

Destruction of Paddy-by-Paddy Swarming Caterpillar (*Spodoptera mauritia*) in Assam

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Abstract - Paddy swarming caterpillar (*Spodoptera mauritia*) *boisduval* (Noctuidae Lepidoptera) is occasional pest which cause damage to rice crop. It is also called as Lawn Armyworm. It is a major pest throughout the world as it was able to eat many types of food. It affected more than 500 hectares of area in one district. The species was first described by Jean baptiste boisduval in 1883. It was spread from the Red Sea to India, Myanmar, Srilanka, Malaya to Australia its larvae can feed on various grasses such as rice, wheat, cynodon, pennisetum, clandestium, sorghum. *Spodoptera* pest is considered as one of the major international agricultural pests on crops and pastures. Upland rice is a major host. Hectares of land has completely damaged by this pest in the paddy field and it was grazed by cattle in many parts of India like Sambalpur district in Orissa, and sundargarh district is also affected locally it is called as "Patarkatti". This armyworm infests paddy crops of less than 20-25 days old. The insect usually occurs on rice from July to September. generally, nursery and early growing stages are seen to migrate from one place to another. if the outbreak is severe it leads to heavy crop yield loss.

INTRODUCTION

Rice (*Oryza sativa*) belongs to graminiae along with wheat, corn, millets, oats, barley, rye etc. In Asia *Oryza sativa* is divided in to 3 subspecies Indica, Javanica, Japonica. Indica refers to tropical and subtropical varieties grown throughout South and Southeast Asia. Javanica designated into bulu and gundil which are owned and awnless which grows in Indonesia. Japonica usually grown in northern californi ait is an annual grass plant. Height of a half meter or two meters but there are some varieties that grow much taller (6-9meters). Bears flat leaves and terminal panicle (flower cluster), made up of spikelet that produce grain and having round hallow joint stem. The processed rice called brown rice, contains 8%

protein and fat in it as the source of thiamine, riboflavin, calcium, iron, niacin. Milled rice without bran is called white rice with diminished in nutrients and it is a source of magnesium and manganese. The harvested rice kernel also called as paddy is enclosed by hull or husk. Rice feeds world with 60% of its caloric intake and 75% of the protein in developing countries. During the green revolution effort to decrease world hunger to produce improved strains of food crops including miracle rice which is disease resistance and increase productivity. The principle cultivating countries are India, China, Japan, Bangladesh, Indonesia, Myanmar, Thailand and others like United States, South Korea, and Brazil. The paddy usually takes 3-6 months from germination to maturity which depends on the variety and environment. The rice growth cycle of rice agronomically in three phases vegetative, reproductive, and ripening. emergence and germination occur in vegetative phase. Reproductive phase is associated with formation, development and maturation of panicle and grain. Rice varieties can be grouped into two groups short duration variety is about 105-120 days, in tropical environment spend 60 days for vegetative phase, 30 days in reproductive phase and 30 days for ripening phase and long duration variety is about 150 days. Insect pest attacks in all plant portion of rice in all plant growth stages by feeding guilds which consists of root feeders, stemborers, leaf hoppers, plant hoppers, defoliators and grain sucking insects and some attacks in rice grains in storage also the lawn armyworm is a dangerous pest which causes severe damage in rice crop. The larvae of army worm infect and move from one field to another field like an army infecting the entire crop (Krishnaiah *et al.*, 2008). In India it was reported from Kerala, Tamilnadu and Orissa (Tanwaret *al.*, 2010). The insect is polyphagous and

causes damage to different crops of Gramineae family and some weeds. Plants which are infected by lawn armyworm have skeletonized leaves, some plants have holes on whole leaf or even entire young plant can be destroyed.

ABOUT SPODOPTERA MAURITIA

The lawn armyworm, *Spodoptera Mauritia* (boisduval), in 1953. It was first recorded correctly from Hawaii (Pemberton, 1955) and exactly in a year (Tanada, 1955) became most serious pest of lawns particularly in Bermuda grass plants. Recently Fletcher in 1956 placed subspecies of Hawaiian specimens, *S.mauritiaacronyctoidesguenee*, rather than in the nominate subspecies. In Hawaii the present importance of *S.mauritia* and limited knowledge of its biology has promoted this study. They are present in flocks and they destroy the whole seedling of a particular field and they move to another field, so they are called as 'armyworm'. Occasionally serious damage will cause to rice crop by this polyphagous species. Insect eggs lay hairy irregular mass of size 0.5cm across the painted wall of house. Moths have a wingspan of 40mm and are ashy gray. Due to the nocturnal habit of females, they mate just after 24 hours of emergence. On various types of grass weeds and rice leaves they start to lay eggs 200-300 in a batch after mating. The baby caterpillars are about 0.1 cm long with big black head. Young caterpillar is green and smooth with longitudinal lines, whereas larvae descend from wall on silk and threads. After this, caterpillar turn brown on front and back with two rows of triangles. If we disturb the head in the middle, they drop and curl into spiral shape. Smooth, cylindrical larvae have C-shaped black spots of two rows having dorsal stripes and pale body. Larvae feeds on leaf tissues and their final length is 3.8cm undergo six larval stages. Pupa pupates in an earthen cocoon in soil and it is in dark brown color which measures 16-17mm long. In a cocoon dug pupation takes place in the soil. The adult moth is brown colored having complex pattern on the forewings with light marks. The pheromones of this species are identified. This moth preyed by the bolas spider of *Selaena* species. On the end this spider oscillates a silk thread with a sticky nobe which emits a copy of a female moths pheromones that attracts male moths. These Caterpillar usually feed at night on leaves and defoliate plants totally. Generally, in large

number of big swarms devastate the whole crop overnight after finishing of one field crop the swarm shifts to another field in a regular army formation. The loss of yield due to this pest varies from 10-20%.



SYMPTOMS OF DAMAGE

Larva cut the seedlings in large scale and feed exposure by cattle is seen in severe infested fields. They feed gregariously and shifts from field to field. The caterpillars feed on plants and cause damage in the form of skeletonized leaf, shotholes on leaf blades, and stem dieback. The swarming caterpillar infect crop by cutting leaf tips, leaf margin and even plants at the base.

LIFE CYCLE

In kharif season this pest is active but the damage appearance is notified in early part specially in cases after good rains which appears in a true armyworm. Actually, there are 3-4 broods in a season among this 2nd brood is the most dangerous. It completes 2-3 generations in a year. Duration of various stages in which it takes egg-7days, larvae-30days, pupa 8-10 days.

ADULT

For oviposition, the adult moth moves long distance (Strong fliers). After 1-2 days of the emergence of seedlings the moth mates and starts oviposition. For oviposition 4-20 days seedlings are preferred in flooded area. Egg laying occurs rarely on rice plant during early infestation. Generally, first instar larvae migrate to rice plants from grasses/weed. Usually, females tend to oviposit in the same area. After the germination of seeds in direct sown fields the first-generation moths appear.

EGG

Generally, females lay eggs on the tip of upright leaves which contains around 150-200 eggs. Eggs are covered with gray hairs from the anal tuft of the female. Usually, Egg is creamy colour while laying and turns a brown tinge when development proceeds. For oviposition it takes 4-6 days and on the first night after mating the female lay minimum number of eggs around one ranging 528-1084. Egg has incubation period of 3-9 days.

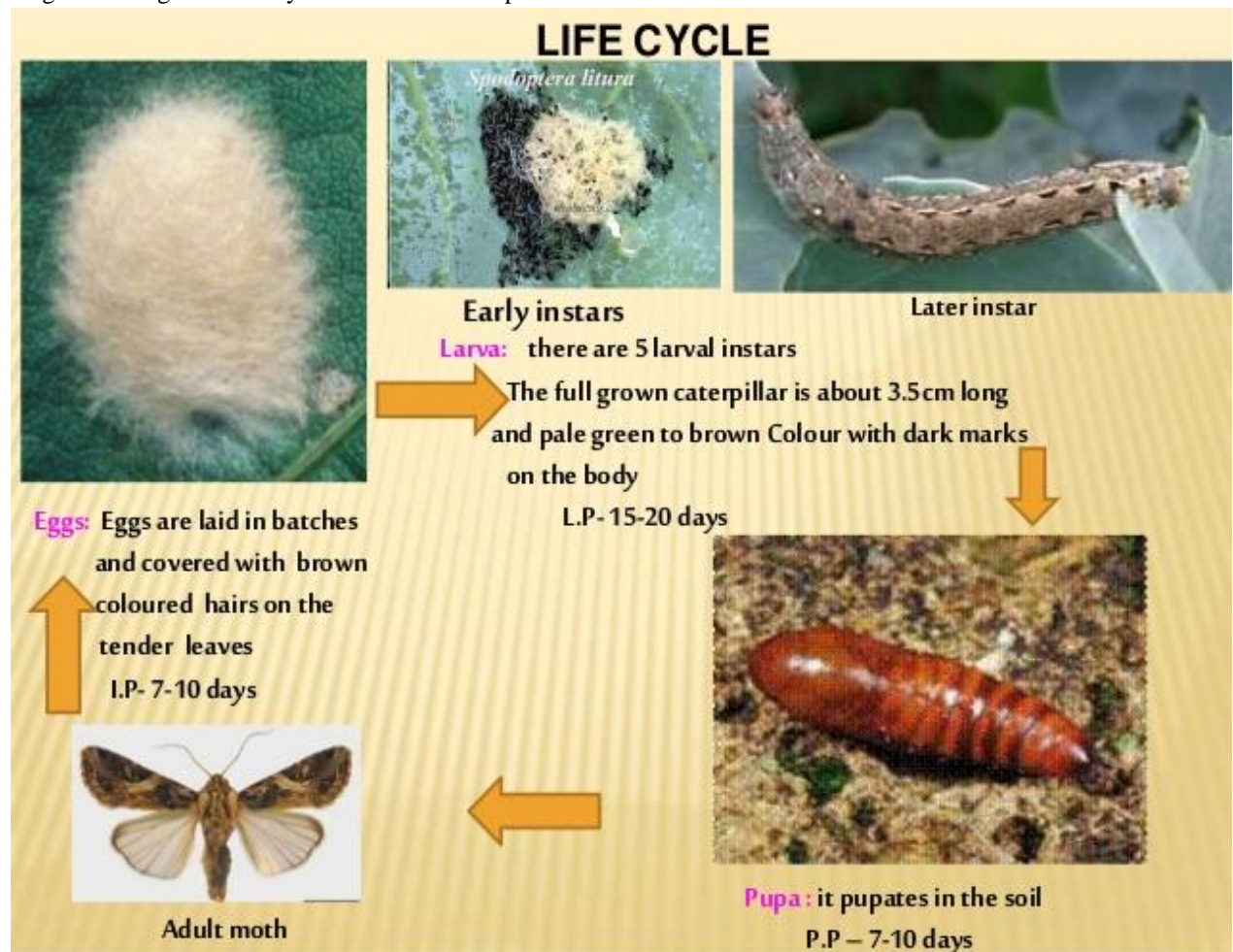
LARVAE

Hatching occurs during mornings and newly hatched larvae rest on rolled edges of leaves and feed on green matter from the leaf tip. They are almost invisible. This newly hatched larvae are difficult to identify on foliage as they are light green with yellowish white lateral and dorsal strips which are about 2mm in length. During 17-32 days of larval development

period the larvae undergoes 5-6 instars. Those beyond 3rd larval instar hide during daytime as they are perfectly nocturnal. They remain active during the day if the weather is cloudy. When caterpillar grows, they turn into greyish brown color with a crescent shape black spot on each side of segment. Upper margins of lateral stripes are reddish in colour. The pattern of feeding describe that late instar armyworms caused sudden damage in the fields. The last instar produces frass which in weight is 5times heavier of that previous instar. The fully grown larvae has dark colored head capsule with pale forked line of 35-40mm long with dull dorsal and subdorsal strips.

PUPAE

Matured larvae burrows in soil in an earthen cell slightly beneath the ground portion by selecting suitable places for pupation. Slender apical spines and finally this period lasts for 7-10 days.



MANAGEMENT PRACTICES

Culture control

- Crop rotation is helpful in control the pest.
- The larvae and pupae are exposed by deep ploughing the field in summer for predation by birds.
- By using bamboo purchase stops predation by birds
- By digging a trench around the infested field, the shift of caterpillar can be prevented in case of heavy infestation.
- By removing weeds and excess nurseries from the fields.
- The larvae come out to the surface by flooding the fields and nurseries so that larvae can be predated by birds if ducks were let into field will feed on caterpillars.

Mechanical control:

- As this pest attracts in night so the light traps should be used to trap them.
- To kill the pest and prevent migration of larvae from one field to another field apply malathion or endosulfan dust along the bunds.
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Biological control:

- In the seedling stage the nurseries may flooded with water which brings caterpillar to the surface where they are picked up by predators.
- The usage of spray solutions containing Nucleopolyhedrovirus and nematode steinernemacarpocapsae are also effective against the paddy swarming caterpillar.

Chemical control:

- Spray Chloropyriphos 20% EC 1250ml/ha at late evenings.
- Dusting of Chloropyriphos 1.5% D.
- The caterpillars are effectively controlled by application of contact insecticide like BHC, Carbaryl, Methyl parathion.
- To be more effective dusted with insecticide in early stages of infection to control migration of caterpillar from one field to another field.

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