animals during the period of the observation. However, one male animal both in treated and water-fed died on 4th and 3rd day respectively. The reason for the death was ascribed to be due to the severe fighting which had occurred when these male animals were put in groups due to the presence of "Bully". The animals were severely mauled and bitten, especially at the back, tail and leg regions. After that these animals were kept in separate cages. All animals were found healthy and there was no change in their bodily appearance, behaviour and feeding activity. Temperature was found normal during the entire test period in both the groups of animals. Body weight gained in each sex of virus treated mice was essentially similar to those of the control. In addition, no difference due to virus treatment could be detected in blood sugar, haemoglobin content and haematocrit value and serum alkaline phosphatase enzyme activity (Table I). Post-mortem examinations indicated no gross pathology in either group. The average welght of each importart organ (Table I) did not vary much. Histological examinations of all the tissues examined showed no evidence of tissue damage and they were similar to healthy animals.

Safety of similar insect viruses has been reported earlier in the case of white mice, guinea pigs[10], various mammals, fishes[3], chicks[11] and human beings[12]. Further, the specificity of *A. albistriga* NPV has also been reported when it was tested against 15 species of lepidopteran insects and found to be non-infective[13]. The result of the present study as well as those previously documented for other vertebrates and invertebrates with different insect inclusion viruses, indicate their safety and they are apparently host specific. Hence our study on *Baculovirus amsacta* in mice further corroborates the high specificity and its safety against white mice and its intended use as a viral insecticide.

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1. Jayaraj, S., Sundaramurthy, V. T. and Mahadevan, N. R., *Madras agric. J.*, 1976, 63, 567.
2. —, —, — and Swamiappan, M., *Ibid.*, 1977, 14, 265.
3. Ignoffo, C. M., *Bull. Entomol. Soc. Amer.*, 1968, 14, 265.
4. Narayanan, K., Govindarajan, R., Jayaraj, S., Paulraj, S. and Kutty, M. N., *Madras agric. J.*, 1977, 64 (in press).
5. — Santharam, G., Easwaramoorthy, S. and Jayaraj, S., *J. Invertebr. Pathol.*, 1977, 29 (in press).
6. Ignoffo, C. M., *Proc. N.Y. Acad. Sci.*, 1973, 217, 1965.
7. Somegyi, N., *J. Biol. Chem.*, 1952, 200, 145.
8. King, E. J. and Armstrong, A. R., *Canad. Med. Assoc.*, 1934, 31, 376.
9. Schalm, O. W., Jain, N. C. and Carroll, J., *Veterinary Haematology*, Lea and Febiger, Philadelphia, 1975.
10. Ignoffo, C. M. and Heimpel, A. M., *J. Invertebr. Pathol.*, 1965, 7, 329.
11. Aizawa, K. A., *Entomophaga*, 1961, 3, 197.
12. Heimpel, A. M. and Buchanan, L. K., *J. Invertebr. Pathol.*, 1967, 9, 55.
13. Rajamohan, N. and Jayaraj, S., *Curr. Sci.*, 1975, 44, 274.

ADULT PIGMENTATION AS AN INDEX OF ENDOCRINE ACTIVITY IN THE CRICKET, *GRYLLUS BIMACULATUS*

THE cricket *G. bimaculatus* exhibits orange-yellow/black colour polymorphism. In laboratory population, the females are normally dark with black pigments but males are light coloured with orange-yellow pigments[1,2]. Further, pigmentation is found to be influenced by the corpora allata hormone. While allatectomy resulted in dark colouration, implantation of corpora allata (CA) led to lighter cuticle[2]. Following observations were made in this laboratory.

Topical application of a synthetic juvenile hormone analogue (JHA) (RO–20–3600, Hoffman-La Roche) to the last instar nymphs 96 hr prior to metamorphosis resulted in lighter coloured adults. These results, being statistically significant, support the view that more of juvenile hormone (or active CA) will favour lighter coloration. Isolated rearing of nymphs retarded nymphal growth and development as noted for *P. gutti-ventris*[3]. Further, male adults were significantly dark coloured as compared with their counterparts reared in groups. On the basis of earlier results, if endocrine activity is to be correlated with pigmentation, CA in group reared nymphs might be secreting higher level of hormone at least during sclerotisation. However, this indirect evidence does not agree with Gona's supposition[4] that CA might be hyperactive in isolated crickets.

Injection of 1 and 10 μg of thiotepa into the last instar male nymphs resulted in the appearance

of completely light coloured adults. This effect was similar to that following JHA application. Again, taking pigmentation as an index of CA activity, thiotepa appears to activate these glands to secrete hormone if injected in last nymphal instar. Though impairment of neuro-endocrine functioning by chemosterilants is noted for *Ephistia kuhniella*[5,6] and *Periplaneta americana*[7], probable 'allatotropic' effect has not been suggested so far. For both isolated rearing and thiotepa treatment females showed less sensitivity towards change in pigmentation. The reason for this is not clear since gonads were not found to play any role in influencing adult pigmentation.

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1. Fuzeau-Braesch, S., *Bull. biol. Fr. Belg.*, 1960, 94, 526.
2. Roussel, J.-P., *J. Insect Physiol.*, 1966, 12, 1085.
3. Dakshayani, K. and Mathad, S. B., *Experientia*, 1973, 29, 978.
4. Gona, O., *Ibid.*, 1976, 32, 44.
5. Tan, K. H., *Ibid.*, 1974, 30, 1403.
6. —, *Physiol. Entomol.*, 1976, 1, 61.
7. Bhargava, S. and Mathur, R., *Chemoster. News*, 1975, 3, 13.

ON THE APPLICATION OF DYAR'S RULE TO THE LARVAE OF *HENOSEPHACHNA VIGINTIOCTOPUNCTATA* (FABRICIUS)

DYAR[3] (1890), while studying the head-capsule width of 28 species of lepidopterous larvae, found that width was relatively static during a stadium and grew in geometrical progression in successive stages of a larva. This growth ratio is constant for a particular species and by using this ratio it was possible to determine the exact number of instars of species. On the other hand Taylor[8] (1931) and Richards[7] (1949) mentioned that progression is rarely regular. Taylor[8] (1931) also suggested a modification of Dyar's Rule. In the present investigation the applicability of Dyar's Rule and Taylor's modification of it in the larvae of *Henosepilachna vigintioctopunctata* (Fabricius) (Coleoptera : Coccinellidae), which is a serious pest of many vegetable crops in India, was tested.

Materials and Methods.—Field collected adults were kept in jars and potato leaves were provided for egg laying. The first instar larvae (0–12 h old) hatching from these eggs were reared individually on potato leaves in plastic petri dishes (10 cm in dia.) at 27 ± 1° C with 60 ± 5% r.h. and photoperiod of 12 h photophase and 12 hr scotophase was also maintained. Head-capsules of each larva were collected and stored in homeopathic vials. The width of the head-capsule was measured across the greatest width of the head, *i.e.*, at the base of mandibles with a stereomicroscope fitted with an ocular micrometer. Modification suggested by Taylor[8] (1931) was also applied. In addition to these, the data were also subjected to regression analysis, *viz.*, linear, exponential, modified exponential and logistic to find out the better fit

Results and Discussion.—Perusal of Table I reveals that the size of the head-capsule varied greatly but there was no overlapping of sizes between instars. Size of one instar, therefore, cannot be confused with that of another instar. However, the sizes of head-capsules of the two sexes of a particular instar did not differ significantly. When log values of the mean head-capsule width were plotted a linear relationship was not obtained indicating that the head-capsule width

TABLE I

Observed and calculated head width of different instars of H. vigintioctopunctata

Instar	Observed head width (mm)			Calculated head width*
	Range	Mean	Growth ratio	
I	0·369–0·469	0·420	1·44	0·452
II	0·530–0·692	0·603	1·47	0·613
III	0·803–0·953	0·887	1·15	0·782
IV	0·968–1·107	1·018	..	1·180

* Average obtained by applying Taylor's modification.