


# CERTIFICATE

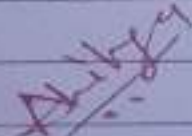
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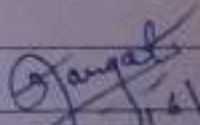
Miss Ratil Sanika Bhivaji

Roll NO. 7890 has satisfactorily carried out the required project work, prescribed by the Vivekanand college, Kolhapur (Autonomous) affiliated to the Shivaji University, Kolhapur for B.Sc. II course in plant protection and that this project represents her bonofied work in the year 2022-2023.

Date — 16-05-2023

  
Teacher in  
charge

  
Examiner

  
Head of the  
department  
Head  
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STUDY OF INSECT PEST :-

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Roll No :- 7890 [B.Sc II]

Subject :- Plant Protection  
[Department of Botany]

Date :- 10/05/2023

  
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16/05/2023

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## Rice — Stem borer

Classification : —

Class — Insecta

Order — Lepidoptera

Family — Crambidae

Scientific name : — Scirpophaga incertulas

Host name : — Oryza sativa

Life Cycle : —

Eggs — The female lays 15-18 eggs in mass near the tip on upper surface. A female lays about 2-3 egg masses and incubation period range from 5-8 days.

Larvae — Newly hatched pale white larva enters the leaf sheath and feed for 2-3 days and bores into stem near the nodal region. The fully grown larva is about 20 mm long in 33-41 days, white coloured.

Pupa — Pupa is dark brown about 12 mm long. Pupal period varies from 6-10 days.

Adult — The entire life-cycle is completed in 50-70 days.

Marks of identification —

Presence of brown coloured egg mass near leaf tip. In vegetative stage larva enters the stem and feeds on growing shoot and causes drying of central shoot known as "dead heart".

Nature of damage —

Larva causes the drying of central shoot called "dead heart" in young plants or drying of panicle called "white ear" in older plants.

October - December has been found conducive for the multiplication of the insects.

Host range — Mostly found in cereal crops such as rice, sorghum, maize, sugarcane, and pearl millet.

## Control measures —

Removal & destruction of rice stubbles from field and also collection and destruction of egg masses.

Collection and destruction of moths using light traps.

Seedlings root dip treatment for 12 or 14 hours before transplanting in 0.02% chlorpyrifos gives protection upto 30 days against stem borer.

By using chemical pesticides.

Spraying of fenitrothion or fenitrothion or endosulfan at 0.5 kg a.i./ha or fipronil 5% SC at 1 litre/ha.

## Sorghum midge

Classification :-

Class :- Insecta

Order :- Diptera

Family :- Cecidomyiidae

Scientific name :- Centurinia sorghicola

Host name :- Sorghum vulgare

Life Cycle :-

Eggs — The female lays flat oval eggs, about 200 on underside of leaves near midrib.

The eggs hatch in 2-6 days.

Larvae — The larva is pale white with black dots and brown head. The larvae remain dormant in winter and hibernate.



**Pupa** :- The maggot feeds inside the developing grain and pupates there itself. It emerges between the tip of the glumes leaving the white pupal case attached to the tip in a characteristic manner.

**Adult** :- The adult fly is very small, fragile and has a bright orange abdomen and pair of transparent wings. The life-cycle from eggs to adult varies from 14 - 30 days.

**Marks of identification** —

Plants become unhealthy & stunted and yellow.

The leaves wither from top downwards.

The midribs of leaves turn red due to egg-laying and may dry up subsequently.

**Nature of damage** — The maggots feed on the developing grains and cause the developing grains to shrivel and severe infestation has a significant effect on

the overall production of grains. The loss varies from 20-50%.

Host range :— Cotton, Sorghum, Soybean, pea, chillies, tomato, groundnut, gram, tobacco, okra, maize.

Control measures :—

Insecticides recommended for the midge in sorghum fields are carbaryl, lambda-cyhalothrin, and zeta-cypermethrin.

Setup of light traps till mid night to monitor, attract and kill adults.

Spraying of endosulfan 35 EC 7 litre, or phosalone 35 EC 4 litre / per hectare at nearly 90% ear-head emergence and repeated after 4-5 days. Phosalone 4% or Malathion 5% or quinalphos 1.5% dust at 12 kg/ha is also effective.

EC = Emulsifiable Concentrate.

## Sugarcane — Early Shoot borer

Classification :—

Class :— Insecta

Order :— Lepidoptera

Family :— Crambidae

Scientific name :— Chilo infuscatellus

Host name :— Saccharum officinarum

Life Cycle :—

Eggs :— The eggs are white and flat, laid in batches on the under surface of the leaves. Eggs are laid on the leaf sheath also. A moth may lay more than 200 eggs at a time, each cluster have 8-60 eggs.

Larvae :— Each caterpillar is white with five violet stripes. It migrates & attacks a number of shoots. The larval stage lasts for about 35 days.

**Pupa** :— The pupa is light brown in colour and the pupal period lasts for 10 days.

**Adult** :— The adult moth is small, pale grayish brown the hind wings are white in colour.

Total life cycle occupies 44-49 days.

**Marks of identification** :—

The central whorl of leaves dry up in the damage plant. It cause dead hearts in plants.

A number of bore holes at the base of the shoot just above the ground level.

**Nature of damage** :—

borer enters into young shoot & tunnels downwards.

The mother shoot dies completely if in early stages.

late attack induce profuse tillering.

**Host range** :— maize, sorghum, barley, oats, various grasses.

## Control measures : —

Light earthing up of the tillers at the early stages of the crop during May & June reduce the incidence.

Mulching with cane trash at early stages.

Cutting the affected tillers as close to the ground as possible and destroying them.

At 30<sup>th</sup>, 45<sup>th</sup> and 60<sup>th</sup> day of crop growth spray granulosis virus of Chilo infuscatellus at 500  $\mu$ l/ha.

## Cotton leaf hopper

### Classification :-

Class :- Insecta  
Order :- Hemiptera  
Family :- Cicadellidae  
Scientific name :- Amrasca biguttula  
Host name :- Gossypium hirsutum

### Life cycle :-

The female leaf hopper inserts about 15 eggs inside leaf veins, incubation period range from 4-11 days.

The nymphal period occupies 7-24 days depending on the other weather conditions.

### Marks of identification :-

Affected leaves turn yellowish and curl, leathery.

Nymphs are whitish pale green, wingless.

The midrib veins become roughened.

Nature of damage :— Both nymphs & adults suck up the plant sap from under surface of leaves. The vigour of plant is impaired to a great extent. Leaves shows symptoms of "hopper burn".

Host range :— Potato, brinjal, castor, bhendi, total tomato, sunflower.

Control measures :—

Cultivate of hairy (hirsute) varieties of cotton.

Adopt Synchronised sowing.

Treat seeds with *Beauveria bassiana* @ 10g/kg.

Apply nitrogenous fertilizers judiciously.

Maintain weed free condition in field.

Spray insecticides twice, 15 & 30 days after transplanting. Spray one of the following:

Fenitenthion 50 EC 80ml (or)

Fenthion 100 EC 40ml (or)

Quinalphas 25 EC 80 ml

# Cabbage butterfly

- Classification :-
- Class :- Insecta
  - Order :- Lepidoptera
  - Family :- Pieridae
  - Scientific name :- Pieris brassicae
  - Host name :- Brassica oleracea L.

## Life cycle :-

**Eggs** :- Eggs are laid in clusters under surface of the leaf. A single female lays only 2-3 egg-masses of 50-80 eggs each. Eggs are flask-shaped.

**Larvae** :- full grown caterpillars are 38-44 mm long, bluish-green in colour with black dots. larval & pupal periods - 5.2, 7.3 days during May.

**Pupa** :- Pupae are yellowish-green with black spots. Pupal period is extending upto 28-8 days



in January.

**Adult** :— Adult butterflies have snow-white forewings with black distal margins more developed in females than males : hind wings are also pure white with black apical spots.

Generally there are 2 generations during winter (plains) and 4-5 in summer (hilly region).

**Marks of identification** :— The males are smaller than females and have black spots on the underside of each fore wing.

The wings are pale white with a black patch on the apical angle of each hind wing.

The females measures about 6.5 cm.

**Nature of damage** :— On hatching, the young caterpillars feed gregariously on leaves for a couple of days, then disperse spreading infestation to adjacent plants and fields.

As a result of their feeding leaves are skeletonized.

Host range :- Cabbage, cauliflower, knol khol, turnip, radish, mustard, toria.

Control measures :-

Pest can be checked by hand-picking and mechanical destruction of caterpillars during early stage of attack.

In case of widespread infestation spray with 0.05% dichlorvos or 0.1% Malathion.

Use enviro-mesh or fine horticultural fleece as a protective barrier.

Grazers G3 is an effective spray to fight against cabbage white butterflies.

Tomato fruit borer

Classification :—

Class :— Insecta

Order :— Lepidoptera

Family :— Noctuidae

Scientific name :— Helicoverpa armigera

Host name :— Lycopersicon esculentum

Life cycle :—

Eggs :— The eggs are yellowish-white, ribbed & dome-shaped, 0.4-0.5 mm in diameter.

Larvae :— freshly hatched larvae are yellowish-white but gradually change greenish tinge. Full grown is about 40-48 mm long.

Pupa :— Pupae are dark-brown in colour, 11-14 mm long and have a sharp spine at the anal end. Moths are medium sized, stout.

Adult :- Hind wings are pale smoky-white with a broad blackish outer border. The entire life-cycle may be completed in 4-6 weeks.

Marks of identification :-

It is polyphagous pest.

The moth of this insect is of medium size yellowish brown in colour.

Caterpillars are light yellow in colour.

Nature of damage :- Eggs are laid singly, generally on leaves and flowers but sometimes on fruits. advanced stage larvae attack the fruits.

They bore circular holes and thrust only a part of their body inside the fruit and eat inner contents.

After damaging fruit later it is invaded by fungi and bacteria and spoiled completely.

Host range :— Cotton, castor, tomato, millets, tobacco, pigeon pea, okra.

Control measures :—

Hand-picking of caterpillars and their mechanical destruction in early stage of infestation.

In case of severe attack, 5% dust or 0.2% spray of carbaryl has been effective.

Spray application of HaNPV @ 250 LE/ha.

Some commonly used insecticides include carbofuran, chlorpyrifos, and quinalphos.

## Maize - Stem borer

Classification : —

Class : — Insecta

Order : — Lepidoptera

Family : — Crambidae

Scientific name : — Chilo partellus

Host name : — Zea mays

Life cycle : —

Eggs — Scale like eggs in overlapping rows, usually on the underside of leaves.

Larva — Dirty white with brown head having many dark spots on the body.

Pupa — Before developing into pupae, the larvae prepare an exit for adult. The straw-coloured or yellowish brown moths, which are about 15 mm long.

**Adult** — Straw-coloured with pale yellow grey forewings with black specks along caudal margin. In males, hind wings are pale straw coloured and in females, hyaline.

### Marks of identification —

Symptoms in maize plant include dead heart, plant death, dieback, internal feeding and presence of frass in the stems.

Small holes in straight lines on the youngest leaves.

### Nature of damage —

The initial symptom is rows of oval perforations in leaves of the unfolding whorl.

This damage is caused by feeding of young larvae. It damage the growing point.

**Host range** — Sugar cane, rice, cyanodan  
dactylon, Maize, etc.

## Control measures

Destroying volunteer and alternate hosts eliminates stem borer.

2) Crop rotation with cotton, groundnut or sugarcane most effective against stem borer.

Trichogramma chilonis cards 2 to 3 per acre.

Use Carbofuran 3G @ 3kg per acre.

Application of fertilizers.



## Maize - Shoot fly

### Classification :-

Class :-

Insecta

Order :-

Lepidoptera

Family :-

Crambidae

Scientific name :-

Altherigona orientalis

Host name :-

Zea mays

### Life cycle :-

Eggs :- Average 40 eggs are laid by a female.

Larva :- Larval period 10-12 days. 4 instars present.

Pupa :- Pupation in stem. Pupation period about a week.

Adult :- Longevity is 12-14 days.

Total life-cycle is completed in 2-3 weeks.

Marks of identification :- Shoot fly is one of the major insect affecting spring maize in North India.

Growing shoot results in "dead hearts".

**Nature of damage** :- Maggots on hatching from eggs bore into central shoots and kill growing point. They feed on the decaying core of the shoots. Plant gives out tillers and gets bushy appearance.

**Host range** :- Maize, wheat, grasses, millets, etc.

**Control measures** :-

Seed treatment with imidachloprid 70 WS 10 g/kg of seeds.

Plough soon after harvest, remove & destroy the stubbles.

Soil application of phorate 10:1. CG 10 kg/ha at the time of sowing.

Apply any one of the following insecticides.

- Methyl demeton 25 EC @ 2 ml/l.
- Carbofuran 3:1 CG @ 20 kg/ha.
- Phorate 10:1. CG @ 1 kg a.i./ha

Mango - Stem borer

Classification :-

Class :-

Order :- Insecta

Family :- Coleoptera

Scientific name :- Cerambycidae

Host name :- Balocera rufamaculataMangifera indica

Life cycle :-

The eggs laid singly on bark or branches hatch in about 1-2 weeks.

The grub feeds for 3-6 months, pupates inside tunnel itself.

The adult emerges in about 4-9 months, has two pink dots on thorax and about 50 mm long.

Marks of identification :- Adults are 3-5 cm, grayish brown, with 2 kidney shaped orange-yellow spots on the sides of the thorax.

### Nature of damage

The grubs feed normally the branches and cause wilting & sap exuding starts drying up.

### Host range

copal, Jackfruit, cashew nut, common fig, mango, rubber, etc.

### Control measures

The attacked portions should be removed and destroyed.

The grubs can be killed by pouring chloroform, petrol, or by pouring carbondisulphide into hole and then closing the hole with mud.

Banana

Rhizome weevil

## Classification :-

Class	:-	
Order	:-	Insecta
Family	:-	Coleoptera
Scientific name	:-	Curculionidae
Host name	:-	<u>Cosmopolites sordidus</u> <u>Musa spp.</u>

## Life Cycle :-

Eggs are laid singly and the newly hatched larvae bore into the corm.

The egg, larval and pupal stages are completed in 5-7, 15-20 and 6-8 days, respectively.

Adult can live over two years without food.

## Marks of identification :-

White coloured eggs present on the upper part of rhizome.

White coloured pupa, occurs in inside the corm.

Grubs bore into rhizome and cause death of plant.

Nature of damage : — The dark weevil oviposits in root stock or leaf sheath just above the ground level. The grubs & adults bore into the rhizome and cause stunting of rhizome development. Shows reduction of leaf number, bunch size & fruit number, weakening the plants.

Control measures : —

Adopt strict field sanitation by removing infected plants and destroying them.

Deep ploughing before planting to expose the weevils to sun and predators.

Setting traps in the field.

Drenching with chlorpyrifos 0.1% emulsion in the soil before planting may afford some relief.

  
Wankar  
16/05/2023