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 $\mu$l 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 $\mu$l 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 ;

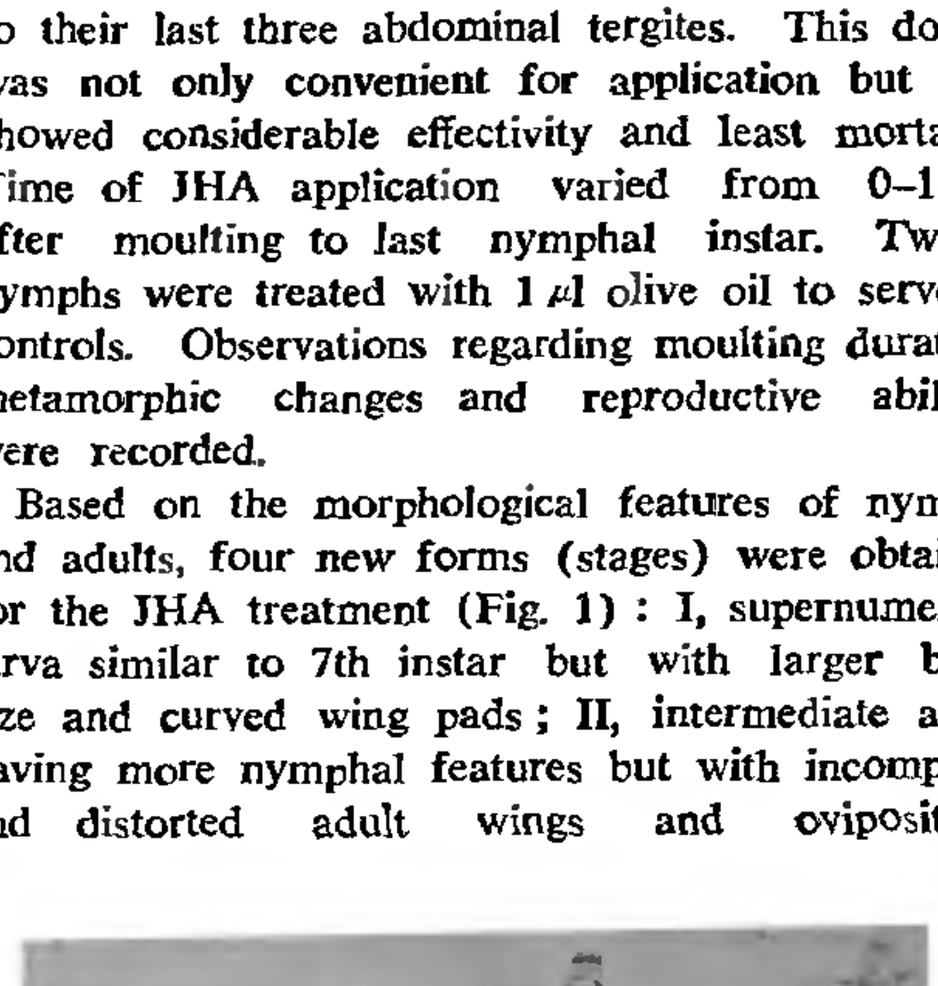


FIG. 1. (I), Supernumerary larvae ; (II), intermediate adults ; (III), adultoids and (IV) giant adults for the JHA application.
A and B : 7th instar control nymphs ; C and D : Control adults.

III, adultoids with adult wings and ovipositor but with smaller body and pale colouration and IV, giant adults, moulted from the supernumerary larvae, with body size 1·6 times larger than control adults.

Time of JHA application influenced the degree of metamorphosis. Application, prior to 72 h after moulting, resulted in supernumerary larvae and thus completely inhibited metamorphosis. While percentages of surviving forms attaining stages I, II and III were 7, 40 and 53 for the nymphs treated between 72–96 h after the moult, they were 0, 13 and 87 for those treated between 96–120 h. JHA treatment after 120 h produced stage III only. All supernumerary larvae moulted to giant adults. Thus JHA action was critical and time dependent during the first one-third period of last nymphal instar. Later application led to decreasing juvenilisation with appearance of intermediate adults and adultoids. This observation conforms to the findings for *T. molitor*[4] and *R. prolixus*[6].

Further, JHA application influenced the duration of 7th nymphal instar. While these last instar nymphs took 8·16 ± 0·39 days to moult to 8th instar (supernumerary), control nymphs showed 9·15 ± 0·09 days to moult to normal adults. The difference was found to be statistically significant ($P < 0·05$). Such accelerated moulting cycle because of JH action has also been recorded for *R. prolixus*[6] and *T. molitor*[10].

Intermediate adults failed to mate, nor did they deposit or produce any eggs. But adultoids mated normally and even produced and deposited eggs. Giant females, though mated with normal males, deposited only a few eggs. But they had retained many developed eggs in their body. Giant males, on the contrary, failed to mate as they could not produce any spermatophores. Their accessory glands were found to lack well developed tubules which might be the cause for their inability to produce spermatophores. Malformation of male genitalia and thereby failure to mate as a result of JHA treatment has been recorded for *D. fasciatus*[3].

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## ON THE SYNONYMY OF *GANEO KORKEI* BHALERAO, 1936 AND *GANEO PUNJABENSIS* GUPTA, 1954 WITH *GANEO TIGRINUM* MEHRA AND NEGI, 1928

THE genus *Ganeo* was erected by Klein, 1905, for the worms he collected from the intestine of *Rana hexadactyla* and designated as *Ganeo glottoides*. Subsequently a number of species were added to this genus, but in the present communication the authors are concerned with three species, *viz.*, *G. tigrinum* Mehra and Negi, 1928; *G. korkei* Bhalerao, 1936, parasitizing the intestine of *Rana tigrina* and *G. punjabensis* parasitizing the intestine of *Rana cyanophlyctis*.

*G. korkei* and *G. punjabensis* differ from *G. glottoides* in the absence of pseudocirrus sac and in possessing a 'U'-shaped excretory bladder with a median stem, but in these respects they closely resemble *G. tigrinum*: however they differ from *G. tigrinum* in having the grouping of vitellaria. Further they are distinguishable from each other on the size of the gonads. In *G. korkei* ovary is larger than testes and in *G. punjabensis* ovary is smaller than testes.

The distinction between these two species does not hold good for tht fact that the size of the gonads is variable in *G. tigrinum*. An examination of a number of ten species of *G. tigrinum* showed that in various specimens of the same species ovary may be larger, equal or smaller than the testes.

When these variations between gonad sizes occur within one species they become intraspecific variations and all the species erected on this basis lose their identity. Hence, *G. punjabensis* becomes synonym of *G. korkei*. But the distinction of *G. punjabensis* from *G. tigrinum* also does not exist for the fact that in the *genus ganeo* the position and arrangement of vitellaria presents many variations, specially in those in which the