tion with the auxin, indole-3-acetic acid (IAA), on adventitious root development in hypocotyl cuttings of cowpea (*Vigna sinensis* Endl. cv. CO.3) is reported in this communication.

The source of the seed material and the experimental procedure have been described elsewhere[4]. From 10-day old seedlings, hypocotyl cuttings of uniform length (about 12 cm) were excised. The cuttings were divided into 6 batches of 10 each. One batch was kept as control by dipping the cut ends in distilled water and the rest were subjected to treatment for 48 hr, as shown in table 1. The test solutions were changed after 24 hr to minimise microbial contamination. On 3rd day, all the cuttings were transferred to distilled water, in which they were maintained for another 15 days with change of water on alternate days. The average maximum and minimum temperature during the experimental period was 31.2° C and 23.4° C, respectively. Observations and recorded data for duplicate experiments are given in table 1.

The results of the experiments clearly indicate that IAA and ABA in both the concentrations employed stimulate root formation in hypocotyl cuttings. Low concentration (1 μ g/ml) of ABA stimulated rooting effect is comparable with that of IAA-stimulated rooting effect. Low concentration (1 μ g/ml) of ABA, when applied in conjunction with IAA, exerts a slight synergistic effect in furthering root development. Even the appearance of visible root primordia on cuttings treated with ABA (1 μ g/ml) + IAA combination occurs one day earlier than the cuttings treated with IAA and ABA (1 μ g/ml) individually. Nevertheless, high concentration (5 μ g/ml) of ABA, when applied to the cuttings in combination with IAA, the former slightly antagonises the root-stimulation effect of the auxin. Recently, it has been demonstrated that ABA further stimulates the auxin-induced cell division and DNA synthesis in excised tuber tissues of Jerusalem artichoke[5]. Though, synergistic effects between auxins and phenolic substances[6,7] and between auxins and gibberellic acid[8,9] are known in promoting adventitious root formation in excised cuttings, synergistic effect between low concentration of ABA and auxin in furthering root development is reported for the first time.

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1. Addicott, F. T. and Lyon, J. L., *Annu. Rev. Plant Physiol.*, 1969, **20**, 139.
2. Milborrow, B. V., *Annu. Rev. Plant Physiol.*, 1974, **25**, 259.
3. Walton, D. C., *Annu. Rev. Plant Physiol.*, 1980, **31**, 453.
4. Janardhanan, K. and Lakshmanan, K. K., *Curr. Sci.*, 1981, **50**, 459.
5. Minocha, S. C., *Z. Pflanzenphysiol.*, 1979, **92**, 327.
6. Gorter, C. J., *Physiol. Plant.*, 1969, **22**, 497.
7. Haissig, B. E., *N. Z. J. For. Sci.*, 1974, **4**, 311.
8. Bhattacharya, S., Bhattacharya, SDe. and Malic, C. P., *Planta.*, 1978, **138**, 111.
9. Adhikari, U. K. and Bhatacharya, D., *Planta.*, 1978, **143**, 331.

THE VOLUME OF CORPORA ALLATA IN RELATION TO THE EGG MATURATION OF THE SWEET POTATO WEEVIL, *CYLAS FORMICARIUS* F. (COLEOPTERA: CURCULIONIDAE)

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The corpora allata (CA) as the source of gonadotropic hormone in insects was first observed by Wigglesworth[1] in *Rhodnius prolixus* and later confirmed by various workers[2,3]. During periods of egg maturation, the size of the CA in *Rhodnius prolixus* increases markedly[1]. The change is basically due to the increase in the size and number of nuclei. The correlation between egg maturation and increased cytoplasmic volume of the CA has been found in many insects[4-6]. In the present communication, the cyclical changes in the volume of the CA was correlated with the egg development and presented.

The sweet potato weevil was mass cultured in the laboratory under controlled conditions (28 ± 1°C; 70 ± 5% relative humidity and 12 hr photoperiod). Late pupae were segregated from the infested tubers

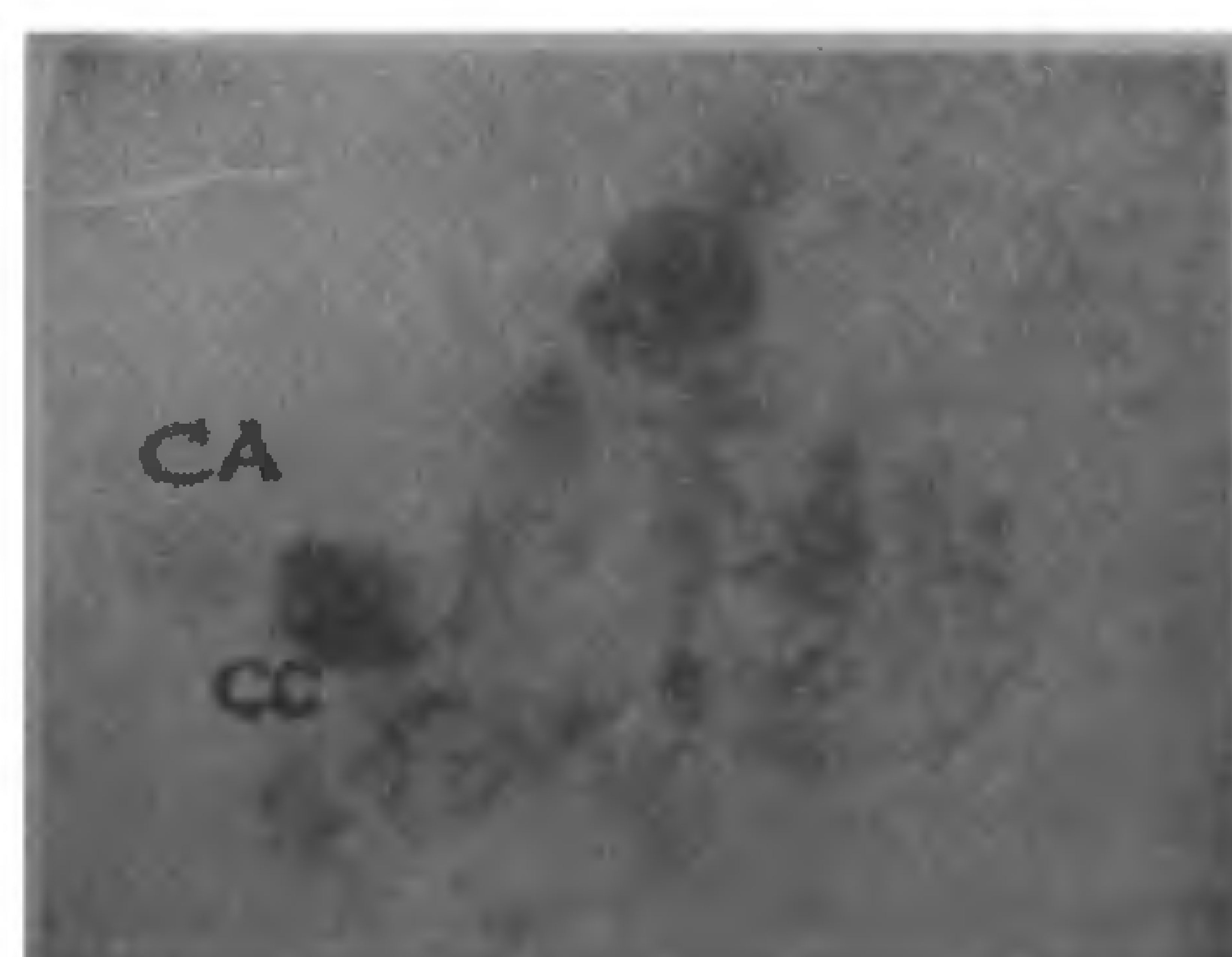

Figure 1. Corpora allata and corpora cardiaca of the sweet patato weevil separated from the brain (600 ×). CA—corpus allatum, CC— corpus cardiacum.

and the adults were separated as soon as they emerged. The adults were kept in 4" petridishes containing moist cotton and a filter paper above it. Pieces of sweet potato tuber were served as food. Daily dissections of the CA and the ovaries were conducted in Insect Ringer's solution and the volume of CA was calculated according to the procedure of Tobe & Pratt[7].

In sweet potato weevil, the CA are connected to the Corpora cardiaca (CC) and the nerve, the nervus corporis allatus cannot be seen due to the fusion of the two glands CC and CA. the CA is oval in shape (figure 1).

In freshly moulted adults, the CA are small in size and measure about 0.039 nl. At this stage the CA are inactive, translucent and cannot secrete juvenile hormone (JH). The CA are activated usually after feeding and mating. From second day onwards, after the adult emergence, the size of the gland increases and on 5th day it decreases and measures 0.076 nl and on the 6th day it reaches its maxium size and on 7th day it decreases again. Thus, the volume of CA increases from 0.039 nl (0-day) to 0.085 nl on the 6th day and on the 7th day it decreases to 0.043 nl. This corresponds with the first gonadotropic cycle. From the 8th day onwards its size increases again indicating the onset of the second gonadotropic cycle (figure 2).

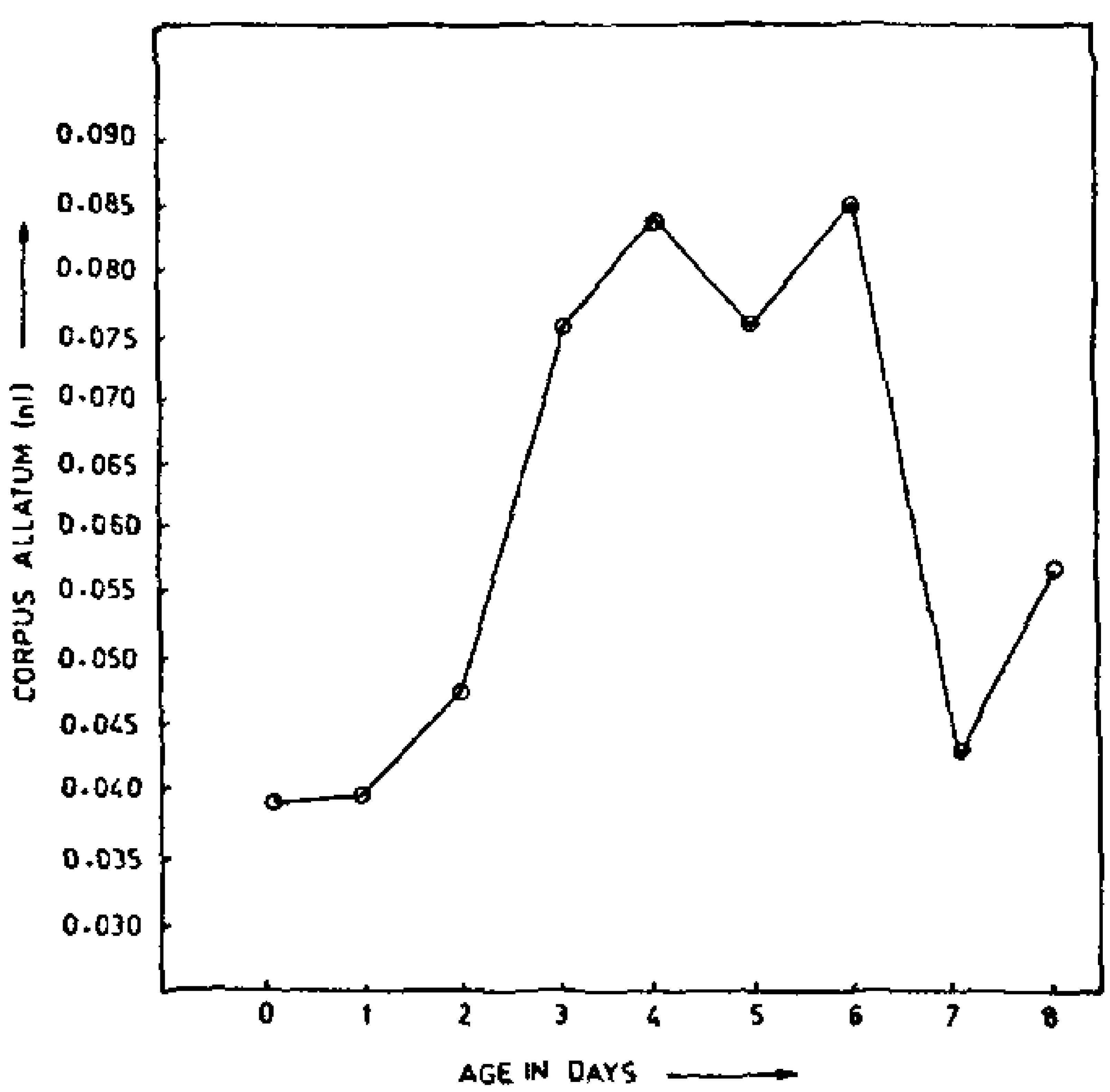

Figure 2. Graph showing the volumetric changes of corpus allatum in a female insect till first gonadotropic cycle.

In the sweet potato weevil, the CA increased in its volume during the previtellogenic and early vitellogenic stages. This suggested that JH was actively synthesized and released into the haemolymph to stimulate vitellogenesis. A short fall in the volume of CA on 5th day may be due to the release of the hormone into the haemolymph for the initiation of vitellogenesis in the other ovarioles. This corressponds to the cyclical development of the oocytes in each ovariole. In the late stages of egg maturation it decreased to about the size observed just after the adult emergence. During the egg maturation, the CA shows a remarkable increase in its size in practically all insects[8-10]. This is in agreement with the results observed in the sweet potato weevil also.

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21 December 1981.

1. Wigglesworth, V. B., *Q. J. Micr. Sci.*, 1936, **79**, 91.
2. Nayar, K. K., *Curr. Sci.*, 1953, **25**, 149.
3. Engelmann, F., *The physiology of insect reproduction*, Pergamon Press, New York, 1970.
4. Loher, W., *Zool, Jb. Physiol.*, 1965, **71**, 677.
5. Wilkens, J. L., *J. Insect Physiol.*, 1968, **14**, 927.
6. Mordue, W., *J. Insect Physiol.*, 1965, **11**, 505.
7. Tobe, S. S. and Pratt, G. R., *Life Sci.*, 1975, **17**, 417.
8. Palm, N. B., *Opuscula Entomol. Suppl.*, 1948, **7**, 1.
9. Kaiser, P., *Arch. Ent. Mech. Organ.*, 1949, **144**, 99.
10. Gundevia, H. S and Ramamurthy, P. S., *Z. Morph. Tiere*, 1972, **71**, 355.

BACILLUS CEREUS FRANKLAND AND FRANKLAND AS A PATHOGEN ON RICE LEAF ROLLER, *CNAPHALOCROCIS MEDINALIS*, GUENEE (PYRAUSTIDAE: LEPIDOPTERA)

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Cnaphalocrocis medinalis, Guenee, commonly known as the rice leaf roller, is one of the serious pests of rice in India. A granulosis virus was reported on this pest from Fiji[1] and from Kerala[2]. In November 1980, a large number of dead and dying larvae of *C. medinalis*, showing symptoms of bacterosis were observed on rice plants in paddy fields of Kerala. A rod-shaped bacterium was isolated in pure culture from these specimens. Preliminary test using third instar larvae of *C. medinalis* obtained from healthy laboratory culture indicated that they would be experimentally infected by feeding them on leaves which had been dipped into