with AF. B-cells (2–3) stain pale purple with AF and pale blue black with CHP and their cytoplasm contains moderate amounts of neurosecretion. C-cells (2–3) are smaller than the B cells and they stain green with AF and red with CHP. The cytoplasm of these cells contains less amount of stainable materials as evidenced by their feeble reaction with these stainings. D-cells (1–2) stain pale purple with AF and faint blue black with CHP and are larger than the A-cells. The cytoplasm of these cells reacts feebly with these stainings (Fig. 3).

The lateral neurosecretory cell group situated above the corpora pedunculata on the lateral side of the pars intercerebralis contains a few (1–2) B-type of neurosecretory cells (Fig. 4). The posterior group includes a few (1–2) B-type of cells situated at the posterior extremity on either side of the pars intercerebralis (Fig. 2). The optic group contains (2–3) B-type of cells (Fig. 6). The tritocerebral group consists of 1-2 tritocerebral neurosecretory cells of B-type. The cytoplasm of these B-cells of different groups contains less amount of stainable materials as evidenced by its feeble staining reactions with AF and CHP (Fig. 1).

The existence of variations in the distribution of neurosecretory cells in the brain has been reported for different Hemipteran insects. Thus, the Lygaeid milk weed bug, *Oncopeltus fasciatus*, contains a single group of neurosecretory cells with A, B, C and D types in the pars intercerebralis part of the protocerebrum[4]. The pyrrhocoreid plant bug, *Iphita limbata*, according to Nayar[5], possesses in its pars intercerebralis part of the protocerebrum two groups of neurosecretory cells, each consisting of sixteen cells. It is interesting to note that the neurosecretory cells have not been reported to occur in deuto and tritocerebral parts of the brain of these insects, although such cells have been identified in these parts of the brain of the present Coreid bug, *S. augur*. Thus, different families of the order Hemiptera seem to have NSC distributed in different ways in the brain as evidenced by their occurrence in Lygaeidae[4], Pyrrhocoridae[5] and Coreidae[6,7]. Similarly, studies on neurosecretory system of insects within the family Coreidae have shown certain variations in the distribution of NSC in the brain. The Coreid paddy bug, *Leptocorisa varicornis* has a single cluster of five AF positive median NSC in its protocerebral hemisphere[7]. Another Coreid bug, *Leptocorisa acuta*, has been reported to contain two groups of median NSC in this part of the brain[8]. The present Coreid bug, *S. augur*, on the other hand, has five groups of NSC in its brain. Further, the medial group of neurosecretory cells of these insects also exhibits difference in its composition of neurosecretory cell types as evidenced by the occurrence of two types of NSC (A and B) in *Leptocorisa varicornis*[7] and *L. acuta*[8] and four types (A, B, C and D) in *S. augur*. It may be inferred from these observations that the distribution of NSC groups as well as the occurrence of NSC types in the brain of these insects seem to be species specific.

The authors are grateful to Dr. Mrs. P. Shankarmurthy, Professor and Head of the Department of Zoology, Annamalai University, for providing facilities and to Dr. Vijayam Sriramulu, for his help in photomicrography. Financial assistance by U.G.C. to one of them (MMS) is gratefully acknowledged.

September 4, 1980.

1. Awasthi, V. B., *J. Morphol.*, 1972, **136**, 337.
2. Ewen, A. B., *Trans. Am. Micros. Soc.*, 1962, **81**, 94.
3. Gomori, G., *Am. J. Pathol.*, 1941, **17**, 395.
4. Johansson, A. S., *Nytt. Mag. Zool.*, 1958, **7**, 1.
5. Nayar, K. K., *Z. Zellforsch.*, 1956, **44**, 697.
6. Faruqui, S. A., *Folia Morph.*, 1975, p. 22.
7. Tiwari, R. K., Srivastav, K. P. and Singh, H. H., *Zool. Beit.*, 1975, p. 105.

A NOTE ON HYDROCYANIC ACID CONTENT IN *ACACIA LEUCOPHLOEA* ROXB. WILLD

B. K. Bhadoria and R. K. Gupta
Indian Grassland and Fodder Research Institute, Jhansi 284 003, India

Acacia leucopheloea Roxb. Willd commonly known as 'Reunja' is an ubiquitous species of genus *Acacia*. It abundantly grows in dry forest tracts of peninsula[1]. The bark of this plant is described to be medicinally useful[2]. Its green foliage is quite nutritious, and readily attracts grazing sheep and goats particularly during summer when green forage is scarce. In spite of its palatability the leaves and pods sometimes contain alarming quantities of hydrocyanic acid[3] which restricts its usefulness as forage for livestock. We report herein the monthly variation in the hydrocyanic acid content in different plant parts.

The HCN was estimated colorimetrically[4]. The values of HCN have been given in Table I on fresh weight basis. The bud formation in plants takes place during August and September followed by flowering and fruiting in October-November.

The concentration of hydrocyanic acid in leaves gradually increased from April touching to its maximum in May (242·6 ppm) and fell sharply from September (19·0 ppm) onwards. Buds and flower contained 562·1 ppm (August) and 478·8 ppm (October) respectively. The trend is indicative of shift of HCN bio-synthesis from leaves to the reproductive organs of the plant. Initially the hydrocyanic

TABLE 1

Hydrocyanic acid content in different parts of plants

Months	Hydrocyanic acid in ppm on fresh weight basis			
	Leaves	Buds	Flowers	Pods
January	0·0	..	..	559·0
February	1·5	..	..	459·3
March	21·11	..	..	457·1
April	142·6	..	..	400·7
May	242·2	..	..	..
June	214·6	..	..	..
July	66·6	..	..	..
August	37·5	..	..	..
September	19·0	562·1	..	..
October	47·5	513·0	478·8	537·5
November	43·5	..	..	987·0
December	0·0	..	..	595·0

acid in young fruits was maximum during November (987·0 ppm) and it decreased with the maturity during April (400·7 ppm). The seeds were devoid of hydrocyanic acid, however, the pericarp showed significantly high quantities of HCN all through. These studies revealed that the plant foliage could be safely utilized as good quality forage for livestock all the year round except in summer. However, caution should be exercised in feeding *A. leucophloea* to the livestock as sole diet when the hydrocyanic acid concentration is above the critical level, *i.e.*, 20 mg/100 gm or 200 ppm. The minimum lethal dose for hydrocyanic acid for cattle and sheep is 2 mg/kg body weight when present as glycoside[5].

The authors express their grateful thanks to Dr. B. D. Patil, Director, Indian Grassland and Fodder Research Institute, Jhansi, for his keen interest during the study.

November 17, 1980.

1. *Wealth of India*, CSIR, New Delhi, 1948, 1, 148.
2. Kartikar, I. R. and Basu, B.D., *Indian Medicinal Plants*, Publ. Lalit Mohan Basu, Ed., 1933, 2, 925.
3. Prasad, J., Singh, A. P. and Rekib, A., *Indian Vet. J.*, 1977, 54, 748.
4. Gilchrist, D. G., Lueschen, W. E. and Hittle, C. N., *Crop. Sci.*, 1967, 7, 267.
5. Blood, D. C., Henderson, J. A. and Radostits, O. M., *Vet. Med. EBLS and Baillie*re, Tindall*, 5th Ed., 1979, p. 966.

HORMONAL CONTROL ON THE MATING BEHAVIOUR IN THE FEMALES OF *SPODOPTERA MAURITIA* (LEPIDOPTERA: NOCTUIDAE)

V. S. K. NAIR
Department of Zoology, University of Calicut
Calicut University, P.O. 673 635, India

AMONG insects hormonal involvement in the sexual behaviour have been well demonstrated in grasshoppers and cockroaches which have long life history and many reproductive cycles[1,2]. It is still uncertain whether hormones control sexual behaviour in insects which do not feed in the imaginal stage and have practically non-feeding adult life period like in many noctuid moths.

An answer to this question was sought in the experiments performed in *Spodoptera mauritia* (Lepidoptera : Noctuidae). The adult moths were collected at night using fluorescent lamps. They were allowed to lay eggs in small specimen tubes. The caterpillars were reared on young paddy plants (three weeks old) or with fresh leaves of the grass *Ischaemum aristatum*. The total larval period extended from 17 to 19 days. The pupae moulted in about 8 days. The adult moths have a very short life span of about 8 days. They were fed with 8% sucrose solution or honey. To study the mating behaviour the pupae were segregated by sexes and were held in emergence in glass chimneys. Virgin male and female insects were kept in pairs and their behaviour was observed at one hour intervals from 18·00 hrs to 6·00 hrs under diffuse light. It was found that mating activity commenced 24 hrs after moulting and the major peak of activity was at about 2·00 hrs to 3·00 hrs when copulation took place. Female sexual behaviour is here defined as wing vibration followed by copulation.

The endocrine tissues used in the present study comprised the median neurosecretory cells of the pars intercerebralis region of the brain (NSC), paired corpora cardiaca and corpora allata the latter two making a complex, the corpora cardiaca–allata complex (CC+CA). The neurosecretory cells were clearly visible in the live condition because of their pale white bluish tinge. NSC or CC+CA were exposed and extirpated *via* a longitudinal slit in the neck membrane by means of fine forceps (No. 5) under insect saline. Following each operation a few crystals of streptomycin sulphate were placed in the wound which was then sealed with wax. Control insects were treated similarly except that a small piece of fat body was removed *in lieu* of NSC or CC+CA. The experimental and control animals were kept individually in separate glass chimneys along with males and were observed continuously from 18·00 hrs to 6·00 hrs