The pectin from mango peel rates well in comparison to mandarin orange peel (Coorg and Nagpur varieties) which has been shown to contain pectin of 150–200 grade[3,4]. However, orange cultivation is localized to small regions while mango is grown more extensively all over India. This therefore points to the possible utilization of wastes from mango processing industry and also as a substitute to imported pectin preparations.

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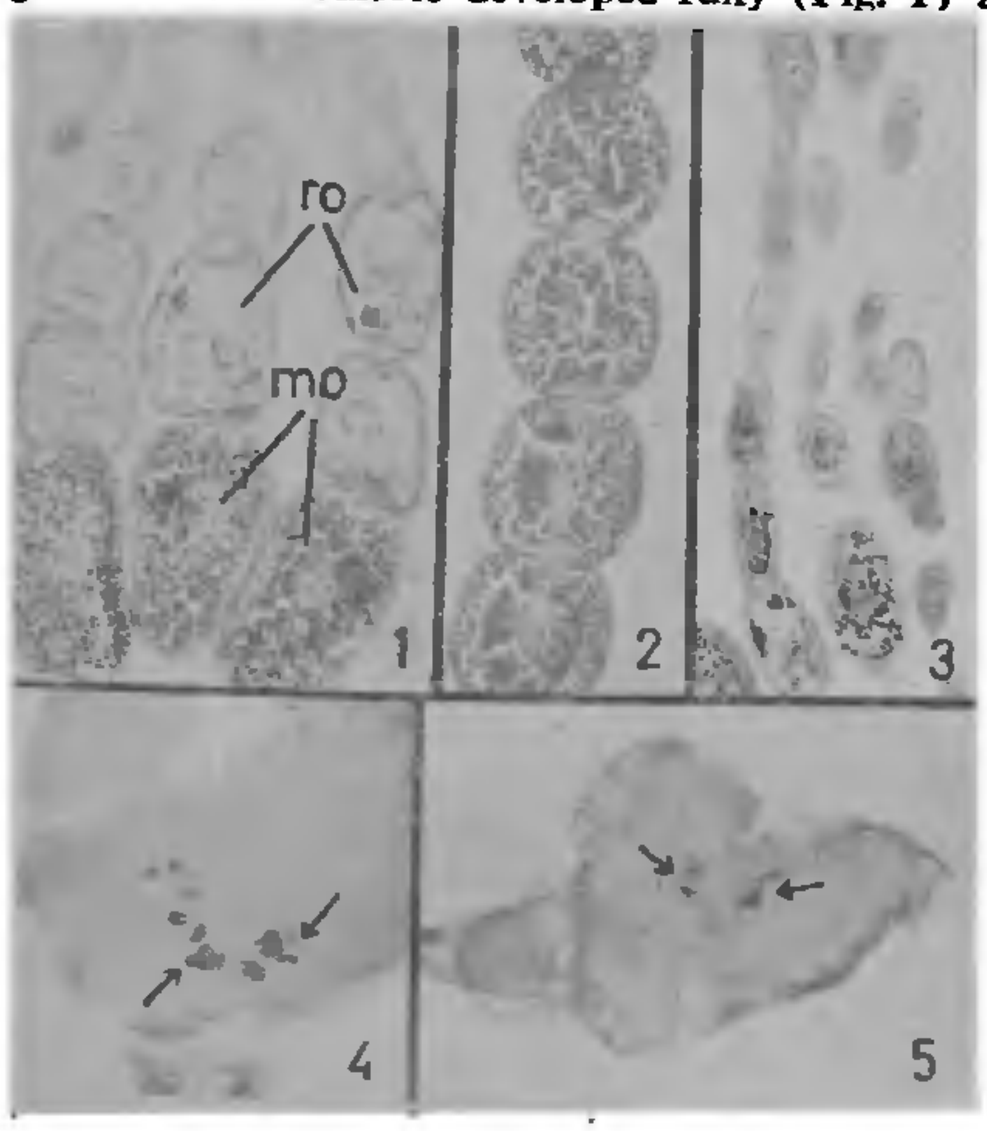
ECDYSTERONE INDUCED OVARIAN INHIBITION IN THE COTTON BUG, *DYSDERCUS CINGULATUS*

ECDYSTERONE or some of its analogues inhibited vitellogenesis in the stable fly *Stomoxys calcitrans*[1,2], in the house fly *Musca domestica*[3,4], in the flour beetle *Tribolium confusum*[3], in the boll weevil *Anthonomus grandis*[5] and in the cockroach *Leucophaea maderae*[6]. However, these hormones stimulated vitellogenesis in the mosquito *Aedes aegypti* in larger doses, but smaller doses inhibited it[7]. So it is suggested that small doses of ecdysterone and analogues present in some plants perhaps serve to inhibit reproduction in plant feeding insects. Since very little evidence is available regarding the influence of ecdysone analogues on reproduction in the female plant bugs which could serve as ideal material for testing this hypothesis it is decided to study small doses of ecdysterone on reproduction in the female red cotton bug *Dysdercus cingulatus*.

Female *Dysdercus cingulatus*, a day after adult emergence were employed for the present study. They were injected ecdysterone (B-ecdysone) dissolved in distilled water on four consecutive days from day 1 onwards, either 2 μg or 4 μg doses after ether anethesia, through pleural region by means of a Hamilton microliter syringe. Animals receiving equal quantity of distilled water served as controls. The animals were kept along with some males in glass chimneys top covered with clothing. They were fed with cotton seeds soaked in water. After five days, the ovaries and brains of 10 females of each group were fixed in Bouin's fluid and were processed, sectioned and stained in iron alum haematoxylin eosin. Brains were stained as a whole using Aldehyde–Fuchsin or Victoria–Blue technique[8]. The remaining animals were kept for a couple of days more and were observed for mating and egg laying.

Mortality was high among animals treated with 4 μg dose. However, the surviving experimental animals were as healthy as controls and mated normally. Both the doses of ecdysterone inhibited normal development of the oocytes. In the injected animals only one to four oocytes in the basal region of each ovariole developed fully (Fig. 1) and such oocytes were comparable in all respects to the basal oocytes of the control animals. But in the controls 8–10 oocytes developed fully in each ovariole (Fig. 2). In the treated animals, oocytes anterior to the developing ones either resorbed or had no yolk granules, but were filled with



FIGS. 1–5. Fig. 1. Section of the ovary of animal 5 days after injection of ecdysterone showing the mature basal oocytes and the anterior resorbing oocytes with very few yolk granules. *mo*—mature oocytes; *ro*—resorbing oocytes, × 22·50. Fig. 2. Section of the ovariole of control of the same age as above showing mature oocytes, × 22·50. Fig. 3. Section of an ovary of an animal 5 days after injection of ecdysterone showing resorption of all oocytes, × 22·50 Figs. 4 and 5. Whole mounts of the brains of animals 5 days after injection of ecdysterone and its control respectively, showing increase in the material of the A-cells (arrows) in the injected animals, × 50.

vacuoles (Fig. 1). Their follicle cells were very small and degenerating or they invaded into the empty ovarian tubes. In some animals almost all oocytes resorbed (Fig. 3). In the germarium, disintegration of trophocytes was more intense in the treated animals. Insects which were kept for 6 days or more laid eggs though the number of eggs laid were only about 50% of those of the controls. Median neurosecretory cells of the brain in the treated insects (Fig. 4) showed pronounced accumulation of secretory material when compared to those of controls (Fig. 5) at the time of sacrifice.

The present studies on *Dysdercus cingulatus* showed that ecdysterone did not completely suppress vitellogenesis unlike in the stable fly[1] or in the weevil[5]. While the number of eggs in which vitellogenesis took place was drastically reduced to about 50% of those of the controls, vitellogenesis apparently proceeded normally in these eggs which were laid ultimately. However, the remaining eggs degenerated and resorbed. Hence it appeared that ecdysterone inhibited vitellogenesis in so far as the number of eggs undergoing vitellogenesis decreased whereas in the remaining eggs vitellogenesis was completely inhibited and they degenerated. It appears that small amounts of ecdysterone present in some plants might have an inhibiting influence on population density of the bugs as hypothesised by Spielman *et al.*[7], in the case of mosquitoes.

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INFLUENCE OF A JUVENILE HORMONE ANALOGUE* ON METAMORPHOSIS AND REPRODUCTION IN THE CRICKET, *PLEBEIOGRYLLUS GUTTIVENTRIS* WALKER

WIGGLESWORTH's classical work[1] on the role of corpora allata in growth, metamorphosis and reproduction of insects has been reinvestigated recently using a variety of compounds mimicking the juvenile hormones[2-8]. However, such an investigation has not been carried out on crickets. This paper deals with the effect of a juvenile hormone analogue (JHA) on metamorphosis and reproduction in the cricket, *Plebeiogryllus guttiventris*.

A total of 126 last instar nymphs from the stock culture[9] was selected for this experiment. One μl of JHA was topically applied with a micropipette to their last three abdominal tergites. This dosage was not only convenient for application but also showed considerable effectivity and least mortality. Time of JHA application varied from 0–168 h after moulting to last nymphal instar. Twenty nymphs were treated with 1 μl olive oil to serve as controls. Observations regarding moulting duration, metamorphic changes and reproductive abilities were recorded.

Based on the morphological features of nymphs and adults, four new forms (stages) were obtained for the JHA treatment (Fig. 1) : I, supernumerary larva similar to 7th instar but with larger body size and curved wing pads ; II, intermediate adult having more nymphal features but with incomplete and distorted adult wings and ovipositor ;

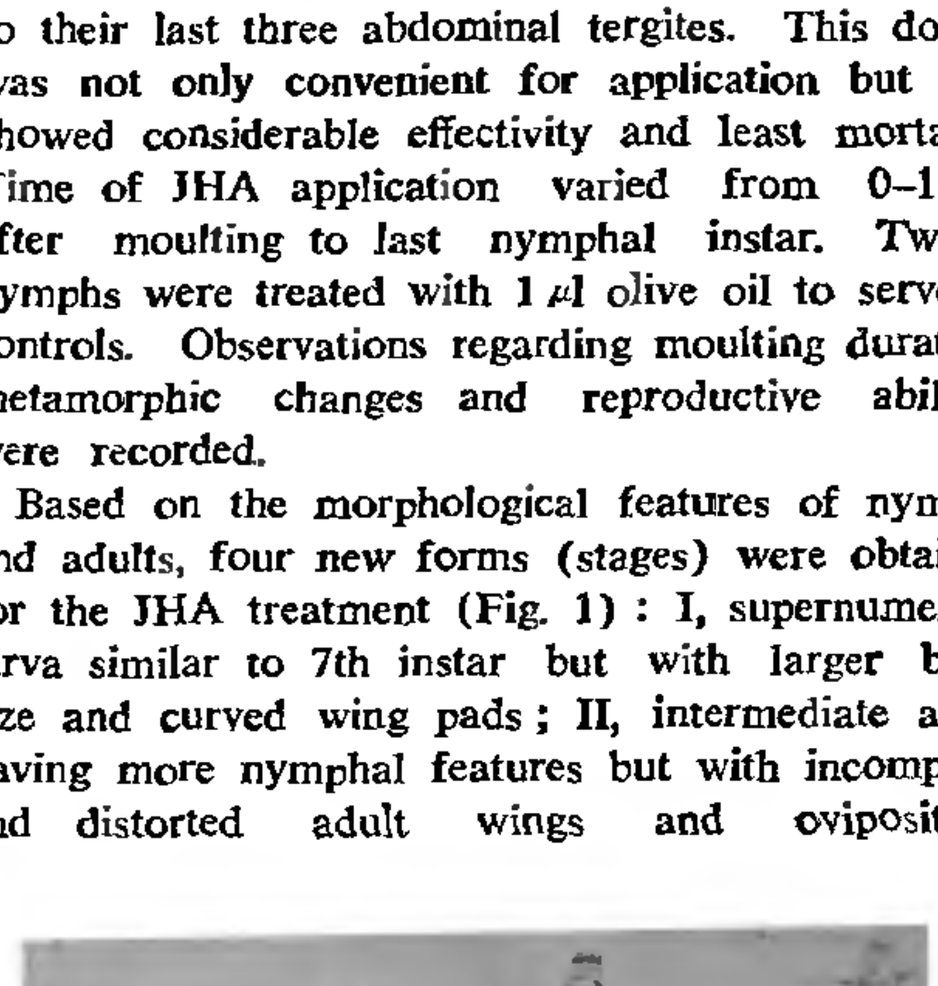

FIG. 1. (I), Supernumerary larvae ; (II), intermediate adults ; (III), adultoids and (IV) giant adults for the JHA application.
A and B : 7th instar control nymphs ; C and D : Control adults.