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Identification of Different Insect Pests of Sugarcane and Their Management

Dr. Priyanka P. Patil

(Ph. D.) Department of Agricultural Entomology,

Email id: priyankapatil3033@gmail.com

Introduction:

Sugarcane, *Saccharum officinarum* perennial grass of the family Poaceae, primarily cultivated for its juice from which sugar is processed. Most of the world's sugarcane is grown in subtropical and tropical areas. Sugarcane is a long duration crop of 10-12 months and therefore is liable to be attacked by a number of insect pests. According to an estimate, sugarcane production declines by 20-25% by insect pests. Sugarcane is attacked and damaged by various insect pests *viz*., whitefly, sugarcane pyrilla, sugarcane woolly aphid, mealy bug, scale insects, termites, white grub and different sugarcane borers. In this article, the insect life cycle is described with all the life stages. The management measures which can be adopted for controlling the different pests of sugarcane in the field condition are also described.

1. Whitefly: *Aleurolobus barodensis* Aleurodidae : Hemiptera

Economic Importance:

- It is a major pest and sporadic pest but occasionally assumes a serious form and causes heavy losses especially in water logged conditions.

Marks of Identification:

- The adults are active tiny insects with a pale body, black eyes and two pairs of nearly white wings.
- They measure about 3 mm in length.

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Nature of Damage:

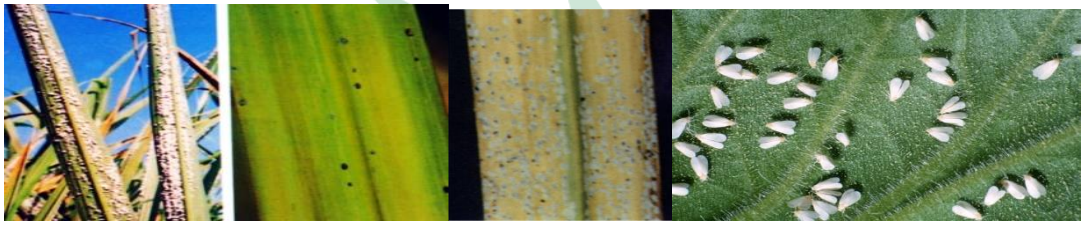
- Nymphs and adults suck the cell sap from the lovers which as a result, turn yellow and ultimately dry, affecting the vigour of the crop and also yield.
- Due to the injury to leaf tissues and also on account of the coverage of leaf surface with mealy secretion, the metabolic activates of the plant are upset, which adversely affect sugar formation.
- Besides excretion of honeydew encourages the development of a black fungus which affects photosynthesis.

Life History:

- Female eggs are deposited in rows side by near the midrib of leaves and attached to the leaf by a short filament. The eggs hatch in 8-10 days.
- The nymphs complete their development in 15-30 days after passing through four instars. The pupal stage lasts for 10-11 days. The life cycle is completed in 5-6 weeks and pest completes 9 generations in a year.

Management Practices:

1. Clipping off and destroying the early infested leaves, prevents further spread of the pest.
2. Spray soon after initiation of pest incidence 0.08% methyl demeton or dimethoate or monocrotophos or dichlorvos (DDVP) or fenitrothion or 0.1 % Malathion. Repeat at fortnightly interval if necessary.
3. Avoid excessive use of nitrogenous fertilizers.
4. Conserve nymphal parasitoids viz., *Azotus delhiensis, Encarsia isacci*.
5. Encourage predators viz., *Chilocorus nigritus*, *Scymnus nubilus*.
6. Spray Monocrotophos 36 SL 2 L /ha.



White Fly or Mealywings (*Aleurolobus barodensis* Mask.)

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2. Sugarcane leaf hopper or Pyrilla : *Pyrilla perpusilla* Fulgoridae : Hemiptera

Economic Importance:

- It is a major pest of sugarcane crop and breed throughout the year, but the incidence is at the peak from April to August.

Marks of Identification: -

- The adults are straw hoppers with two pairs of wings, folded like a pointed beak which is quite readily visible.
- Newly hatched nymphs are milky white in colour with a pair of characteristic anal processes or filaments covered by wax.

Nature of Damage:

- Both nymphs and adults suck the cell sap from the lover surface of leaves which as results lose turgidity, begin to wither and ultimately get up dried under severe conditions.
- Due to feeding the sucrose percentage of juice and development of cane is adversely affected.
- Besides sucking the sap, these insects secrete honeydew like substance that spreads on the leaves, on which a black fungus sooty mould) develops, that adversely affects the photosynthesis and ultimately the yield of canes.

Life History:

- The pale greenish yellow eggs are laid on the lower surface of the leaves and also between the detached leaf sheath and the stem, the eggs are covered with white cottony waxy filaments.
- Incubation period lasts for 7 to 14 days under warm conditions while in winter it continues up to 30 to 40 days.
- The nymphs become adult hoppers within 50 to 60 days.
- There are about 5 instars and the life cycle is completed in about 60 days in summer and 120 days in winter.
- Depending upon the weather condition 3 to 5 generations are competed in a year.

Management Practices:

1. Mechanical method such as collection and destruction of eggs masses helps to minimize the pest incidence.

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2. Disposal of cane trashes.
3. Stripping off 5 to 6 lower most leaves on which generally eggs are laid.
4. Avoid excessive use of nitrogenous fertilizers.
5. Set up light trap.
6. Release cocoons @ 5000/ha or egg masses @ 500000 eggs/ha of *Epiricania melanoleuca* parasite for effective control of pyrilla. After establishment of parasites, insecticide should not be used.
7. Avoid trash burning to prevent destruction of hibernating above parasite eggs on dry leaves.
8. Use of *Metarhizium anisopleae* and *Aspergillus flavous* (Fungus is also reported effective against this pest.
9. If biocontrol is not undertaken, spray quinalphos 0.03% fenitrothion 0.03% or malathion 0.05% or monocrotophos 0.03% or dimethoate 0.03% as soon as the incidence is noticed.

Host Plant:

- Besides sugarcane crop, it also feeds on jowar, maize, bajara and barley crops.

Sugarcane Pyrilla or leaf hopper (*Pyrilla perpusilia* Walk)

3. Sugarcane white woolly aphid : *Ceratovacuna lanigera,* Pemphigidae : Hemiptera

Economic Importance:

- It is one of the major pests in sugarcane growing areas.

Marks of Identification:

- Nymphs are yellowish or greenish yellowish in colour.
- They moult four times and become a adult.

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- Adult are black in colour having two pairs of transparent wings and two cornicles on last abdominal segment.

Nature of Damage:

- Nymphs and adults suck the sap from leaves and excreted honey dew like substance on which black sooty mould developed.
- Yellowish spot developed on leaves, leaves edges dries and complete leaves dried.
- Stunted growth of the plant and yield losses up to 26 per cent.
- On single leave, 8000 aphids are seen.
- Older sugarcane damages more.

Life history:

- Each female produces 15 to 35 young one/day.
- Maximum 2/7 nymphs during 20 days of life time.
- Nymphal period 6-22 days.
- Adult period 32-57 days.
- Total life cycle is completed within 30 days.

Management Practices:

1. Use pest free sets for planting and Cleaning of field.
2. Set treatment with 300 ml malathion + 100 lit. water deep for 15 min.
3. Use resistant varieties like Co-98125, Co- 8021, Co-9909.
4. Proper application of nitrogenous fertilizer.
5. Avoid late application of nitrogenous fertilizer and excessive irrigation.
6. Spray infested crop with acephate 75 SP 2.0 kg or monocrotophos 36 WSC 2.0L or dimethoate 30EC 2.0 L in 1000 L of water directing the spray fluid towards the under surface of leaves.

Biological Control:

1. Release *Chrysoperla carnea* at 2500 eggs/ha. Or
2. *Dipha aphidivora* at 1000 larva /ha**.** Or
3. *Micromus spp.* at 2500larva/ha. Or
4. *Syrphid fly* at 2500 larva/ha.

Host Plant:

- Sugarcane and bamboo.

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Sugarcane Woolly Aphids (*Ceratovacuna lanigera* Zeh.)

4. Mealy bug : *Saccharicoccus sacchari* Pseudococcidae : Hemiptera

Economic Importance:

- It is one of the important pests of sugarcane in the state, but sporadic in occurrence and may cause heavy losses especially under drought conditions.

Marks of Identification:

- Adults and Nymphs of mealy bugs are soft bodied, light coloured oval creatures and found in large numbers near the nodes, covered over by a mealy white secretion of waxy powder.

Nature of Damage:

- Both nymphs and adults remain under the leaf and continuously suck the cell sap from the cane stalks.
- As a result, the plants are weekend and the sucrose content of the cane juice is reduced.
- Excretion of honey dew encourages development of black sooty mould, which adversely affects the photosynthesis.
- Mealy bug also acts as vectors of "Motlling" and "Spike" disease of sugarcane.

Life History:

- Female lays yellowish, smooth, cylindrical eggs. Within few hours the eggs become soft and elongated and soon the nymph emerges.
- Newly emerged nymphs are quite active with a pinkish transparent body. Nymphal period 2-3 weeks.
- Life of adult female is 3-5 days. The entire life cycle is completed in about a month.
- The pest completes several generations in a year.

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Management Practices:

1. Selection of setts frees from infestation of mealy bugs for planting and burning the affected canes.
2. Clean cultivation and detrashing of old leaves along with leaf shoots.
3. Spray soon after initiation of pest incidence 0.08% methyl demeton or dimethoate or monocrotophos or dichlorvos (DDVP) or fenitrothion or 0.1 % malathion. Repeat at fortnightly interval if necessary.

Host Plant:

- Besides sugarcane crop, feed on sorghum, grasses.

Mealy Bug (*Saccharicoccus sacchari* Ckll.)

5. Scale Insect : *Melanaspis glomerata* Coccidae : Hemiptera

Economic Importance:

- This was earlier considered as a minor pest of sugarcane crop in Maharashtra however, it is assuming a serious form in recent year, particularly in western Maharashtra.

Marks of Identification:

- The adults are greyish black in colour, oval and slightly convex in shape.

Nature of Damage:

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- Both nymphs and adults suck the sap from cane stalks. As a result, the infested canes become shrivelled.
- The internodes are shortened and cane sucrose percentage of the juice is reduced.
- In case of severe infestation, the entire cane is covered with the pest forming thick encrustation of the stem and ultimately the crop dry up completely.
- This also adversely affects the market value of the cane.

Management Practices:

1. Removal and burning of dried leaves, stubbles after the harvest of the crop clean cultivation before planting.
2. Selection of healthy insect free sets for planting.
3. Dipping of cane sets in the suspension of dimethoate 30 EC- 265 ml or malathion 50 EC – 200 ml in 100 litres of water for 2 min.
4. No sooner pest incidence is noticed spray with dimethoate 0.08% or malathion 0.1% for effective control of the pest.

Host Plant:

- Sugarcane and wild grasses.

Scale Insect (*Melanaspis glomerate* Green.)

6. Termite (White ant) : *Odonototermes obesus,* Termitidae : Isoptera

Economic Importance:

- They are polyphagous insects and cause damage to several cultivated crops. The pest is prevalent throughout the state.

Marks of Identification:

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- Termites are social insects. Only workers are able to move outside the termitoria and hence they are injurious to crops.
- They are whitish – yellow, flat and bodied insects.
- They are not able to move in light and therefore, they construct a passage of mud for their movement outside and above the soil.

Nature of Damage:

- The workers feed on planted setts near the eye bud and occasionally attack the root system and thus the infested plants succumb to death.

Management Practices:

Preventive measures:

- Locate the termitoria and destroy the queen.
- Dipping cane sets in 0.5% chlorpyriphos suspension or Treat setts with Imidacloprid 70 WS 100-150 g per 100 setts.
- Application of phorate 10 G or quinolphos 5 G or carbofuran 3 G @ 25 kg/h in the furrow before planting.

Termites (*Microtermes obesi*)

7. White grub (Root grub) : *Holotrichia consanguinea, Leucopholis lepidophora*

Scarabaeidae : Coleoptera

Marks of Identification:

- Adult beetles are stoutly built, dull brown in colour with light brown abdomen, measuring about 25 mm in length.
- Newly hatched grubs are creamy white with dark brown head in colour and Scarabidae form type.

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- When touches they get curved to from 'C' shape. Full grown grub measures 45 to 50mm.

Nature of Damage:

- The grubs feed on tender roots.
- As a result, affected plants which turn yellowish may die ultimately.
- The attacked plants can be easily pulled out from the soil.
- The withering and drying of plants and one direction in row killing plants in series b single grub (damage in line).

Life History:

- The adults emerge from soil at the onset of monsoon and feed on the foliage of Neem, Babul, Ber etc. during night eggs are laid in small earthen cells in the soil at depth of 15 to 23 cm.
- The incubation period is about 8 to 10 days. Grub stage lasts for about 5 to 6 months by feeding on the roots underground.
- The duration of pupal stage is about 11 days and a generation is completed in a year. The adult beetles formed in November remain in soil next June. Adults are long lived (90 days).

Management Practices:

- Do summer ploughing to expose pupae and adults.
- Set up light trap to attract and destroy the adults.
- Crop rotation in endemic areas.
- Shaking the host tree during night hours and collect and destroy the adult beetles
- Dust quinalphos 5% D at 25 kg/ha 10 days after first summer rains
- Spray carbaryl 0.1 % on the host plants like neem, babul, ber when average number of beetles per tree are 20 or more in the endemic pockets after the onset of monsoon.
- Apply phorate 10 G or quinolphos 5 G @ 25kg/ha in the furrows before planting the sugarcane setts and mix thoroughly in the soil.
- Application of *Metarhizium anisopliae* EPF @ 5kg/ha.
- Drenching of chloropyriphos 20 EC @ 40ml / 15 lit of water.
- Drenching of Lasenta [Imidacloprid 40% + Fipronil 40% w/w WG (80 WG)] @ 150gm/ha

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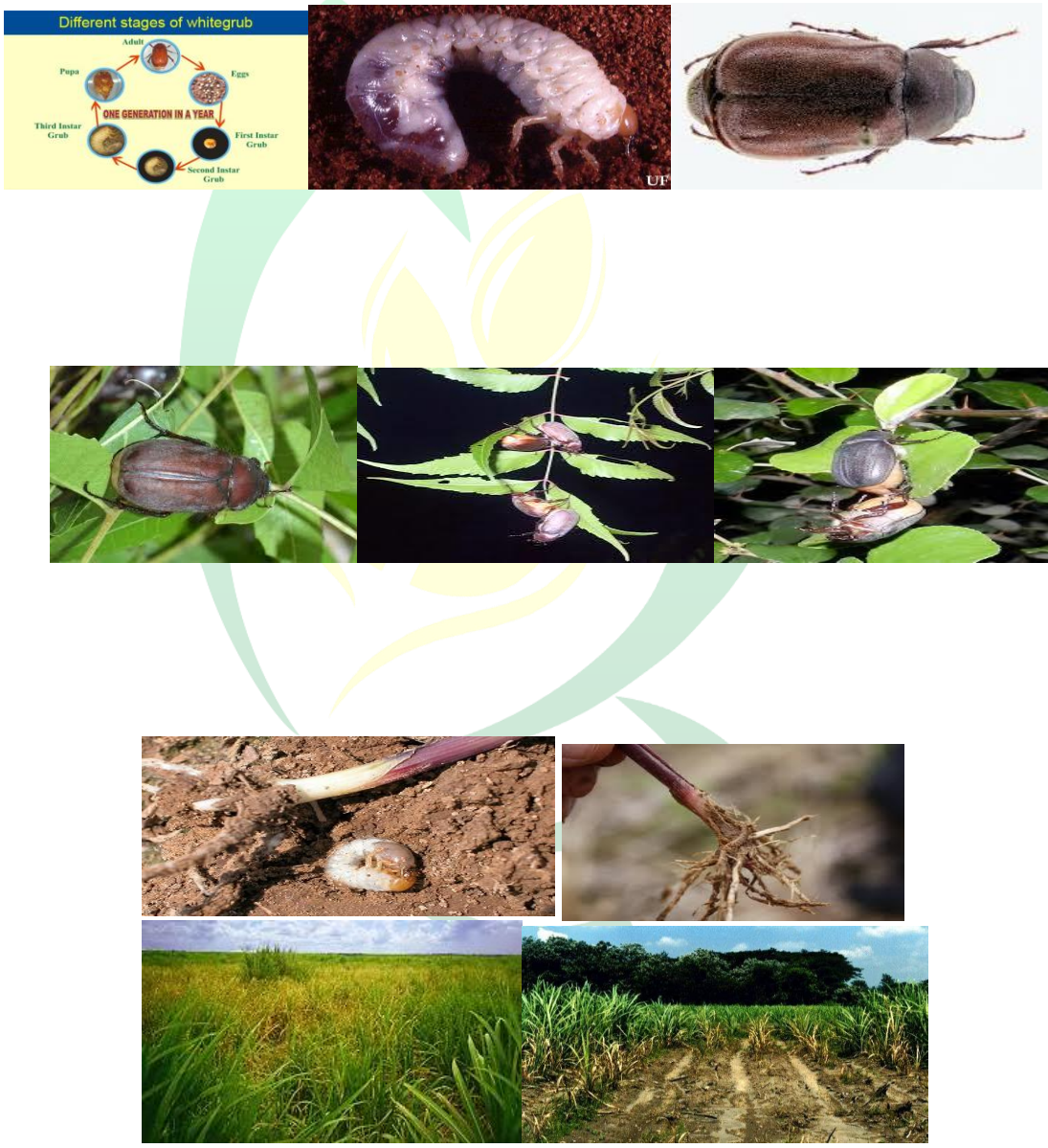
Host Plant:

- It is a polyphagous pest.
- Grubs feed on roots of sugarcane, maize, sorghum, groundnut, paddy, chilli, cotton, tobacco, potato, pulses etc.

Host plants of adult beetles:

- Mostly prefer Neem, Babul, Ber, and can be found feeding on mango, guava, fig, anar.



White Grub (*Holotrichia spp.*)

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Conclusion :

Sugarcane is one of the important cash crops in Maharashtra and even in India. In *India* the white *sugar industry* is of considerable *economic importance*. It is the second largest after the cotton textile industry. But its productivity is reduced due to pest problem which causes severe damage to sugarcane resulting in yield losses. The information generated in present study would be helpful in developing efficient pest management strategies against borers of sugarcane crop for increased production efficiency, profit besides safety to the environment.