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Course name :

**Crop Production Technology-II
(ASAG 2204)**

Course credit :

(2-1-0)

Lecture 14

Topic: Sugarcane



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1.22 WATER MANAGEMENT

Water requirement of cane is high and varies with region

In Tropics, water requirement is **2000-3000 mm**, in sub-tropics **1500-2000 mm**.

Under severe stress the yield loss may go up to 60-70 per cent.

Germination phase = up to 60 DAP

Formative phase = 60- 130 DAP

Maturity = 250-365 DAP

Water requirement during **formative and grand growth phases** is more.

Light & frequent irrigations gave higher yield, than heavy irrigations at longer intervals.

In summer, irrigation interval depends up on soil type and season.

Generally shorter interval in winter and in heavy soils whereas longer intervals in summer.

In light soils **trash mulching** has to be done @3t/ha.

Irrigation can be provided : **0.75, and 0.50 IW/CPE ratio** at tillering, grand growth ,maturity.



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1.23 EARTHING UP:

Earthing-up is done at 90 - 120 DAP coincides with peak tiller stage.

It can be done either manually or by using a bullock-drawn/tractor drawn furrower.

Earthing-up @ 120 DAP checks tillering, provides sufficient soil volume for root proliferation,

It promotes better **soil aeration** and provides a sound **anchorage or support** to the crop and thus **preventing lodging** and also controls weeds.

One more earthing up at 180 DAP may be helpful in preventing lodging.

1.24 PROPPING :

- Propping is done to prevent the crop against **lodging due to heavy winds and to keep the crop field open for proper aeration.**
- It is done by tying the cane together using dry leaves and bottom green leaves.
- Trash is twisted to form rope and cane stalks are tied together – **trash twist propping.**



Earthing up



Propping



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1.25 Diseases :Red rot, Smut, Wilt, Ratoon stunt and Red stripe.

- **Management strategies:**
- **1.25.1 Cultural method:**
- Select healthy setts for planting.
- Field should maintain at proper sanitation.
- Ungerminated setts should be removed and fill the gap with new setts which should be treated before planting.



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1.25.2 Mechanical method:

- Treat the setts with hot water at 50°C for about 2 hours this gives 100 per cent control. A temperature higher than this would kill the cane and lower temperature than the specified enables the pathogen to survive.
- Aerated steam therapy eliminates the pathogen from the infected canes. Use of disinfectants to clean seed cutting tools which would reduce the chance of spread of pathogen from the infected to healthy setts.



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- **1.25.2 Chemical method:**
- Chemical disinfectants that may be used on cane cutting knives includes, Lysol, Dettol, ethanol, Mirrol and Roccal. Atleast 5 minutes of contact with the cutting surface is needed to assure disinfection.
- **1.26 Insect pests**
- Early shoot borer
- Root borer
- Top borer
- Sugarcane white fly
- Black bug.



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- **Management:**
- **ETL:** 15% dead heart.
- **1.26.1 Cultural method:**
- Use resistant varieties like CO 312, CO 421, CO 661, CO 917 and CO 853
- Early planting during December – January escapes the early shoot borer incidence.
- Sugarcane intercropped with Daincha recorded the lowest early shoot borer incidence.
- Trash mulching along the ridges to a thickness of 10-15 cm 3 days after planting.
- Ensure adequate moisture to bring down the soil temperature and increase humidity (unfavourable condition for the multiplication of early shoot borer).
- Partial earthing up on 45 days after planting reduces the incidence.



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- **1.26.2 Physical method:**
- Remove and destroy dead hearts.
- Install pheromone traps @ 10Nos. /ha for surveillance and monitoring, change the septa/lure once in 30 days.
- **1.26.3 Biological method:**
- Apply granulosis virus 1.5 x 13 5 IBS / ha (750 diseased larvae / ha) along with teepol twice on 35 and 50 DAP.
- Release 125 gravid females of *Sturmiopsis inferens* a tachinid parasite per ac.



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- **1.26.4 Chemical method:**
- Apply any one of the following insecticides if the pest crosses ETL.
- Carboryl +Sevidol 4% G 12.5 kg, Carbofuron 3G 33 kg (Soil application). The granular application should be immediately followed by irrigation.
- Chlorpyrifos 1000 ml a sticker like Teepol (250 ml / 500 l of water) can also be added to make the solution stick on to the surface of the crop and it is preferable to use high volume sprayer to be most effective.



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1.21 WEED MANAGEMENT

Requires weed free for the first **90-100 days** before and, most sensitive to weeds during **tillering stage**.

Manual weeding at 30, 60 & 90 DAP is effective to control weeds.

Trash mulch at 45 DAP @ 7-10 t/ha, 10 cm thick is effective against many weeds.

Application of **Atrazine @ 5kg/ha** in 1125 litres of water to be sprayed on the third or fourth day after planting, depending on soil moisture

At 20 and 60 days of planting spraying of 2,4-D + Gramoxone (2.5 lts) in 125 lts/ha is recommended

Initial ploughing, trash mulching are the weed control methods in ratoon .



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Lecture 20

SUGARCANE



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1.27 Factors affecting ripening :

Location

Low temperature

Maximum temperature

Varieties

Fertilizers

Intercropping

Irrigation

Lodging

Earthing up



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1.28 RIPENING

Ultimate economic product of sugarcane is not the seed but the sugar stored in stalk.

Accumulation of sugars in the stalk begins soon after completion of elongation phase, when glucose produced during photosynthesis is converted to sucrose stored in stalk.

As the cane is ripened sheath moisture should dropdown from 85 to 72%.

1.29 Maturity stage:

When sucrose exceeds 16% , juice purity increases over 85% - cane is mature

When cane stalk is cut with a knife at above the middle portion, it end looks **watery cane is unripe**, if it **sparkles slightly it is ripening**.



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1.30 HARVESTING :

- In NI cane ripens by **early december** but sugar content of **juice rises up to march.**
- Maturity is recognised by drying of older leaves leaving few top leaves green.
- If the reading of hand refractometer shows b/w 17-18 the crop is ready for harvest. (middle portion of cane should be taken for reading).
- By sweetness of the cane harvest can be done.
- Stalks are cut at the ground level, dried leaves are stripped off from the cane.

1.31 Products from sugarcane juice

Jaggery, Juice concentrate, Powder jaggery, Vinegar and sugar



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Constraints : (less sugar recovery and quality)

Harvested canes should be supplied with in 5-10 days.

Limited crushing capacity of mills.

Stocking of canes at mill yard.

Inordinate delay in transport of harvested cane from field to mills..

Week end shut down of the factory and unforeseen circumstances .

Weather parameters like high temp & humidity leads to greater deterioration.



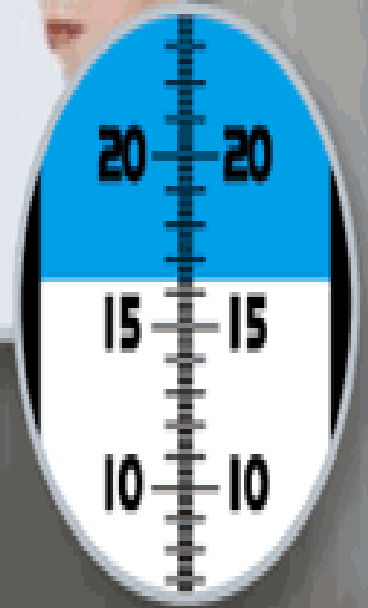
1 Apply 1-2 drops onto the prism.



2 Close the daylight plate. View the scale through the eyepiece.



3 Read the measurement value where the boundary line intersects the scale.





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1.32 Ratoon Management

The number of succeeding cane crops raised from single planting is **“Ratoon”**

Ratoon occupies 50-55% of total cane area in India.

The crop raised from planting cane setts is **“Plant crop”**.

Plant crop should be harvested in **February** to ensure favorable re-growth of ratoon sprout, because **sprouting will be poor under low temperatures.**

Harvesting close to the ground level is most important for good ratooning.

Break the ridges so that soil will be loose rather than compact and organic matter will be decomposed.

200 N + 60 P₂O₅ + 60 K₂O are recommended for good ratoon crop.

Nitrogen should be applied in 2 splits at ratoon initiation and 60 days after root initiation. Entire dose of P & K should be applied at ratoon initiation



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1.33 Irrigation :-

- Ratoon crop require more frequent irrigations than plant crop.
- Irrigation at 12-15 days interval in subtropical regions and 8-10 days in tropical areas.
- Earthing up
- Propping
- Weeding
- Plant protection.



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1.44 YIELD :

- 11-12 months crop of NI– 400-500 q/ha.
- 18 months crop of SI – 1000-1200 q/ha .

1.55 JAGGERY MAKING:

Step 1. Cutting sugar cane from fields

Step 2. Feeding the grinder to extract juice

Step 3. Boiling the juice

Step 4. Adding Ingredients (Na_2CO_3 - reducing agent helps in making jaggery balls)

Step 5. Tray Feeding

Step 6. Jaggery output

