

Major and Emerging Pest Complex of Jute and Allied Fibers and Its Integrated Management Approach

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Abstract

Jute and associated fibre (JAF) crops hold a special place in the Indian economy since they are recyclable, eco-friendly natural fibres that contribute significantly to agriculture, industry, and foreign exchange. Approximately 4 million farmer families produce raw jute and mesta, producing about 13.50 lakh tonnes on an area of roughly 7.32 lakh hectare. In recent years, it has experienced the effect of the gradual declination due to increased diversity and intensity of biotic stresses such as disease and pests outbreak. The first step in managing an infestation is to identify and handle the disease or the pest. In this article, attempts are made to update the information on major pests of JAF along with its management.

Introduction

JAF are natural bast fiber-producing crops that are stacked in layers of sclerenchyma cells that have been joined together to produce small or large strands or bundles. These are primarily grown in South-East Asia and tropical regions, primarily in Bangladesh and India. In India, the most important bast fibre crops are Jute (*Corchorus olitorius* and *C. capsularis*), Mesta (Roselle: *Hibiscus sabdariffa* and Kenaf: *H. cannabinus*), Sunnhemp (*Crotalaria juncea*) and Ramie (*Boehmeria nivea*). One of the obstacles to increasing this group of crops' production is the prevalence of various pests, which can drastically change in terms of their frequency and responsiveness to currently used control measures.

Major Pests of Jute:

1. *Anomis sabulifera* (Guenee)(Jute semi-looper, Lepidoptera: Noctuidae): The caterpillars after hatching begin to feed on the apical leaves and buds. The second

generation does the most harm, with up to 90 percent of the leaves being consumed which badly affects plant growth and significantly lowers the supply of fibre.

2. ***Nupserha bicolor postbrunnea* Dutt (Jute stem girdler, Coleoptera: Lamiidae):** The main damage is by oviposition holes which leads to fibre length breakage at several locations. The result is a decrease in both yield and fibre quality. Estimated damage ranges from 6 to 30 percent, with younger individuals suffering more harm than older ones.
3. ***Apion corchori* Marshall (Jute stem weevil, Coleoptera: Apionidae):** The weevils dig holes in the stem during their active season and lay their eggs at the base of the petiole, where the larvae burrow and harm the top leaves. It results in degradation of fibre quality.
1. ***Spilosoma (Diacrisia) obliqua* (Bihar Hairy Caterpillar, Arctiidae: Lepidoptera):** It is a polyphagous pest. It defoliates and feeds on the delicate parts of jute plants. Plants are stunted and their leaves get skelotimized.

Pests of Mesta:

1. ***Euproctis scintillans* (Mesta Hairy Caterpillar, Lymantriidae: Lepidoptera):** Polyphagous in nature, the early instar larvae feed gregariously on the foliage.
2. ***Alcidodes affaber* (Mesta Stem Weevil, Curculionidae: Coleoptera):** The grubs' drilling into the stem and petioles, which results in swellings that resemble galls, can cause serious damage. Frass is inserted into the holes. Stunted plants, slowed-growing fruits and flowers are the damage's symptoms. Up to 12 grubs may be present on a single plant. The grubs are parasitised by *Aphrastofracon alcidophagus* (Braconidae) and *Zoridescopus spp* (Ichneumonid).
3. ***Meconellicoccus hirsutus* (Mealy Bug, Pseudococcidae: Hemiptera):** Crawlers suck sap, which causes symptoms like swelling on the stem, short internodes, and bunched top development as secondary branches grow. During retting, the fibre breaks at the location of infestation.

Pests of Ramie

1. ***Vanessa indica* Herbst (Indian red admiral caterpillar, Nymphalidae: Lepidoptera):** The larva, which can only be found on ramie, stunts the plant's growth

by feeding on its young, tender leaves. The infestation was more prevalent on R-67-34 (Kanai) germplasm, which is peculiar to this pest occurrence.

2. ***Microtermes sp* (Termite, Termitidae: Isoptera)** : When termites entirely halo feed the hard woody stem cuttings due to which the plant dies. It sometimes also damages the rhizome and causes the whole plant to dry up and perish.
3. ***Lepidiota sp* (White grub, Melolonthinae, Coleoptera)**: *Lepidiota sp.* indet outbreak was seen in Ramie Research Station, Sorbhog, Assam in 2012, It is a phototactic insect. In the wild, beetles have been observed to consume the leaves of ramie, mango, *Citrus grandis*, litchi, rubber, black pepper, and arecanut.
4. ***Pachnephorous bretnghami* Baly (Leaf beetle, Coleoptera)**: Adults consume plant foliage at night, creating shot holes in the leaves. The majority of leaves become skeletonized in extreme cases. The behaviour of this beetle is nocturnal. This is currently the most significant insect problem of the ramie crop. May through August sees the most damage.
5. ***Cheilomenes sexmaculata* (Epilachna beetle, Coccinellidae, Coleoptera)**: The adult beetle scrapes the tender leaves and feeds on the chlorophyll, which at first results in whitish longitudinal broad stripes on the leaves and eventually results in membranous leaves that appear burned and impede the plant's ability to photosynthesize.

Pests of Sunhemp

1. ***Utetheisa lotrix* *Argina cribraria* (Sunhemp Hairy Caterpillar Arctiidae: Lepidoptera):**. The larva either defoliates (the vegetative stage) or bores into pods and eats the seeds (in heading stage).
2. ***Laspeyresia tricentra* (Sunhemp Stem Borer, Eucosmidae: Lepidoptera)**: On the stem and shoots, the caterpillars causes tiny swellings that resemble galls. Plants afflicted with the pest exhibit excessive branching and altered fibre length.
3. ***Longitarsus belgaumensis* (Sunhemp Flea Beetles, Chrysomelidae: Coleoptera)**: It is common in South India. Adult beetle bite holes in leaves.

Integrated Pest Management in JAF:

- In places of Jute Cultivation, where the yellow mite is endemic, it may be advised to cultivate tolerant types like JRO 204 (Suren) and JRC 212 (Basudev), but JRO 7835 should be avoided in locations where the grey weevil is endemic for jute.
- Before spraying pesticides, remove any leaves that have early gregarious hairy caterpillar larvae.
- Proper observance of planting distance in ramie.
- Compared to the broadcast crop in jute, line sowing with the CRIJAF-seed drill lessens infestation.
- The incidence of stem weevil, grey weevil, and yellow mite is higher in early sown jute, whereas the incidence of semilooper is the opposite in the same condition. The date of sowing from 4 week of March to 2nd week of April is optimum in order to minimize the pest incidence.
- Timely sowing at the onset of monsoons reduces incidence of Mesta hairy caterpillar.
- Self-sown plants and weeds should be removed properly to avoid carry over of the pests.
- Pests can be suppressed naturally by insect, spider predators and larval parasitoid
 - *Protapanteles obliquae*: Larval Parasitoid of Jute Hairy Caterpillar.
 - *Meteorus spilosomae*: Larval Parasitoid of *Spilosoma oblique*.
 - *Sisyropa spp*: Jute Semilooper
 - *Bracon brevicornis*: Larval parasitoid for Sunhemp Hairy Caterpillar.
 - *Cryptolaemus montronzieri*: Mealy Bug in Mesta.
- Neem formulations with 10,000 PPM Azadirachtin and commercial BT-K formulations may be used as a component of jute IPM, particularly for the control of lepidopteran pests in case of organically grown Jute.
- Neem oil @ 4ml/ lit was reported to be effective against the jute semilooper.
- Spraying of Chloropyriphos @ 0.3 percent at 15 days intervals is effective in ramie.
- Once the ETL has been determined, two sprays of spiromesifen 240 SC @ 0.8 ml/lit at 36 and 46 DAS and profenophos 50 EC 2.0 ml/lit at 66 and 76 DAS are recommended for safeguarding the jute crop from the yellow mite and lepidopteran pests. 42 mites/cm³ area on the second unfolded leaf and 10 percent plant damage were the individual EIL for yellow mites and lepidopteran pests respectively.



- Foliar spray with methyl parathion @ 2 ml /l against Sunhemp Hairy Caterpillar.
- Spraying with monocrotophos @ 1.6ml/l in the evening hours against Sunhemp Flea beetles and Mesta stem weevil.
- Foliar spraying with methyl demeton 2ml/l or dimethoate 1.5ml/l against Mesta mealy bug.

Conclusion

JAF are a readily available, reusable, renewable, and biodegradable source of biomass. The spectrum, intensity, and damage caused by insect-pests in the JAF ecosystem have recently undergone a dynamic transformation. Some seemingly unimportant pests, like mealy bugs, have become significant and major. Due to green revolution, intensive pests broke out around the country. Pests become more resistant to pesticides when they are used frequently. Additionally, pesticides harm the environment and cause other health problems. IPM introduces a biological pest control programme as a result. Other lepidopteron larval that feed on the same plants are attacked by the parasitoids. As a result, the parasitoid may be adequately constrained in its attack on non-target species and may thus be taken seriously as a biological control agent. Therefore, by using these modern IPM techniques, we may create eco-friendly opportunities for the environment.

Reference:

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