Other Rice stem borers:

Apart from yellow stem borer (YSB), *Scirpophaga incertulas* (Walker), white stem borer (WSB), *Scirpophaga spp*, dark headed stem borer (DSB), *Chilo polychrysus* (Meyrick), pink stem borer (PSB), *Sesamia inferens*, striped stem borer (SSB), *Chilo suppressalis* (Walker), gold-fringed rice borer (GFB) *Chilo auricilius* (Dudgeon), and spotted stem borer (SSB), *Chilo partellus* (Walker) are reported as pests of rice from India.

Description: The forewing is brownish ochreous with a raised dark metallic spot in the cell, a series of small black dots covered with golden scales. Female is paler with all metallic spots. Hindwings are whitish to dirty cream. Young larvae are greyish-white, with a distinctive black head and prothoracic shield. Fully grown final-instar larvae are 21- 25 mm long, creamy-white with five purplish-brown stripes (3 dorsal and 2 lateral) along the body. The head and prothoracic plate are dark-brown to black. It is similar to *C. auricilius*.

Biology: Eggs are flat, scale like and laid in clusters overlapping each other on the lower or upper leaf surface in longitudinal overlapping rows, each cluster containing up to 80 eggs. Fecundity is around 488 eggs. Ovipositional period is 3 days. Egg period is 6 days in Kerala. Larvae feed for 23-36 days and there are 6 instars. Pupal period is 4 days. It pupates in the larval tunnel. No dormancy or diapause has been reported.

Host plants: Maize and sugarcane are the cultivated hosts apart from 33 other species being reported as alternate hosts.

Gold fringed borer: *Chilo auricilius* (Dudgeon)

Distribution: *C. auricilius*, the gold-fringed borer, is an important pest of sugarcane and rice in the Oriental region. The distribution range of *C. auricilius* overlaps with that of its look-alike *C. polychrysus*. The adults can be distinctly differentiated by their genitalia and larvae by thoracic chaetotaxy (Rao and Nagaraja,1966). Though primarily a pest of sugarcane it was a major pest of rice in Orissa and is the only rice borer in hills of Kalimpong (Ref). It is also found in West Bengal, Bihar, UP, Gujarat, Jammu& Kashmir.

Description:

The forewings are 8-13 mm long, with yellow or occasionally brown colour, and are variably ornamented with brown scales. A discal spot is present and there are rows of sub-terminal and median metallic scales. There are also a few small silvery specks in the middle of the wing, the terminal dots are large and the fringe is shiny gold. Coloration is variable and in some cases the forewings are uniformly yellow. The hindwings are light brown. Coloration and pattern of silver specks on forewing is highly variable. Sometimes the silvery specks are irregularly dispersed, while in other specimens they form two parallel transverse lines. First-instar larvae are about 1 mm long and creamy-white, with a black, dorso-ventrally flattened head. A full grown larva is cream to dull in colour; head dark fuscous, body with 5 violet stripes. (Bleszynski,1970). But Dale (1994) reported that larvae have only 4 stripes and the dorsal stripe is absent. The crochets on the abdominal prolegs form a complete circle.

Biology: Eggs are laid on the under surface of the rice plants and at times also on the leaf sheaths. The oviposition period is 3 days and nearly 123 eggs are laid per female. The eggs hatch in 5-7 days. The larval period varies from 30- 32 days undergoing six moults. The pupal period is for 6 days. The postero- lateral and postero -dorsal spines on cremaster of pupae are more prominent. There are 5-7 generations in India. The insect is active during and just after monsoon (Rao and Rao, 1980).

Striped stem borer: *Chilo suppressalis* (Walker)

Distribution: Reported from plains of India (Fletcher 1919), Assam, West Bengal, Bihar and Orissa (Nair, 1986) and Kerala. In extensive field studies of lowland rice in Bangladesh and Eastern India in 1974-81 and 1985-87, *C. suppressalis* was found on only a few occasions. (Srivastava *et al*., 2003).

Description:

Adults are dirty white to yellow-brown, variably sprinkled with grey-brown scales; metallic scales absent. Hind wing white to yellow brownish. Male Head and thorax of the male insects are brown and abdomen is pale. Forewing with apex somewhat acute, ochreous wholly suffused with brown except a patch in cell and a streak below median vein, with a marginal series of black specks (Ghai *et al*., 1979). Larva are dull yellow coloured; head, prothoracic shield and mid dorsal tubercles of meson ad metathorax are ochreous ; with 5 distinct (one median, two sub dorsal and two lateral) and 2 distinct sub lateral stripes,

Biology:

No information on biology in India is available (Nair, 1986). However it has been reported from many temperate regions like Japan and China where it is a major pest. It's a polyphagous pest feeding on many weeds.

Pink stem borer: Sesamia inferens Walker

Distribution:

Ghai *et al*. (1979) reported this species from Navsari, Bassein, Nagpur, Surat, Pusa, Rajasthan, Coimbatore and Bellary. Nayar (1986) reported that it was found all over India but occurs as a serious pest of rice in Andhra Pradesh and Tamil Nadu only and low infestation in northern hilly tracts. Dale (1994) remarked that it is the least destructive pest among the rice stem borers.

Description:

Adult are whitish to dark straw colored; head and thorax, without dark hairs; Forewings has a distinct and continuous dark brown streak; Hind wing white in colour. Sexual dimorphism is conspicuous. The male moth is slightly smaller than the female and has pectinate antenna.

The female has filiform type of antennae. Larva is purplish pink dorsally and white in colour ventrally with an orange red head capsule and the head is relatively large as compared to the rest of the body.

Biology: Female moth lays more than 400 eggs in batches of up to 161 eggs (Nair, 1986).They are laid between leaf sheath and stem in rows of 2-3 or on soil surface near base of the plant. They are creamy white to dark and naked. Egg period varies with season, 4-9 days in summer and 9-25 days in winter. The caterpillars do not tend to congregate but disperse early. Larval duration is for 3-4 weeks with 5-7 moults. Pupation usually takes place inside the larval tunnel within the stem and pupal period varies from 5-12 days in summer and 12-36 days in winter.

Nature and symptoms of damage

In the vegetative stage the larvae of stem borers enter the plant usually at the base above the water level and feed on the growing point. The damage is evident as 'dead heart' due to death of the growing point and when pulled, it easily separates out. The number of productive tillers are reduced and the damage at this stage can be compensated upto 10 %. When infestation occurs at booting stage the damage manifests as a 'white ear' or "white head" and the whole panicle turns white. But when the larvae enters a plant after booting stage though there is no severing of plant parts at the base because of internal feeding the vigour may be reduced and the grain filling may be affected. At times the non- productive side tillers also harbour larval population. These are the common symptoms of damage by YSB, PSB and WSB. Larva of dark headed borer enters the midrib and tunnels down, The attacked leaf sheath is yellow and dries down. Usually one larvae is found in a single stem (Dale, 1994) but Nair (1986) reported them as gregarious. The insect attacks at all stages of crop growth and whole clumps of paddy die as a result of larval feeding. Bleaching and breaking down of the stalk occurs due to larval feeding by striped stem borer. Leaf sheath is nibbled and discoloured. Larvae congregate on panicles and bite on the spikelets making them chaffy (Nair,1986). *C. suppressalis* infestation result in a wilted sheath that eventually dies. Infestation also causes dead hearts. An important symptom is the existence of (white heads) due to larval feeding.

Striped borer, *C. partellus*

Striped borer is mostly a stem feeder. PSB being a polyphagous pest it is opined that the damage in rice is due spill over of the pest from other hosts. Both dead hearts and white heads are the damage symptoms caused. Due to extensive tunneling at later stages of crop growth grain filling may be severely affected.

Source of information

Bentur JS, Padmakumari AP, Jhansilakshmi V, Padmavathi Ch , Kondala Rao Y , Amudhan S and Pasalu IC .2011. Insect resistance in rice .Technical bulletin No.59. Directorate of Rice Research, Rajendranagar, Hyderabad- 500 030, A.P. p. 89

Heinrichs EA 1994. Biology and management of rice insects. International Rice Research Institute, Philippines, Manila. 799 pp

Karthikeyan and Jacob S.2008. Fecundity and developmental stages of rice blue beetle (Coleoptera: Chrysomelidae) on rice. Entomon33: 35-40

Padmavathi Ch, Katti G, Padmakumari AP and Pasalu IC. 2006. Comparative leafoflders, *Cnaphalocrocis medinalis* Guenee and *Marasmia patnalis* Bradley in rice. Entomon, 31(4):1-8.