

## Cultivating Sugarcane Seedlings Using Tray Culture

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### Abstract

The study is concentrated on Raising of sugarcane nursery. As we know India is an agricultural country and sugarcane is one of the most primary profit-making crops (Kharif crop). Sugarcane (*Saccharum officinarum*) belongs to family Grasses. Brazil has been largest sugarcane producer but in 2018-2019 it come 2<sup>nd</sup> largest producer after India. In India, Uttar Pradesh is the top-notch state regarding sugarcane production having area 22.77 lakh ha along yielding of 135.64-million-ton cane. There are 2 most common varieties i.e., *Saccharum officinarum* and *Saccharum barberi* having good sugar content, thicker stem and poor sugar content, thinner stem respectively.

**Keywords** - commercial crop, kharif crop, variety

### Introduction

Sugarcane is primal matter for white sugar and sugar is most important ingredient of kitchen especially in India. So nursery is good option for successful production of sugarcane. Elegant area for raising sugarcane Nursery: Monitoring of soil physical properties like moisture, aeration, alkalinity etc., Sufficient spraying of water, Excess distribution of seed plot should be avoided, Transportation should be easy, the planter should be operative. If it is Primary nurseries than it should be placed near factory farm/research institution farm/Government organization. [1]

In India, Uttar Pradesh is the top-notch state regarding sugarcane production having area 22.77 lakh ha along yielding of 135.64-million-ton cane i.e. 50% of cane produced alone in the country by this state. Followed by Uttar Pradesh sugarcane producing state are Maharashtra (82,984 tons, Karnataka (31,135 tons), Tamil Nadu (17,153 tons), Bihar (13,824 tons), Gujarat (12,072 tons), Haryana (9,632 tons), Punjab (8,023 tons), Andhra Pradesh (7,789 tons), Uttarakhand (6,271 tons). In India's agro industry after textile, sugarcane industry is the second largest industry.

In world, Brazil is the top-notch state regarding sugarcane production production having area 10.226-acre ha along yielding of 75.167 kg/ha sugarcane. Followed by Brazil sugarcane producing countries are India (348.448 tons), China (123.059tons), Thailand (87.468 tons), Pakistan (65.450 tons), Mexico (56.446 tons), Colombia (36.951 tons), Australia (34.403 tons), Guatemala (33.533 tons), USA (29.926 tons), Indonesia (27.158 tons).

## **Diversity of Uttar Pradesh**

### **Flora of Uttar Pradesh**

Tropical Moist Deciduous Forests are the utmost common forest of Uttar Pradesh. the most common plants are silver fir, spruce, hododendrons, betula, deodar, gigantic haldu, dhak, chir, oak, sal, teak, mahua, sisso, chironji salai, and tendu. Also medicinal herbs like Podophyllum, hexandrum, Rauwolfia Sarpagandha, Viala serpens and aephekra gerardiana.

### **Fauna of Uttar Pradesh**

The animals found are Nilgai or Dharrose , Wild pig , Jackal , Fox , Hare , Black buk, tiger, leopard, wild bear, sloth bear, elephant, gond, para, chinkara, sand grouse, musk deer, brown bear, chital, sambhar, jackal, porcupine, jungle cat, hare, squirrel, monitor, lizard and Wolf .

### **Birds of Uttar Pradesh**

The utmost common birds which found are crow, pigeon, dove, jungle fowl, black partridge, house sparrow, peafowl, blue jay, parakeet, kite, myna, quail, bulbul, snipe, comb duck, grey duck, whistling teal, kingfisher and woodpecker.

### **Reptiles of Uttar Pradesh**

The utmost reptiles found are Lizard, Bamania, Krait, Cobra, Pit-viper, Crocodile, Goh, Dhaman and Tortoise.

### **Fishes of Uttar Pradesh**

The utmost common are Parthan, Vittal, Mahaser, Saul, Mirgal, Cuchia, Labi, Einghi, Hilsa, Trout, Tengan, Rohu, Rasela, Mangur, Kata, Mirror Carp and Eel.

### **Local name of sugarcane**

English - Cultivated Sugarcane, Noble Sugarcane, Sugar Cane, Noble Cane.

Hindi – Ikh, Sakhara, Ganna.

Tamil: karumbu.

### Scientific classification of sugarcane

Kingdom: Plantae

Division: Magnoliophyta

Class: Liliopsida

Order: Poales

Family: Poaceae

Genus: Saccharum

### Botanic Depictio N

#### a) Root

- Sugarcane root is fibrous root system
- Sugarcane has 2 type of root sett root and shoot root
- Sett root is temporary root which come forth in a period of 24 hrs.
- Shoot root are permanent root which come forth in a period of 5-6 days later planting.
- Sugarcane roots are broad, husky and fewer branches.

#### b) Stem

- Stem of sugarcane is cylindrical, node and internode present.
- Lateral bud, growth ring and root primodia present at node part.
- Upper part of stem consists of less amount of sucrose so this part is not required to sugar industry.
- Sugarcane is produced asexually i.e. vegetative propagated by stem cutting.

#### c) Leaf

- Alternate arrangement of leaf present in sugarcane.
- The leave is present at node
- Leaf has two-part blade and sheath parted by leaf joint.
- The leaf blades are in tubular shape.
- The leaf sheaths are in linear shape.
- In leaf scar type extension are seen called auricles.

#### d) Inflorescence

- Inflorescence of sugarcane is arrow type.
- Arrow is silky appearance with 20-30 cm long.
- The spikelet is in racemose arrangement.

- Each Inflorescence content number of seed which have reproduction capacity.

### Climatic Requirement

#### a) Latitude and altitude

- Sugarcane successfully grown from altitude 36.7° N and 31.0° S and altitude of 1000m from sea level.

#### b) Rainfall

- For cultivation of sugarcane 1100 and 1500mm rainfall required. As sugarcane is vegetative propagated plant so it also cultivated with low rainfall up to 500mm. In rainfall below 500mm plant get wilted have to suffer from water stress and rainfall above 1500 lead to water logging.

#### c) Temperature

- Sugarcane can grow in wide temp. Range from 38<sup>0</sup> C.
- Required temp for germination is 27<sup>0</sup> c -30<sup>0</sup> c.
- Temp less than 27<sup>0</sup> c is injruis to health and aboe 38<sup>0</sup>c affect the sprouting stage.
- Optimum temp –

Carbon metabolism	-30°c
Sugar fusion	-30°c
Sugar carrier	30-35°c
Tillering	-33.3-34.4°c
Root Rise	-36°c
Shoot Rise	- 33°c

#### d) Sunshine

- Sugarcane is day plant
- More solar radiation led to higher yield
- Approx. 7-8hrs sunshine required for healthy growth of sugarcane

#### e) Frost

- As sugarcane is day Plant chill weather affect the sprouting
- Even in chill temp meristem tissue gets damaged.

#### f) Wind

- Relative wind velocity is 30-40km/hr

- Wind velocity more than 60m/hr cane lodging and breakage

**g) Planting Season**

**i) Subtropical region**

- Sept to Oct (autumn)
- Feb to march (spring)
- Tropical season

**ii) June to August (Adsali)**

- January to February (Eksali).
- October to November (Eksali).

**Major Disease in Sugarcane Nursery**

**1. Bacterial diseases**

**a) Red stripe**

Causal agent - *Xanthomonas rubrilineans*.

**Symptoms**

- Red and brown strip on the leaf
- Necrosis and rotting of leaf occur
- Spindle leaf get damaged

**b) Gummy disease**

- Causal agent - *Xanthomonas axonopodis* pv. *vasculorum*.

**Symptoms**

- Red brownish streak on leaf
- Chlorosis occur in apical meristem
- Plant growth get stunted
- Vascular bundle gets reddened

**2. Fungal diseases**

**I. Red rot**

- Causal agent - *Colletotrichum falcatum*

**Symptoms**

- Drying of spindle leaf
- Stalk get colorless and hollow
- Black fruiting bodies develop on node

- Sour smell emerges from stalk
- Reddening on internal tissue

## II. Eyespot

- Causal agent - *Bipolaris sacchari*.

### Symptoms

- Spot occur on leaves and stalk
- Spot run parallel to vein
- Reddish and yellow hole occur on leaves
- Yellow brownish streak gets extended to leave

## III. Viral diseases

### a) Mosaic disease

- Causal agent - *Sugarcane mosaic virus*

### Symptoms

- Molting occurs on laminar part of plant
- Plant leaves discoloured
- Plant growth get stunted

### b) Yellow leaf

- Causal agent - *Sugarcane yellow leaf virus*

### Symptoms

- Plant growth stunted
- Leaf gets discolored
- On the lower side of leaf yellowing of the mid rib occur

## IV. Nematodes disease

### a) Lesion

- Causal agent - *Pratylenchus spp*

### Symptoms

- Root gets affected
- Moisture and nutrient content decrease in plant
- Stalk growth stunted

### b) Root-knot

- Causal agent - *Meloidogyne spp.*

### Symptoms

- Poor plant growth
- Yellowing of foliage
- Wilt appearance in plant
- Uptake of water capacity get reduced

### V. Phytoplasma diseases

#### a) Grassy Shoot

- Causal agent - Sugarcane grassy shoot disease

### Symptoms

- Yellowing and whiteing of leaf
- Internode growth get stunned
- Size of leaf reduced
- Shoot gets proliferated
- Apical meristem gets affected

### Study Area

#### 1. Bud Choice

- ❖ Prefer vigorous canes of 7 to 9 months old with 10-12 buds per cane (Fig. 1).
- ❖ Bud should be removed using bud chipper tool.
- ❖ The chipped buds have to be used along organic or chemical solutions.
- ❖ 450-500 canes per acre are desired. [2]







## 2. Sett Regimen

- ❖ **Sett medication with Azospirillum:** Make its slurry along 10 packets (2000 g/ha) with adequate water and immerse the setts in the slurry for 15 minutes before planting.
- ❖ **Sett medication with fungicide:** soak set in Carbendazim (1 gram per liter)
- ❖ **Aerated steam medication:** make setts Aerated steam at 50 o C for 1 hour to manage initial disease of grassy shoot disease i.e. mainly related to near shoot part.

[2]



### 3. Site Preration

- ❖ Tray culture area can be done either open or in room but in proper confined room it will more suitable and there will be less chance of nursery failure.
- ❖ Room should have sunlight source or artificial light arrangements.
- ❖ Room should have complete ventilation, germ free surface (sanitized room/surface) and water facility.
- ❖ Humidity of room should also maintain as coco pit moisture depend upon room Humidity Too.

### Methodology

#### A) Nursery Preparation in Tray

- ❖ Stuff half of the tray with well decomposed coco pit.
- ❖ Set the buds horizontal or in a lightly tilt point in the cones of a tray.
- ❖ Now enclose the tray fully by coco pit.
- ❖ Room should have proper sunlight, aeration, temp or artificial condition also be done.
- ❖ If favourable temperature (warm) maintained white root will come within 3 – 5 days and shoot will show in next 2-3 days.
- ❖ As per the moisture requirement of coco-pith, spraying to the trays in the evenings for the next 15 days, water logging should be avoided.
- ❖ At six leaf stage grading of the plants has to be initiated (Fig.2). [3]





## Result and Discussion

### Why nursery is important?

- It helps in prevent from soil born disease, seed born disease and pest.
- Like smut, sett rot, red rot, wilt and grassy shoot disease etc.
- All these diseases are because of fungus and cause serious damage to crop due which affect the production very badly and farmers suffer huge loss due to it.

As from fig 1,2,3,4 bud selection should be done carefully, during bud selection bud should be present on root primordial region of sugarcane. If bud was damaged or absent nursery will not grow successfully and directly lead to loss to the farmer. Looking from fig 5, 6 we assume that with good bud selection bud sett is successfully grown in nursery. And from fig 7, 8 we see that nursery is ready for transplanting. As sugarcane is cultivated by sowing the seeds setts straight into the field but growing its nursery is also cheaper farmer can look into this instead of direct planting of sets in field with proper management. So that farmer can have good sugarcane yield.

### Refernce

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