branch subdivides at the apex into two or more giving rise to ribbed fasciation[3]. When the growing point divides into two, it results in true dichotomous branching (figure 4). Due to overtopping, some of the healthy and more vigorous laterals, in conjunction with the mother axis, exhibit pseudo-dichotomy (figure 2), which may very much resemble true dichotomy. Rarely funnel-shaped (ring fasciation) (figure 5) and hood-shaped fasciations are observed among normal branches. Owing to inequalities in growth (unilateral growth) still other branches terminate in a snail-like helix (figure 3) with the scale leaves in spiral phyllotaxy, in contrast with the normal whorled phyllotaxy. Sometimes spiral and whorled phyllotaxy can be observed on the same axis (figure 1). The lateral branches which develop from the coiled or twisted axis are normal. In a true dichotomy the direction of twisting of a branch is clockwise while in the other it is anticlockwise (figure 4).

The funnel-shaped fasciation may be due to the functioning of peripheral ring of initials and not by those which are centrally located. The derivatives of the shoot apical meristem in normal development differentiate into nodes and internodes in transverse plane. But in some branches such differentiation takes place in vertical plane. Moreover the unilaterally occurring nodal differentiation makes a continuous rotation (either clockwise or anticlockwise as the case may be), resulting in a continuous spiral phyllotaxy bearing innumerable leaves. The change of phyllotaxy from whorled to spiral or spiral to whorled in the same branches may be attributed to the differential mode of nodal differentiation among the derivatives of the single apical meristem.

As soon as the vertical (lateral) differentiation of node is established, the promeristem should have undergone equal branching at the nodal point leading to the formation of dichotomy with clockwise and anticlockwise twisting.

The occurrence of various categories of stem fasciation, such as strap-shaped (linear), ribbed (multiradiate), funnel-shaped and dichotomous in the single species or even in individual *Casuarina* plant is in complete harmony with the report of White[3]. Present observations agree with the statement of White[3] that linear or strap-shaped form of fasciation is most common and ring fasciation is very rare.

18 December 1982; Revised 17 February 1983

1. Sinnott, F. W., *Plant Morphogenesis*, McGraw Hill, New York, 1960.
2. Gopal, V., Rajendran, J., Ravignanam, T. and Lakshmanan, K. K., *Indian J. Forestry*, 1984, **7**, 68.
3. White, O. E., *Bot. Rev.*, 1948, **14**, 319.

INHIBITION OF NEUROSECRETORY ACTIVITY BY ECDYSONE IN THE BLISTER BEETLE *MYLABRIS PUSTULATA* THUNB.

D. R. KAMALAKANNAN and
K. P. S. JEYACHANDRAN
Department of Zoology, Thiagarajar College, Madurai 625 009, India.

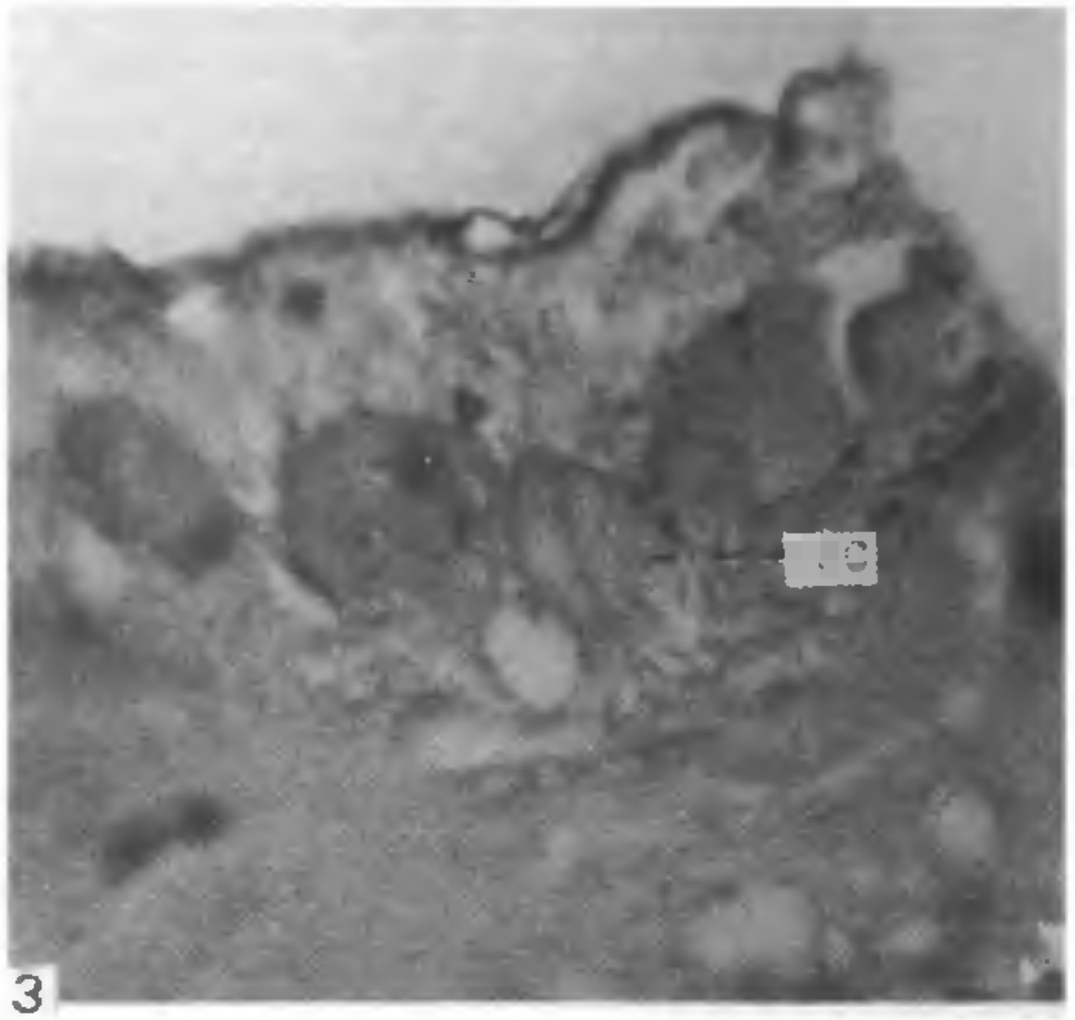
HAGEDORN *et al*[1] discovered the ovary as a source of ecdysone in adult mosquito. Since then, investigations have been done by injecting ecdysone into adult female insects and this hormone is found to inhibit corpus allatum activity[2-4]. It is believed that this effect of ecdysone on the corpus allatum activity could be through the neurosecretory cells of brain[2, 5]. This suggestion prompted the authors to investigate the effect of ecdysone on the neurosecretory activity in the blister beetle *Mylabris pustulata*.

Adult blister beetles were collected and maintained on shoe-flowers in laboratory cages. Groups of ten females of approximately the same weight (about 950 mg) were selected. Each was injected with 20 μg of ecdysone (inkosterone) per gram body weight of the insect using a microsyringe. The hormone solution for injection was made by dissolving 10 mg of ecdysone in 100 ml of 10% ethanol in insect Ringer's saline. The controls received an equivalent quantity of 10% ethanol-saline only.

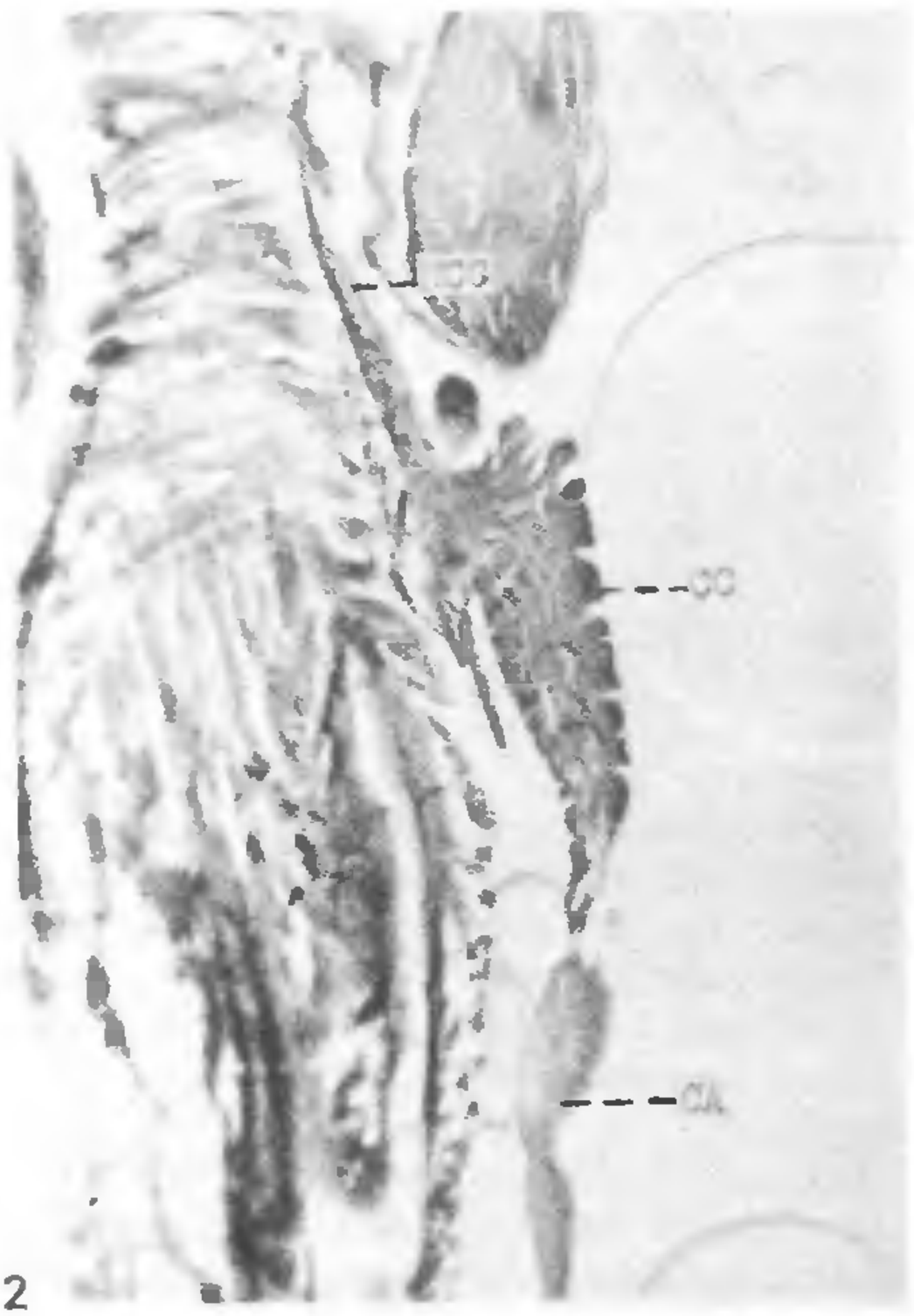
The brain and retrocerebral complex (corpora cardiaca and corpora allata along with their associated nerves) of the control and experimental insects was dissected under insect Ringer's saline after two or three days and fixed in Bouin's fluid. Paraffin sections of 6 μ thickness were stained with aldehyde fuchsin (AF) of Ewen[6].

Two groups of neurosecretory cells (NSC) loaded with stainable neurosecretory material (NSM) are found in the brain of controls (figure 1). The NSM is transported axonally and stored in corpora cardiaca (CC) (figure 2), which serve as the neurohaemal organs. Corpora allata are devoid of the stored cerebral NSM. On the contrary, the NSC of brain (figure 3) and the CC (figure 4) are found to be devoid of NSM in experimentals.

1



3



2

4

Figures 1–4. 1. Section of brain showing NSC and AX loaded with NSM. AF × 600. **2.** Section showing the presence of NSM in NCC and CC. AF × 120. **3.** Section of brain of ecdysone injected insect showing the absence of NSM in NSC. AF × 600. **4.** Section showing the absence of NSC in NCM and CC of ecdysone injected insect. AF × 120. AX—Axons; CA—Corpus allatum; CC—Corpus cardiacum; NCC—Nervus corporis cardiacum; NSC—Neurosecretory cells; NSM—Neurosecretory material; AF—Aldehyde fuchsin.

These observations in *M. pustulata* suggest that the injected ecdysone inhibits the synthesis of NSM in the NSC of brain. The absence of stainable NSM in the experimentals cannot be construed as due to release, because the result is observed after two or three days and it is shown in *Diploptera punctata* that the effect of injected ecdysone manifests only after 36 hr[2].

Based on the *in vitro* experiments, Friedel *et al*[2] have suggested that the inhibition of juvenile hormone biosynthesis by ecdysone is indirect and probably mediated through cerebral NSC. They have pointed out that only further work would reveal whether the ecdysone inhibits the release of an allatotropin or induces the release of an allatostatin. The present observation on the inhibition of neurosecretory activity by ecdysone in the blister beetle favours the former possibility. Garcia *et al*[5] believe that in *Rhodnius prolixus* the ecdysone inhibits oogenesis through its inhibitory activity on the NSC of brain.

The authors are grateful to Dr S. Kannan, Head of the Department of Zoology, Dr S. P. Annamalai, Principal, Mr. T. Kannan, Correspondent and Dr (Mrs.) Radha Thiagarajan, President of Thiagarajar College, Madurai, for offering facilities and encouragement. Thanks are due to Dr Kornath Madhavan for the gift sample of inkosterone.

2 March 1984; Revised 8 May 1984

1. Hagedorn, H., O'Connor, J. D., Fuchs, M. S., Sage, G., Schlaeger, D. A. and Bohm, M. K., *Proc. Natl. Acad. Sci.*, USA, 1975, **72**, 3255.
2. Friedel, T., Feyereisen, R., Mundall, E. C. and Tobe, S. S., *J. Insect Physiol.*, 1980, **26**, 665.
3. Stay, B., Tobe, S. S. and Mundall, E. C., *Science*, 1980, **207**, 898.
4. Stay, B. and Tobe, S. S., *Am. Zool.*, 1981, **21**, 663.
5. Garcia, M. L. M., Mello, R. P. and Garcia, E. S., *J. Insect Physiol.*, 1979, **25**, 695.
6. Ewen, A. B., *Trans. Am. Microscop. Soc.*, 1962, **81**, 94.

MASS MORTALITY OF *MODIOLUS METCALFEI* (HANLEY) (BIVALVIA: MYTILIDAE) IN CUDDALORE BACKWATERS

P. SAMPATH and R. KASINATHAN
Centre of Advanced Study in Marine Biology, Annamalai University, Portonova 608 502, India.

MODIOLUS METCALFEI (Hanley) is a burrowing benthic form inhabiting the backwater of Cuddalore coast. The shell is trigonal-ovate; yellowish brown; smooth except for the postero-dorsal area which is covered by a fibrous periostracum. This is known as a weaving mussel as it is attached to the muddy bottoms by means of the byssus thread.

M. metcalfei occurs in the Cuddalore backwater coastal area as vast beds and can be collected almost throughout the year during low tide, except during heavy freshwater inflow. This species is *euryhaline* as any other backwater species and can withstand wide variations in salinity from 5 to 30‰. Recently during an unusual heavy downpour of 135 mm on 23 December 1983, there were flash floods in the backwaters and the organisms in the whole bed area were found dead.

Most of the animals measured from 4 to 7 cm in length. A dense population of 200 to 250 dead animals was observed in a square meter which extended to about 2.5 km^2. During flash floods the bed area had 5 to 7 feet of water.

The surface water temperature, salinity, pH and oxygen recorded before flood were 28°C, 19.1‰, 7.9 and 5.94 ml/l respectively. However, during the flood the corresponding values were 19°C, 0.1‰, 8 and 6.5 ml/l, and after flood these were 29°C, 17.8‰, 7.8 and 4.89 ml/l respectively.

M. metcalfei is *euryhaline* and it can withstand variations in salinity to a large extent (5–35‰) as shown by the laboratory investigations. Even though *M. metcalfei* is *euryhaline* it could not perhaps withstand a sudden lowering of salinity (19‰ to 0.09‰) thus leading to mass mortality.

Mass mortality of *Lingula anatina* (Lam) was reported earlier from Portonovo waters (South India) by Ramamoorthi *et al*[1] and Lazarus and Sreenivasan[2] also reported mass mortality of marine organisms at Kovalam (South West coast of India) due to sudden lowering of salinity during cyclonic storm.

The authors thank the Director of this centre for encouragement. Thanks are also due to Dr Ajmal Khan for helpful suggestions. We are also thankful to the MAB Project for providing financial support.

8 February 1984; Revised 19 May 1984

1. Ramamoorthi, K., Venkataramanujam, K. and Srikrishnadhas, B., *Curr. Sci.*, 1972, **42**, 285.
2. Lazarus, S. and Sreenivasan, P. V., *Indian J. Fish.*, 1972, **25**, 198.