products that are free from synthetic pesticides, herbicides, and fertilizers. The global market for organic products continues to expand, driven by growing consumer awareness and demand for healthier and environmentally friendly food options. These practices not only enhance soil fertility and biodiversity but also contribute to mitigating climate change by sequestering carbon in soils. Organic farming presents opportunities for farmers to access premium markets, improve farm profitability, and contribute to sustainable agriculture. However, challenges such as certification costs, market access barriers, and competition with conventional agriculture remain significant. Future research and development in organic farming are crucial to addressing these challenges and enhancing the scalability and efficiency of residue-free production. Innovations in organic pest management, soil health management, and sustainable agriculture practices will further support the growth of organic farming worldwide. Overall, organic farming stands as a promising solution for residue-free food production, promoting human health, environmental stewardship, and sustainable development in agriculture.

Keywords: Organic farming, residue free production, sustainable food system: Certification.

EFFECT OF NITROGEN AND SULPHUR LEVELS ON GROWTH ATTRIBUTES, YIELD AND QUALITY FACTORS OF MUSTARD GROWN IN VERTISOL

[1]Umesh B. Dolaskar, [2]Ommala D. Kuchanwar, [3]R. N. Katkar, [4]Padmaja H. Kausadikar, [5]S. R. Kamdi

(M.Sc. Scholar, Section of Soil Science, College of Agriculture Nagpur, Dr. P.D.K.V, Akola, Maharashtra)

(Professor (CAS), Section of Soil Science, College of Agriculture Nagpur, Dr. P.D.K.V, Akola, Maharashtra)

(Associate Dean, LAE, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra)

(Assistant Professor, Section of Soil Science, College of Agriculture Nagpur, Dr. P.D.K.V, Akola, Maharashtra)

(Mustard Breeder, AICRP on linseed and mustard, College of Agriculture Nagpur, Dr. P.D.K.V, Akola, Maharashtra)

RTAAAS/AB/2024/192

The field experiment was conducted to study the & Effect of nitrogen and sulphur levels on yield, nutrient uptake and quality of mustard in Vertisol at College of Agriculture farm, Nagpur, during rabi season of 2023-24. The research were comprised in three levels of Nitrogen (50, 65 and 80 kg ha -1) and Sulphur (15, 30 and 45 kg ha -1). It was framed in Factorial Randomized Block Design with nine treatment and three replications. The experimental soil was medium black, moderately alkaline in reaction, clayey in texture. The highest number of primary branches plant -1 (3.79), number of seeds plant -1 (13.39) and the shortest time to 50% flowering (41.36 days) were observed with nitrogen application at 80 kg ha^{-1}. Similarly result were found by the application of sulphur, the highest number of primary branches plant -1 (3.59), number of seeds plant -1 (13.01), and the shortest duration to 50% flowering (42.38 days) were recorded with the application of 45 kg S ha^{-1} and significantly higher seed yield (1225.11 kg ha^{-1}) and stover yield (2971.35 kg ha^{-1}) of mustard were observed with the application of 80 kg N ha^{-1}. Similarly, the highest seed yield (1201.56 kg ha^{-1}) and stover yield (2689.08 kg ha^{-1}) were recorded with the application of 45 kg S ha^{-1} and the interaction effect were found significantly higher than other lower combinations of nitrogen and sulphur. Seed quality were found significantly higher therefore, test weight (4.15 g), oil content (39.14%), protein content (21.46%) and amino acid content (methionine 4.48 mg g -1 and cysteine 5.26 mg g -1) by the application of nitrogen 80 kg ha -1 and sulphur 45 kg ha -1.

Keywords: Nitrogen, Sulphur, Growth, Yield, Quality, Mustard.

Evaluating Heterosis in Brinjal Hybrids: Growth and Yield Performance under Conventional and Natural Farming Systems

Hitaishi Kuriyal[1], Alka Verma[1], Imamuddin Shah[1], Neelima Rawat[1] and Charu Bisht[2]

Department of Vegetable Science, College of Agriculture, GBPUAT, Pantnagar, Uttarakhand, India[1]

Department of Genetics and Plant Breeding. TMU, Moradabad, UP, India[2]

RTAAAS/AB/2024/193

An experiment was conducted at the Vegetable Research Centre, GBPUAT, Pantnagar, Udham Singh Nagar, Uttarakhand, India, to study the comparative analysis of brinjal hybrid under conventional and natural farming systems. 10 genotypes (PB-411, PB-413, PB-416, PB- 415, PB-405, PB-407, PB-407, Pant Rituraj, Kashi Uttam, and PB-414), were crossed in a line × tester mating design to investigate the extent of heterosis over better parent and standard check for growth and yield character of brinjal. All parents and resultant crosses with two standard checks, Pant Rituraj and Kashi Uttam, were evaluated during Kharif season in a randomized block design with three replications. Appreciable heterosis was recorded mid parent, better parent, and two standard checks for all the traits studied. For fruit yield per plant in conventional farming, sixteen crosses had a significant positive better parent, and for two standard checks, viz., Pant Rituraj and Kashi Uttam, four crosses indicated positive estimation, and all crosses resulted in positive estimation, respectively. When compared to natural farming, only one cross showed positive estimation for the better parent, i.e., PB-413 × Pant Rituraj, and for two standard checks, in the initial check only two crosses showed positive estimation, and in the second check six crosses showed positive heterosis. Some of the promising hybrids showed desirable heterosis for day 50% flowering, plant height, primary branches, number of flowers per cluster, fruit length, fruit diameter, number of fruits per cluster, and number of fruits per plant. PB-416 × Pant Rituraj was identified as promising for both farming systems.

Keyword: Brinjal, Conventional farming, Heterosis, Natural farming.

The use of modern techniques in bioremediation to convert contaminated soil to fertile soil using earthworm.

Santanu Das

B.Sc (Hons.) Agriculture, Doon (P.G) College of Agriculture Science and Technology, Camp Road,

Selaqui, Dehradun, Uttarakhand, India

RTAAAS/AB/024/194

Earthworms are known as “farmers friend”. They are key players in soil health and are increasingly utilized in bioremediation efforts due to their ability to process organic matter and improve soil structure. The process of bioremediation in combination with earthworms is known as vermi- remediation. Several modern techniques have been used in bioremediation using earthworm are such as Bioaugmentation, Vermifiltration, Integration of Nanotechnology, Enzyme-Assisted Vermi-Remediation, CRISPR and Genetic Engineering, Electrokinetics, etc. Added microbes or fungi degrade complex pollutants. In another technique, wastewater treatment is introduced to filter that contains earthworms and microorganisms called vermifiltration. Faster degradation of persistent organic pollutants we introduce enzymes (such as laccase or peroxidase) to enhance pollutant degradation, the process called enzyme assisted vermin-remediation. Enzymes break down complex pollutants, which are then further processed by earthworms and soil microbes. In genetic engineering we introduce CRISPR-modified bacteria into the earthworm gut to degrade complex hydrocarbons. Engineered gut microbes can break down synthetic compounds or immobilize heavy metals. In electrokinetics we use low-voltage electric fields to mobilize contaminants in soil while leveraging earthworms to process pollutants. The electric field moves pollutants toward specific areas where earthworms and microbes degrade or immobilize them. The advantages of combining earthworms with modern techniques are Enhanced Efficiency, Environmental Safety, Sustainability, Cost-Effectiveness. The limitation may be (1) high concentrations of pollutants can harm earthworms; (2) Time- intensive, (3) not all pollutants are easily degradable by earthworms or their associated microbes. These approaches utilize the natural capabilities of earthworms, amplified by advancements like nanotechnology, genetic engineering, and enzyme application, to achieve efficient and sustainable soil restoration.

Variation in Acetylcholinesterase, Polyphenol oxidase, Glutathione S-transferase and Carboxylesterase activities of Spodoptera frugiperda larvae when fed on Teosinte and derived lines

[1]Lovepreet Kaur, [1]Kamaljit Kaur, [2]Jawala Jindal, [1]Yadhu Suneja, [2]Tosh Garg

[1]Department of Biochemistry, [2]Department of Plant Breeding and Genetics,

Punjab Agricultural University, Ludhiana

RTAAAS/AB/2024/195

Spodoptera frugiperda, commonly known as fall armyworm (FAW), has appeared to be the most devastating pest that invaded India and reduced maize (Zea mays L.) productivity drastically. Studies suggested that wild progenitors of plants show more tolerance to pest infestation. This investigation was undertaken to compare the feeding response of teosinte, the wild maize, inbred lines and teosinte derived lines on acetylcholinesterase, polyphenol oxidase, glutathione S-transferase and carboxylesterase activity of FAW. Seeds of thirteen genotypes were sown in the experimental fields in randomized block design (RBD) with three replicates. Fall armyworm larvae were released on the whorls of 25 days old plants at the rate of 15 larvae per plant. Larvae were collected from the plants at 5, 10 and 15 days that corresponded to 4 th , 5 th and 6 th instar stages after infestation, for biochemical evaluation. A significant reduction in acetylcholinesterase activity was observed in the larvae fed on teosinte, CM 139 (1968) x teosinte, CM 139 (1969) x teosinte, LM 24 (1927) x teosinte and LM 24 (1971) x teosinte. A decrease in polyphenol oxidase activity was found in larvae collected from LM 13 (1933) x teosinte, CM 139 (1968) x teosinte, CM 139 (1969) x teosinte. Carboxylesterase activity was observed to be reduced in the larvae collected from CM 139 (1968) x teosinte, CM 139 (1969) x teosinte, LM 24 (1927) x teosinte and LM 24 (1971) x teosinte. There was also a significant reduction in glutathione S- transferase activity in larvae being fed on LM 13 (1933) x teosinte and LM 16 (1951) x teosinte. It may be concluded that the teosinte derived lines were less suitable than the inbreds for FAW infestation. Further, among the derived lines, teosinte, CM 139 (1968) x teosinte and CM 139 (1969) x teosinte appeared to be least preferable for FAW.

Smart Livestock Management: A Comprehensive Approach for Health Monitoring, Location Tracking, Behavior Analysis, and Environmental Optimization

Madhvi

Masters Student, Department of Food Science and Technology, DAV University, Sarmastpur, Jalandhar, Punjab

RTAAAS/AB/2024/196

The incorporation of advanced technologies into livestock management is transforming the agricultural industry, facilitating more efficient and sustainable methods. Implementation of intelligent livestock systems utilize the Internet of Things (IoT), artificial intelligence (AI), and sensor-driven technologies to facilitate ongoing observation of animal health and welfare. Through the integration of wearable technology, smart collars, RFID tags, and real-time data analysis, farmers are able to monitor critical indicators such as temperature, heart rate, and activity levels, enabling the early identification of potential illness or distress in the animals. These advancements facilitate precise health management, thereby decreasing the necessity for invasive procedures and limiting disease transmission. Furthermore, automated systems for feeding, breeding, and environmental monitoring enhance resource efficiency and improve overall productivity in livestock. This system not only promotes the welfare of animals but also strengthens the economic feasibility and sustainability of contemporary agricultural practices. Ultimately provides farmers with immediate access to information regarding animal health, while simultaneously establishing a more sustainable and resilient agricultural framework. As these technologies continue to advance, they possess the capacity to transform the future of livestock farming worldwide.

Keywords: Technology, Advancement, Artifical Intelligence, Productivity, Sustainability

"A Comprehensive Review of Rubia tinctoria Linn in Natural Dyeing."

Miss. Payal Vinod Rathod

Teaching Associate, Tulsi College of Fashion Design, Beed

RTAAAS/AB/2024/197

Natural dyeing has garnered significant attention as an eco-friendly and sustainable alternative to synthetic dyes. Rubia *tinctoria* Linn, commonly known as madder, is a versatile dye plant used historically across cultures for its vibrant red hues and medicinal properties. This comprehensive review delves into the botanical aspects, phytochemical constituents, and dyeing potential of Rubia tinctoria Linn, emphasizing its application in textile dyeing processes. The study evaluates traditional and modern extraction techniques, mordanting methods, colorfastness properties, and environmental impacts. Insights into the challenges and opportunities of integrating Rubia tinctoria in contemporary natural dyeing practices are discussed, aiming to bridge traditional knowledge with modern innovations. This review underscores the significance of Rubia tinctoria as a sustainable resource, advocating for its broader adoption in the textile industry.

Keywords - Natural dyeing, Rubia tinctoria Linn, madder, sustainable textiles, phytochemistry, eco-friendly dyes, colour fastness, mordanting techniques.

PLANT NURSERIES FUTURE: A HIGH-TECH APPROACH

J. Srinivas[1], C N R Santhoshini[2] and M. Shiva Prasad[3]

[1]Assistant Professor, Department of Vegetable Science, College of Horticulture, SKLTGHU,

[2]Assistant Professor, Department of Floriculture and Landscaping,

College of Horticulture, Rajendranagar, SKLTGHU, Hyderabad,

[3]M.Sc. Scholar, Department of Vegetable Science, College of Horticulture,

Rajendranagar, SKLTGHU, Hyderabad,

RTAAAS/AB/2024/198

Traditional methods of cultivation, administration and distribution are being reshaped by sophisticated technologies, causing a radical change in the plant nursery sector. To improve nursery production, efficiency and sustainability, this study looks at how high-tech solutions like automation, artificial intelligence (AI), the Internet of Things (IoT) and data-driven precision agriculture may be integrated. Processes like fertilization, watering and pest control are now streamlined by automated devices, which lower labour costs and enhance plant quality. With the help of IoT-enabled sensors and real-time data analytics, environmental variables can be precisely monitored, allowing nurseries to maximize resource use and guarantee ideal growing conditions. Furthermore, controlled environment agriculture (CEA) technology and smart greenhouses are promoting resilience against climate fluctuation and year-round production. These high-tech developments portend a future in which plant nurseries are more sustainable, effective and efficient as digital transformation continues.

Keywords: High- tech nurseries, Smart greenhouses, Internet of Things (IoT) in nurseries and Nursery industry innovation.

Influence of Different Tillage Practices on Soil Health Under Groundnut based cropping systems

Meti Ranjitha[1], Sanatkumar T Hundekar[2], Basavaraj S Yenagi[3], Mahalaxmi Shrishail Devarnavadgi[4], Jakir Hussain K N[5]

[1]Ph.D. Scholar, Department of Soil Science and Agricultural Chemistry, University of Agricultural Sciences

[2]Senior Scientist (Soil Science), AICRP on Agro-forestry, MARS, University of Agricultural Sciences

[3]Agronomist, Agronomist, AICRP on Groundnut, MARS, University of Agricultural Sciences,

[4]Ph.D. Scholar, Department of Soil Science and Agricultural Chemistry, University of Agricultural Sciences

[5]Ph.D. Scholar, Department of Soil Science and Agricultural Chemistry, University of Agricultural Sciences

RTAAAS/AB/2024/199

Soil fertility is crucial for groundnut-based cropping systems, and tillage practices significantly impact nutrient availability and organic matter. While conventional tillage can disrupt soil health, minimum or no-till methods help preserve soil structure, enhance organic matter, and support microbial activity The experiment was laid out in strip plot design with two tillage practices in main-plot i.e., minimum tillage with crop residue incorporation (MT) and conventional tillage without residue (CT) and four cropping systems in sub-plots (groundnut + pigeon pea, groundnut + cotton, groundnut + chilli, groundnut-wheat cropping systems). Study revealed that, among the tillage practices, minimum tillage with incorporation of crop residue recorded significantly enhanced the soil organic carbon (7.65 and 5.30 g kg -1) over a conventional tillage practice at both 0-15 and 15-30 cm depths, respectively. And also, there was significant increase in available NPK (315.8, 44.06, 324.5 and 275.0, 35.15, 282.27 kg ha -1 , respectively) in soil under minimum tillage with incorporation of crop residue compared to CT at both 0-15 and 15-30 cm depths, respectively. Among the intercropping systems, groundnut + pigeon pea system recorded significantly higher soil organic carbon and Available NPK in soil (6.30 g kg -1 and 306.8, 43.35, 325.05 5 kg ha -1 , respectively) compared to other cropping systems under 0-15 cm depth. There was slightly increase in available NPK in soil (231.2, 33.71 and 278.6 kg ha -1 , respectively) under 15-30 cm depth in groundnut + pigeon pea systems compared to other cropping systems.

Keywords: Soil Fertility, Cropping system, Minimum tillage

Hi-tech Horticulture, Horticulture innovations, Food processing and Value addition.

Corresponding Author: Dr.Gadde. Jyothi,
Scientist (Hort.) Head, Floricultural Research station, Rajendranagar, Hyderabad,
Sri konda Laxman Telangana Horticultural university.

RTAAAS/AB/2024/200

India is bestowed with varied soils and agro climatic conditions. Horticulture is a sun rise industry which plays a vital role in enhancing the economic status of our nation by implementing hi-tech practices in production technology, various innovations like fortification and making different value-added products which may directly or indirectly creates employment oppurtunities in the processing industries, plantation crops estates etc. Hi- tech Horticulture is a technology which includes modern concept, completely not dependant on climate and capital intensive but had capacity to improve productivity and farmer's income. It aims at efficient utilization of resources with precise production techniques so as to generate the income around the year. Presently it has become necessity so as to sustain productivity and economic stability of the Indian farmers. for doubling the farmer's income. Horticulture innovations include Robotics, drones, artificial intelligence (AI) and sensor based solutions (automation) which offers opportunity to meet the current challenges in horticulture. Food processing aims at extending the shelf life of food by enhancing the acceptability in terms of flavor,color and texture so as to generate additional income by the farmers and enterpreneurs. It includes the practices like blanching, drying, (fruit slices) dehydration, (Raisins, okra, carrot etc.) freezing. Value addition is the process of increasing the price of primary product by processing, packing or improving its quality. Horticulture produce is highly perishable and especially during glut there is spoilage of fruits and vegetables which can be be converted into various diversified products like jams, jellies, sauces, chutneys an pickles, canned fruits and vegetables by blending or fortification for long term consumption and can be made available in the market through out the year and fetch good returns to the growers.

Eco-Friendly Pest Management in Organic Farming: Achieving Residue-Free Production

Shalini Naik

Department of Vegetable Science, Dr. Y S Parmar University of Horticulture and Forestry, Nauni, Solan

RTAAAS/AB/2024/201

Eco-friendly pest management is a cornerstone of organic farming, particularly in achieving residue-free production. The growing demand for organic food, driven by concerns over pesticide residues and environmental sustainability, has accelerated the adoption of alternative pest control methods. Conventional agriculture often relies on synthetic pesticides that leave harmful residues on crops, posing health risks and causing environmental degradation. Organic farming, however, emphasizes the use of natural and ecological methods for controlling pest populations, focusing on biological control, cultural practices and physical methods. Recent trends highlight the use of biological control agents such as predatory insects, parasitoids and microbial agents like Bacillus thuringiensis (Bt), which target pests without leaving harmful residues, thus promoting natural pest control without affecting non-target species. For example, ladybugs are effectively used to control aphids and nematodes manage soil pests, showcasing successful applications in many organic farms. Additionally, integrated pest management (IPM) is gaining prominence as a comprehensive approach that combines biological control, cultural techniques like crop rotation and intercropping and mechanical methods such as trap crops and barriers to manage pest populations without resorting to chemical interventions. The increasing use of plant-based biopesticides, derived from natural substances like neem oil, garlic extract and essential oils, further supports organic practices, as these products are less toxic, decompose quickly, and leave minimal residues, making them ideal for residue-free production. In conclusion, eco-friendly pest management is crucial for organic farming to maintain healthy crops, protect biodiversity, and meet consumer demand for clean, safe food, with continued research and innovation, these strategies will become even more effective, supporting the long-term sustainability of organic agriculture.

Effect of Different Land Use Systems on Soil Biological Properties and Soil Biological Health Under Tarai Conditions of Uttarakhand

Abha Lohani[1*], A. P. Singh[1], K.P. Raverkar[1], Ajaya Srivastav[1], V. K. Singh[2]

[1]Department of Soil Science, College of Agriculture,

Govind Ballabh Pant University of Agriculture and Technology, Pantnagar,

[2]Department of Agronomy, College of Agriculture,

Govind Ballabh Pant University of Agriculture and Technology, Pantnagar.

RTAAAS/AB/2024/202

Soil biological health is one of the most important and dynamic components for soil quality and overall soil health. Soil biota mediate important ecosystem processes such as energy flow, nutrient cycling, and water infiltration and storage. Soil biological indicators are more susceptible to any kind of changes imposed on soil use and management and therefore, can be used for early detection of any kind disturbance in sustainability of soil health and environment. For the present study soil samples were collected from various land use system being followed since 2017 at the integrated farming system of N. E. Bourlaug Crop Research Centre, Pantnagar, Uttarakhand during May 2024 to June 2024. The following land use systems viz. (1) Rice- Wheat- Green Manure, (2) Sorghum-Berseem+ Mustard+ Oat (3) Basmati Rice-Oat-Bajra+ Cowpea (Fodder), (4) Maize-Broccoli-Okra (5) Basmati Rice-Potato-Maize (Green Cobs/Grains), (6) Soybean- Lentil, (7) Soybean-Wheat and (8) Fallow were assessed for soil microbial populations and soil enzymatic activities. The results showed significant differences for the studied biological indicators and soil health under different land use systems. The findings were in line that legume-based systems showed significantly better results and the biological properties were also influenced by the type of crop taken in the systems. Overall the study concludes that diversifying the existing land use systems considering different modules with inclusion of vegetables, legumes, pulses, green manure and fodder crops influences soil biological properties and therefore soil health and soil quality.

Keywords: Soil biological properties, Soil enzymes, Soil quality.

Area, production and productivity of fresh fruits and vegetables in India – A Study on Growth and instability Index

Priyanka. T

Business Executive, ANGRAU Poshan Incubator, Tirupati

RTAAAS/AB/024/203

India is a country with a strong agricultural economy that gives a platform for economic growth and higher growth in agriculture assumes great importance and is a matter of concern for policy planners and research scholars in recent times. In view of this the present study was aimed to analyse the growth and instability in area, production and productivity of fruits and vegetables in India. The present study used the secondary data collected from secondary sources for 16 years (2006 – 2022). The results revealed that other fresh fruits had the highest CAGR which was 3.05 per cent in productivity and onions had the highest CAGR was 7.95 per cent in production (significance at 1 % level) and fresh grapes had the highest CAGR was 5.96 per cent in area (significance at 5% level). In instability index the fresh grapes had the highest CDVI was 23.60 per cent in productivity, other fruits has highest CDVI was 22.25 per cent and 26.74 per cent in production and area.

Keywords: Compound annual growth rate, instability index, significant, area, production, productivity etc.

IMPACT OF CONVENTIONAL AND MINIMUM TILLAGE PRACTICES ON PRODUCTIVITY OF GROUNDNUT BASED CROPPING SYSTEMS

METI RANJITHA[1*], S. T. HUNDEKAR[2], BASAVARAJ S. YENAGI[3] AND MAHALAXMI SHRISHAIL DEVARNAVADGI[4], JAKIR HUSSAIN K N[5]

[1]Ph.D. Scholar, Department of Soil Science and Agricultural Chemistry

[2]Senior Scientist (Soil Science), AICRP on Agro-forestry

[3]Agronomist, Agronomist, AICRP on Groundnut, MARS

[4]Ph.D. Scholar, Department of Soil Science and Agricultural Chemistry

[5]Ph.D. Scholar, Department of Soil Science and Agricultural Chemistry

RTAAAS/AB/024/204

A number of factors constrain groundnut production in Karnataka including declining soil fertility and inappropriate tillage practices. Therefore, suitable cropping and land management practices are essential for increasing crop yield. A field experiment was conducted during 2022-23 kharif and rabi seasons at the MARS, UAS, Dharwad Study revealed that, among the tillage practices, minimum tillage with incorporation of crop residue recorded significantly higher pod and haulm yield of groundnut (1,392 and 2,899 kg ha - 1 , respectively) compared to conventional tillage without crop residue. Among the cropping systems, groundnut-wheat cropping system recorded significantly higher pod and haulm yield of groundnut (1,966 and 4,033 kg ha -1 , respectively) as compared to other cropping systems. Among intercropping systems, groundnut + pigeon pea cropping system recorded higher pod and haulm yield of groundnut (1,156 and 2430 kg ha -1 , respectively) over groundnut + cotton cropping system and which was on par with groundnut + chilli cropping system. Higher yield of inter crops and sequence crop were recorded in MT plot. MT plot recorded significantly higher groundnut equivalent yield (GEY-2,345 kg ha -1) compared to CT plot. Among cropping systems, groundnut-wheat cropping system significantly superior and recorded higher GEY (2,950 kg ha -1) as compared to other cropping systems. Among intercrops, groundnut + pigeon pea revealed significantly higher GEY (2,132 kg ha -1) whereas groundnut + chilli and groundnut + cotton cropping system recorded significantly lower GEY (1,956 and 1,837 kg ha -1 , respectively). Higher biological yield and harvest index were also recorded in MT plot.

Keywords: minimum tillage, conventional tillage, cropping systems

In vitro characterisation for potential probiotic of gut-derived bacteria from fish (*Labeo rohita*)

Arambam Ashwini Devi[1], Md. Idrish Raja Khan[1], Tanmoy Gon Choudhury[1] and Dibyendu Kamilya[1, 2]

[1]Dept. of Aquatic Health and Environment, College of Fisheries,

Central Agricultural University (Imphal), Lembucherra, Tripura, India.

[2]Agricultural and Food Engineering Department, Indian Institute of Technology Kharagpur,

RTAAAS/AB/024/205

In the current study, 21 potential strains were isolated from the intestinal tract of *Labeo rohita* in order to evaluate their probiotic potential. Based on the result of agar well diffusion test, the probiotic strains, COF_AHE01 was ultimately selected and identified to be *Bacillus velezensis* by 16S rRNA gene sequencing. The isolate demonstrated strong antimicrobial activity against 14 indicator bacteria as well as high tolerance to a wide range of pH and bile salt concentration. The isolate exhibited remarkable mucus adhesion, cell surface hydrophobicity, and auto- and co-aggregation ability in terms of in vitro adhesion properties. The strain had a high level of free radical scavenging activity, was non-haemolytic, and capable of producing extracellular enzymes. By using PCR, it was determined that B. velezensis enclosed putative probiotic associated marker genes. Consequently, the identification of a potential probiotic from an autochthonous source with the possibility of its application in the aquaculture industry was made possible by in vitro and genetic approaches.

Keywords: Aquaculture, In vitro, Probiotic.

Evaluation of Macronutrient Status of Bhandara Tehsil, Maharashtra to Foster Soil Health and Sustainability

Amruta S. Ekapure[2*], S.S. Balpande[1], Deepti V. Agarkar[2], Monika Bhavsar[2],

Dhananjay Sirsat[2], Nagesh Lingayat[2], Rahul V. Jadhao[1]

[1]Soil Science Section, College of Agriculture, Nagpur, Maharashtra,

[2]Department of Soil Science, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola,

RTAAAS/AB/024/206

The study assessed the macronutrient status of the Bhandara tehsil of Maharashtra with the help of GPS-based one hundred-and-five soil samples during 2021-2022. The results recorded that soils were clay loam to sandy clay loam in texture. The soils of the study area were slightly acidic to slightly alkaline, non-saline in reaction, non-calcareous in nature, and low in organic carbon. The soil nutrient index values showed that organic carbon and available N were low; available P and S were medium; and available K was high. Based on percent samples deficient or likely to be deficient nutrients in the near future were organic carbon (85 percent), followed by sulphur (73 percent) and nitrogen (66 percent). The farmers of the study area mostly adopt improper nutrient management practices which might have resulted in poor fertility status in the area. Considering these things, a data-driven Decision Support System on nutrient management in soil has been given. Green manures are an ideal method of sustaining soil fertility and increasing the organic carbon and nitrogen content of soil. Considering the yield potential and nutrient availability, the different combinations of organic (legumes, green manure, and farmyard manure) amendments with inorganic fertilizers would be the best treatment. Management of sulphur in the soil can be done by applying S to the seedbed, incorporating straw instead of completely removing or burning it.

"Assessment of the Influence of Marigold (*Tagetes erecta*), Red pepper (*Capsicum annum*) and Shrimp (*Acetes indicus*) meal on pigmentation in red swordtail, *Xiphophorus hellerii*)"

Minal S. Wagde[1,2], Subodh K. Sharma[1], Bhanu K. Sharma[1] and Manish Jayant[3]

[1]College of Fisheries, Maharana Pratap University of Agriculture and Technology, Udaipur,

[2]College of Fishery Science, Maharashtra Animal and Fishery Sciences University, Nagpur

[3]ICAR-Central Institute of Fisheries Education, Mumbai, Maharashtra

RTAAAS/AB/024/207

The present study is aimed to assess the impact of various natural dietary carotenoid sources viz., marigold (*Tagetes erecta*), red pepper (Capsicum *annum*) and shrimp (*Acetes indicus*) on pigmentation (carotenoid content) of red swordtail (*Xiphophorus hellerii*). Nine isonitrogenous and iso-energetic experimental diets viz. control, M 1 P 1 S 1 , M 1 P 2 S 1 , M 1 P 1 S 2 , M 1 P 2 S 2 , M 2 P 1 S 1, M 2 P 2 S 1 , M 2 P 1 S 2, and M 2 P 2 S 2 were prepared using two graded levels of marigold petals meal (M 1 -1.04 %; M 2 -1.55 %) , red peppers meal (P 1 - 3.17 %; P 2 - 4.76 %) and shrimp meal (S 1 -10.90 %; S 2 -16.35 %). The control diet was devoid of carotenoid source. Fish were fed with experimental diets for 60 days. 270 fish were randomly distributed in experimental tanks (9 treatments in triplicate) following completely randomized design. The results revealed that maximum carotenoid content in fins, skin and flesh of swordtail were observed in the fish fed with red peppers meal (P 2) followed by shrimp meal (S 2) and marigold petal meal (M 2), respectively in case of individual carotenoid sources. Among two combinations, P 2 S 2 has been found to show better carotenoid content deposition in fish fins, skin and flesh. Higher doses i.e. M 2 P 2 S 2 found to show highest carotenoid content deposition in fins, skin and flesh. From the results it was concluded that, individual natural carotenoid sources i.e. marigold petals meal, red peppers meal and shrimp meal or/and their combinations could be successfully incorporated in the diet of swordtail fish to enhance colouration in fins, skin and flesh.

Keywords: Carotenoid content, Carotenoid sources, Fins, Skin, Flesh

A Sustainable Approach to Fish Farming in India: Integrated Multi-Trophic Aquaculture (IMTA)

Dr. Minal S. Wagde*

* College of Fishery Science, Maharashtra Animal and Fishery Sciences University, Nagpur

RTAAAS/AB/024/208

Integrated Multi-Trophic Aquaculture (IMTA) represents a transformative approach to aquaculture, particularly relevant in addressing food security challenges in India and beyond. Unlike traditional polyculture, IMTA combines species from different trophic levels with complementary ecological functions, optimizing resource use and minimizing environmental impacts. The system integrates fed aquaculture species, such as shrimp or finfish, with organic and inorganic extractive species like shellfish and seaweed, creating a balanced ecosystem that leverages the waste and by-products of one species to support others. This innovative method addresses social acceptability, environmental sustainability, and economic stability, making it a promising solution for modern aquaculture systems. The design of an IMTA system focuses on selecting and positioning species to maximize waste recapture and reuse. Organic extractive species, like sea cucumbers, consume larger organic matter, while filter feeders, such as mussels, remove fine particles. Seaweed, as an inorganic extractive species, absorbs dissolved nutrients, including nitrogen and phosphorus, contributing to nutrient cycling and biomitigation. Species selection for IMTA systems prioritizes tropical adaptability, market demand, economic viability, and compatibility within the ecosystem. Despite its promise, challenges persist, particularly in disseminating accurate information and fostering consumer trust in aquaculture products. The study underscores the need for improved management practices, awareness campaigns, and robust research to realize full potential. As India explores open-sea IMTA, this sustainable aquaculture approach offers a pathway to address food security while promoting environmental conservation and economic resilience.

PHYSICO-CHEMICAL CHARACTERISTICS OF CARROTS

Sukomaljot Kour, Anju Bhat and Jagmohan Singh

Division of Post-Harvest Management, Sher-e-Kashmir

University of Agricultural Sciences and Technology, Chatha, Jammu

RTAAAS/AB/024/209

Carrots (*Daucus carota* L.) are one of the most widely consumed and nutritionally rich vegetables in the world. Known for their vibrant orange colour, carrots are not a staple in many cuisines but also offer an array of health benefits due to their rich contents of vitamins, minerals and antioxidants. They are especially renowned for their high levels of beta carotene, a precursor to vitamin A, which supports vision, immune system and skin health. Carotenoids, including β-carotene, were quantified using spectrophotometry, revealing the importance of carrots as a key dietary source of antioxidants. In addition, minerals such as potassium, calcium, and magnesium were analyzed, highlighting their contribution to the vegetable's overall health benefits. The study also discusses the bioactive compounds present in carrots, including phenolic acids and flavonoids, which are associated with antioxidant properties. Finally, postharvest quality, including shelf-life and storage conditions, were assessed to understand how various factors impact the texture, color, and nutrient retention of carrots. Overall, the physicochemical analysis of carrots provides valuable insights into their nutritional value, quality control for commercial production, and the role they play in human health. Carrots majorly hold carbohydrates in form of starch and sugars, such as sucrose and glucose which are also a relatively good source of fiber, with one medium-sized carrot (61 g) providing 1.9 grams carbs. Carrots often rank low on the glycemic index (GI), which is a measure of how quickly foods raise blood sugar after a meal. Their GI ranges from 30 to 85, while the glycemic load ranges from 2.0 to 4.25. It's the lowest for raw carrots, and little higher in cooked carrots. As consuming foods with low glycemic index provides numerous health benefits to normal people and is considered particularly beneficial for people with diabetes. Therefore, high content of vitamins, minerals and antioxidants makes them an essential part of a balanced diet.

Keywords: Carrot, beta-carotene, carotenoids, dietary source, vitamins.

Simulation of Sorghum Grain Yield by Dssat Ceres- Sorghum Model

Sabarinathan B* [1], Pazhanivelan S[2], Sudarmanian N S[3]

[1]Research Scholar, Department of Remote sensing & GIS, Tamil Nadu Agricultural University, Coimbatore.

[2]Director, Centre for Water and Geospatial Studies,

Tamil Nadu Agricultural University, Coimbatore.

[3]Research Associate, Centre for Water and Geospatial Studies,

Tamil Nadu Agricultural University, Coimbatore.

RTAAAS/AB/024/210

DSSAT-CERES-Sorghum crop simulation model was used to model growth and productivity of sorghum. The input files were generated using the tools in DSSAT model. Weather and soil files were generated using weatherman and 'S' build tool, respectively. Input files for crop management were generated using 'X' build and crop genetic coefficients were calculated using 'GenCalc'. Crop growth and development variables derived from crop simulation model were validated using the observed data. Simulated LAI ranged from 4.50 to 6.90 with the mean of 6.00 across sixty monitoring sites in the study area. The simulated sorghum yield by DSSAT-CERES-Sorghum for the study area ranged from 1393 to 2484 kg ha -1 with the mean yield of 1829 kg ha -1. Simulated values were validated in comparison to the observed values. The mean agreement between simulated and observed LAI values was 92.96 per cent, whereas agreement between simulated and observed yield data ranged from 71.82 to 97.42 per cent with the mean of 87.80 per cent.

Keyword: DSSAT, CERES – Sorghum, Yield simulation.

Integrated Management of White Grubs: A Sustainable Approach

Shailla Hussain[1], Dr. Magdeshwar Sharma[2]

Sher-e-Kashmir University of Agricultural Sciences and technology of Jammu,

RTAAAS/AB/024/211

White grubs, the larval stage of scarab beetles, are among the most destructive soil pests in agriculture, particularly in potato-growing regions of Jammu. Their subterranean feeding on plant roots causes significant yield losses and poses a serious challenge to sustainable crop production. This study highlights an integrated management approach to address the white grub menace, emphasizing environmentally sustainable and economically viable strategies. Key components of the integrated strategy include the identification of prevalent white grub species and their seasonal biology through extensive field surveys. Preventive measures such as deep ploughing, crop rotation, and intercropping with non-host plants are recommended to disrupt the pest's life cycle. Biological control measures, including the use of entomopathogenic fungi like Metarhizium anisopliae and natural predators such as Scolia spp., are shown to suppress grub populations effectively. The role of pheromone traps and light traps for adult beetle monitoring and capture is emphasized for early intervention. Selective application of eco-friendly chemical pesticides, when integrated with biological controls, is suggested to minimize environmental impact. Field trials conducted across multiple agro-ecological zones in Jammu indicate a 35–50% reduction in grub population and a 20–30% increase in crop yield when these strategies are combined. Adoption of an integrated pest management framework ensures reduced reliance on chemical inputs, preservation of beneficial soil microorganisms, and enhanced soil health. This research advocates for community- driven implementation and policy support to upscale integrated pest management practices for white grubs, ensuring long-term agricultural sustainability.

Keywords: White grubs, integrated pest management, biological control, sustainable agriculture, Jammu.

Organic Dairy Production: Myth and Reality

Sudhanya Nath*

Additional Veterinary Assistant Surgeon (FARD Department), Hemgir, Sundargarh, Odisha -

RTAAAS/AB/024/212

Organic dairy production is a system of farm design and management practices for producing milk, yogurt, cheese, cream and other dairy products without the use of pesticides, synthetic fertilizers or antibiotics. Products which are obtained from the organic dairy farm are known as organic dairy products. Organic dairy is a relatively recent addition to the organic movement, although organic fruits, vegetables, grains, and some livestock have long been staples. In the 1990s, organic dairy emerged as a significant area in the organic market. Several pivotal moments, such as launch of genetically modified or recombinant Bovine Growth Hormone (rBGH), play a significant role in the rise of organic dairy. The food production and supply has increased by the use of fertilizers, antibiotics, drugs, agrochemicals and improved feeds but now- a-days, consumers have become quality-conscious and are increasingly seeking environmentally safe, chemical-residue free healthy foods, along with product traceability and a high standard of animal welfare, which organic production methods are said to ensure. Organic dairy production with its myths is a challenge for producers in developing countries. However, it's high time to understand the opportunities organic dairy farming provides.

Keywords: Organic dairy production, quality-conscious, healthy foods, myths, opportunities

Development of Harvesting Tool for drumstick (*Mringa Oleifera*)

R.K. Sahu, N.K. Mishra, and O.P. Suryawanshi

Department of processing and food engineering Vaugh institute of agricultural engineering and technology, Sam Higginbottom University of agriculture, technology & sciences Prayagraj

Department of Agricultural Processing and Food Engineering, S.V. College of Agricultural Engineering and Technology & Research Station, Faculty of Agricultural Engineering, I.G.K.V., Raipur

RTAAAS/AB/024/213

Harvesting of fruits and vegetables is an inevitable need. Drumstick harvesting process faces a wide range of problems like that of time consuming and become inefficient due to heavy in weight of tool. It is very helpful and important allied in agriculture sector. Mechanization of harvesting operation will play a vital role in removing the negative attributes of the traditional harvesting technique and promote to use of developed harvesting techniques for drumstick with desired capacity. This paper shows the chronological development of harvesting tool and highlights on new concept of drumstick harvesting tool. The purpose of our paper is to design and develop and fabricate the prototype of harvesting tool. It is aimed at providing a base for the commercially production of harvesting tool, using locally available raw material at a relatively low cost. The tool constitutes of a fiber plastic pipe, 'V' shape serrated cutter.

Keywords: harvesting, drumstick, serrated cutter.

The Golden Fruit: Unlocking the Secrets of Persimmon

Priya Uday Shinde, Neeraj Gupta, Monica Reshi, Seerat Gupta

Division of Post Harvest Management, Sher-e-Kashmir University of Agricultural Sciences and Technology, Chatha

RTAAAS/AB/024/214

Persimmons, renowned as the "golden fruit," are a delicious and versatile fruit with numerous health benefits. This ancient fruit, native to East Asia, offers a delightful blend of sweetness and unique texture, flavour and high content of nutrients. The fruit is a good source of carbohydrates, organic acids, vitamins and minerals. It also possesses bioactive compounds like ascorbic acid, carotenoids, polyphenols, dietary fibre, tannins and pectin. There are two main types of persimmons: astringent and non-astringent. Astringent persimmons are puckering when unripe, but when fully ripe, they turn into sweet, soft, delicious foods. Persimmons that are not astringent and have reduced tannin levels can be consumed crisp or soft. The fruits also have many bioactive features for the prevention of chronic diseases such as cardiovascular diseases, atherosclerosis, cancer diseases, protect the epithelial system and eye health by absorbing ultraviolet radiation and also enhance the immune system, cough treatment and dental caries as well as on viral and bacterial infectious diseases. Carotenoids are currently gaining attention in preventing changes to memory and cognitive function, decreasing the risks of diabetes mellitus along with effectiveness against cancer insurgence. Persimmon is one of the nutritious fruits bestowed with strong antioxidant activity. The antioxidants in persimmons help protect cells from damage caused by free radicals. Moreover, it also reduces cholesterol and remedies digestive system diseases. It has a therapeutic effect on weakness, vitamin deficiency, anemia and gastrointestinal diseases Therefore, there has been a pronounced increase in the production of persimmon fruits. They are incredibly versatile, finding their way into fresh consumption, dried snacks, juices, smoothies, baked foods, and sauces. By understanding their unique characteristics, choosing ripe fruits, and exploring their diverse culinary applications, one can unlock the secrets of the golden fruit and savour its delightful taste and nutritional benefits.

Keywords: Persimmons, Bioactive compounds, Antioxidants, Nutritional benefits, Dietary Fibres.

Construction and Standardization of Attitude Scale to Measure the Attitude of Marigold Farmers on Marigold Cultivation

Mohammad Monis Ansari*[1] Dr. Jasbir Singh Manhas[2]

[1]Ph.D. Scholar, Division of Agricultural Extension Education, FoA

[2]Professor, Directorate of Extension

Sher-e-Kashmir University of Agricultural Sciences and Technology of Jammu, India

RTAAAS/AB/024/215

Attitude is a behavioral construct that requires multiple variables to be measured hence, it was required to develop and standardize an instrument to measure the construct. The focus of the study was to develop a reliable and valid scale to know the attitudinal orientation of marigold farmers towards marigold cultivation. Likert's summative rating technique was used, the items were collected based on attributes of marigold cultivation, edited based on the criteria suggested by Edwards, and translated in to Hindi language. Item responses were obtained on five-point continuum. Item analysis was determined to find out that weather the scale differentiate between the low and high attitude group. Cronbach's Alpha was used for the measurement of reliability and was found 0.829, which indicates the scale items has good internal consistency. To know the content validity of the scale initially the Content Validity Ratio (CVR) was calculated, with a threshold of 0.49 or higher considered acceptable. Subsequently, Item Content Validity Index (I- CVI) and Scale Content Validity Index (S-CVI) was determined for the estimation of Content Validity Index (CVI). The Kappa statistics was also employed for the removal of chance agreement. The final scale includes nineteen items.

Keywords: Attitude Scale, Content validity, Cronbach's Alpha, Kappa, Marigold, Reliability

Effect of Integrated Nutrient Management on Yield Parameters of Rabi Sunflower

Supunya Nath*, Manoranjan Satapathy

Department of Agronomy, College of Agriculture, Odisha University of Agriculture and Technology (OUAT), Bhubaneswar, Odisha

RTAAAS/AB/024/216

A field experiment was conducted in sunflower (Helianthus annuus L.) on integrated nutrient management during rabi season from November 2023 to February 2024 at OUAT, Bhubaneswar, Odisha. It emphasized on the optimization of integrated nutrient management practices in sunflower cultivar 'KBSH-78'. An integrated approach that includes both organic and inorganic nutrient sources, as well as secondary and micronutrients, can be a practical and appropriate method for increasing seed output and improving oil quality. The experiment result revealed that integrated nutrient management practice of STBFR + Lime + FYM + S 40kg/ha + Borax 0.2% 2 sprays produced maximum seed yield (2276 kg/ha), stover yield (5373 kg/ha), harvest index (29.7%), oil content (42.1%) and oil yield (958 kg/ha). The optimal balance of major, secondary, and micronutrients is crucial for improving sunflower oil yield and quality. Sulphur application improves sunflower growth, yield, and quality whereas boron is a crucial element for flowering, pollen germination, fruiting, and seed setting in the sunflower crop. Hence both sulphur and boron have a positive effect on seed yield and oil quality of sunflower.

Keywords: Integrated nutrient management, photoperiod insensitivity, sustainable agriculture, Micronutrients

Development of scale to measure the farmers perception on climate smart interventions under technology demonstration project of NICRA project

Sheema Khan 1 * and Poonam Parihar 2

1 Ph.D. Scholar, Division of Agricultural Extension Education, FoA

2 Professor, Agricultural Extension Education, FoA SKUAST- Jammu

RTAAAS/AB/024/217

Farmers in rain fed areas are highly vulnerable to the impact of climate change due to their dependence on agriculture, therefore adoption of climate smart interventions are important in these areas. The technology demonstration component of National Innovations in Climate Resilient Agriculture (NICRA) project deals with demonstrating proven technologies for adaptation of crop and livestock production systems to climate variability. It is therefore important to measure the perception of farmers towards climate smart interventions as it may affect the implementation of the climate smart interventions of technology demonstration component of NICRA project. The present study made an attempt to develop the scale to measure the farmers perception on climate smart agricultural interventions. A total of thirty-five items were administered to ten experts. Relevancy weightage (RW) and mean relevancy score (MRS) was measured to assess the relevancy of items of the scale. A total of 26 statements were retained. The scale developed was found to be reliable and valid.

Keywords: Agriculture, Climate, Interventions, NICRA, Perception

Optimization and Quality Assessment of High Protein Fruit bar using Apricot- Plum

Anjali Langeh*, Julie D. Bandral, Monika Sood and Kamaldeep Kour

Division of Post Harvest Management, Sher-e-Kashmir University of Agricultural

Sciences and Technology-Jammu, Chatha, Jammu and Kashmir, India.

RTAAAS/AB/024/218

The development of high-protein fruit bars has gained significant attention due to the increasing demand for convenient, nutritious snacks. This study focuses on the optimization and quality assessment of a high-protein fruit bar incorporating apricot and plum as primary fruit ingredients. The goal was to create a balanced formulation that maximizes the protein content while retaining the natural flavour, texture, and nutritional benefits of the fruits. The optimization process involved adjusting the ratio of apricot and plum powder, selecting appropriate protein sources (spirulina, amaranth seeds, dry fruits) and fine-tuning other ingredients like sweeteners and binders. Various processing parameters, including drying time, temperature, and mixing methods, were also optimized to ensure product stability, texture, and nutrient preservation. The quality assessment encompassed sensory evaluation, nutritional analysis and shelf-life testing. The results demonstrated that the inclusion of apricot and plum in combination with selected protein sources produced a fruit bar with an enhanced protein profile, without compromising on taste or texture. The product exhibited good consumer acceptability, with optimal levels of protein and fiber, as well as preserved antioxidant activity from the fruit ingredients. This study highlights the potential of apricot-plum based high-protein fruit bars as a functional, nutrient-dense snack that meets the needs of health-conscious consumers.

Keywords: Bar, Spirulina, amaranth seeds, snacks, high protein

Optimization of Ultrasound-Assisted Accelerated Aging of Paddy: Process Development and Techno-Functional Characterization

Ramandeep Kaur [1*], Hanuman Bobade[2] and Savita Sharma[2]

[1]ICAR-CIPHET, Regional Station, Abohar

[2]Department of Food Science and Technology, Punjab Agricultural University, Ludhiana

RTAAAS/AB/024/219

The present research study was undertaken to explore the possibilities of accelerating the aging of paddy through ultrasound processing and assess its effects on techno- functional properties of milled rice. The central composite rotatable design of response surface methodology was adopted for experimentation with time of ultrasound processing and thermosonication temperature as process variables and milling and cooking characteristics as response variables. The paddy grains, free from dust and foreign materials, were subjected to controlled ultrasound processing at constant frequency (20 kHz) and power (250 W) for various time durations (30, 60 and 90 minutes) and at different ultrasound temperatures (30, 40 and 50℃). The results indicated that ultrasonication improved the milling efficiency and certain cooking quality characteristics of milled rice. The cooking time of rice decreased while water uptake ratio, volume expansion ratio and solid loss of rice increased. The ultrasonication process contributed in improvement of bioactive components of rice which was resulted from increased phenolic content and antioxidant activity. Moreover, texture profile of rice was modified after ultrasound treatment which was evidenced from the increase in cohesiveness and springiness of rice which are responsible for mouthfeel texture of rice. The numerical optimization suggested that the optimum ultrasound treatment conditions were finalized up to 60 minutes time and 50℃ temperature at which desirable changes at par to naturally aged rice were found. Furthermore, the structure profile of rice performed through the X-ray diffraction, Fourier Transform Infra-Red spectroscopy analysis and Scanning electron microscopy have revealed that the rice from ultrasound treated paddy had higher crystallinity, undergo protein dissociation and had more porous structure.

"Sustainable Biofuels from Poultry Waste: An Understanding Towards Technological Advances, Challenges, Future Directions on Energy Potential and Environmental Impact"

Vasudeva Nayaka K B L

Research Scholar, Dept. of Biotechnology and Research Center Bapuji Institute of Engineering

RTAAAS/AB/024/220

The growing demand for sustainable energy solutions has led to increased interest in biofuels derived from organic waste materials. Poultry waste, consisting of feathers, manure, and other by-products, is one such abundant resource that can be converted into biofuels, offering a potential alternative to fossil fuels. This study explores the conversion of poultry waste into biofuels, focusing on its biochemical composition, pretreatment methods, and the processes of anaerobic digestion, fermentation, and transesterification. Poultry waste is rich in proteins, lipids, and carbohydrates, making it a suitable candidate for biogas production and biodiesel synthesis. Additionally, it is an environmentally advantageous option for waste management, reducing the environmental footprint associated with poultry farming. Various approaches, including the use of enzymes and microbial consortia, have been investigated to optimize the conversion process, yielding significant energy outputs. However, overcoming challenges such as high processing costs, technological limitations, and infrastructure development is essential to unlock the full potential of poultry waste as a biofuel feedstock. The research should extensively focus on optimizing conversion technologies, improving economic feasibility, and developing policies that promote the adoption of poultry waste-to-biofuel systems on a larger scale. In India, where agriculture and livestock farming play a significant role in the economy, the production of poultry is a major industry, contributing substantially to both food security and employment. However, the rapid growth of poultry farming has resulted in large quantities of waste, including feathers, manure, and other by-products, creating environmental challenges such as pollution, waste disposal issues, and greenhouse gas emissions. These challenges and opportunities, in scaling up the biofuel production process from poultry waste, with an emphasis on economic feasibility, sustainability, and the reduction of greenhouse gas emissions, suggest that poultry waste can serve as a valuable feedstock for biofuel production, contributing to the development of renewable energy sources and enhancing waste-to-energy technologies.

From Forest Waste to Functional Products: Sustainable Particle Boards from Pine Needles (*Pinus roxburghii*) for Furniture Solution

Dr. Sangya Singh[1], Dr. Deepa Vinay[2]

[1]Young Professional-II, Deptt of Resource Management and Consumer Science,

G.B.Pant University of Agri and Tech,

[2]Professor, Deptt. Of Resource Management and Consumer Science,

G.B.Pant University of Agri and Tech,

RTAAAS/AB/024/221

The growing concern for environmental sustainability and the depletion of forest resources has led to the exploration of alternative raw materials in wood-based product manufacturing. This thesis presents an innovative approach to forest resource management by utilizing pine needles (*Pinus roxburghii*), an abundant but underutilized biomass, for the development of sustainable particle boards. Pine needles, which are traditionally considered a waste product in forest ecosystems, are processed to create particle boards that demonstrate promising mechanical properties and suitability for furniture applications. The study explores various processing techniques, including chemical treatments, to enhance the bonding characteristics and durability of pine needle-based boards. The resulting products are subjected to rigorous testing for strength, stability, and aesthetic quality, aligning with environmental sustainability goals. The research highlights the potential of integrating waste biomass from forests into value-added products, reducing the dependency on conventional wood resources and promoting circular economy principles. This approach not only contributes to sustainable forest management but also presents a viable solution for the growing demand for eco-friendly furniture materials. The findings offer insights into the feasibility and application of pine needle-based particle boards as an alternative to conventional wood products, with implications for both the furniture industry and forest management practices.

Keywords: Sustainable Forest Management, Pine Needles, Particle Boards, Furniture Applications, Environmental Sustainability

Optimization of height of raised beds in raised and sunken bed system in low lands of Hirakud Command Area

Sushilkumar Bansude A.K. Mohanthy, N. Panigrahi and Ipsita Kar

Regional Research and technology transfer Station, Odisha University of Agriculture and Technology, Bhubaneswar.

RTAAAS/AB/024/222

Raised and sunken bed (RSB) system is being found very beneficial for crop diversification in low lands of canal command areas. However It is required to standardize width and elevation difference in sunken-raised beds in relation to soil physical properties, crop characteristics (cultivated on the raised bed) and water availability. Accordingly, the experiment is being conducted at Regional Research and Technology Transfer Station, Chiplima to optimize the height of raised beds in RSB system in low lands of Hirakud Command Area and to find out best suitable crop combination for both Kharif and Rabi season. Three elevation differences H 1 (30 cm), H 2 (45 cm) & H 3 (60 cm) of RSB system were modified for cultivation of rice in sunken beds and four crops viz., Okra, Maize, Tomato and cowpea were cultivated on Raised beds for both Kharif and Rabi seasons of 2018, 2019 and 2020 to determine the optimum elevation difference and optimum crop combination of RSB system. The results obtained showed significant improvement for all the elevation differences in terms of rice equivalent yield (REY) and net returns due to RSB land configuration compared to farmers' practice (FP) of rice monocropping. However elevation difference of 60 cm with Rice-Cowpea combination in kharif season found most significant in context of higher REY 73.86 q ha -1 , higher net returns of Rs. 72,170.72 ha -1 and higher BC ratio of 2,58. For Rabi season elevation difference of 60 cm with Rice-Tomato crop combination were found most significant in context of higher REY of 68.54 q ha -1 , net returns of Rs. 70,307.29 ha -1 and BC ratio of 2.41.

Keywords: Raised and sunken bed system, crop diversification and Hirakud Command Area.

Genetic Studies for Yield and Quality Traits in Bottle Gourd

B. Chandra Mouli,

Ph.D scholar,

Dr. Y.S.R. Horticultural University, Andhra Pradesh,

RTAAAS/AB/024/223

Development of different kinds of plant types in bottle gourd is paramount breeding objective in India as existence of diverse agro-climatic conditions. But its genetic improvement has limited as complex inheritance of yield with fruit traits. Hence, creation mean investigation was used to unravel the genetics of 12 traits using parents, F 1, F 2 , BC 1 as well as BC 2 populations of two cross combinations, Pusa Naveen x Local Round (cross I) and Pusa Naveen x Pusa Santhusti (cross II) throughout early autumn, 2020. Days to first fruit harvest, fruit yield per vine can be enhanced through simple collection in early segregating creations as these traits exhibited additive and additive × additive type of gene interactions. Duplicate kind of epistasis was recorded for vine length, inter-nodal length, days to first male flower, sex ratio, number of seeds per fruit in both crosses and heterosis breeding is helpful in genetic improvement. As per, potence ratio and epistatic gene interactions assortment in later segregating productions can be worthy for majority of the characters in the present study. Hence, modified bulk technique of crop reproduction can be employed for genetic development of these attributes of the bottle gourd.

Keywords: Bottle gourd; Gene action; Generation Mean analysis; Quality traits; Yield

Biochemical Changes during Different Maturity Stages of Pyrus pashia Fruits Mala

Rathore, Manisha Gusain, Surender Singh and Parul Kewat

Non-Timber Forest Products Discipline

Silviculture and Forest Management Division

Forest Research Institute,Dehradun

RTAAAS/AB/024/224

Pyrus pashia is an underutilized fruit species commonly known as the Indian wild pear, belongs to the family Rosaceae,. It bears small and oval shaped crown, attractive white flowers with red anthers and small pear like fruits. It is found widely distributed in the subtropical regions of the Himalayas. The flowering season varies between late February and April. The fruits have extended ripening period beginning from May to first week of November and continue to do so till the last week of December or even January in cold areas. The early fruit is mostly of light green color but at maturity, its color turns blackish brown. The fully ripe fruit has a reasonable flavor, it is sweet and very pleasant to eat. Mature fruits are soft and perishable. It is best eaten when slightly decaying. Fruit ripening is a critical phase in fruit development, involving a cascade of biochemical, nutritional, and physiological transformations. So as to investigate the changes of underlying mechanisms regulating fruit ripening process, fruits of Pyrus pashia were collected during different ripening stages (unripe, semi-ripe, and fully ripe) from Rudraprayag , Uttarakhand. The nutritive contents of fruits during different maturity stages ranged from 7.3% to 10.6% total soluble sugars, 3.75% to 10.75% crude protein, 1.59 mg/100g to 5.76mg/100g vitamin C, 1.08 % to 2.86% fat content 1.51% to 4.53% total ash, 22.8% to 34.9% crude fibre, 14.75 to 26.5 mg/g total phenolic content and 17.12 to 29.8 mg/g total flavonoid content. At present the fruits of Pyrus pashia are not being commercially exploited. This study shall provide information about correct harvesting and post-harvest storage period of the fruits required for optimizing their nutritional value, enhancing shelf life, and exploring their potential for value-added products. Such insights could support efforts to promote the commercial utilization of this underutilized fruit species, benefiting local communities and fostering sustainable livelihood opportunities.

Keywords: Pyrus pashia, fruit ripening, nutritional, color codes, antioxidant activity, biochemical changes.

Comparative Morphology of Male Genitalia in The Sub Families of The Family: Acrididae

Varanasi Shiva Kumar

Ph.D. Research Scholar

Department of Entomology, College of Agriculture, VNMKV, Parbhani, Maharashtra

RTAAAS/AB/024/225

Study was conducted on comparative examination of male genital structure in members of the family, Acrididae, specifically the epiphallus in short horned grass hoppers collected from three zones of Telangana viz., Southern Telangana Zone, Northern Telangana Zone and Central Telangana Zone feeding on crops like, maize, cotton, rice, redgram, pearl millet, bajra, castor, safflower, sapota, okra, brinjal, shrubs and grass lands. A rigorous comparative examination of male genital structure, specifically the epiphallus i.e. strongly sclerotized structure possessing a pair of hook like lophi, a pair of anterior ancorae and a bridge body. Ancorae may be short or long, acute or blunt; bridge may be broad or narrow and lophi may be single or bilobed which are suggested as generic characters though shape of the lophi and ancorae are suggested as species specific characters. Epiphallus is plate like in the subfamily, Calliptaminae, undivided bridge shaped in the subfamilies, Acridinae, Oedipodinae, Hemiacridinae, Spathosterninae, Catantopinae, Cyrtacanthacridinae and Eyprepocnemidinae; however, a divided bridge shape was observed in the subfamily, Oxyinae. Enormous amount of variation was observed in each part of male phallic structure across the subfamilies, genera and species which can be used in the field of insect Systematics.

Keywords: Short horned grass hopper, Epiphallus, Lophi, Ancorae, Bridge

Sustainable Valorization of Agricultural Mixed Waste into Biofuel and Antifungal Solutions

Dr. Pooja Sharma

Department of Biological and Chemical Sciences, Baba Farid College, Bathinda (Punjab),

RTAAAS/AB/024/226

The rising need for sustainable biofuels has driven research into the holistic utilization of mixed agricultural waste. This study emphasizes on transforming agricultural residues such as leaves, stems, corn cobs and husks into bioethanol while synthesizing lignin-derived metal-oxide nanoparticles (MONPs) to combat plant-pathogenic fungi. The optimization of fermentation process and parameters for bioethanol production was done by using Response Surface Methodology (RSM) software, analyzing key parameters with One-Factor at a Time (OFAT) approach, such as temperature, pH, and fermentation-duration along with substrate concentration. The resultant bioethanol exhibited promising yield and efficiency. In order to minimize the impact on the environment, lignin was extracted using organic acids and bio-synthesized into MONPs, which showed strong anti-fungal efficacy against 2 prevalent garlic crop diseases (Fusarium oxysporum and F. proliferatum). This study underscores the potential of agricultural waste as a renewable energy resource and highlights the dual benefits of producing eco-friendly antifungal agents. This holistic approach contributes to environmental sustainability by reducing waste and promoting the use of bio-based materials in agriculture. Future work will focus on scaling up production processes and further evaluating the efficacy of MONPs in field applications.

Keywords: Sustainability, Lignocellulose, Agricultural Waste, Biofuel, Nanoparticles.

Pathology and Molecular Characterization of Important Respiratory Disease Pathogens of Chicken

Kaore M. P, Arul G. Pandiyan, Hedau M.S., Dahake M, Sonkusale P. M Kurkure N.V.

Kaore M. P. : Assistant Professor, Department of Pathology, Nagpur Veterinary College,

Arul G Pandiyan: MVSc scholar, Department of Pathology, Nagpur Veterinary College, Nagpur

Hedau M.S: Assistant Professor, Department of Pathology, Nagpur Veterinary College, Nagpur

Dahake M: MVSc scholar, Department of Pathology, Nagpur Veterinary College, Nagpur

Sonkusale P. M : Assistant Professor, Department of Pathology, Nagpur Veterinary College, Nagpur

Kurkure N.V.: Director of Research, Maharashtra Animal and Fishery Sciences University, Nagpur

RTAAAS/AB/024/227

Respiratory diseases remain a great threat to the poultry industry as causing great mortality and significant economic losses. The present study aimed to study the pathology and molecular characterization of important respiratory disease pathogens of chicken. In this study total of 50 samples were collected from the birds, which showed clinical manifestations and gross lesions of respiratory diseases. Out of 50 samples, 45 were positive for one of the screened pathogens concurrently or singly. Concurrent infection induced severe pathological lesions than mono-infection. Grossly, the trachea revealed mild to severe congestion, hemorrhages, and the presence of exudates varying from catarrhal, and mucopurulent to fibrinopurulent. Lungs revealed severe congestion and hemorrhages, and deposition of pleura over the surface of the lungs. Air sac revealed cloudiness, thickening, and caseous exudate. Histopathological examination revealed moderate to severe epithelial hyperplasia, necrosis of mucosal epithelial cells, lymphocytic infiltration, and exudate in the tracheal lumen. Examination of lungs showed thickening of interalveolar septa with fibrin, infiltration of heterophils, lymphocytes, and macrophages, and edema in parabronchi. Molecular characterization of NDV revealed the circulation of two different genotypes, genotype XIII and genotype VII. IBV viruses were grouped with 4/91 strain of IBV and belonged to GI 24 lineage. Molecular characterization of ILTV revealed the circulation of chicken embryo originated (CEO) related vaccine strain in unvaccinated flocks. FAdV virus belongs to serogroup D. Experimental study of these viruses needs to be done to study detailed pathogenesis of these pathogens.

Michelia champaca: A Fragrant Jewel of the Botanical World

Sawant SK[1*], Shirke GD[1], Kadam JH[2], Shinde PU[3]

[1]Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Post Graduate

Institute of Post Harvest Technology and Management, Post Harvest

Management of Fruit, Vegetable and Flower Crops, Roha, Maharashtra.

[2]Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Post Graduate

Institute of Post Harvest Technology and Management, Post Harvest

Management of Medicinal, Aromatic, Plantation, Spices and Forest Crops, Roha, Maharashtra

[3]ICAR- National Institute of Abiotic Stress Management, Baramati, Maharashtra.

[4]Sher-e-Kashmir University of Agriculture Sciences and Technology of Jammu.

RTAAAS/AB/024/228

Michelia champaca, commonly known as Champaca, is a magnificent evergreen tree revered for its captivating beauty and rich cultural significance. This botanical gem, belonging to the Magnoliaceae family, native to the tropical and subtropical regions of South and Southeast Asia. Its aromatic flowers, with their delicate yellow petals and intoxicating scent, have inspired poets, artists, and perfumers alike. In India, champaca garlands are often presented to guests as a symbol of welcome and respect. The fragrance of champaca is also associated with love, passion, and spirituality. Beyond its aesthetic appeal, Champaca holds immense ethnobotanical importance. Various parts of the plant, including the flowers, leaves, and bark, have been traditionally used in Ayurvedic medicine to treat a wide range of ailments. The fragrance of Michelia champaca is a complex blend of volatile organic compounds (VOCs). While the exact composition can vary, some of the key compounds contributing to its distinctive aroma include benzyl acetate, ethyl benzoate, linalool, geraniol, β-pinene. Recent scientific studies have further validated these traditional uses, revealing the presence of bioactive compounds with potential therapeutic properties. As urbanization and deforestation threaten the natural habitats of Champaca, it is imperative to conserve this invaluable species. By understanding its ecological significance, promoting sustainable cultivation practices, and exploring its potential applications in modern medicine and industry, we can ensure the legacy of this fragrant treasure for generations to come.

Determination of saturated and unsaturated fatty acids in walnut oil through gas chromatography coupled with flame ionization detection

Sahil[1], R. M. Sharma[1], A. K. Goswami[1], K. K. Pramanick[2], G.P. Mishra[3], Shruti Sethi[4], V.S. Rana[5], Amrender Kumar[6], O.C. Sharma[7], D.P. Sharma[8], M. K. Verma[7],

Nirmal Sharma[8]

[1]Division of Fruits and Horticultural Technology

[2]IARI Regional Station, Amartara Cottage, Shimla

[3]Division of SST, [4]Division of FS& PHT, [5]Division of Agricultural Chemicals, [6]AKMU

ICAR-Indian Agricultural Research Institute, New Delhi

[7]ICAR-CITH, Srinagar, [8]RHRSS, Bhaderwah, SKUAST Jammu

RTAAAS/AB/024/229

Walnut (Juglans regia L.), a prominent member of the Juglandaceae family, is a rich source of essential fatty acids, significantly reducing the incidence of chronic diseases such as diabetes, coronary heart disease, and cancer. The fatty acid composition of walnut oil is crucial in determining its quality, nutritional value, and potential for health-conscious consumers. Walnut oil samples were extracted from kernels of 35 diverse genotypes, previously characterized for their nut and kernel traits. The oil samples were analysed for their fatty acid composition, distinguishing between saturated (e.g., palmitic and stearic acids) and unsaturated fatty acids (e.g., oleic and linoleic). Walnut oil is also recognized for its favourable omega-6 to omega-3 ratio. However, this study focuses specifically on quantifying omega-6, the predominant fatty acid in walnut oil. The findings underscore the nutritional superiority of walnut oil, with some genotypes such as 'Mandi Selection', 'CITH-W-2', and 'PAD 1-23' showing potential for breeding programs aimed at enhancing oil quality. Additionally, the results have implications for promoting genotypes suited for nutraceutical applications, value-added products, and export markets. The use of GC-FID as a reliable method ensures accurate fatty acid profiling, supporting future research in walnut oil quality assessment.

Sensible heat transfer characteristics of Horizontal liquid full scraped surface heat exchangers for forewarming above atmospheric pressure

Jahangir Badshah*, Rashmi Kumari and L. M. Bal*****

*Dr. J. Badshah, University Professor – cum- Chief Scientist, Dairy Engineering

Department, SGIDT, Patna, (Bihar Animal Sciences University, Patna)

RTAAAS/AB/024/230

In this paper, the sensible heat transfer characteristics have been modelled as Nusselt equations in the form of Cobb Douglas models for film heat transfer coefficients and in Box Wilson models for overall heat transfer coefficient. Least square means and ANOVA with two way interactions for overall heat transfer coefficient with reference to true scraped surface heat transfer coefficients (based on temperature jump method) have indicated that for working liquid of Sweetened condensed milk (SCM WL), mass flow rate significantly affected overall heat transfer coefficient at P 0. ≤ 01 and d s /d t and T s at P ≤ 0.05 but V c at P≤ 0.10. The true scraped surface film heat transfer coefficient varied from 476 to 2851W/m 2 K in large rotor having d s /d t as 0.51 and 339 to 2634 W/m 2 K in small rotor assembly having d s /d t as 0,16. From the box Wilson model, the optimum values of scraper blade speeds were evaluated as 3.69 to 5.40 rps for considering the flow rate of SCM WL as 50 to 200 litres per hour at Ts of 127°C under pressure of 1.5 to 1.7 Kg/cm 2 . The effects of independent variables on temperature rise ratio were determined in an ANOVA with interactions for SCM WL, which indicated that the effects of scraping speed, M f , d s /d t , V c, P c and M f x V c increased the outlet temperature. The large rotor with d s /d t of 0.51 has effective use with SCM WL in comparison to water. Higher rotor speed beyond optimum value produced the intensity of mixing which caused back mixing and reduced the plug flow characteristics The temperature rise modelling for SCM WL was made at inlet temperature of 50°C with outlet temperature of 120 °C was estimated from the developed model at a steam condensing temperature of 133.2 °C which corresponds to steam pressure of 303.56 KPa (i.e. 2.06 kgf/cm 2 gauge). The ANOVA indicated that d s /d t , M f , and V c were affecting significantly (P ≤ 0.01) but steam pressure affects less significantly at P , 0.05 for SCM WL.

Impact of Environmental Parameters on Workplace of Handloom Weavers

[*1]Rupanagudi Unesha Fareq, [2]Seema Kwatra and [3]V.Vijaya Lakshmi

[*1]Teaching Associate, Department of Resource Management and Consumer Science, College of Community Science, Acharya N.G. Ranga Agricultural University. email:

[2]Professor, Department of Resource Management and Consumer Sciences, College of Community Science, GB Pant University of Agriculture and Technology, Pantnagar, Uttarakhand.

[3]Professor, Department of Resource Management and Consumer Sciences, College of Community Science, Professor Jaya Shankar Telangana State Agricultural University, Hyderabad, Telangana.

RTAAAS/AB/024/231

The workplace of handloom weavers is highly sensitive to environmental parameters such as Light, Noise, Temperature and humidity as they directly affect their health, productivity and the quality of the work. The objective of the study is to understand the impact of environmental parameters on workplace of handloom weavers. A total of 120 handloom weavers were randomly selected from Kurnool and Kadapa district of Andhra Pradesh. The handloom produces very much noise while performing the weaving activity, the minimum and maximum level of noise recorded was 80 decibels and 105 decibels with mean score of 83.08 ± 5.51. Permissible exposure limit of noise level is 90 db for 8 hrs given by Occupational Safety and Health Administration (OSHA). The mean and SD value of humidity was 37.08 ±5.21 with range of minimum 24% and maximum 46%. The temperature recorded in the handloom weaving unit workplace was minimum of 24.5 0 C and maximum of 32.6 0 C respectively with a mean score of 27.74±2.37. Permissible limits for humidity and temperature were 20-60 % and 20 0 -24 0 C. The study concluded weavers and poor productivity. Handloom weavers expressed that they were suffering from eye strain due to poor light, hearing problems due to heavy noise produced by handloom and also most of the weavers were performing the activity in open halls and sheds exposing to hot and cold weather conditions that affects the weaver's performance. Therefore, there is a need to create awareness on environmental parameters effect on health of weavers.

Keywords: Environmental Parameters, Light, Noise, Temperature, Humidity and Handloom Weavers

Effect of different fertigation levels on growth and yield of Bt cotton intercropped with moongbean

Anu*, Karmal Singh, Shweta and Arun

Department of Agronomy, CCS Haryana Agricultural University, Hisar

RTAAAS/AB/024/232

The experiment on "Effect of different fertigation levels on Bt cotton intercropped with moongbean" was conducted in 2022-23 and 2023-24 at Cotton Section, CCS HAU, Hisar. In the present study, four fertigation levels (control, 40% RDF, 50% RDF and 60% RDF) and two cropping patterns, Bt cotton intercropped with moong bean (2:1) and sole Bt cotton were used. The experiment comprised of eight treatments, each having three replications with split plot design. The study revealed that among different fertigation levels, highest growth parameters (plant height, leaf area and dry matter accumulation and plant population) and seed cotton yield (SCY) was found in 60% RDF fertigation level followed by 50% RDF fertigation level as compare to control. Among intercropping system, highest growth parameters (plant height, leaf area and dry matter accumulation) and SCY was observed in intercropping system (cotton intercropped with moongbean (2:1) as compare to sole cotton during both years i.e. 2022-23 and 2023-24, respectively.

Keyword: growth, SCY, cotton, moong bean, fertigation, intercropping.

Effect of marigold exudates on tomato production and nematode management

Divya, S.K. Sehrawat and Arvind Malik

Department of Horticulture

CCS Haryana Agricultural University

Hisar, Haryana,

RTAAAS/AB/024/233

1. The experiment was conducted at Agri-tourism Centre, CCSHAU, Hisar (Haryana) to study the effect of marigold exudates on tomato production and nematode management. Three replications and a completely randomized design were used to set up the experiment. The experiment consists of Intercropping of marigold with tomato to manage nematode infestation. different treatment combination were , T 1 : Tomato intercropped with 1 row of French marigold, T 2 : Tomato intercropped with 2 rows of French marigold ,T 3 :Tomato intercropped with 1 row of African marigold , T 4 :Tomato intercropped with 2 rows of African marigold , T 5 :*Tomato intercropped with 1 row of bacteria treated French marigold , T 6 :*Tomato intercropped with 2 rows of bacteria treated French marigold, T 7 :*Tomato intercropped with 1 row of bacteria treated African marigold, T 8 :*Tomato intercropped with 2 rows of bacteria treated African marigold and T 9 :Tomato alone. The observations were recorded for no. of J2 per 200cc soil, no. of egg masses per plant, no. of eggs per egg mass after harvesting of tomato var. heemshona. The data recorded was analysed by using OPSTAT software. This experiment was done to explore the best treatment combination for nematode control. Among different treatments, treatment (T 6 :*Tomato intercropped with 2 rows of bacteria treated French marigold) proved best with maximum nematode control and better plant growth.

Keywords: intercropping, nematode, marigold, tomato

Management of major insect pests and diseases in potato through an integrated approach

Noorulla Haveri*, Shashidhar K R, Deepa Terdal and K Thulasiram

University of Horticultural Sciences, Bagalkot

RTAAAS/AB/024/234

Insect pests and diseases are major limiting factors in potato cultivation. Integrated management practices against major insect pests and diseases in potato was demonstrated by ICAR-Krishi Vigyan Kendra, Kolar, Karnataka (India) through Frontline demonstration (FLD) farmer's fields during 2015-16 and 2017-18. Effect of the demonstrated technologies on pest management was quite encouraging which resulted in a reduction in mean mite incidence, defoliator incidence and potato tuber moth incidence compared to control plots. A similar effect was noted on disease management with the least late blight, early blight and Sclerotium wilt incidence over the control plots. The demonstration plots recorded the highest yield and economic returns. Thus, the demonstrated technologies proved to be highly effective in management of insect pests and diseases.

Keywords: Integrated insect pests and diseases management, Frontline demonstration (FLD) and Potato.

Isolation and Morphological Identification of Endophytic Fungi from Aloe vera Roots with Potential Agricultural Applications

Smrati Shukla[A*], Ankit Agrawal, and Abhishek Gupta[B]

[A]Department of life science, Rabindranath Tagore University, Raisin Madhya Pradesh

[B]CMBT research institute Bhopal Madhya Pradesh, India

RTAAAS/AB/024/235

In twenty first century climate change is the biggest challenge for sustainable agriculture production. Different reports highlighted the need for batter agriculture practices. In this context, endophytic fungal species could be a model fungus to sustain crop productivity. Microorganisms associated with plants have been recognized for their high therapeutic potential. Endophytic fungi contribute to agricultural sustainability by promoting plant growth and providing resistance to environmental stresses and pathogens. Currently, these fungal species are widely used as inoculants for biocontrol and biofertilization. Endophytic fungi are reported to improve photosynthetic efficiency, enhance nutrient uptake and increase nitrogen use efficiency in crops. Aloe vera is the widely used plant in medical and pharmaceutical practices, endophytes associated with Aloe vera have potential in many bioactive properties these fungi reside in the plant without causing any apparent harm and often contribute in plant growth. This study focuses on the isolation and characterization of endophytic fungi from the roots of Aloe vera to observe their efficiency in best agriculture practices. Endophytic fungus were isolated from surface-sterilized root of Aloe vera. The isolated fungi were identified based on their morphological characteristics like colony appearance fungal hyphae and spore formation. We have find twelve different funguses out of which based on their morphological characteristics Fusarium, Aspergillus, Trichoderma, and Penicillium were identified. As earlier it is reported that these fungi can be used to reduce the need of synthetic fungicides and improve plant health. This study underscores the potential of fungal communities from Aloe vera roots, highlighting their plant growth-promoting attributes and paving the way for sustainable agricultural practices and pharmacological applications.

Keywords: - Endophytic fungus, Bio fertilization, Pharmaceutical, Photosynthetic, Plant growth promotion

"Exploring the Ethanobotany and Health Benefits of Himalayan Wild Pomegranate"

Habiba Begum[1], Amol Vasisth[2] and Kajal Srivastava[3]

1 PHD scholar, VCSG, UUHF, Department of Forest product and Utilization,

College of Forestry, Ranichauri.

2 Associate Director of Research, VCSG, UUHF Bharsar.

3 Assistant Professor, Doon (P.G.) College of Agriculture Science and Technology,

RTAAAS/AB/024/236

Himalayan wild pomegranate (Punica granatum) has been a cornerstone of traditional and ethnobotanical practices for centuries, valued for its impressive range of health benefits. People in Himalayan communities have long relied on various parts of this plant—its fruits, seeds, peel, and bark—to treat common ailments. Packed with bioactive compounds like polyphenols, flavonoids, tannins, and antioxidants, wild pomegranate offers a natural way to support health and well-being. Traditionally, extracts from the fruit and peel have been used to aid digestion, treat respiratory conditions, and improve oral health. Its rich antioxidant content helps fight oxidative stress, supports heart health, and strengthens the immune system. The plant also has antimicrobial and anti-inflammatory properties, making it useful for wound healing and skin infections. Folk remedies often rely on it to manage dysentery, and parasitic infections. Modern research backs many of these traditional uses, highlighting the plant's potential to fight cancer, control diabetes, and protect the liver. Its ability to regulate blood sugar and improve cholesterol levels makes it especially beneficial for people dealing with metabolic disorders. Beyond its medicinal properties, Himalayan wild pomegranate is a powerhouse of nutrients, including vitamins, minerals, and dietary fibre, which further enhance its health benefits. This abstract delves into the traditional and ethnobotanical uses of Himalayan wild pomegranate and explores its growing significance in modern medicine. With its wide range of therapeutic applications, this plant could play a vital role in developing natural remedies and healthier food alternatives. However, more research is needed to fully understand its potential and bring it into mainstream healthcare.

Influence of Nitrogen Levels and De-Topping practice on Quality, Fodder Value and Economics of Maize Varieties

P. S. Solunke*, S. V. Sapkal, A. B. Chorey, D. V. Mali, A. B. Age and R. R. Shelke

Department of Agronomy, Dr. PDKV, Akola

RTAAAS/AB/024/237

A field experiment entitled “Influence of nitrogen levels and de-topping practice on quality, fodder value and economics of maize varieties” was conducted during kharif season of 2018 at Department of Agronomy, Dr. P.D.K.V., Akola The experiment was laid out in split plot design with three replications keeping four combination of two de-topping practice (D 1 : No de topping and D 2 : De-topping after 15 days tasseling) and two varieties (V 1 : African tall and V 2 : Pioneer- 3396) under main plot and four nitrogen levels (N 0 -0 Kg, N 1 -50 Kg, N 2 -100 Kg and N 3 -150 Kg N ha -1 , respectively) under sub plot. Quality parameters viz., crude protein, ether extract, total ash content and fodder yield ha -1 was maximum with variety African tall as compared to Pioneer- 3296. However, yield attributes, grain yield ha -1 , gross and net monetary returns ha -1 and B:C ratio were recorded significantly maximum with variety Pioneer-3396 over African tall. Increased levels of nitrogen increased yield attributes, quality parameter and grain, fodder and biological yield ha -1 , monetary returns viz., gross and net returns and B:C ratio was greater with application of 150 Kg N ha -1 as compared to application of 100 Kg N ha -1 , 50 Kg N ha -1 and control, respectively. However higher level of nitrogen recorded minimum nitrogen free extract as compared to rest of the lower levels of nitrogen treatments, respectively.

Keywords: Topping, De-topping, N Levels and Fodder Maize

Economic analysis of Women Dairy Cooperative farmers in Jaipur District of Rajasthan

Vijender Kumar[1*] Latika Sharma[2] Hari Singh[2]

[1]Ph.D. Scholar, Department of Agricultural Economics and Management, Rajasthan

College of Agriculture, MPUAT, Udaipur

[2]Assoc. Professor, Department of Agricultural Economics and Management

Rajasthan College of Agriculture, MPUAT, Udaipur

RTAAAS/AB/024/238

The present study was under taken in the Jaipur district of Rajasthan with the objectives to analyse the income and profitability of women dairy cooperative Society (WDCS) farmers as compared to non-cooperative dairy farmers. The Jaipur district was purposively selected because of highest number of dairy cooperative societies and one of the leading milk producing district in the state. A total of 80 respondents were selected i.e., 40 respondents were from women dairy cooperative farmers and other 40 respondents are non-cooperative dairy farmers. Production performance of dairy farmer was calculated by taking the average cost and milk yield (litre/day/animal). The study revealed that among all cost components, total feed and labour cost were the major cost components. Feed cost varied from 54.50 percent in WDCS farmers to 57.60 percent in non-cooperative dairy farmers and labour cost was varied from 33.50 per cent in WDCS farmers to 34.70 per cent in non-cooperative dairy farmers. Contribution of total variable cost was varied from 90.40 to 94.20 percent in WDCS and non-cooperative dairy farmers respectively. The average total maintenance cost for WDCS farmers was worked out to be ₹195.50 /animal/day. It was quite higher for a non- cooperative dairy farmer ₹ 260.20/animal/day. Despite the higher milk production cost, the cost of milk production of WDCS farmers was lower ₹24.71/litre/day than the non-cooperative dairy farmers due to the better milk production management. The analysis indicates that dairy animals maintained by WDCS farmers in Jaipur region were profitable by average net returns per animal/per day which was recorded ₹ 120.18 which was higher than non-cooperative dairy farmers. Similarly, the Benefit–Cost (B-C) ratio was also found higher (1.44) in WDCS farmers and lower in the case of non- cooperative dairy farmers (1.35).

Keywords: Dairy Cooperative Society, Benefit-Cost Ratio, Variable Cost, Milk production

Parijatak: Blooming Plant for Pharmaceutical and Health Benefits

Aniketkumar L. Bijewar[1], Aishwarya R. Ingole[2]

[1,2]- Ph. D. Scholar, Department of Floriculture and Landscape Architecture,

Post Graduate Institute, Dr. P. D. K. V., Akola

RTAAAS/AB/024/239

Parijatak (Nyctanthes arbour-tristis Linn) is an important flowering plant having a vast range medicinal benefits, therapeutic applications, chemical properties, pharmacological actions and biological activities. This plant has unique therapeutic qualities and values fron each plant part. It exhibits hepatoprotective, anti- leishmaniasis, anti-viral, anti-fungal, anti-pyretic, anti-histaminic, anti-malerial, anti- bacterial, anti-inflammatory and anti-oxidant properties. A traditional herbal remedy called Nyctanthes arbour-tristis Linn is used to treat inflammatory and rheumatic disorders. It also known as Night Jasmine as it blooms at night only. The flowers include carotenoids, glycosides such as monogentiobioside- D monoglucoside ester of crocetin and digentiobioside ester of -crocetin, as well as essential oils, nyctanthin, D-mannitol, tannins, glucose, and crocin-3 (or crocin-1). Flowers are used as ophthalmic, stomachic, astringent, carminative and trichogenous and are useful in inflammations, ophthalmopathy, dyspepsia, splenomegaly, flatulence, colic and greyness of hair. The decoction of the roots is used to enlarge the spleen and the roots are traditionally used as anthelmintics. Traditional uses for barks include anti-dysentric and anti-diarrheal properties. Corolla tubes were once employed in the dyeing of silk. Together with Tagetus erecta, its flower extract has sunscreen action. Its seed are useful in baldness, scury and affection of the scalp. The leaves of the parijatak plant have been used to cure various fevers, coughs, worm infestations, arthritis, and more. The bitter juice from the leaves acts as a tonic. The kadha or decoction is fantastic for worm infestation, constipation and arthritis. Ayurvedic physicians advise using Parijat leaf decoction to treat sciatica and arthritis. It treats a number of unpleasant fevers, including those caused by malaria, dengue, and chikungunya. It According to recent studies, Parijat leaf and bark extract is particularly effective at reducing fever quickly and helps to improve platelet count in cases of dengue and chikungunya fever.

Keywords: Parijat, medicinal properties, pharmaceutical use, health benefits, ophthalmic use.

"Studies on Fruit Rot of Papaya (Carica papaya L.)"

Dhanshree Bachkar*, Sanjay Kolase, Chatur Thakare, Navnath Daingade, Mayur Bhujbal

Department of Plant pathology, College of Agriculture, Dhule

Mahatma Phule Krishi Vidyapeeth, Rahuri, Ahmednagar, Maharashtra

RTAAAS/AB/024/240

Papaya (Carica papaya L.) is an important and most widely grown fruit crop of both tropics and subtropics of the world, belonging to the family Caricaceae and ranks third in importance among fruits. Papaya fruits lose their market value due to damage caused by many fungi. Fruit rot caused by Fusarium incarnatum adversely affects fruit quality, quantity and ultimately reduces market value. The fruit rot of papaya causes enormous yield losses, often in field and markets. Detailed investigations on various aspects were carried out in present study during 2019-20. The papaya fruits showing typical characteristic symptoms of fruit rot were collected from Pachkandil vegetable market, Dhule. Infected fruits exhibited water-soaked spots at stem-end portion, showed softening and mummification of fruitsThe pathogen was isolated by standard tissue isolation method and purified by single spore technique. Pathogenicity of fungus was proved by following Koch's postulates. The fruit rot causal fungus was got identified by AGHARKAR RESEARCH INSTITUTE as Fusarium sp. aff. F. semitectum Berk & Ravenel (Current name- Fusarium incarnatum (Desm.) Sacc.) (ID.NO.3/426/2019/MYC/1135). Morphological studies of F. incarnatum (=semitectum) revealed macroconidia were spindle or sickle shaped with or without blunt ends and microconidia were pyriform to oval or round to oval shaped. Chlamydospores were globose, intercalary, solitary or in chains and 6-11 µm in diameter. In cultural studies, maximum radial growth of fungus on Oat meal agar medium with excellent sporulation, followed by Potato dextrose agar. In vitro evaluation of bioagents and botanicals, revealed that Bacillus subtilis and garlic extract @ 5% and neem seed kernel extract @ 10% showed highest mycelial growth inhibition of test pathogen. In fungicides, carbendazim 12% + mancozeb 63% WP (0.2%) and hexaconazole 5% EC (0.1%) completely inhibited mycelial growth of test fungus. Host range studies revealed initial chlorotic symptom on pomegranate, apple, sweet orange, banana, chilli, brinjal and no symptoms observed on sapota, cucumber, onion, tomato.

Keywords: Papaya, Carica papaya L., Fusarium incarnatum, Fusarium semitectum.

Nanotechnology-driven pesticides: A pathway to sustainable agriculture and enhanced global food security

Mansi Pathak[#], Megha Panwar[@], Meena Yadav[@]

[#]U.G. Student, [@]Assistant Professor

[#@]Department of Agriculture, Doon (P.G.) College of Agriculture Science and Technology,

Camp Road, Selaqui, Dehradun-248011 Uttarakhand, India

RTAAAS/AB/024/241

Nanotechnology-driven pesticides are a transformative advancement in agricultural science, offering sustainable and highly efficient solutions for crop protection. These innovative formulations utilize the unique properties of nanoscale materials to address the limitations of conventional pesticides, such as environmental contamination, off-target effects, and pest resistance. By enabling precise and targeted delivery of active ingredients, nanotechnology-based pesticides improve pest control efficacy while significantly reducing the quantity of chemicals needed. Nanoparticles enhance the stability, solubility, and bioavailability of active compounds, ensuring prolonged activity and minimizing chemical degradation in the environment. The integration of nanotechnology into pesticide development aligns with the principles of sustainable agriculture, promoting resource efficiency, reducing ecological disruption, and lowering reliance on conventional agrochemicals. Moreover, nanotechnology has the potential to mitigate challenges posed by climate change, such as the emergence of new pest species and shifts in agricultural patterns. Despite its immense potential, the widespread adoption of nanotechnology- driven pesticides necessitates addressing several challenges, including regulatory concerns, environmental safety, public acceptance, and ethical considerations. Comprehensive risk assessments and transparent communication with stakeholders are essential to ensuring the responsible application of this technology. Continued interdisciplinary research and collaboration between scientists, policymakers, and agricultural practitioners will play a vital role in optimizing these solutions and integrating them into global agricultural systems. By providing an innovative pathway to sustainable agriculture, nanotechnology-driven pesticides hold the promise of transforming global food production systems, enhancing food security, and creating a more resilient agricultural future in the face of evolving environmental and socioeconomic challenges.

Use of drone technology in Agriculture

Sarita Pradhan[1] Twinkle Jena[2], Sujit Kumar Majhi[1], Tanaya Bala[3]

[2]Odisha University of Agriculture and Technology, Odisha

[1]Indian Agricultural Research Institute, New Delhi, India

[3]Siksha O Anusandhan University, Bhubaneswar

RTAAAS/AB/024/242

Drones also known as Unmanned Aerial Vehicles (UAVs), have experienced significant advancements in recent years. Use of Global Positioning System along with multiple sensor can detect and analyse things which are beyond the visual range. It has the potential to capture detailed information with greater accuracy, reliability, precision. The present agricultural practices which is suffering from number of environmental issues along with climate change and land degradation can be addressed by increasing the precise use of all natural resources. Drones are nowadays perceived as an important component of precision agriculture while contributing to sustainable agriculture. Reduction of cost, fuel, Green House Gases (GHGs) emission and labour is possible by planting of seeds by drones. Monitoring crops in inaccessible regions and restoration of degraded land can also one of potential application of drones. Further, it can be used to monitor weed, disease pest incidence in crop, scheduling of irrigation, geofencing, monitoring crop failure for insurance and precision livestock management. Drones can also be used to spray chemicals like fertilizers, pesticides, etc. based on the spatial variability of the crops and field which reduces the dose and environmental pollution due to excess application. Drones have changed agriculture by substantial cost savings, increased operational efficiency, and better profitability. Certain regulation by government, prevalence of small and marginal farmers, and lack of skilled personnel are major hurdles in adoption and popularization of drone technology. Though drone technology has the potential to govern future data oriented agricultural revolution, cost of operation and lack of support is preventing its adoption. Addressing the concern of job loss and by providing support at institutional skill to reap the benefit of using drone technology in transformation of agriculture.

Keywords: Drones, Precision agriculture, Sustainable agriculture

Sustainable Agroforestry Models for Enhancing Muga Silkworm Productivity and Environmental Conservation

Toko Naan

Phd Scholar, Division of Sericulture, Sher-e-Kashmir University of Agricultural Science Technology,

Jammu, Jammu and Kashmir

RTAAAS/AB/024/243

The indigenous Muga silkworm (Antheraea assamensis) of Northeast India coexists harmoniously with host plants such as Som (Persea bombycina) and Soalu (Litsea polyantha). Muga silkworm rearing sustainability is largely dependent on maintaining the agroforestry ecosystems that sustain these host plants. In this study, sustainable agroforestry models specifically designed for Muga silkworm rearing are proposed and evaluated, with a focus on biodiversity protection, efficient land use, and financial gains for rural people. The suggested approaches combine organic agricultural methods, mixed plantations, intercropping, and other contemporary ecological concepts with traditional rearing practices. Important discoveries demonstrate how these models improve soil fertility, pest control, and climate resilience while guaranteeing a steady supply of high-quality host plant leaves for silkworm diets. Also, looks at how agroforestry might improve carbon sequestration, reduce deforestation, and give rural farmers alternate revenue streams through varied cropping systems. The scalability and adaptability of these models are demonstrated by field tests carried out in Assam across a range of agroclimatic zones. The results highlight how these systems could support Muga silk production while fostering rural livelihoods and ecological balance. In order to create long-term plans for raising Muga silkworms in balance with the environment, this research offers insightful information to environmentalists, sericulturists, and politicians.

Keywords: Muga Silkworm, Agroforestry, Sustainability, Host Plants, Rural Livelihoods.

Salinity induced changes in leaf soluble proteins and some isozymes in salinity susceptible and salinity tolerant sugarcane genotypes

Manisha Rameshrao Patil[a], Ajay Kumar Singh[b], Priyanka Rameshrao Patil[c]

[A]ICAR-Indian Institute of Soybean Research, Indore, Madhya Pradesh

[B]ICAR-National Institute of Abiotic Stress Management, Baramati, Pune,

[c]Shri Shivaji College of Agricultural Biotechnology, Amravati, Maharashtra

RTAAAS/AB/024/244

Salinity negatively affects plant growth, development and productivity in sugarcane. Isozymic and protein diversity among two sugarcane genotypes CoC-671 (salinity susceptible) and CoM-265 (salinity tolerant) were evaluated for biochemical markers associated with salinity stress tolerance. In the present study, the salinity susceptible CoC-671 and salinity tolerant sugarcane genotype CoM-265 were evaluated for Peroxidase (POX), Esterase (EST) and Alcohol Dehydrogenase (ADH) isozymes and soluble protein profiling by SDS and native- PAGE at salinity levels 0.41 dSm -1, 2.31 dSm -1, 4.21 dSm -1, and 8.01 dSm -1 maintained by NaCl solution. Isozyme accumulation was decreased in salinity susceptible sugarcane genotype CoC-671 as compared to salinity level in salt tolerant sugarcane genotype CoM-265, while it was not detected in salt sensitive sugarcane genotype CoC-671. The ADH isozyme profiling revealed six isozymes banding patterns, i.e., ADH1, ADH2, ADH3, ADH4, ADH5 and ADH6 with Rm value 0.189, 0.377, 0.382, 0.389, 0.452, 0.490, respectively. The ADH3 and ADH5 isozymes bands were not detected in salinity susceptible sugarcane genotype CoC- 671 and these may have role in salinity tolerance trait. The POX, EST and ADH isozyme activities were higher in salinity tolerant sugarcane genotype CoM-265 as compared to salinity susceptible sugarcane genotype CoC-671. Moreover, the soluble protein content was less in salinity susceptible sugarcane genotype CoC-671 as compared to salinity tolerant sugarcane genotype CoM-265. The present study could be useful for genetic variability analysis in sugarcane genotypes differing in salinity stress tolerance capability. In this study, we delineated effect of POX, EST and ADH isozymes pattern and leaf soluble protein on salinity tolerance ability of sugarcane genotypes CoC-671 (salinity susceptible) and CoM-265 (salinity tolerant).

Keywords: Peroxidase, Esterase, Alcohol dehydrogenase, Isozyme, Sugarcane, Salinity levels

Therapeutic Effects of Polyphenols in Ginger: A Review of Clinical Studies

Anjali P. Jagtap,

Savitribai Phule Pune University, Pune, Maharashtra, India.

RTAAAS/AB/024/245

Polyphenols, bioactive compounds found in ginger, have gained attention for their potential therapeutic effects in various health conditions. This abstract provides an overview of clinical studies that focus on the health benefits of polyphenols, particularly gingerols and shogaols, present in ginger. These compounds have shown promise in areas such as inflammation, metabolic health, cardiovascular function, gastrointestinal support, and chronic disease prevention. A significant body of research supports the anti-inflammatory and antioxidant properties of ginger polyphenols. Clinical studies have reported reductions in body weight, improved insulin sensitivity, and enhanced fat metabolism, particularly in overweight and obese individuals. These findings suggest a role for ginger in managing metabolic syndrome and promoting weight loss. In gastrointestinal health, clinical trials have shown that ginger can alleviate nausea, bloating, and discomfort associated with functional dyspepsia. Additionally, there is emerging evidence suggesting that ginger polyphenols may have cancer-preventive properties, particularly in colorectal cancer. In cognitive health, clinical studies suggest that ginger polyphenols may improve cognitive performance and memory in older adults, indicating potential neuroprotective effects. Furthermore, research in diabetes management has shown that ginger extract can reduce fasting blood glucose levels and improve insulin sensitivity in type 2 diabetes patients. In conclusion, clinical trials provide strong evidence of the health benefits of ginger polyphenols, with potential applications in managing inflammation, metabolic diseases, cardiovascular health, and cognitive decline. However, further research is needed to fully elucidate their mechanisms and therapeutic applications.

Keywords: Polyphenols, Ginger, Gingerols, Shogaols, Anti-inflammatory, Antioxidant, Metabolic health, Cardiovascular health, Gastrointestinal health, Cognitive function, Clinical trials

"Crunchy and Nutritious: High-Fiber Breadsticks for a healthy Snack"

Anjali Kumari, Monika Sood, Julie D. Bandral and Kamaldeep Kour

Division of Post Harvest Management, Sher-e-Kashmir University of Agricultural

Sciences and Technology of Jammu Chatha, Jammu and Kashmir

RTAAAS/AB/024/246

Recent years have seen a rise in the popularity of ready-to-eat foods due to their ease of preparation, storage, and consumption; however, these foods are often high in fats and sugars. In this regard, a growing number of consumers focus primarily on the nutritional and health aspects of their food expenditures, and bakery products, which are consumed globally, have the potential to be excellent carriers of functional ingredients that enhance the wholesome global characteristic of these foods. Breadsticks are popular because of their taste, crispiness, and long shelf life. They are conventional pencil-shaped sticks of bread that have been rolled and baked. Additionally, as shown in earlier research, breadsticks are a food preparation that is well suited to fortification in order to enhance the overall nutritional profile. Nutritionally, the incorporation of pea pod powder with breadsticks had a higher content of phenolic compounds and dietary fiber. Pea pod powder has proved to be a valuable functional ingredient for producing breadsticks rich in fiber and antioxidants and with a good sensory acceptability.

Keywords: ready-to-eat foods, preparation, expenditures, antioxidants

"Studies on the effect of plant growth regulators on growth and economy of sapota [Manilkara achras (Mill.) Forsberg] cv. Cricket Ball under Agro-climatic condition of Chhattisgarh plains"

Roshan Lal Sahu*, Prabhakar Singh, Hemant Kumar Panigrahi and Gangaram Rana

Department of Fruit Science, IGKV Raipur, (C.G.)

RTAAAS/AB/024/247

The current study was conducted at the Horticulture Instructional Farm Experimental Field, Department of Fruit Science College of Agriculture, IGKV, Raipur (C.G.) in the years 2020–21 and 2021–22. The experiment involved applying foliar sprays of several amounts of plant growth regulators at 50% flowering and the pea stage of fruit growth to twenty-year old sapota cv. Cricket Ball trees. Using a Randomised Block Design, the trial included 25 treatments with three replications. Among the various vegetative characters, the plant growth regulators GA 3 @ 150 ppm at 50 per cent flowering + pea stage (T 12) imparts the significant effect with respect to maximum length of new shoots (11.64 cm), girth of new shoots (1.13 cm), number of leaves per shoot (28.33) and plant height (8.67 m) as compared to control. As regard yield, the treatment NAA 200 ppm, when applied at 50 per cent flowering and pea stage of fruit development produced significantly maximum number of fruits (189.16) as well as yield/tree (22.72 kg), yield (22.72 qt/ha), gross realization (159045.90 Rs./ha) and net realization (114977.89 Rs./ha) in contrast to the remaining treatments being examined in this study as compared to T 0 (control). The maximum benefit: cost ratio (2.81) was noticed under the treatment NAA @ 100 ppm, while minimum in case of treatment T 0 (control).

Keywords: Benefit: cost, CCC, GA 3 , gross realization, NAA, growth parameters

Optimizing Planting Density and Nutrient Management for Enhanced Yield and Economic Returns of Medium-Maturity Maize Hybrids in Godavari Zone of Andhra Pradesh

V. Sujatha[1*], I. Sudhir Kumar[2], P. Muniratnam[3], S.L Jat[4] and A.K. Singh[5]

[1,2,3]Agricultural Research Station, Peddapuram, Kakinada Dist. Acharya N.G. Ranga Agricultural University (ANGRAU), Guntur, Andhra Pradesh

[4,5]ICAR-Indian Institute of Maize Research, PAU Campus, Ludhiana,

RTAAAS/AB/024/248

Maize, often called the "queen of cereals" is the third most important cereal crop in India, following rice and wheat. It plays a significant role in food security, livestock feed and industrial by-products. Its wide adaptability across diverse climates makes it a vital crop grown throughout the year in different regions of India. The productivity of maize is influenced by several factors, including soil quality, weather conditions, genotype selection, planting density and nutrient management. It is well-established that optimal grain yield is dependent on factors like optimum plant density, adequate fertilizer application and varietal selection. Therefore, Field studies were carried out at Agricultural Research Station, Peddapuram, Kakinada District during kharif, 2019 in sandy loam soils to study the effect of varying planting density and nutrient levels on pre release medium maturity maize genotypes. The pre-release maize genotypes were tested at two densities (60 x 20 cm and 50 x 20 cm) and two nutrient levels (100% RDF and 150% RDF). The experiment was laid out in split-split plot design with three replications. The results revealed that the high density planting (50 x 20 cm) recorded higher grain yield (8171 kg ha -1) as compared to low density planting. Among the different nutrient levels tested, 150 % RDF (300- 90-75 kg NPK ha -1) recorded significantly higher grain yield (8151 kg ha -1) over 100 % RDF (200-60-50 kg NPK ha -1). The medium maturity maize genotype INDAM 1122 recorded significantly higher grain yield (8248 kg ha -1), net returns (Rs. 83,780 ha -1) and B:C ratio (2.37). Based on the results, it can be concluded that maize hybrid INDAM 1122 under 50 x 20 cm spacing with 150 % RDF was found good for achieving higher yield and net returns during kharif season in godavari zone of Andhra Pradesh.

Isolation of indigenous isolates of entomopathogenic fungi from insect cadavers

Vinod Kumar Nirmalkar

State bio-control Laboratory, BTC College of Agriculture & Research Station, Sarkanda, Bilaspur,

RTAAAS/AB/024/249

Entomopathogens are naturally occurring organisms, such as bacteria, viruses and fungi for the control of crop pests, which can act as a parasite of insects and kills or seriously disables them. In recent years, microbial pathogens like viruses, bacteria, fungi and protozoa have been recognized for the biological suppression of many insect pests. About 1.5 million species of fungi alone are known to occur worldwide out of which nearly half of the species have been identified. Amongst these, several asexual stages of fungi are associated with insect infection. Isolation of entomopathogenic fungi from insect's cadavers at BTC, College of Agriculture Research Station, (IGKV) Bilaspur in 2018-19 to obtain new indigenous isolates of entomopathogens which are used for further field studies against many insects groups. The collected insect cadavers were isolated on potato dextrose agar (PDA) and Sabouraud maltose agar with yeast (SMYA) plates. Twelve different entomopathogenic fungi were isolated from thirty collected cadavers. Among them ten were identified as isolates of Beauveria bassiana, one species each from Metarhizium anisopliae and Nomuraea rileyi. The entomopathogenic fungi were identified based on their cultural, morphological and key characters. Among the EPF isolated from collected thirty cadavers, 83.33% were B. bassiana, 8.33% Metarhizium anisopliae and Nomuraea rileyi.

"A Review of Plant-Based Ice Cream Formulation: Ingredient Selection, Texture Enhancement, and Consumer Acceptance"

Abhishek R. Ranvare[3,1], Avinash Singh[2], Samadhan Khupase[3], Ganesh D Khule[4]

[1,3,4]Ph.D. Research Scholar, [2]Associate Professor,

[1,3,4]Department of Dairy Technology, Warner College of Dairy Technology (WCDT), Sam Higginbottom University of Agriculture, Technology and Sciences (SHUATS), Prayagraj,

RTAAAS/AB/024/250

Ice cream is a complex food colloid composed of an unfrozen serum phase, ice crystals, fat globules, and air bubbles. The key elements of ice cream are fat, sugar, milk solids excluding fat, stabilizer, and emulsifier. This structure is developed through several manufacturing processes, such as mixing, pasteurization, homogenization, aging, freezing, and hardening. A freeze-concentrated solution containing probiotic organisms, high molecular weight polysaccharides, lactose, glucose, and saccharose makes up the serum phase. During the homogenization process, Proteins and fats are positioned in interfacial gaps to produce the mixture emulsion. The formation of the emulsion and ice crystals during the freezing process consists of the main structural component of the frozen product such as a network of partially coalesced fat surrounding the air bubbles, discontinuous foam, ice crystals, and a continuous, unfrozen aqueous solution Vegan ice creams are typically made from plant-based milk substitutes like almond, coconut, soy, or oat milk. However, despite what consumers may believe, it is evident from the nutritional labels that vegan ice creams cannot be regarded as a healthier option because they frequently have very similar amounts of fat, sugar, and calories overall to traditional recipes. This review aims to cover Plant-based milk alternatives for the formulation of vegan ice cream.

Keywords – Vegan, Plant-based, Milk, Ice cream

Evaluating the Potential of Biochar for Soil Health Improvement

Meena Yadav[1], Paridhi[*], Megha Panwar[1]

[*]B.Sc. Student, Department of Forestry, Doon (PG) College of Agriculture Science

[1]Assistant Professor, Department of Agriculture, Doon (PG) College of Agriculture Science

RTAAAS/AB/024/251

Biochar, a carbon-rich material derived from the pyrolysis of organic biomass, has emerged as a promising amendment for improving soil health and mitigating climate change through carbon sequestration. This study explores the multifaceted role of biochar in enhancing soil's physical, chemical, and biological properties. Incorporating biochar into the soil has been shown to improve water retention, reduce bulk density, and enhance soil aggregation, thereby promoting plant growth in degraded soils. Its high surface area and porous structure facilitate nutrient adsorption, reduce leaching losses, and increase nutrient availability. Biochar is rich in carbon and possesses a high cation exchange capacity (CEC), enabling it to adsorb and retain essential nutrients, reduce nutrient leaching, and improve soil pH in acidic conditions. Furthermore, biochar amendments enhance microbial activity and diversity, which are essential for nutrient cycling and organic matter decomposition, fostering a more resilient soil ecosystem. A significant contribution of biochar is its ability to sequester stable forms of carbon in the soil, serving as a long-term carbon sink and contributing to climate change mitigation. The findings provide valuable insights into the potential of biochar as a sustainable soil amendment and highlight its role in advancing agricultural productivity and environmental sustainability.

"Nutritional importance and health benefits of minor millets: A Mini-Review"

Aditya Lal[1], Bapurao Jadhav[2]

Assistant Professor[1], Research scholar[2]

Vaugh Institute of Agricultural Engineering and Technology,

Sam Higginbottom University of Agriculture, Technology and Sciences.

RTAAAS/AB/024/252

Millets are the group of small seeded grains belonging to poaceae family. They are classified on the two major categories such as major millets and minor millets. The major millet includes sorghum, pearl millet and finger millet, whereas the minor millet includes barnyard millet (Echinochloa species), finger millet (*Eleucine Coracana*), foxtail millet (*Setaria italica*), kodo millet (*Paspalum scrobiculatum*), little millet (*Panicum sumatrense*), guinea millet (*Brachiaria deflexa*), browntop millet (*Urochloa ramose*), teff (*Eragrotis tef*), white fonio (*Digitaria exilis*), proso millet (*Panicum miliaceum*) and job's tears (*Coixlacrima jobi*). Minor millets are richest source of nutrients such as protein (7-13%), carbohydrate (60-70%), fat (1.5-5%) and fiber (2- 7%). In comparison with cereal grains, millets contain lower amount of carbohydrate. Th se millets grain consist of nutracital properties which provide health benefits to human body. These millets are rich in fiber which contributes lower the blood glycemic level. These millets are packed source of phenolic compounds such as tannins and phytates which reduce the risk of cancer. The main health benefit of minor millet is gluten free, which beneficial for the patients of celiac diseases. These review aims to cover nutritional characteristics and major health benefits of minor millet.

Keywords - Minor-Millet, Gluten free, celiac disease, macronutrients.

Comprehensive Extension Strategies Govt. Policies for the Promotion of Natural Farming Successful Cases of Natural Farming

Tanvi[1], Rammehar[2]

[1]Chaudhary Charan Singh Haryana Agricultural University, College of Agriculture, Bawal

[2]Chaudhary Charan Singh Haryana Agricultural University, College of Agriculture, Bawal

RTAAAS/AB/024/253

Natural farming is a method of farming that aims to be in harmony with nature, minimizing the impact of humans and external inputs such as synthetic chemicals, fertilizers, and pesticides. It is based on the belief that soil, plant, and animal health are interconnected and that sustainable agriculture can be achieved by improving natural processes. The principles of natural farming include maintaining soil fertility through organic matter and microbial activity, promoting biodiversity, and focusing on ecosystem health. This approach encourages the use of a combination of compost, mulch, crop rotation, and animals to provide fertilizer and pesticides. It also uses local resources, avoiding the use of genetically modified organisms (GMOs) and synthetic chemicals, reducing the need for external energy sources. It is a traditional agriculture but also incorporates a modern understanding of ecological science. It encourages farmers to care for and adapt to their environment by creating a variety of agriculture that does not rely on chemical products. Development, reducing environmental degradation and improving food security. It is also an alternative to traditional agriculture, which is often associated with environmental damage and poor practices. The main goal of natural agriculture is to create a harmonious relationship between humans and the environment before ecological health exceeds short-term productivity. There are some cases of farmers who did natural farming over conventional farming there are some examples of farmers are given who get more profit than conventional farming. Acharya Dev Vrat, Phool Kumar are some successful cases of Natural farming.

Keywords: organic matter, ecology, crop rotation, productivity.

Studies on Advanced Agricultural Technologies for Climate Resilience

Prince Sharma,

Bsc (Hons.) Final Year

College of Agriculture, Chaudhary Charan Singh Haryana

Agricultural University, Hisar

RTAAAS/AB/024/254

The present study on Impacts of Advanced Agricultural Technologies on Climate Resilience was undertaken in different agro-climatic zones during the period of 2020-2023. Results showed that precision farming systems conserved water use by 35% in semi-arid regions, while wheat and rice yields were enhanced by 10–15% under elevated CO_2 conditions. Genetically engineered drought-tolerant crops sustained yields at severe drought conditions in drought-prone areas with a 35% improvement over traditional varieties. Moreover, sensor-based irrigation systems decreased nitrogen emissions by 15–20%, thus considerably lowering the carbon footprint of agriculture. The technology adoption rate was highest in developed regions at 70–80% but remained below 30% in developing countries, owing to socio-economic constraints. Against this backdrop, the study brings to the fore the premise of localized adaptation strategies and policy interventions to the fore to bridge such disparities.

Keywords: Advanced agricultural technologies, climate resilience, precision farming, drought-resistant crops, nitrogen emissions, sustainable agriculture.

Bhaskar Reddy S[1*]

Division of Genetics, Indian Agricultural Research Institute, New Delhi

RTAAAS/AB/024/255

The current breeding tools employed in food crops are inadequate to meet the projected 60-80% increase in food demand by 2050 for the growing population. Achieving higher rates of genetic gain is a significant challenge for breeders, as the observed genetic improvements in experimental fields are not fully realized in farmers' fields. Moreover, the changing climatic patterns, reduced arable land, and limited water availability pose additional obstacles to ensuring yield stability across diverse environments and closing the yield gap. Genetic gain, defined as the increase in performance achieved through artificial selection, is influenced by several key factors, including the genetic variation in breeding material, heritability of traits of interest, selection intensity, and the time required to complete a breeding cycle. Advancements in modern molecular and genomic approaches, such as high throughput genotyping and phenotyping, speed breeding, double haploid, pan-genomes, genome editing, genomic selection, TILLING, and Eco-TILLING offer promising avenues to unlock the genetic variation and enhance the rate of genetic gain. Next-generation sequencing has enabled the comprehensive sequencing of large germplasm collections in several crops, where field phenotyping has lagged significantly. High throughput phenotyping technologies distinguish stress responses in crops, facilitating shorter breeding cycles. Genomic Selection, using genome-wide markers and genomic estimated breeding values, improves prediction accuracy and shortens breeding cycles, especially when combined with speed breeding. Genome editing techniques, particularly the CRISPR-Cas9 system, enhance crop resistance and agronomic traits. Thus, integrating sequencing, genome editing, GS, speed breeding, and recision phenotyping will significantly impact genetic gain in plant breeding.

Keywords: TILLING, Genetic gain, CRISPR, speed breeding, double haploid

Constraints Faced by The Farmers in Adoption of Integrated Pest Management Practices of Chümoukedima District of Nagaland

Ngangshikokba[1], Pongen[1] and, J. Lomgkumer[1]

Department of Agricultural Extension Education, SAS, Nagaland University, Medziphema

RTAAAS/AB/024/256

The study entitled "Constraints faced by the farmers in adoption of Integrated Pest Management Practices by the farmers of Chümoukedima district of Nagaland" was undertaken to find out the constraints faced by the farmers in adoption of IPM practices. The study was conducted purposively in Chümoukedima district, Dhansiripar block and five villages were selected purposively. Furthermore, 20 farmers from the selected villages were randomly selected, making a sample of 100 respondents. The study revealed that high cost of inputs (seeds and fertilizers) was the major constraint followed by lack of proper irrigation facilities, lack of knowledge about bio control agents and bio-fertilizers, lack of proper training facilities, discouraging the use of chemical pesticides, non-availability of soil testing laboratories near the vicinity and lack of storage facilities. Thus, appropriate measure to tackle the constraints faced by the farmers should be urgently provided by the concerned departments and organizations to effectively increase the rate of adoption of IPM practices by the famers in the study area.

Keywords: Knowledge, IPM, Chümoukedima, Dhansiripar

"Accelerating crop genetic gain through advanced molecular breeding approaches"

Bhaskar Reddy S[1*]

Division of Genetics, Indian Agricultural Research Institute, New Delhi

RTAAAS/AB/024/257

The current breeding tools employed in food crops are inadequate to meet the projected 60-80% increase in food demand by 2050 for the growing population. Achieving higher rates of genetic gain is a significant challenge for breeders, as the observed genetic improvements in experimental fields are not fully realized in farmers' fields. Moreover, the changing climatic patterns, reduced arable land, and limited water availability pose additional obstacles to ensuring yield stability across diverse environments and closing the yield gap. Genetic gain, defined as the increase in performance achieved through artificial selection, is influenced by several key factors, including the genetic variation in breeding material, heritability of traits of interest, selection intensity, and the time required to complete a breeding cycle. Advancements in modern molecular and genomic approaches, such as high throughput genotyping and phenotyping, speed breeding, double haploid, pan-genomes, genome editing, genomic selection, TILLING, and Eco-TILLING offer promising avenues to unlock the genetic variation and enhance the rate of genetic gain. Next-generation sequencing has enabled the comprehensive sequencing of large germplasm collections in several crops, where field phenotyping has lagged significantly. High throughput phenotyping technologies distinguish stress responses in crops, facilitating shorter breeding cycles. Genomic Selection, using genome-wide markers and genomic estimated breeding values, improves prediction accuracy and shortens breeding cycles, especially when combined with speed breeding. Genome editing techniques, particularly the CRISPR-Cas9 system, enhance crop resistance and agronomic traits. Thus, integrating sequencing, genome editing, GS, speed breeding, and precision phenotyping will significantly impact genetic gain in plant breeding.

Keywords: TILLING, Genetic gain, CRISPR, speed breeding, double haploid

Importance And Need of Fish Preservation

Dr. Priti Mishra, Dr. Madhuri Sharma, Mr. Anil kewat

College of Fishery Science, Nanaji Deshmukh Veterinary Science University,

Jabalpur (M.P.)

RTAAAS/AB/024/258

Fish is an excellent food for mankind and is unfortunately highly perishable. To prevent spoilage of fish some form of preservation is necessary. Preservation means keeping the fish, after it has landed, in a condition wholesome and fit for human consumption for a period ranging from days to moths depending upon types of preservation. Fish curing is a traditional preservation method which shall include drying and dehydration, salting. These are traditional as well as cheapest method of preservation, since no expensive technology is used. There are different methods of salting available such as dry salting, wet salting, mono curing pit curing, columbo curing. Salting depends on types of salts also which as solar, brine-evaporated, rock and salt-lake. And method of fish-drying are natural drying, drying on the ground, rack drying and solar drying. The studies indicated that the drying efficiency was varied with the different drying methods in terms of drying rate and storage period of dried fish and its effect on the organoleptic, chemical and microbial indices. In general, all the drying methods gives a high efficiency except natural sun drying.The natural sun drying method gives less efficiency in eliminating microbes, and it also differed whether the fish was salted or unsalted, and this affected the storage periods.

Keywords: Fish spoilage, Drying, Organoleptic

Broccoli: A Potential Crop

Kamal Kumar

Assistant Professor, Department of Agriculture

Sri Guru Teg Bahadur Khalsa College,

Sri Anandpur Sahib District: Rupnagar, Punjab

RTAAAS/AB/024/259

Broccoli (*Brassica oleracea* var. italica) is important exotic vegetable crop. Broccoli belongs to Brassicaceae family. This group includes the crops like Cauliflower, Cabbage, Brussels Sprouts, Savoy cabbage and Knol –Khol of economic importance. Broccoli is an cool season crop and has large green flowering heads which are edible consumable in the form cooked vegetable and salad. The leading broccoli producing states are west Bengal, Odisha, Bihar, Madhya Pradesh, Haryana, Jharkhand and Gujarat. Brassica vegetables have been identified as rich source of anti-oxidants, vitamins, minerals, glucosinolates, carotenoids and polyphenols. Broccoli is a important super food due to the fact as a leading constituent of healthy diet. Broccoli is the rich source of phytochemicals that protect against cancer. Broccoli has Antioxidant , Antiamnesic, Neuroprotective, Anti-Diabetic and AntiInflammatory , Dyslipidemia and hepatic injury Effects, Antiproliferative, Antigenotoxic Effects, Apoptotic role, antiproliferative and Anticancer activity. Broccoli is a potential crop having promising higher economic returns for farmers. Broccoli has exceptional nutritional and health potential, and its plant parts like florets, leaves, stalks, sprouts, and seeds can be developed into useful foods for the prevention and treatment of chronic diseases. Farmers can earn more as the demand of fresh green broccoli market is noticeably higher than the quoted price of processed broccoli.

Keywords: Broccoli, Antiamnesic, Antiproliferative, Apoptotic.

Yield forecasting in maize using the CERES -Maize Crop Simulation model: A comprehensive approach

V. Sujatha[1], M. Srinivas[2], P. Munirathnam[3], K.M. Dakshina Murthy[4],

Ch. Sreenivas[5], M. Ravi Babu[6]

[1]Agricultural Research Station, Peddapuram, [2]DAATTC, Rajamahendravaram, [3]LAM, Guntur,

[4]Agricultural College, Rajamahendravaram, [5]RARS, Maruteru. [6]RARS, Anakapalle

Acharya N.G. Ranga Agricultural University (ANGRAU), Guntur, Andhra Pradesh

RTAAAS/AB/024/260

Accurate yield forecasting is critical for effective agricultural planning and food security, particularly for staple crops like maize (*Zea mays* L.). The CERES- Maize model, a widely recognized crop simulation tool, to predict maize yields under varying environmental and management scenarios. The model simulates the growth and development of maize based on inputs such as weather data, soil characteristics and agronomic practices. Field experiments were conducted across diverse agro-ecological zones to calibrate and validate the CERES-Maize model. Key parameters including phenological development, leaf area index (LAI) and biomass accumulation were analysed during calibration process. The model was run using historical weather data and yield predictions were compared with actual harvest data to assess the model's accuracy. Results indicate that the CERES- Maize model effectively captures the dynamics of maize growth with an overall predictive accuracy of 10-20 %. Sensitivity analysis reveal that temperature and precipitation significantly influence yield outcomes, underscoring the model's utility in evaluating climate change impacts on maize production. By providing reliable yield forecasts, the model can aid farmers and policymakers in optimizing resource allocation, enhancing food security and developing adaptive strategies in the face of climate variability. Future research will focus on refining model parameters to better represent local conditions and integrating advanced techniques, such as machine learning to further enhance forecasting accuracy. Overall, the CERES-Maize model offers a powerful tool for improving yield predictions and fostering sustainable maize production practices.

Enhancing Nutritional Quality: Strategies and Future Perspectives for Iron and Zinc Biofortification in Wheat and Rice

Shalini Saha[1], Megha Panwar[2], Namita[3] and Kajal Srivastava[4]

[1]B. Sc. (Hons.) Agriculture, Doon (P.G.) College of Agriculture Science and Technology,

Camp Road, Selaqui, Dehradun Uttarakhand, India

[2,3,4]Assistant professor, Doon (P.G.) College of Agriculture Science and Technology, Camp

Road, Selaqui, Dehradun Uttarakhand, India

RTAAAS/AB/024/261

Biofortification aims to improve their nutritional quality of Wheat and Rice By raising the iron (Fe) and zinc (Zn) content and combat micronutrient deficiency in a sustainable manner. Iron and Zinc are two essential micronutrients for human health. Deficits in both of these nutrients continue to be a global issue, particularly for mothers and children in underdeveloped nations. Around two billion people worldwide, the majority of whom depend on rice (Oryza sativa) and wheat (Triticum aestivum) as main foods, are deficient in iron and zinc. So it's important to increase the amount of Iron and zinc in conventional crops. Biofortification of crops are a sustainable way to do this. Various factors come into play for doing biofortification of crops. The development of nutritionally enhanced wheat and rice will benefit from an understanding of genetic diversity, genetics, physiology/molecular foundation, and breeding for biofortification and bioavailability for Zinc and Iron. Nanotechnology might contribute to better food quality through biofortification. Because nano-fertilizers are target-specific, have regulated release, and can be stored for extended periods of time, they stop soil runoff and leaching. Apart from nanotechnology, genetic modification strategies also may help in addressing the issue. Mutagenesis, transgenic techniques, and genome editing are the main genetic engineering procedures used as significant biotechnological tools..This abstract deals with importance of biofortification for enhancing micro-nutrient content of conventional crops and strategies adopted in recent years. Futureprospects involve integrating multi-disciplinary approaches, including bioinformatics, precision agriculture, and microbiome research, to optimize biofortification efforts.

Evaluating the Impact of Air Speed on Peripheral Temperature in Indigenous Cows During Heat Stress: An Infrared Thermographic Approach

Neha Rajawat, Babita, Anil Kumar Sudha Saini, Gagan Chawla, Ashutosh A.K. Dang

Animal Physiology Division, ICAR-National Dairy Research Institute, Karnal, Haryana

RTAAAS/AB/024/262

The study assessed the impact of varying wind speeds on the thermoregulatory responses of Sahiwal cows in hot and humid conditions. The Thermal Humidity Index (THI) was significantly higher in summer and hot humid conditions compared to spring, indicating increased thermal stress. Under the current study, Five conditions were evaluated: thermoneutral, control, and low (7.5), moderate (10), and high (35 km/hr) wind speeds using mechanical colling fan. Infrared thermographs reveal that at moderate wind speeds body surface temperature was significantly lower, during summer stress conditions Stagnant wind or lower wind speeds generally increased body temperatures, suggesting higher metabolic activity and physical stress. Core body parts showed greater variability than peripheral parts, highlighting their role in thermoregulation. The study underscores wind speed's importance in modulating thermoregulation in Sahiwal cows during hot humid conditions.

Keywords: Livestock; Hot humid, Indigenous cattle, Tropical climatic conditions

Doubling of Farmers Income Through Integrated Farming Systems

N. Satheeshkumar[1], P.M. Shanmugam[2], S. P. Sangeetha[3], K. Sivasubramanian[4]

S.K. Natarajan[5], T. Parthiban[6], S. Senthilnathan[7] and T. Selvakumar 8

[1,8]Maize Research Station, TNAU, Vagarai

[2,3,4,7]Department of Agronomy, TNAU, Coimbatore

[5]Tapioca and Castor Research Station, TNAU, Yethapur

[6]Agricultural Research Station, TNAU, Kattuthottam

RTAAAS/AB/024/263

Field experiments were conducted during 2022-23 at Maize Research Station, Vagarai to identify the critical constraints for increasing productivity and profitability of small and marginal farmers house holdings and ensure livelihood in farmer's fields. The study was conducted in twelve small and marginal farmers' fields in three villages each of Palani (Ayakudi, Kanakkanpatti and Eramanaickenpatti) and Guziliamparai (Palayam, Karungal and D. Gudalur) blocks in Dindigul district of Tamil Nadu. Bench mark survey was conducted before the start of experiment to know the existing farming systems and availability farm resources of individual farm holdings. The crop + dairy+poulrry and crop+dairy+goat/sheep +poultry were the two farming systems existed in the study area. Integrated Farming Systems interventions implemented in the existing farming systems were adoption of SRI planting in rice, INM and IPDM in maize and groundnut through biofertilzers bio-inoculants and crop boosters, introduction of CNH CO 5 for year round green fodder supply, supplementation of TANUVAS mineral mixture, salt lick ,deworming and kitchen gardening. By implementing suitable interventions in the crop + dairy+poultry farming systems, 55 % higher net income was observed in crop module as compared to bench mark year. From this study, it could be concluded that, the crop+dairy+goat/sheep+poultry farming systems resulted 84 % increased annual net income of Rs 1,70,977/- due to implementation of all the integrated farming systems interventions as compared to bench mark year income of Rs. 93,170/-in the marginal and small farmers holdings.

Keywords: Integrated farming systems, Integrated nutrient management, mineral mixture, green fodder and kitchen garden.

One health approach in Wild animal health: Integrating role of multiple antibiotic resistant E. coli of meat origin in wild animals

M.K. Saini*, L.Kurrey, J Singh*, S.L. Ali*, S. Shakya N.Rawat, C.S.Sannat, H.K.Ratre,

N.E.Gade, B.P.S.Kanwar, P.Kashyap and R.S. Kashyap

*Wildlife Health & Forensic Centre; College of Veterinary Science A.H.

college of Veterinary Science A.H., Anjora

Dau Shri Vasudev Chandrakar Kamdhenu Vishwavidyalaya, Durg (Chhattisgarh)

RTAAAS/AB/024/264

Integration of one health approach into wild animal health and its potential in control of various zoonotic pathogens entering wild ecosystem has been a subject of recent discussion cross the globe. Reducing the prevalence of various antimicrobial-resistant bacteria due to indiscriminate use of antimicrobials in animals of food origin is one of the most potential foci for spread of drug resistance across various food chain system. However, lowest MAR index value in chevon was 0.07 while it was 0.14 in poultry meat samples. Overall prevalence of ESBL producers was 26.66% (32/120) in meat samples under study. Highest prevalence of presumptive ESBL producer by phenotypic method was observed in MBZ (30%) while it was lowest in NVZ (22.5%). Highest prevalence of presumptive ESBL producer by phenotypic method was observed in poultry (28.33%) while it was lowest in chevon (25%) samples under study. In the present study, a total of 23 isolates were observed to be harbour ESBL producing genes, bla TEM and bla CTX-M . Highest prevalence of ESBL producing E.coli by molecular method was observed in MBZ (27.5%) while it was lowest in KPZ (15%). Highest prevalence of ESBL producing E.coli by molecular method was observed in poultry (21.66%) while it was lowest in chevon (18.33%). The present study hence, provides an alarming situation in near future where wild animals could also act as potential source of transmission of MAR E. coli of food origin across various related animal and human food chain system which needs to be addressed globally as an integrated one health approach for better health of human and animals.

"Aquaponics a sustainable water-based production System"

Aascharya Pandey*, Saket Mishra Deepak Lal*****

Ph.D. Scholar, Associate Professor &Amp; Assistant Professor

Department of Horticulture,

Sam Higginbottom University of Agriculture Technology and Sciences

RTAAAS/AB/024/265

Aquaponics is defined as the combination of hydroponics and recirculating aquaculture system is also played a major role in minimizing the negative environmental impacts resulted from intensive fish farming and crop production. It is absolutely a natural well- disposed creation framework because of its full reusing possibility of waste and supplements. It is a cooperative reconciliation of two kind of food creation disciplines inside a shut recycling framework for example (I) Aquaponics (the act of fish cultivating); and (ii) hydroponics, the development of plants in water without soil. Depending on the specific conditions, aquaponics can provide a sustainable food source in low and medium income countries, especially where climate conditions are favourable. Aquaponics has advantageous decreases for a few natural effects related with food creation. Other than this it is one of the complicated framework however it manages three unique ideas of fish, plant and microorganism all in all. So the water quality administration angles are thought about on need premise especially the pH, Supplement and phosphorous substance of water during this kind of culture practice. Generally the varieties of these boundaries might prompt mass killing of fish, plant and helpful organisms together. Also certain key monetary focuses should be concentrated on make Aquaponics framework manageable and productive for example the general speculation cost, Yearly functional expense and reasonable assessments of market costs and so on. Taking into account the food creation and populace utilization example of our country, fostering the imaginative hydroponics strategies in a manageable manner is required. In this specific circumstance, the Aquaponics framework assumed a significant part towards natural, social and monetary supportability which prompts in general maintainability

Keywords: Aquaponics, Sustainable, Fish, plants, water based production,

In Vitro Propagation of Gentiana kurroo: A Tissue Culture Approach for Enhanced Medicinal Plant Production

Susom Chakraborty[1], Megha Panwar[2], Meena Yadav[3] and Kajal Srivastava[4]

[1]B. Sc. (Hons.) Agriculture, Doon (P.G.) College of Agriculture Science and Technology, Camp Road, Selaqui, Dehradun, Uttarakhand, India

[2,3,4]Assistant professor, Doon (P.G.) College of Agriculture Science and Technology, Camp Road, Selaqui, Dehradun, Uttarakhand, India

RTAAAS/AB/024/266

Native to the Himalayan region, Gentiana kurroo is a critically endangered medicinal plant that is prized for its therapeutic qualities, especially its ability to treat liver and intestinal issues. However, the species' wild populations are drastically declining as a result of overharvesting and habitat loss. Several tissue culture methods have been investigated as efficient ways to produce a lot of plants, such as nodal segment culture, shoot multiplication, callus induction, and rooting. The type of explant chosen, the growth medium's composition, and the use of different plant growth regulators (PGRs), like auxins and cytokinins, are important variables that affect effective propagation. In order to maximize shoot growth and minimize genetic variety and somaclonal mutations, it is imperative to optimize these parameters. Additionally, the biochemical examination of plantlets cultivated in vitro has demonstrated that they retain vital secondary metabolites, like gentiopicroside, which are necessary to the plant's therapeutic effectiveness. Even with great advancements, there are still issues in standardizing procedures across various geographical areas and guaranteeing high plantlet survival rates during acclimatization. Furthermore, continuous study is needed to improve tissue culture conditions, increase rooting efficiency, and lower costs for the commercial-scale propagation of G. kurroo. To support both its conservation and the increasing demand for its medical uses, tissue culture provides a practical and sustainable means of mass propagating G. kurroo. In addition to highlighting the value of tissue culture in the preservation of G. kurroo and related medicinal plants, this review offers insights into the future paths of plant biotechnology research for the conservation of medicinal species and sustainable use.

Effectiveness of rubber mats in farrowing pens to minimise piglet injuries and mortality

Doni Jini*, Joken Bam, Rajesh A. Alone and Thejangulie Angami

RTAAAS/AB/024/267

This study investigated the impact of rubber mats on physical injuries and mortality among newborn Yorkshire piglets during winter conditions. The study was conducted at the pig farm of ICAR Research Farm, Gori, involving 48 piglets from six sows housed in pens with either rubber mats or concrete floors. The piglets were born from December to February 2022. The mean temperature during December 2022 ranged between 6.7°C and 22.3°C. Farrowing pens were made of concrete and measured 5×2.7 m, with a covered area of 2×2.3 m. Four out of six pens were used as it for farrowing, with the provision of straws for bedding and two featured rubber mats (7×4 ft, 23 mm thickness) in the covered sections. After 30 days of birth among 48 piglets with (mean litter size 8.2±1.09) no mortality was observed in pens with rubber mats, compared to a 12.5% mortality rate in concrete-floor pens. Piglets housed on rubber mats exhibited significantly lower injury scores for the sole, soft heel, and coronary band than those on concrete floors. Injury assessments at 7, 14, and 21 days revealed reduced injury scores for the sole, soft heel, and coronary band. Sole injury was more prominent in concrete (56%) compared to 32 per cent in rubber mat. Skin abrasions were also less frequent on rubber mats (54.16%) than concrete (87.50%). These findings show the effectiveness of rubber mats in providing a practical solution to improve piglet health and reduce winter-related mortality.

Keywords: injury, mortality, piglets, rubber mat, welfare

Impact of Silica Application on Rice Growth, Yield, and Stress Resistance

Neha Kumari Jha[1], Megha Panwar[2] and Namita[3]

[1]B. Sc. (Hons.) Agriculture, Doon (P.G.) College of Agriculture Science and Technology,

Camp Road, Selaqui, Dehradun, Uttarakhand, India

[2,3]Assistant professor, Doon (P.G.) College of Agriculture Science and Technology, Camp

Road, Selaqui, Dehradun, Uttarakhand, India

RTAAAS/AB/024/268

The use of silica (Si) in rice farming has drawn more attention recently because of its ability to boost tolerance to environmental challenges, increase output, and improve rice growth. Although it is not categorized as a nutrient, silica is a necessary component for many plants and helps to promote structural integrity and tolerance to a variety of abiotic stressors, including heavy metal toxicity, salt, and drought. The benefits of silica supplementation on rice plants are reviewed in this abstract, with an emphasis on how it enhances agronomic traits, stress resilience, and physiological performance. It has been demonstrated that adding silica to rice improves photosynthetic efficiency, leaf area, and root development. Furthermore, the plant's cell wall structure is strengthened by Si supplementation, which results in better mechanical support and less lodging. Grain size, number of grains per panicle, and total biomass all rise as a result of these advantages. Better growth and production are further facilitated by its role in enhancing nutrient and water intake. Moreover, silica is essential for reducing environmental stress. Si has been shown to preserve cellular integrity, lessen oxidative stress, and increase antioxidant activity in drought and salinity- prone environments, all of which improve plant tolerance. In order to cope with osmotic stress, Si also aids in the regulation of ion homeostasis, water retention, and stomatal conductance. Furthermore, silica treatment has demonstrated promise in reducing heavy metal toxicity, offering an extra benefit in areas where soil contamination exists. This analysis suggests that by encouraging development, increasing output, and improving stress tolerance, silica application offers substantial advantages for rice cultivation. Its application may be a useful tactic to lessen the negative consequences of climate change and enhance rice sustainability under various environmental circumstances. To maximize the benefits, more research is advised to optimize Si application rates and techniques.

Impact of conventional and conservation tillage practices on nutrient dynamics of soil

Meena Yadav[1], Jitumoni Patir*, Kajal Srivastava[1], Namita Rani[1]

* B.Sc. Student, Department of Forestry, Doon (PG)

College of Agriculture Science Technology, Dehradun.

[1]Assistant Professor, Department of Agriculture,

Doon (PG) College of Agriculture Science Technology, Dehradun

RTAAAS/AB/024/269

Tillage practices play a crucial role in influencing soil nutrient dynamics, affecting nutrient availability, cycling, and retention. Numerous studies have examined the impact of conventional tillage (CT) and conservation tillage (CT) practices on soil nutrient dynamics across different soil types and climatic conditions. Conventional tillage, which involves intensive soil disturbance, was shown to promote nutrient mineralization by exposing organic matter to microbial decomposition. However, this practice often led to increased nutrient leaching, soil erosion, and loss of soil organic matter, particularly in regions with high rainfall or sandy soils. In contrast, conservation tillage, which minimizes soil disturbance and promotes surface residue retention, was found to enhance soil structure, improve water retention, and reduce erosion. This practice improved nutrient cycling by fostering more stable organic matter content and encouraging a diverse soil microbiome, which in turn enhanced nutrient availability and retention. Additionally, conservation tillage increased the efficiency of applied fertilizers, reduced nutrient runoff, and promoted long-term soil fertility. The findings suggested that conservation tillage practices offered advantages in maintaining or improving soil nutrient dynamics compared to conventional tillage, providing a more sustainable approach to nutrient management in agriculture. These findings underscored the importance of choosing appropriate tillage practices to optimize soil fertility and promote sustainable agricultural systems.

Effect of nutrient and weed management on growth, yield and nutrient uptake of field pea [*Pisum sativum* L. var. arvense]

Jitendra Kumar

Ph.D. Research Scholar,

Department of Agronomy,

R.B.S. College, Bichpuri, Agra, Uttar Pradesh, India

RTAAAS/AB/024/270

Pulses are important for the nutritional security point of view of the cereal based vegetarian diet of large scale of country. India is the largest producer, consumer and importer of pulses in the world. It has been projected those 32 million tonnes of total pulse requirement for the burgeoning population of India, which will grow to 1.69 billion by 2050. To attain up to this level an annual growth rate of 2.2% is required. The demand for pulses continues to grow at 2.8% per annum Although challenges are diverse including climate changing scenario, decreasing land and water resources, this target is not unattainable. Increasing the average productivity of pulses to 1200 kg ha -1 and bringing an additional area of about 3.5 million hectare under pulses cultivation will be a concrete step in this direction. In order to study the effect of different nutrient and weed management practices a field experiment, entitled "Effect of Nutrient and Weed management on growth, yield and nutrient uptake of field pea (Pisum sativum L. var. arvense)" was conducted at the Agricultural Research Farm (Department of Agronomy), Raja Balwant Singh College, Bichpuri (Agra) during Rabi seasons of 2021-22 and 2022-23 with the objectives, to study the effect of nutrient management on yield and quality of field pea, to find out the suitable nutrient and weed management for field pea and to study the economic feasibility of the treatments. Experiment was laid out using two factor viz., main plot treatments (4): NM 0 -Control, NM 1 -100% RDF (20:40:20 NPK kg ha -1), NM 2 -75% RDF + 2 t FYM ha -1 , NM 3 -75% RDF + 2 t FYM ha -1 + Rhizobium + PSB and sub plot treatments (5): WM 0 -Unweeded, WM 1 -Weed free, WM 2 -Pendimethalin 30% EC @ 1.0 kg a.i. ha -1 as PE + 1 Hand weeding at 30 DAS, WM 3 -Imazethapyr 10% SL @ 25 ml a.i. ha -1 as PoE at 15-20 DAS, WM 5 -Quizalofop ethyl 5% EC @ 75 g a.i. ha -1 as PoE at 10-15 DAS. The treatments were replicated thrice and laid out under split plot design (SPD). Highest per plant studies and yield attributes viz., number of plants running metre -1 , number of pods plant -1

, number of grains pod -1 , seed weight (g), shelling percent and number of pods plant -1 , weight of pods plant -1 (g), length of pods plant -1 (cm), number of grains plant -1 , biological yield plant -1 (g), grain yield plant -1 (g) and straw yield plant -1 (g) of field pea has been achieved with the application of 75% RDF + 2 t FYM ha -1 + Rhizobium + PSB with weed control using pendimethalin 30% EC @ 1.0 kg a.i. ha -1 as PE + 1 Hand weeding at 30 DAS during first year, second year and pooled respectively. The data pertaining to the qualitative studies viz., nutrient content (N P K %), protein (%) and protein yield (kg ha -1) in grain and straw, nutrient uptake (N P K kg ha -1) by grain and straw are presented in table 4 to 7. The data related to weed studies viz., weed density of broad leaved weeds (no. m -2), weed density of grassy weeds (no. m -2), weed density of sedges (no. m -2), total weed density (no. m -2), number of weed species (m -2), fresh & dry weight of weeds (g m -2) and weed control efficiency (WCE %) are presented in tables from 8 to 12 during both the year of experimentation. Highest productivity of field pea have been achieved with the application of 75% RDF + 2 t FYM ha -1 + Rhizobium + PSB with weed control using pendimethalin 30% EC @ 1.0 kg a.i. ha -1 as PE + 1 Hand weeding at 30 DAS and the maximum net returns was fetched when nutrient management was done by application of 75% RDF + 2 t FYM ha -1 + Rhizobium + PSB and weeds were controlled with pendimethalin 30% EC @ 1.0 kg a.i. ha -1 as PE + 1 Hand weeding at 30 DAS. But, Maximum B: C ratio was fetched when nutrient management was done by application of 75% RDF + 2 t FYM ha -1 + Rhizobium + PSB, (2.06, 2.27 and 2.16) and weeds were controlled by Imazethapyr 10% SL @ 25 ml a.i. ha -1 as PoE at 15-20 DAS, (2.16, 2.36 and 2.26) during first year, second year and pooled respectively.

Genetic variability analysis in chickpea (*Cicer arietinum* L.) genotypes under normal and late sown conditions

***[1]Zafar Imam, [1]Rafat Sultana, [1]Rabiya parveen, [1]Mankesh Kumar, [2]Digvijay Singh and [3]Swapnil**

[1]Department of Genetics and Plant Breeding, Bihar Agricultural University, Sabour,

[2]Department of Genetics and Plant Breeding, Narayan Institute of Agricultural Sciences, Gopal Narayan Singh University, Jamuhar, Sasaram, India,

[3]Department of Genetics and Plant Breeding, Centurion University of Technology and Management, Paralakhemundi, India

RTAAAS/AB/024/271

The increasing threat of climatological extremes including very high temperatures might lead to catastrophic loss of chickpea productivity and result in wide spread dearth particularly in the area where rice is harvested late and farmers' wants to grow chickpea as a next crop. The overall population mean of these traits were higher in chickpea genotypes grown under non-stressed conditions in comparison to those grown under stressed condition. The trait-wise difference between phenotypic and genotypic coefficient of variation (GCV) was very low. However, the genotypic coefficient of variation was higher (>20) for some of the traits studied such as average number of filled pods per plant, average number of pods per plant, number of secondary branches per plant, seed index, and chlorophyll content. 3. A higher heritability (bs) i.e. >70 was observed for seed index (97.37 %), germination percentage (96.71 %), average number of filled pods per plant (95.76 %), average number of pods per plant (94.25 %), canopy temperature at pod filling stage (78.24 %), number of secondary branches per plant (92.63 %), chlorophyll content (90.46 %), number of primary branches per plant (89.02 %), and grain yield (86.77 %) for genotypes grown under non-stressed conditions. Alternatively, a higher heritability was observed for number of secondary branches per plant (97.16 %), seed index (97.04 %), average number of filled pods per plant (96.81 %), average number of pods per plant (95.79 %), germination (95.51 %), chlorophyll content (94.27 %) and grain yield (93.36 %) for genotypes grown under heat-stressed conditions. A high heritability along with high genetic advance as per cent of mean was observed for germination percentage, number of secondary branches per plant, chlorophyll content, average number of pods per plant, average number of filled pods per plant, seed index, and grain yield for plants grown under both conditions. However, a high heritability along with high mean genetic advance for number of primary branches per plant was observed only for plants grown under timely sown condition.

Keywords; Chickpea, Heritability, Normal and late sowing, GCV, PCV

Association of IGFBP-2 gene polymorphism with economic traits in Large White Yorkshire pigs

Rohit Solanki*[1], S.S. Dhaka[2], Manoj Kumar[2], Poonam Ratwan[2], Mohit Singh[2] and Sunil Kumar[2]
[1]Assist. Prof., Department of Animal Genetics and Breeding, SGVC,
Tantia University, Sri Ganganagar
[2]Department of Animal Genetics and Breeding, COVS, LUVAS, Hisar

RTAAAS/AB/024/272

Insulin like growth factor binding protein-2 (IGFBP-2) gene regulates embryonic development by inhibiting action of Insulin like growth factor and is located on chromosome 15 in pigs. Therefore, primary aim of present study was to explore the genetic variability and its association with economic traits in Large White Yorkshire pigs by screening 245 bp in intron 2 region of IGFBP-2 gene by polymerase chain reaction-restriction fragment length polymorphism (PCR-RFLP) method. The economic traits studied were age at first farrowing (days), weight of sow at first farrowing (kg), litter size at birth, number of piglets born alive, litter weight at birth (kg) and number of teats. Blood samples from 148 pigs distributed in different villages of Hisar under DST-SEED project were used. Amplified PCR products were digested by using restriction endonuclease enzyme *Msp*1. Two types of genotypes, viz. CC (190 bp + 55 bp) and CT (245 bp + 190 bp + 55 bp) were observed having 89.19% and 10.81% frequencies, respectively. Allele frequencies of C and T alleles were 0.945 and 0.055, respectively. Results of Chi-squares test showed that targeted locus of IGFBP-2 gene was in Hardy-Weinberg equilibrium in screened pig population. CT genotyped animals had significantly higher litter size at birth (8.83 ± 0.46) and litter weight at birth (9.98 ± 0.42) as compared to homozygous CC genotyped pigs. A total of 13 samples of intron 2 region of IGFBP-2 gene were sequenced and on comparison of sequencing results with reference sequence of Duroc cross (BV727778), one SNP was found at g. 278 T>C locus and there was change in nucleotide at one position i.e. g. 171 A>G (Transition). In conclusion, for the targeted region of IGFBP-2 gene, CT genotyped pigs should be propagated in future for getting higher litter size and litter weight at birth.

Antifungal Efficacy of Some Plant Extracts Against Alternaria Leaf Spot of Mustard

Kheto K Achumi[1]

[1]Department of Plant Pathology, School of Agricultural Sciences, Nagaland

University, Medziphema Campus,

RTAAAS/AB/024/273

Alternaria leaf spot caused by Alternaria brassicae is the most common and destructive fungal disease of Indian mustard. In the investigation twenty plant extracts were evaluated under in vitro condition at 5%, 10% and 15% concentrations respectively against *Alternaria brassicae*. In in vitro test the result indicated that the minimum growth inhibition (65.01%) @ 15% was rendered with Mechinga fruit extract followed by Eucalyptus leaf extract (63.38%), Neem leaf extract (60.31%), Sky flower leaf extract (64.12%), Onion bulb extracts (63.20%) and Chilli fruit extract (59.85%) which were further considered for evaluation under in vivo condition. Alternaria leaf spot, caused by *Alternaria brassicae*, is a significant fungal disease affecting mustard (*Brassica juncea*), leading to considerable yield losses. The excessive use of synthetic fungicides to manage this disease raises concerns regarding environmental safety, pathogen resistance, and human health. This study evaluates the antifungal efficacy of selected plant extracts against A. brassicae to explore sustainable disease management strategies. Aqueous and methanolic extracts of neem (*Azadirachta indica*), garlic (*Allium sativum*), tulsi (*Ocimum sanctum*), and ginger (*Zingiber officinale*) were tested *in vitro* for their inhibitory effects on fungal growth using the poisoned food technique. Results revealed that garlic extract exhibited the highest antifungal activity, significantly reducing fungal growth, followed by neem and tulsi extracts. Ginger extract showed moderate efficacy. Phytochemical analysis indicated the presence of bioactive compounds such as alkaloids, flavonoids, and phenols, contributing to the antifungal properties of these plants. In field trials, foliar sprays of neem and garlic extracts reduced disease severity and improved plant health. The findings suggest that plant-based antifungal agents could be effective, eco-friendly alternatives for managing Alternaria leaf spot in mustard. Further research is recommended to optimize application methods and explore the synergistic effects of combined extracts for enhanced disease control.

Keywords: Indian mustard, Alternaria brassicae, plant extract

Optimizing soil health and productivity with subsurface drip irrigation

Varsha Rattan 1 and S.K Sandal 2

RTAAAS/AB/024/274

Water is a critical yet finite resource, especially in countries like India, which, despite housing 17% of the global population, has only 2.4% of the land and 4% of the world's water resources. The rapid growth of population and industrialization has placed immense pressure on these limited resources, making the efficient use of water vital for ensuring food security and sustainable agriculture. Technologies that optimize water use, such as drip irrigation, have become essential. Drip irrigation, particularly subsurface drip irrigation (SDI), offers a highly efficient solution for minimizing water wastage. SDI is a low-pressure system that applies water directly below the soil surface, eliminating issues typical of surface irrigation, such as evaporation, ponding and soil erosion. By delivering water directly to the root zone, SDI improves water use efficiency and significantly reduces surface runoff. In addition to conserving water, SDI enhances crop productivity by ensuring that water and nutrients are delivered precisely when and where they are needed. When combined with fertigation, the practice of applying fertilizers through the irrigation system, SDI optimizes nutrient uptake, reduces nutrient leaching and improves plant growth. This combination allows for more effective use of water and nutrients, which leads to healthier crops and higher yields while minimizing environmental impact. The controlled, efficient application of both water and nutrients helps maximize crop yields while minimizing waste. Moreover, SDI improves the physical, chemical and biological properties of soil by maintaining consistent moisture levels throughout the growing season. This promotes better soil structure, reduces compaction and enhances microbial activity, which in turn supports stronger and more resilient plants. With healthier soil and more efficient water use, agricultural productivity is significantly boosted. By optimizing water and nutrient use, SDI also contributes to reducing water wastage, expanding the irrigated area and ensuring that agricultural systems remain sustainable in the face of growing water scarcity. Ultimately, SDI offers a comprehensive and sustainable solution to water scarcity, optimizing water use, increasing crop yields, and promoting environmental sustainability for future generations.

Keywords: crop; drip irrigation; nutrient; soil; water; yield

Women at the Core of livestock Management: Need of financial and technological empowerment

Dr. Sangya Singh1, Dr. Poonam Tewari2 and Dr. Seema Kwatra3

Young Professional-II, Deptt of Resource Management and Consumer Science, G.B.Pant University of

Junior Scientist, Deptt. Of Extension and Communication Management, G.B.Pant University of Agri and Tech,

Professor, Deptt. Of Resource Management and Consumer Science, G.B.Pant University of Agri and Tech, Pantnagar

RTAAAS/AB/024/275

Livestock is an important source of economic activity in the agricultural sector contributing a major portion of GDP in India and improving socio-economic conditions of rural families. Hill women play an important role in livestock management activities besides fulfilling their responsibility in farming and household activities. Data collected from 600 farm families of hill regions of Uttarakhand reveals that hill women predominantly manage regular livestock management activities, with more than 50% of hill women's independent involvement in activates such as cleaning sheds, washing animals, fodder harvesting collection, fodder transportation and, fodder chaffing. In contrast, men's independent involvement was negligible across these regular livestock management activities. Health care activities including vaccination, care of newborns, pre-post-natal management and, managing sick animals were performed jointly by men and women. Marketing activities such as selling of milk, purchasing & selling of animals, purchase of fodder and, insurance of animals also exhibit high joint participation of women and men, though obtaining and repayment of loans was predominantly handled by men. Decision-making follows a similar pattern, with women often taking the lead, either independently or jointly with men. The study highlights the significant role of hill women in livestock management while acknowledging the collaborative nature of many activities, especially in health care and marketing. Since women bear more role and responsibility of livestock management, there is need to empower rural women to increase their access over finances, technology, market and extension services in order to make livestock rearing a powerful sector of economic growth of the nation. Keywords: livestock management, gender roles, decision-making, empowerment.

Cassia tora: An alternate host for offseason survival of tobacco caterpillar, *Spodoptera litura* (Fabricius, 1775).

Sadashiva Tippimath[a*], Balaji Nayak M[b], Srivijay Malipatil[c] and Chidananda M. H[b]

[a*] Department of Entomology, Keladi Shivapppa Nayaka University of Agricultural and Horticultural Science

[b] Department of Agricultural Entomology, UAS, GKVK, Bengaluru, India.

[c] Department of Genetics and Plant Breeding, Keladi Shivapppa Nayaka University of Agricultural and Horticultural Science, Shivamogga

RTAAAS/AB/024/276

Spodoptera litura (Fabricius, 1775) is a serious polyphagous pest that causes serious damage to various crops like tobacco, cotton, cabbage, etc. in Asia and other Indian subcontinents. Depletion of major host plants may lead to adverse effects on the alternate host plants. During the survey, it was observed that *S. litura* larvae were feeding on weed species, *i.e., Cassia tora* brought to the laboratory and reared on the weed host up to F1 generation. Larval, prepupal, and pupal weights were compared with populations fed on common hosts and on *C. tora*. Among the three hosts, larvae fed on *C. tora* had a higher larval weight (0.825 mg) and longer larval period compared to the other two hosts. No differences were observed in prepupal and pupal (male and female) weight. Percent pupation was higher in castor and tobacco fed larvae, *i.e.,* 100 % and 96.67% respectively, and *C. tora* recorded the lowest percent pupation (20%). Adult emergence rate was found to be non-significant on castor and tobacco fed larvae and the lowest rate of adult emergence was observed in *C. tora* fed larvae (18%). In the feeding reconfirmation study, after mating, egg masses were collected and incubated for hatching. Later, newly hatched larvae were released on the young succulent leaves of *C. tora*. Observed that most of the hatched instars were started feeding on *C. tora*. Therefore, the feeding reconfirmation study confirmed that, not only later instars, early instars of *S. litura* can also feed and complete its life cycle on a weed host, i.e., *C. tora*. Feeding of late instars of *S. litura* in fields and newly hatched instars in laboratories confirms that *S. litura* uses *C. tora* as an alternate host during off-season survival and completes its life cycle. Feeding of *S. litura* larvae on *C. tora* plants during off-season may regulate its protein level in order to avoid forthcoming stress and buildup of proteins responsive for its immunity. So, further detailed study on the insecticidal activity of *C. tora*, the effect of *C. tora* on the different growth stages of *S. litura* and the adoption of proteins responsible for avoiding forthcoming stress, immunity buildup and detoxification mechanisms of *S. litura* is needed.

Emerging trends in sustainable organic vegetable production

Richa

Department of vegetable science, Dr YS Parmar University of Horticulture and Forestry

RTAAAS/AB/024/277

In recent years, there has been an increasing demand for organic vegetables because of their sensory qualities, higher nutritional value and the decreased risk of harmful chemical residues. To overcome the limitations and challenges of organic farming, it is crucial to blend traditional organic practices with novel innovative technologies. Innovative methods and new approaches are driving sustainable farming trends, boosting agricultural productivity, and improving the quality of life for many farmers in an environment friendly manner. Across the globe, researchers are actively developing cultivars specifically suited for organic agriculture. These cultivars may either be organic heterogeneous plant material or organic varieties tailored to withstand abiotic and biotic stresses. Meanwhile, the use of biofertilizers and biostimulants is gaining prominence. These products enhance plant nutrition processes, leading to better nutrient utilization, increased tolerance to stress, and improved nutrient quality and availability in the rhizosphere. Commonly used biofertilizers and biostimulants include those derived from algae extracts, humic and fulvic acids (obtained from crop waste), plant extracts and functional microorganisms. By offsetting excess carbon dioxide, the traditional agricultural techniques such as crop rotation, intercropping and use of cover crops help combat climate change. These techniques, combined with the rising use of auxiliary fauna are like secret weapons for boosting biodiversity in various farming systems. The primary objective is to establish resilient and sustainable agroecosystems capable of withstanding various challenges. Additionally, emerging plant-derived nanovesicles (PDNVs) have garnered attention. These naturally occurring carriers transport active biomolecules and antioxidants directly to plants. Notably, PDNVs from organic agriculture exhibit elevated antioxidant levels compared to their conventional counterparts. Organic vegetable production offers significant potential for healthier and more eco-friendly agriculture. By tackling challenges and striving for sustainable solutions, organic farmers can help create a future filled with nutritious, high-quality vegetables while supporting the well-being of our planet and communities.

Unlocking the Potential of Garcinia Genus: Bioactive Compounds and Value-Added Applications

Shephali S. Surve[1], R.C. Gajbhiye[2], Y.S. Saitwal[3] and S.B. Thorat[4]

[1]Ph.D. Scholar, Department of Plantation, Spices, Medicinal and Aromatic Crops,

College of Horticulture, D. B. S. K. K. V., Dapoli

[2]Professor (CAS), College of Horticulture, Dapoli, D. B. S. K. K. V., Dapoli

[3]Assistant Professor, Department of Vegetable Science,

College of Horticulture, D. B. S. K. K. V., Dapoli

[4]Assistant Professor, Department of Plantation, Spices, Medicinal and Aromatic

Crops, College of Horticulture, D. B. S. K. K. V., Dapoli

RTAAAS/AB/024/278

The Garcinia genus, which includes fruits like mangosteen, kokum, Malabar tamarind and yellow mangosteen, comprises tropical fruits rich in nutrients, minerals, vitamins and dietary fiber. These fruits are also abundant in bioactive compounds such as xanthones, benzophenones, hydroxycitric acid and anthocyanin, which has shown potential health benefits due to their antioxidant, anti-inflammatory, anticancer, antimicrobial, antiulcer, and weight-management properties. Their bioactive extracts are promising candidates for pharmaceutical and nutraceuticals applications. Particularly, Garcinia indica shows significant biochemical potential, with by- products like HCA, garcinol and kokum oil widely utilized in pharmaceuticals and cosmetics. Kokum oil, valued for its demulcent and astringent qualities, is in demand for producing ointments, face creams, and lipsticks. The properties and is used as a natural dye, potentially beneficial for the textile industry due to its biodegradability and non-toxicity. These antioxidants have healing properties which heal cells damaged by free radicals, slow down aging and ward off degenerative diseases and physical and mental deterioration. This comprehensive utilization supports value addition for Garcinia farmers, enhancing income opportunities and highlighting the need for further development of commercial plantations, value-added products and processing techniques. Continued research and technological advances could enhance global demand, particularly benefiting Indian cultivators and the agricultural economy.

Keywords: Garcinia, Bioactive compounds, Nutraceuticals, Pharmaceuticals

Integrated nutrient management effect on quality parameters of onion

Madhvi[1], Deepa Sharma[2], Dharminder Kumar[3] and Aanchal Chauhan[4]

Ph D Student[1], Senior Scientist[2], Associate Professor[3] and Assistant

Professor[4], Department of Vegetable Science,

Dr YS Parmar University of Horticulture and Forestry, Nauni Solan (HP)

RTAAAS/AB/024/279

The experiment was laid out in randomized block design with three replications comprising of nine treatments (T 1 :Absolute control, T 2 :Recommended dose of FYM (250 q/ ha) and NPK (120 Kg N, 80 Kg P and 60 Kg K/ ha) (Control), T 3 :Recommended FYM (250 q/ ha) as basal dose at the time of field preparation + 50% RDF of NPK + Ghanjivamrit (250 kg/ ha) at 20 days interval from transplanting, T 4 :Recommended FYM (250 q/ ha) as basal dose at the time of field preparation + 50% RDF of NPK + Panchagavya @ 3% at 20 days interval from transplanting, T 5 : Recommended Sheep manure (190 q/ ha) as basal dose at the time of field preparation + 50% RDF of NPK + Ghanjivamrit (250 kg/ ha) at 20 days interval from transplanting, T 6 : Recommended Sheep manure (190 q/ ha) as basal dose at the time of field preparation + 50% RDF of NPK + Panchagavya @ 3% at 20 days interval from transplanting, T 7 : 50% Recommended FYM (125 q/ ha) + Sheep manure (95 q/ ha) as basal dose at the time of field preparation + 50% RDF of NPK + Ghanjivamrit (250 kg/ ha) at 20 days interval from transplanting, T 8 : 50% Recommended FYM (125 q/ ha) + Sheep manure (95 q/ ha) as basal dose at the time of field preparation + 50% RDF of NPK + Panchagavya @ 3% at 20 days interval from transplanting, T 9 : Ghanjivamrit (250 kg/ ha) + Panchagavya @ 3% (at 10 days interval from transplanting) with a plot size 2 × 2 m 2 and plant spacing 15 × 10 cm. Results revealed that highest TSS (13.67 °B) and dry matter (14.23%) content was found in treatment T 8 whereas phenol content (25.33 GAE mg/100ml) in treatment T 6 . Keywords: Ghanjivamrit, Onion, Panchagavya, Phenol, TSS

Digital marketplaces and blockchain in Agri-supply chain

Kapadiya Ekata

College of Horticulture, Junagadh Agricultural University, Junagadh, Gujrat

RTAAAS/AB/024/280

The agricultural supply chain is essential yet often delayed by inefficiencies, lack of transparency, and high operational costs. Digital marketplaces and blockchain technology present innovative solutions to enhance the efficiency, transparency, and profitability of the Agri-supply chain. Digital marketplaces serve as platforms that connect farmers, suppliers, and buyers, enabling direct transactions and offering benefits such as broader market access, real-time price discovery, and a reduction in intermediaries, thereby increasing farmer profits and lowering consumer prices. Blockchain, a decentralized and secure ledger technology, provides enhanced traceability, transparency, and secure data storage, improving product quality assurance, reducing fraud, and fostering trust among stakeholders. Interactions between digital marketplaces and blockchain can be realized through the use of smart contracts, data integrity, and secure information sharing, which further strengthens supply chain processes. Case studies like IBM Food Trust, Agri Digital, and VeChain highlight the practical applications of these technologies, demonstrating their ability to improve traceability, verify product authenticity, and streamline payments. Together, these technologies hold the potential to transform the agricultural supply chain by driving efficiency, reducing costs, and enhancing transparency, ultimately benefiting all stakeholders from farmers to consumers.

Role of plant growth regulators at different concentration on Brinjal production under hill region of Uttarakhand

Gargi Goswami[1], Varsha Pant[2], S.C. Pant[3] and Manju Negi[4]

[1,3,4]Assistant Professor, College of Horticulture, VCSGUUHF, Bharsar, Uttarakhand.

[2]AAO, Uttarakhand.

RTAAAS/AB/024/281

A field experiment was conducted during warm season of the year 2022 at Vegetable Research Block of College of Horticulture at VCSGUUHF, Bharsar (Uttarakhand) to study the role of plant growth regulators at different concentration on Brinjal production under hill region of Uttarakhand. The experiment was laid out in RBD with three replications consisting of 10 treatments with different concentrations of GA 3 , NAA and IAA. All plant growth regulators were sprayed at 50, 100 and 150 ppm concentrations at 20 and 40 days after transplanting. The study concluded that application of GA 3 @ 150 ppm recorded maximum number of flowers per plant (28.053), number of fruits per plant (19.923), fruit set percentage (71.557%), average fruit weight (92.450 g), length of fruit (22.820 cm), diameter of fruit (3.773 cm) and fruit yield per plant (1.843 kg). Therefore, it can be concluded that application of GA 3 @ 150 ppm as growth regulator can be adopted to get higher production of brinjal under hill region of Uttarakhand. The cultivation of brinjal (Solanum melongena L.), an important solanaceous vegetable, is influenced significantly by agro-climatic conditions and the use of plant growth regulators (PGRs). In the hill regions of Uttarakhand, where challenging environmental conditions often limit crop productivity, the application of PGRs at different concentrations can play a pivotal role in optimizing growth, yield, and quality. This study investigates the effect of PGRs such as auxins, gibberellins, cytokinins, and ethylene-based regulators on brinjal production under these specific agro-climatic conditions. Results indicated that moderate concentrations of auxins and gibberellins significantly enhanced vegetative growth, flowering, and fruiting, while cytokinins promoted cell division and delayed senescence, improving the quality and shelf life of fruits. Over-application of PGRs, however, led to adverse effects such as flower drop and uneven fruit development. This study concludes that the judicious use of PGRs at optimal concentrations can substantially improve brinjal production in the hill regions of Uttarakhand. These findings provide valuable insights for farmers and researchers aiming to enhance brinjal cultivation in challenging environments.

AI in horticulture: Transformative machine learning approaches in vegetable crops

Pramod B S, Yogesh M, Kavya and Vidya

Department of vegetable science, University of Horticultural Sciences, Bagalkot

RTAAAS/AB/024/282

Machine learning (ML) is the scientific discipline focused on developing algorithms and statistical models that enable computer systems to perform specific tasks without explicit programming. As defined by Arthur Samuel, ML empowers computers to learn and improve autonomously. Samuel, renowned for creating a groundbreaking checkers-playing program, laid the foundation for this field. The integration of artificial intelligence (AI), particularly machine learning, is revolutionizing vegetable crop management by leveraging vast datasets. Ability of various machine learning algorithms like decision trees, random forest, Support Vector Machines (SVM), K-Nearest Neighbour (KNN) and Convolutional Neural Networks (CNNs) to learn autonomously addresses key challenges in knowledge-based farming, enhancing pest and disease detection, optimizing management strategies, and improving crop modelling and yield prediction. Its application in plant breeding, when combined with big data, is driving significant advancements in vegetable crop improvement. Mohammadi and Vakilian (2023) reported that machine learning model optimized by metaheuristic optimization techniques can provide specific detection of two miRNAs namely miRNA-477b and miRNA-399g that had the highest and lowest contribution to salt and drought stresses, respectively in cucumber plants. Zaki et al. (2021) reported a novel approach for the rapid and accurate diagnosis of onion purple blotch disease from images through deep learning detection, segmentation and classification model InceptionV3 which achieved the highest classification accuracy of 85.47 per cent in recognizing the disease. Liu et al. (2019) proposed a coarse-to-fine scanning method developed to detect mature tomatoes using a trained Support Vector Machine classifier followed by a method to remove the false-positive detections and Non-Maximum Suppression showed recall, precision and F-1 scores of 90 per cent, 94.41 per cent and 92.15 per cent respectively in the test image results. Therefore, machine learning revolutionizes vegetable production by addressing challenges with precision, enhancing plant breeding efficiency, and improving crop quality and productivity, ensuring sustainable solutions to meet global agricultural demands.

Impact of NGF gene polymorphism on growth traits in Black Bengal goats

Rakesh Kumar[1*], Shanker Dayal[1], Rajni Kumari[1], P.C. Chandran[1], A. Dey[1],

P. K. Ray[1], Jyoti Kumar[1], M. K. Tripathi[1], R. K. Kamal[2], S. K. Ahirwal[1], and Kamal Sarma[1]

[1]Division of Livestock and Fisheries Management,

ICAR-Research Complex for Eastern Region, Patna

[2]ICAR RCER Research Centre Ranchi, Tata Rd, Namkum, Palandu (Jharkhand)

RTAAAS/AB/024/283

The expression of the nerve growth factor (NGF) gene in skeletal muscle tissue is linked to an autocrine action that influences the proliferation of myotubes and the development of myoblasts. Therefore, this study was carried out to explore the genetic variations within the NGF gene and their association with growth traits in Black Bengal goats. We utilized PCR- RFLP to identify polymorphic locus i.e., SNP: g.705A&G-MboII and investigated their association with growth parameters in the examined breed. The PCR-RFLP analysis reveals that the NGF gene's SNP: g.705A&G-MboII locus is characterized by two distinct genotypes: GG and AG. The frequencies of the G and A alleles in the examined goat breed were found to be 0.92 and 0.08, respectively. The polymorphic loci exhibited a state of Hardy-Weinberg disequilibrium in the analysed goat breed (P<0.05). In the examined breed, the GG genotype exhibited slightly higher values for certain biometric traits than the other genotypes; however, none of the traits demonstrated a significant correlation (P<0.05). Thus, the GG genotype may act as a promising marker for improved growth traits in the studied goat breed. However, further research with larger sample sizes and different breeds will be necessary to validate and implement these findings.

Keywords: NGF gene, Goat, Growth trait, Polymorphism

Identification of Suitable Site for Water Harvesting and Soil and Water Conservation Structures Using Gis and Rs Techniques

Pavithra B. N[1*], Rajashekarappa K.S[2], Devappa[3]

[1,2]Department of Soil and Water Conservation Engineering,

College of Agricultural Engineering, UAS, GKVK, Bengaluru

[3]Department of Soil and Water Conservation Engineering, AEC and RI, TNAU, Coimbatore

RTAAAS/AB/024/284

Geospatial techniques were employed for developing a land and water management action plan for the Niragantipalli micro-watershed, situated between 13° 46' 17.36'' N latitude to 13° 44′ 51.06'' N latitude and 77° 51′ 56.44'' E longitudes to 77° 53′ 19.97'' E longitude in Bagepalli taluk, Chikkaballapura district, Karnataka. ArcGIS software was utilized to assess the micro-watershed morphological characteristics, revealing a dendritic drainage pattern. The micro-watershed spans 632 ha. A mean bifurcation ratio of 2.5 suggests high relief and steep ground slope with elongated shape in nature, while a drainage density values with in the study area indicates that the streams are coarse texture nature. The elongated shape of the micro watershed is evident from its form factor. Runoff volume for harvesting was computed using the Modified Infiltration method. Thematic maps illustrating land use/land cover, soil types, slope, and drainage were produced using a projected Digital Elevation Model (DEM). While Google Earth Pro and GPS visualizers can offer foundational data, creating accurate and detailed DEMs for such thematic mapping typically necessitates higher-resolution elevation data and specialized GIS software for processing and analysis. This study aids in identifying suitable locations for various soil and water conservation structures. The results indicate that the majority of the study area is suitable for farm ponds, while only about 10% of the area is suitable for constructing percolation ponds and check dams., contributing to the sustainable development of the micro-watershed's natural resources through the implementation of proposed action plans.

Impact assessment of Mycorrhiza culture and potassium on drought mitigation in yield, irrigation scheduling, water use efficiency and economics of hybrid maize

Dr. P. Thukkaiyannan[1], Dr. N. Satheeshkumar[2] and Dr. P. Ayyadurai[3]

[1.]Associate Professor (Agronomy), ICAR-KVK, Tiruppur,

[2.] Associate Professor (Agronomy), MRS. Vagarai and 3. Assistant Professor (Agronomy),

CEM, Athiyanthal, Tiruvannamalai

RTAAAS/AB/024/285

An assessment study was conducted at Maize Research Station (TNAU), Vagarai during early summer season during 2019 and 2020 to assess mycorrhiza culture and potassium chloride on drought mitigation, irrigation scheduling to increase irrigation use efficiency and grain yield of hybrid maize. The foliar spray of drought mitigation materials coincides with critical stages of maize crop (at critical stage of knee-high stage, pre flowering stage and flowering stage). Irrigation scheduling was fixed based on available soil moisture (ASM) at 50 % ASM, 40 % ASM, 30 % ASM and 20 % ASM. A significantly higher plant population (59,220 plants/ha and 59,930 plants/ha) was recorded in control and irrigation given at 50 % available soil moisture respectively at 25 DAS. The plant height was significantly higher (135.2 cm and 142.5 cm respectively) in PPFM (1 %) foliar spray at knee high, pre flowering and flowering stages and irrigation scheduling at 50 % ASM at 50 DAS. The significant higher dry matter was obtained (6,715 kg/ha and 7,522 kg/ha respectively) in foliar spray of PPFM (1 %) at critical stages and irrigation scheduling at 50 % ASM. Grain yield of maize was significantly higher (5,564 kg/ha) in spraying of PPFM (1 %) at critical stages of maize viz., knee high stage, pre flowering and flowering stages. Irrigation given at 50 % ASM gave significantly higher grain yield (8,355 kg/ha) than other irrigation schedules. The crop water use efficiency was higher (13.31) in irrigation scheduling at 50 % ASM. The net returns and benefit cost ratio calculated that the higher net returns and benefit cost ratio of Rs.40,023/ha and 1.65 respectively in spraying of PPFM (1 %) at critical stages and Rs.88,776/ha and 2.44 respectively in irrigation scheduling of 50 % ASM.

Enhancing maize yield and economics through split nitrogen and potassium at critical stages of hybrid maize

D.Ajith[1], P. Thukkaiyannan[2] and P. Ayyadurai[3]

[1.]Senior Research Fellow, Department of Agronomy, [2.] Associate Professor (Agronomy), ICAR-KVK, Tiruppur and [3]Assistant Professor (Agronomy), CEM, Athiyanthal, Tiruvannamalai

RTAAAS/AB/024/286

An experiment on split application of major nutrients viz., nitrogen, phosphorus and potash to standardize the dose and time of fertilizer application in maize. The experiment was conducted at Maize Research station, Vagarai in 2023 summer season under irrigated conditions. The research trial was laid out in Randomized block design (RBD) with six treatments and four replications. The trial comprised treatments viz., T 1 – recommended split (25:100:100% NPK as basal, 50% N on 25 DAS, 25% N on 45 DAS),T 2 – Alternate split I (25:100:50% NPK as basal, 50:50:50% N&K on 25 DAS, 25% N on 45 DAS),T 3 – Alternate split II (33.3:100:33.3% NPK as basal, 33.3:0:33.3% N&K on 25 DAS,33.3:0:33.3% N&K on 45 DAS),T 4 – Alternate split III (25:100:25% NPK as basal, 25:0:25% N&K on 25 DAS, 25:0:25% N&K on 45 DAS, 25:0:25% NPK on 60 DAS), T 5 – Alternate split IV (20:100:20% NPK as basal, 20:0:20% NPK on 15 DAS, 20:0:20% NPK on 30 DAS, 20:0:20% NPK on 45 DAS, 20:0:20% NPK on 60 DAS) T 6 – Absolute control. Among the combinations of nutrients tested, Alternate split IV (20:100:20 % NPK as basal, 20:0:20 % NPK on 15 DAS, 20:0:20 % NPK on 30 DAS, 20:0:20 % NPK on 45 DAS, 20:0:20 % NPK on 60 DAS) registered higher grain yield, stover yield as well as economic returns. Whereas, lesser yield parameters, yield and economics were registered in control. Based on the experimental results, it could be concluded that split application has paramount effect on increasing yield and thereby increasing the increasing net returns and thereby minimizing the loss of fertilizer by bulk application. Keywords: Split application, fertilizers schedule, Maize grain yield, nutrient use efficiency

Studies on Preparation of Blended Marmalade from Mandarin and Lime

[1]*Rutuja Narendra Deshmukh and [2]Dr. S. G. Bharad

[1]Ph.D. Scholar, Department of Fruit Science, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola

[2]Professor and Head, Department of Fruit Science, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola

RTAAAS/AB/024/287

Marmalade is a product that is prepared from citrus fruits, where the peel of the fruit is suspended. Marmalade is a good source of vitamin C, dietary fibres and minerals which offers numerous health benefits. Blending is one of the best methods to improve the nutritional quality of value-added product by providing the nutrients of various fruits in single product, hence giving better quality and nutrition. Thus, keeping this objective in mind, the present investigation was done for finding the best suitable combinations of blended marmalade where blended marmalade was prepared using mandarin and lime in different proportions, and analyzed with respect to physicochemical and sensory parameters. The experiment was conducted at the PHT Laboratory, Department of Fruit Science, Dr. PDKV, Akola during the year 2019-20. The marmalade having 55% mandarin and 10% lime juicy vesicles recorded maximum acidity, ascorbic acid, pectin and sodium content after 150 days of storage. The preparation of blended marmalade using mandarin (Citrus reticulata) and lime (Citrus aurantiifolia) offers a novel approach to utilizing their complementary flavors, nutritional value, and availability. This study focuses on optimizing the blending ratio of mandarin and lime juices, peel, and pulp to develop a high-quality marmalade with enhanced sensory and nutritional properties. Experiments were conducted to evaluate the effects of different blending ratios on physicochemical parameters, including pH, acidity, total soluble solids (TSS), vitamin C content, and antioxidant activity, alongside sensory attributes like color, texture, taste, and overall acceptability. The results indicated that a 70:30 ratio of mandarin to lime yielded the most favorable outcomes in terms of taste balance, aroma, and consumer acceptability. The high vitamin C and antioxidant content of lime complemented the sweetness and flavor profile of mandarin, resulting in a product with superior nutritional and sensory quality. Furthermore, the marmalade exhibited good gel strength and a balanced consistency due to the pectin content derived from both fruits.

Garcinia indica: commercially valuable non timber forest products yielding tree species

Sreevidhya S[1], Hanumantha M[2], Sahana S[3], Nandini K[2] and Roopa S Patil[4]

[1]Dept. of FBT, College of Forestry, Sirsi Uttara Kannada, Karnataka

[2]Dept. of FPU, College of Forestry, Sirsi Uttara Kannada, Karnataka

[3]Dept. of SAF, College of Forestry, Sirsi, Uttara Kannada, Karnataka

[4]Assoc. Professor and Head, Krishi Vigyan Kendra, Sirsi, UAS Dharwad

RTAAAS/AB/024/287

Kokum (*Garcinia indica*) is one of the important indigenous tree spice grown in Western Ghats of India; which belongs to the family Clusiaceae. It is an ancient fruit that is widely consumed in the form of sharbat. This is a fruit tree having culinary, pharmaceutical, nutraceuticals and industrial uses.It has a long history in Ayurvedic medicine. Fruits are spherical, fleshy and dark purplewith 5-8 seeds. The flowers are Polygamodioecious consisting of male, female and bisexual flowers. High fruiting yieldis obtained from female trees (December- February) whereas it is comparatively less in bisexuals and no fruiting yield is seen in male trees. Kokum fruits are harvested between May and June.The important parts utilised are the seeds and fruits. The acidic pulp of the fruit is used forculinary, pharmaceutical and industrial applications. The kernel of the seed contributes about 61% of seed weightcontaining 44% of its oil. The edible seed oil which is valuable is known in commerce as Kokum butter. The major value-added products include Kokum butter which is obtained by the processing of kokum seed that has wide applications in the cosmetic industry, chocolate industry and for candle preparation. The juice obtained from kokum is prepared with sugar concentration of 125%, Kokum agal is prepared by the addition of 15% of salt concentration to rind and various other products include kokum-based beverages, Natural colourantand extract for medicinal purposes.Although the economic benefits derived from 'kokum' are of significant importance for the rural economies, absence of an organized market chain leads to an inequitable division of power, information and benefits along the chain, making it disadvantageous tofarmers.Interventions to improve these market chains are identified at different levels:Increasing consumer awareness of the medicinal purposes of 'kokum'. The establishment and strengthening of farmer organizations to increase the efficiency and improve access.The introduction of processing technologies can reduce labour constraints and facilitate value addition.

Keywords: Kokum, NTFP's, Economic benefits, Value added products

Sustainable Harvesting Techniques - An Effective Approach for Conservation of NTFP Species

Hanumantha M[1], Karthik H N[1], Vilaskumar[2], Vasudeva R[3] and Roopa S. Patil[4]

[1]Asst. Professor, Dept. of FPU, College of Forestry, Sirsi, Uttara Kannada, Karnataka

[2]Dept. of SAF, College of Forestry, Sirsi, Uttara Kannada, Karnataka

[3]Dean (Forestry), College of Forestry, Sirsi, Uttara Kannada, Karnataka

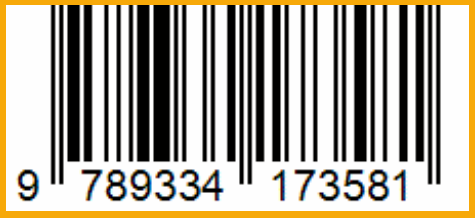
[4]Assoc. Professor and Head, Krishi Vigyan Kendra, Sirsi, UAS Dharwad

RTAAAS/AB/024/288

Non-Timber Forest Products (NTFPs) have been harvested by human population for subsistence use and trade over thousands of years. NTFPs provide 20-40 per cent annual income of forest dwellers, 20-30 per cent edible products and create large scale employment opportunity. The growing commercial trade of natural products has resulted in the over harvesting of plants. In India, total 17000 flowering plant species is recorded, among them 9000 plant species are used for medicine purpose; 112 species are in trade of which 240 species are consumed for more than 100 MT. According to WHO, the global market value for herbal industry is expected to reach US 5.0 trillion in 2050. It is estimated that between 4000 and 6000 non-timber plant species are of commercial importance world-wide. Excessive NTFP harvest can alter forest structure, composition and regeneration. Sustainable harvesting is therefore not only essential for conservation of the plant species, but also for the livelihoods of many rural people. Understanding of sustainable harvesting is not an easy task, and suitable robust thumb rules are to be followed for different plant parts. Several works were carried out by scientists indicated that strip harvesting during December to March helps in faster bark recovery with higher chemical constituents in *Terminalia arjuna, Litsea glutinosa* and *Holarrhena antidysenterica*. Maximum bark and leaf yield with higher benefit cost ratio can be obtained by retaining five to seven sprouts after coppicing in cinnamon. Application of Neem Seed Kernel Extract (NSKE), Burgundy and Bordeaux paste helps in faster bark recovery in cinnamon and arjuna. Non-destructive sampling with 70 per cent intensity of harvesting was found to be better for regeneration of *Terminalia bellerica*. Simple knotching, 1.0 cm depth incision and 1.0 cm length were better for gum production in *Butea monosperma*. Strip patches (25×6 cm^2) covered with polythene cover, NSKE, Bordeaux and Burgundy paste enhanced the recovery of bark in *Pterocarpus marsupium, Vateria indica, Lannea coromandelica, Alstonia scholaris* and *Phyllanthus emblica.*

Keywords: NTFPs, Herbal industry, Sustainable harvesting, Strip harvesting, NSKE

ISBN: 978-93-341-7358-1



JUST AGRICULTURE PUBLICATIONS