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**B.Sc. Zoology Part I**

**IMPORTANT PADDY PESTS THEIR LIFE HISTORY AND CONTROL**

- Paddy (*Oryza sativa*) is the important kharif crop of India. It is attacked by more than three dozen potential pests of paddy. Some of them which cause most serious damage are following:-

**1. *Tryporyza incertulas*:-**

**Systematic position**

Phylum: Arthropoda  
Class: Insecta  
Order: Lepidoptera  
Family: Pyralidae  
Genus: *Scerpophaga* (*Tryporyza*)  
Species: *incertulas*

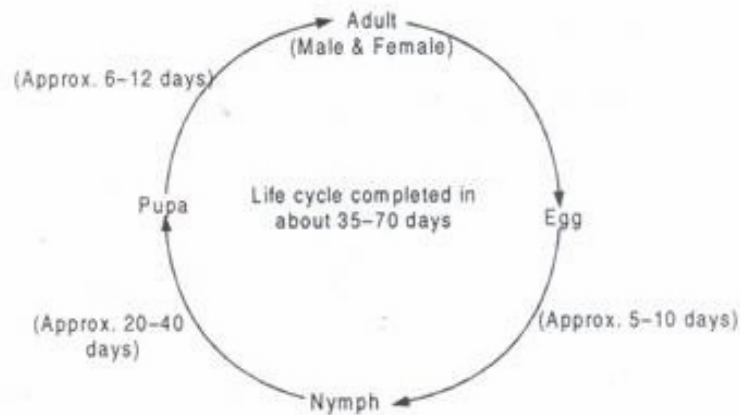
**Introduction:**

- It is a monophagous pest belonging to order **Lepidoptera**. It is found throughout India including **Bihar**.

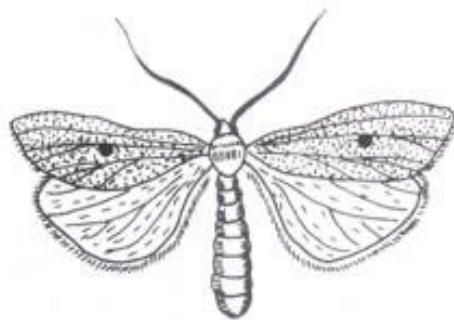
**Life cycle:**

- Adults show sexual dimorphism.
- Females are yellowish brown to orange yellow in colour, with wing span of 3.0 cm, one black spot in the middle of fore wing and tip of abdomen bearing yellowish to buff coloured anal tuft of hairs.
- Males are slightly smaller in size; have yellowish forewings containing 6-7 small blackish spots. Eggs are laid on upper leaf surface in masses of 15-80 and are covered with buff-coloured hairs.
- The number of eggs laid by a single female moth is up to 150.
- Eggs are oval, flattened and whitish in colour. Eggs hatch in about 5-10 days.

- The instar larvae get dispersed with the help of silken threads and wind. Then they bore into the rice stem. Generally only one larva enters a plant.
- The larvae feed on the internal tissues of the stem and undergo 5-6 moults.
- They usually feed on the lower part of the stem and migrate from one plant to another to mature.
- A fully grown larva is formed in about 20- 40 days depending upon the climatic conditions.
- Larva makes an exit hole and pupates within the larval tunnel, usually at the base of the plant.
- Pupation takes place inside a whitish silken cocoon within the rice stem, near the root-stem joint.
- Before pupation larva cuts an exit hole on the stem, above the surface of water and covers it with a silken web as an exit for emerge.
- It remains in pupal stage for 6-12 days (may prolong up to a month in certain season).
- Total life cycle takes about 45 days and 4-5 generations can be completed from April to October.
- Generally two or three generations of this pest is completed during a single crop. Winter and heavy rains are inimical to this pest.



**Fig; Life cycle of *Tryporyza insertulas***



**Fig; Adult *Tryporyza insertulas***

### **Damages:-**

- Its larva bores into the stem causing drying of the central shoots or dead hearts in young plants and white scars on drying off panicles in older plants.
- It is commonly called **paddy stem borer**.

### **Control:-**

- (i) The affected plants should be removed and destroyed.
- (ii) Plough the field after harvest.
- (iii) Collect moths by setting light traps and destroy.
- (iv) Always cultivate resistant variety of paddy in infested area.
- (v) Give three spraying fortnightly of parathion 0.05% or diazinon 0.05% or phosphamidon 0.1%.
- (vi) Lindane 2.5 kg ai/ha or carbofuran 1.5 kg ai/ha can be applied to paddy water.

### **2. *Leptocorisa varicornis*:-**

#### **Systematic position**

Phylum:	Arthropoda
Class:	Insecta
Order:	Hemiptera
Genus:	<i>Leptocorisa</i>
Species:	<i>varicornis</i>

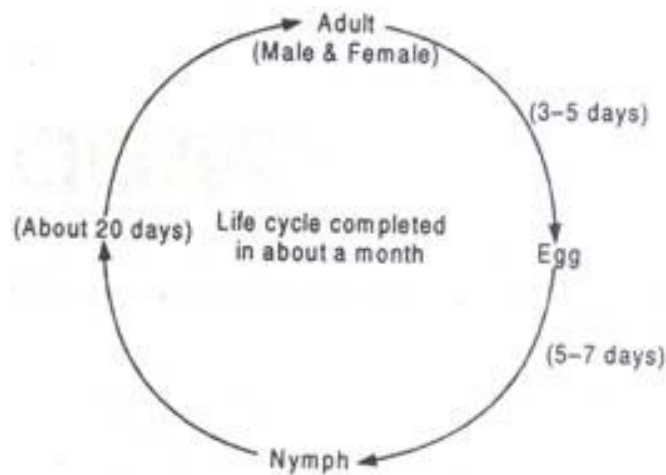
#### **Introduction:**

- It emits characteristic buggy odour, hence it is commonly called '**Rice Gandhi bug**'.
- It is found throughout India but it is a major pest in Bihar, Assam, M.P., U.P., Rajasthan, Tamil Nadu and Kerala.
- It belongs to family **corcidae** of order **Hemiptera**.
- It is polyphagous.
- Its both nymph and adult suck milky juice from the developing paddy grains.
- It causes 40-50% loss of the paddy crop.

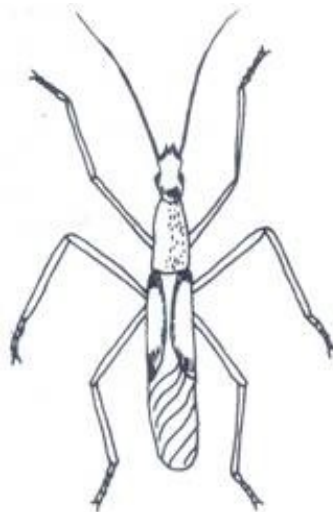
#### **Life cycle:**

- After copulation female lay eggs symmetrically, into two or three rows.
- Eggs are dark coloured, oval in outline and flattened at the top.
- Eggs hatch in about a week.
- The young nymphs have slender green body and longer legs.
- These nymphs generally take about twenty days to attain full maturity.
- All e stages of developing bug clusters round the ripping ears and suck out the juice.
- This pest is more common during July to November.
- During winter their breeding rate is lowered much and the adults manage to tide over the cold on several species of grasses.

- On paddy it has five broods during the season.



**Fig; Life cycle of *Leptocorisa varicornis***



**Fig; Adult *Leptocorisa varicornis***

**Damages:**

- They infest paddy crops in large number when it comes to flower.
- With their sucking mouth parts they suck out the milk from the newly formed grains which soon shrivel.
- The stalk remains quite sound but without grains.
- The loss caused to paddy by this pest varies from 5 to 25 %.

**Control:-**

- (i) Pests should be light trapped and killed.
- (ii) Dusting of 10% B.H.C. dust.
- (iii) Spraying of 0.05% Bidrin or Fenthion or Carbaryl or 0.075% Diazinon.
- (iv) Wild grasses should be removed from the field.

### 3. *Hispa armigera*:-

#### Systematic position

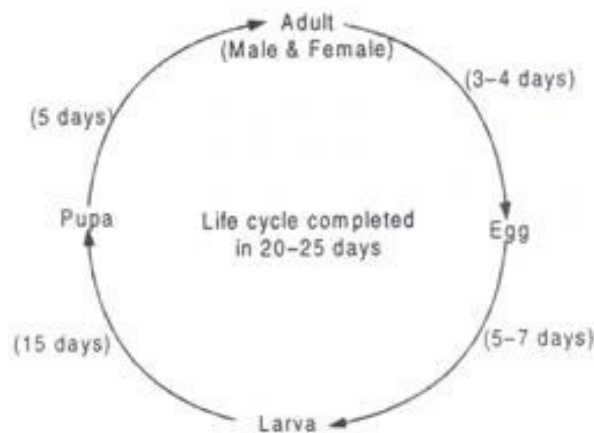
Phylum:	Arthropoda
Class:	Insecta
Order:	Coleoptera
Family:	Chrysomelidae
Genus:	<i>Dicladispa</i>
Species:	<i>armigera</i>

#### Introduction:

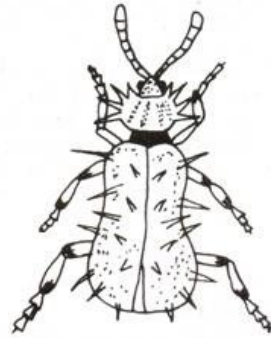
- It is commonly called **Rice Hispa**.
- It is small blue black beetle covered with bristles on dorsal surface.
- Its grub is a leaf miner.
- It is a major pest in some rice growing states.
- It is a serious pest in Assam, Bihar, M.P., Odisha, W. Bengal, Punjab, Kerala and Manipur.

#### Life Cycle:

- The female beetle starts laying eggs only 3-4 days after emergence and continues to do so for a month.
- A female lays up to 300 eggs.
- Eggs are pushed inside the leaf tissues singly close to the leaf tips.
- The hatch in about 5-7 days.
- The grubs start feeding on the mesophyll portion of the leaf and become fully grown in about 15 days.
- Pupation takes place inside the tunnels formed by larvae which lasts for nearly 5 days.
- The total life cycle is completed in about 20-25 days.
- The maximum life span for adults is about 80 days.
- Generally six life cycles are completed by the insect in one year.
- In the absence of rice the insect keep themselves alive on **graminaceous** weeds.



**Fig; Life cycle of *Hispa armigera***



**Fig; Adult *Hispa armigera***

**Damages:**

- The adult feeds on chlorophyll of the leaf.
- The grub mines into the leaf tissues and feeds in between two epidermal layers of the leaf.
- A yellow blotch develops round the grub.
- The infested crops become stunted and leaf tops dry up.

**Control:-**

- (i) Dusting of 5% B.H.C. and spraying of 0.25% DDT is effective.
- (ii) Clipping off and destroying of leaf tips in nurseries while transplanting.

**4. *Pachydiplosis oryzae*:-**

**Systematic position**

Phylum:	Arthropoda
Class:	Insecta
Order:	Diptera
Family:	Cecidomyiidae
Genus:	<i>Pachydiplosis</i>
Species:	<i>oryzae</i>

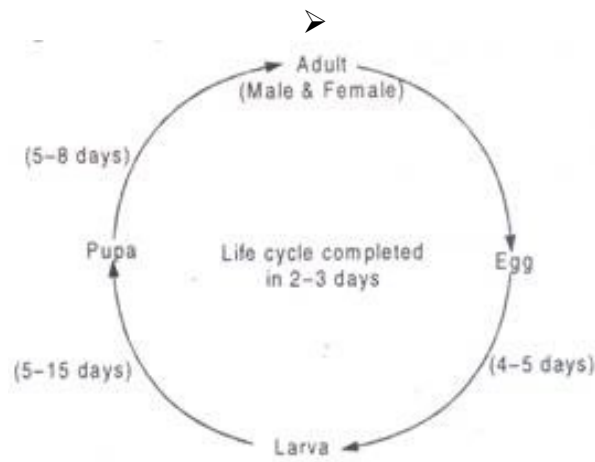
**Introduction:**

- Its adult is a small mosquito like fly.
- Its maggot is white or pinkish in colour.
- It burrows in the shoot and causes the characteristic silver shoots.
- As a result, hollow outgrowth takes place in place of normal filters.
- It is also a serious pest in Assam, Bihar, W. Bengal, A. P., M. P., Tamil Nadu and Karnataka.

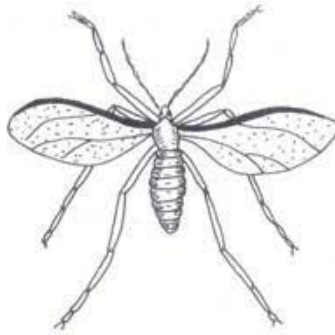
**Life Cycle:**

- The elongated pinkish eggs are laid at the base of the paddy leaves either singly or in clusters.
- The maximum number of eggs laid by a female is 200.

- The larva hatches in about 4-5 days. It crawls between the leaf sheath and try to reach the apical point or the growing point.
- After that it starts feeding.
- As a result of continuous feeding and irritation, an oval chamber is formed around the maggot.
- These chambers grow out as elongated, cylindrical gall known as the “Silver Shoots”.
- The larval period lasts for 5-15 days, depending upon the climatic conditions.
- The full grown larva is about 3mm in length and pale red in colour.
- After the formation of the gall the larva pupates inside it.
- After 5-8 days of pupation, the adult fly emerges out from the gall.
- The whole life cycle is completed in about 2- 3 weeks.
- The tillering stage of the paddy crop is most susceptible to the attacked by this pest.



**Fig; Life cycle of *Pachytiplosis orizae***



**Fig; Adult *Pachytiplosis orizae***

**Damages:**

- The maggot enters into the plant tissues and stimulates the formation of hollow tubular out growth called, “Silver Shoots”.
- Such tillers do not produce grain and the affected plant ultimately dies.

- Sometimes abnormal growth of the infected plant has been observed which may be due to the irritation caused to the plant by the developing maggots inside the stem.
- The loss done to the crop by this pest varies between 10-15 %.

**Control:-**

- (i) Insects should be light trapped and killed.
- (ii) Spraying of DDT and B.H.C. dust kills the adult and eggs.
- (iii) Spraying of Diazinon 0.5 to 1.5 kg ai/ha (3-4 rounds at 15-20 days intervals).

**5. *Nymphula depunctalis*:-**

**Systematic position**

Phylum: Arthropoda  
 Class: Insecta  
 Order: Lepidoptera  
 Family: Pyralidae  
 Genus: *Nymphula*  
 Species: *depunctalis*

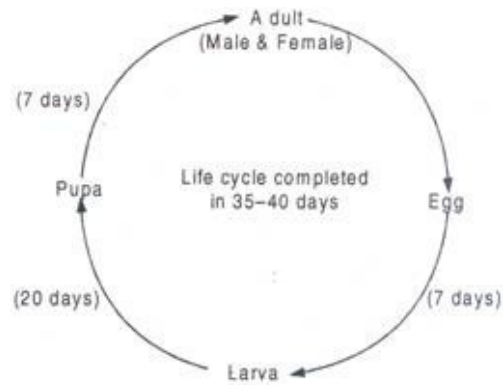
- The adult is a small moth with wings.
- The wings are white-specked with pale brown markings.
- The caterpillars are slender with hairs on the body and remain inside a case 3-5 cm long made of paddy leaves.
- Hence it is commonly called paddy case worm.
- It is a serious pest in Assam, Bihar, Odisha, Karnataka, A. P., Maharashtra, Tamil Nadu and Manipur.

**Life cycle:**

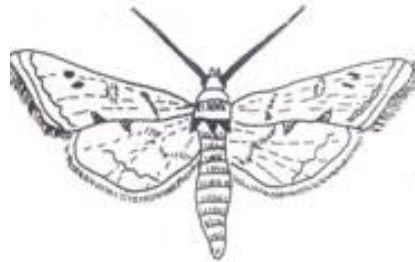
- Tiny eggs are laid on leaves and leaf sheath in rows and batches.
- Under South Indian conditions a female lays about 150 eggs which hatch in about a week.
- Young larvae feed by scrapping the leaf surface.
- The larva makes a cylindrical, tubular case out of a portion of the leaf cut and remains inside it, moving with the case on the leaves.
- It feeds on the leaves actively and becomes fully grown in about 20 days reaching a length of 1-12 mm.
- The caterpillars undergo six instars and is characterized by the presence of tubular gills on its body.
- The gills become branched with the growth in the caterpillar's size.
- Larger cases are made by the succeeding larval instars.
- The larval stage pupates inside the last case.
- Before pupation the case is attached to the leaf sheath above the water level and its both ends are plugged.



- The pupal period lasts for about a week, after which it is converted into an adult insect.
- The pest is active during the monsoon and there may be two or three broods in a season.
- The life cycle is completed in about 35-40 days.



**Fig; Life cycle of *Nymphula depunctalis***



**Fig; Adult *Nymphula depunctalis***

**Damages:**

- The larva cuts the leaf blades and constructs a tubular case inside which it remains and feeds on the green matter leaving characteristic white marks.
- The attack by this pest can easily be detected by the presence of large number of green tubes of leaves floating on water in the paddy fields.

**Control:-**

- Drain out the water.
- Thin film of kerosene oil on water kills the larvae.
- Dusting of 10% B.H.C.
- Spraying of phosphamidon 300-500g ai/ha, monocrotophos 500g ai/ha, fenitrothion 500g ai/ha.

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