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EFFECTS OF PRECOCENCE II ON LAST INSTAR LARVAE OF *SPODOPTERA MAURITIA* (LEPIDOPTERA: NOCTUIDAE)

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PRECOCENES (I and II) have been reported to inhibit the function of corpora allata, and consequently affect the juvenile hormone (JH) controlled processes of development, like moulting and metamorphosis in several insect species[1-5]. Such morphogenetic effects of these compounds have been noticed mostly in hemimetabolous insects. In these insects precocenes induce precocious metamorphosis as well as a delay in moulting. Experiments reported in this paper were designed to test whether treatment of last instar larvae of *Spodoptera mauritia* Boisd. (Lepidoptera:Noctuidae) with precocene II (PII) will induce precocious metamorphosis and delay in ecdysis. In addition, experiments were also carried out to find out whether treatment of juvenile hormone analogue (JHA) would reverse the effects caused by the application of PII.

Last instar (6th instar) larvae of *S. mauritia* of different age groups, *e.g.* freshly ecdysed, or 0-day old, 1-day and 2-day old, were obtained from laboratory stock culture[6]. These were treated with PII either as a single dose on 0-day or as repeated daily doses from 0-day till pupation. PII (gift from Prof. W. S. Bowers, New York State Agriculture Experimental Station, Geneva, N.Y.) was dissolved and diluted in acetone so as to obtain 100, 80 and 60 μg/5μl. Larvae treated with an equivalent volume (5 μl/ larvae) of acetone in a similar manner were kept as controls. JHA, ZR-512 (gift from Dr. S. Siddall, Zoecon Corp., Palo Alto, California, U.S.A.) was also diluted in acetone to get 0.2 μg/ μl. 6th instar larvae were treated with PII on 0-day and 1-day followed by a dose of JHA on 2-day. PII or JHA was applied topically on the larvae using a Hamilton microliter syringe.

Treatment of 6th instar larvae of *S. mauritia* with single or repeated daily doses of PII failed to induce precocious adult development but prolonged larval-pupal period (table 1). Larvae treated with PII pupated in 7-8 days whereas control larvae pupated in 5 days. Repeated application of PII produced various abnormalities in the ecdysed animals. In most cases they failed to shed their larval cuticle and retained larval legs (Figure 1 A,C). Pupal case partially covered the abdominal region. Further, when PII pretreated animals were given a single dose of JHA, the larvae pupated in 5 days and the pupae appeared normal (table 1).

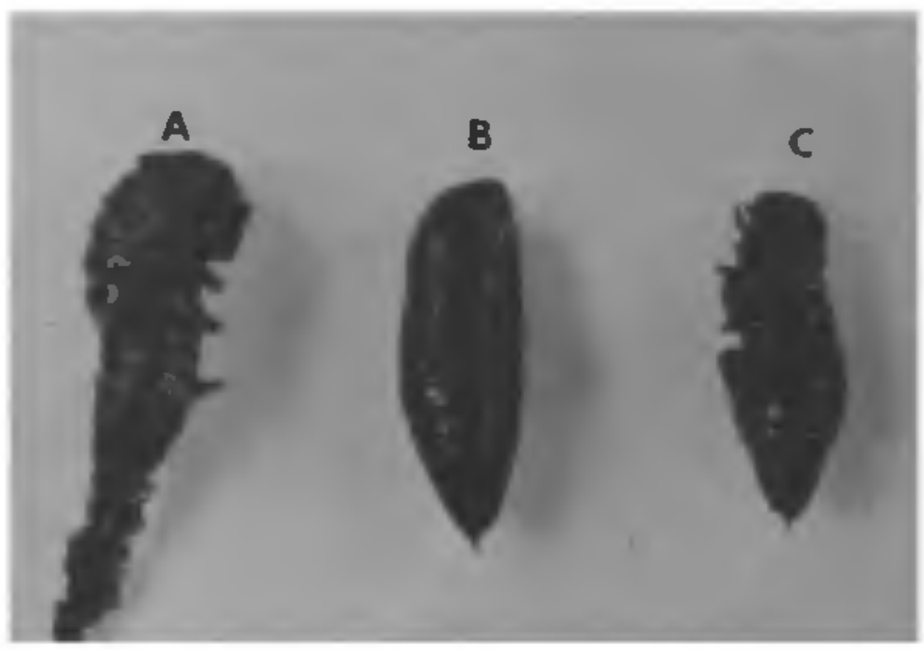

Figure 1. Abnormal pupae (A & C) induced by repeated topical application of 60 μg precocene II to 6th instar larvae of *S. mauritia*. B. Normal pupa.

The experiments show that treatment of the last instar larvae of *S. mauritia* with PII prolongs larval-pupal period. In *S. mauritia* it is suggested that the delay in pupation is caused by the decreased titre of JH in the haemolymph, because JHA application to PII pretreated larvae reduced the larval-pupal period to its normal duration. A similar phenomenon was observed in *Mamestra brassicae* where allatectomy caused a significant prolongation of larval-pupal period[7]. It has also been reported that in lepidopterous insects, in addition to the activation by prothoracotropic hormone, an increase in JH titer in the prepupal state is necessary to induce prothoracic glands to their maximal rate of secretion[7,8]. In view of these findings it seems that in *S. mauritia*, because of the decreased titre of JH in the haemolymph, the prothoracic glands secrete ecdysone at a slower rate delaying pupation. The production of abnormal pupae as a result of repeated application of PII on 6th instar larvae seems to indicate that at high doses PII retards progressive adult development. Juvenilizing property

TABLE 1

Effects of different treatments of precocene II and juvenile hormone analogue on 6th instar larvae of S. mauritia

Treatment and age of larvae	Dosage (μg)	Number of animals treated	Mortality (%)	Days required for pupation (mean ± SD)	Nature of ecdysed animals
I. (a) Single application of PII on 0-day old	100	15	16.6	6.5 ± 0.5	Normal
	80	15	0	8	Normal
	60	15	50	7	Normal
(b) Control	–	20	0	5	Normal
II (a) Repeated daily (from the first day till pupation) application of PII	60	15	11	8	Abnormal
	80	15	40	7.5 ±0.5	Abnormal
(b) Control	–	20	0	5	Normal
III. Repeated daily application of PII on 0-day and 1-day old followed by JHA on 2-day old	PII 60 + JHA 0.2	10	0	5	Normal

of precocenes has been reported previously by many authors[9-11].

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