

It has been found earlier that stipe elongation<sup>8</sup> and pileus formation<sup>7</sup> may be prevented by CO<sub>2</sub> which is accumulated within the closed culture tubes due to vigorous respiration of the fungi. But in the present study no such effect of CO<sub>2</sub> was encountered. Instead, light is the limiting factor for basidiocarp initiation of *P. atcalarius*, which was observed previously in some other cases<sup>5-7</sup>.

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#### DIFFERENTIATION OF SEX IN PUPAE OF SPOTTED BOLLWORM, *EARIAS FABIA* (STOLL) (LEPIDOPTERA: NOCTUIDAE- ERASTRINAEE)

MALE and female cocoons of Spotted Bollworm, *Earias fabia* were studied and it was found that the male cocoons have a well developed knob at the antero-dorsal end. These knobs were not seen in female cocoons.

Segregation of pupae by sexes is very essential for the pheromonal studies. Only the virgin insects show the behavioural changes when exposed to slightest amount of the sex pheromones of opposite sexes. Shorey *et al.*,<sup>1</sup> have segregated the pupae of *Trichoplusia ni* by sexes. In the present paper, the author has described some character by which the male and female pupae of *Earias fabia* can be segregated.

*Earias fabia* is a serious pest of Bhindi (*Hibiscus esculantus*). The infected Bhindi fruits were collected from Tikamgarh (M. P.) during May 1977, and were kept in wire-screen cages. The larvae pupated on the surface of fruits and on the walls of the cages in thin whitish cocoons. Generally after two days the cocoons became cream-coloured, but some brownish cocoons were also observed.

The cocoons are elongated and conical in outline. The ventral longitudinal surface of the cocoon by which it remains attached to the substratum is flat whereas the upper surface, lateral sides and the anterior broader side are convex. The anterior half of the cocoon is nearly uniform in height and width but the posterior half gradually decreases to a point. There is a median vertical ridge at the anterior end of the cocoon. At the time of the emergence of the moth, a vertical slit is formed through the ridge. The union point of the upper end of this ridge with the mid-dorsal line of the cocoon is slightly elevated. In the male cocoon this elevation forms a well developed knob which is directed forward and upward and varies in length from 1.5 mm to 2 mm. These knobs are not seen in female cocoons (Fig. 1, A and B). Male and the female cocoons can be separated by this character.



FIG. 1. (A) Male Cocoon, (B) Female cocoon.

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#### ATTACHMENT TO INTESTINAL WALL AND COPULATION IN *BUNOSTOMUM TRIGOCEPHALUM* (RUD., 1808) RAILLIET, 1902

*Bunostomum trigocephalum* occurs free in the lumen of intestine of the host. On several occasions out of a large number of worms present in the intestine only a few were seen attached to its mucosa. This indicated that the worms remain free in the lumen and only at the time of feeding they become attached to the mucosa of the intestine.

*Bunostomum trigocephalum* burrows individually in the intestinal wall of the host, *Capra hircus* (L.) damaging its mucosal layer and causing severe bleeding. The worm has a large buccal cavity with cutting plates at the entrance. The worm draws a plug of tissue into the buccal cavity (Fig. A) and abrades it with the cutting plates. The abraded tissue is seen in the oeso-

phagus. In *Ancylostoma caninum* and *Necator* sp. the digestive enzyme and an anticoagulant are secreted from the pharyngeal glands and abraded tissues are digested in the intestine<sup>1</sup>. *Bunostomum trigocephalum* also secretes an anticoagulant.

Four specimens were recovered in the act of copulation. The male worm is oriented at an angle to the body of the female in the region where the vulva is

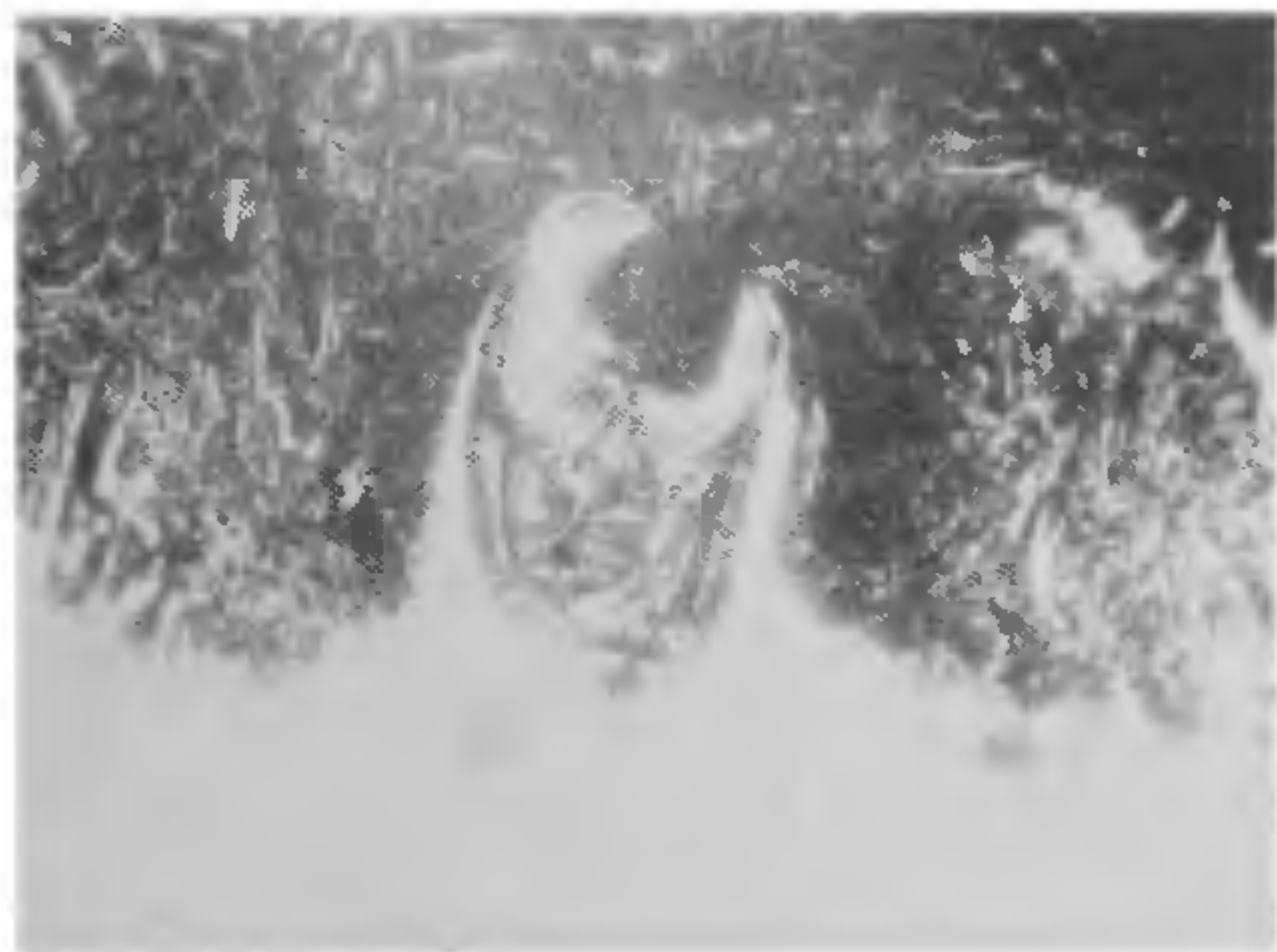


FIG. A. *Bunostomum trigocephalum* (Rud., 1808) Railliet, 1902; The worm drawing a plug of tissue into the buccal cavity.

situated. The bursa of male folds over the body of female and the spicules are inserted in the vulva (Fig. B) to widen its opening. The tip of the spicule



FIG. B. Microphotograph of *Bunostomum trigocephalum* (Rud., 1808) Railliet, 1902; showing insertion of spicules in the vulva during copulation.

is bent inside to keep the opening widened for the discharge of sperms. This obviously ensures insemination.

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#### TALC PELLETING AS AN AID TO LEGUME SEED INOCULATION

LEGUME seed inoculation involves introduction of rhizobia in a vegetative state into an environment to which it is not immediately adaptable and, therefore, must compete with an existing established microbial complex, until such time as more favourable rhizosphere zone of the legume seedling is available. Foci of infection are available for a limited time only<sup>1</sup> and their location moves progressively down and away from the crown in the root system<sup>2</sup>. The pelleting of seed provides a micro-environment much more favourable for the rhizobia and thus provides a greater nucleus population when the first infection foci become available.

The present study was, therefore, undertaken to examine the seed pelleting as an aid to legume seed inoculation. A variety of pelleting materials were used to see their effect on soybean (*Glycine max*) in the pot culture experiment. Pelleting was done according to the method described by Iswaran<sup>3</sup>.

It is clear from the perusal of the data in Table I that nodulation pattern is influenced by different types of pelleting materials along with the inoculation with *Rhizobium*. Of the six pelleting substances used in the present investigation, talc was found to be the most efficient and comparable to calcium sulphate and charcoal. Although dicalcium phosphate and rock phosphate could also be used, their influence was significantly lower than that of talc as measured by the total number of nodules produced. In terms of fresh weight of nodules also, the trend was nearly the same. The efficiency of pelleting the seeds with talc is very clearly registered in the dry weight of root and top of the plant when examined at the end of 8th week and also in the final grain and shoot yield at the harvesting stage. An additional increase of