

bamate insecticides from Union Carbide, which have been effective against BPH adults in insectary studies at IRRI. FMC 35001, also a carbamate, recently has been registered for use in insect con-

trol in several countries. One of its breakdown products is carbofuran, which showed high ovicidal activity in previous IRRI experiments. NNI-750 is a novel insecticide which, according to

its manufacturer, Nihon Noyhaku, is an insect growth regulator. It is reported to have shown BPH ovicidal activity in company tests. ■

Rice ear-cutting caterpillar, an injurious pest at panicle stage

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The rice ear-cutting caterpillar *Mythimna separata* (Walk.) has become a regular rice pest, particularly at the panicle stage of the crop. The second and third generations of the pest are responsible for economic losses of grain yield in early-maturing and medium duration varieties, respectively.

The peak activity is from the last week of September to the second week of October, depending on the planting time of the crop. Observations on the pest's biology under natural conditions on caged plants of a popular variety, Kranti, were made in kharif, during September-October 1980 at Jabalpur.

In the field, the eggs generally were laid on the bottom of semidried leaves, and not near the tip, in a line under the fold of leaves where they were protected from parasitization. The egg period varied from 5 to 7 days. Immediately after hatching, the larvae first fed on dried

leaf tissues; later they fed on the green leaves. Early instars (up to 4th instar) also fed on the palea and lemma of the grain as well as on anthers of the flowers. Advanced-stage larvae (4th to 6th instars) cut and nibbled the grains and spikelets. The larval period varied from 22 to 27 days. The pupae were either naked between the tillers or in earthen cocoons in the soil near the base of the plant. The pupal period was 8-11 days. The whole life cycle from egg to adult emergence was completed in 33-45 days. ■

Sugarcane pyrilla attacking rice, and its biological control in India

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Sugarcane pyrilla or leafhopper *Pyrilla perpusilla* (Walker) (Homoptera: Fulgoroidea:Lophopidae) is a serious pest of sugarcane in northern India, and is potentially dangerous to wheat, oats, maize, bajra (pearl millet), rice, and sorghum, particularly the hybrid varieties. Sugarcane is a primary host of *P. perpusilla*.

During August-October 1978-79, a heavy incidence of sugarcane pyrilla was observed on rice in Karnal and Sonapat districts of Haryana during surveys of the pest and its natural enemies. The infested rice fields were near heavily infested sugarcane fields. Adults, nymphs, and egg masses of pyrilla were found on the rice. The pyrilla population averaged 15.5 individuals (eggs + nymphs + adults/leaf). Interestingly, the adults and nymphs of pyrilla in rice and sugarcane fields were parasitized by the larvae of the ectoparasite *Epipyrops melanoleuca* Fletcher, and the eggs were parasitized by the egg parasite *Tetrastichus pyrillae* Crawford. Parasitization

of nymphs and adults averaged 20-60% and that of eggs 75-95%. The parasites probably effectively controlled pyrilla on rice in late September 1978 and in 1979; no insecticides were applied.

A pyrilla attack was similarly heavy in rice fields adjacent to sugarcane fields in Gurdaspur district, Punjab, in August-September 1980. The pyrilla also appeared to be effectively controlled by *E. melanoleuca* and *T. pyrillar*. The two parasites keep pyrilla under control in sugarcane in Bihar, Uttar Pradesh, Haryana, Punjab, and parts of Rajasthan. The eggs and live cocoons of *E. melanoleuca* can be released in pyrilla-infested fields at 40,000-50,000 eggs/ha and 4,000-5,000 cocoons/ha when the pyrilla population averages 3.5 individuals (eggs + nymphs + adults)/leaf (the threshold level in sugarcane). ■

Egg parasitoids of rice pests in Malawi, East Africa

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During ecological investigations on rice pests in Malawi from 1971 to 1975

many parasitoids were reared from eggs collected in the fields (see table).

Trichogramma kalkae was the most important parasitoid of the stem borer *Diopsis macrophthalma*, one of the most common rice pests in Africa. It parasitized an average of 41% of the *Diopsis* eggs. *T. pinneyi* parasitized an average of 16% of *D. macrophthalma* eggs. An unidentified Sciomyzid fly was an important alternative host of *T. pinneyi*. Two other parasitoids (but of little importance) were *Trichogrammatoidea simmondsi* and a *Paracentrobia* species. (An extensive paper on the mentioned *Trichogramma* species is in press.)

Of the lepidopterous borers *Chilo djffusilineus* was parasitized mainly by *Telenomus ulliyetti* (27%) and *Trichogramma mwanzai* (7%), a recently described species.

Eggs of the pink borer *Chilo partellus* were parasitized by *T. japonicum* (33%) and *Trichogrammatoidea simmondsi* (17%). From eggs of *Thopeutis* spp. were reared *T. japonicum* (42%), *Telenomus tolli* (21%), and *T. uliyetti* (7%). Unidentified lepidopterous eggs were parasitized by another *Paracentrobia* sp. and by *Lathromeromya cercopocida*.

Experiments showed *T. kalkae* and *T. pinneyi* to be highly susceptible to pesticides such as diazinon, dimethoate, endosulfan, malathion, and phospho-