difficulty was overcome by the use of *C. axillaris*, *I. aquatica* and *C. nudiflora*. The former two gave very satisfactory results compared to *P. stratiotes* and *E. speciosa*, for they remained fresh for prolonged periods of time under the laboratory conditions.

Among the inert materials used for larval attachment, thermocol was the most suitable, though larval mortality remained high compared to those left on a live plant. Laurence *et al*[3] made no comparison between larval mortality in the presence of "paper leaves" and "live plant". It is therefore difficult to judge the efficiency of thermocol as compared with "paper leaves". It is possible that though thermocol contains many air chambers, the difficulty in diffusion of carbon dioxide through the walls of the chambers could cause mortality.

In the present study, it was found that sugar is an inevitable factor for the survival of the adults and realisation of the full egg-laying potential. When these factors were satisfied, it is possible to get egg clusters regularly from the laboratory colonies of both *Ma. annulifera* and *Ma. uniformis*.

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APPEARANCE OF CHLORIDE CELLS IN THE GILLS OF TWO FRESHWATER TELEOSTS UNDER UREA STRESS

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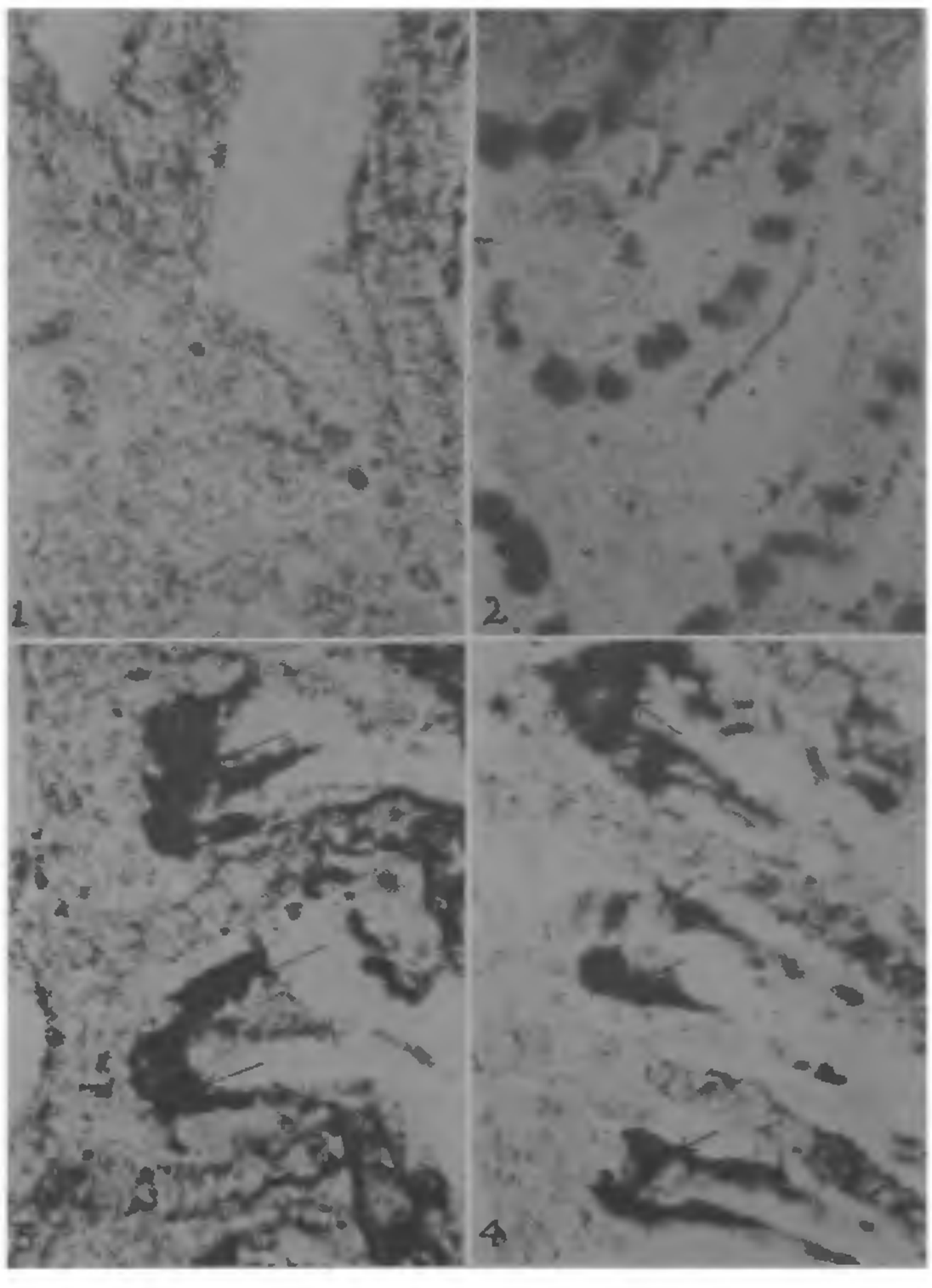
SINCE the work of Keys[1] the study of chloride ion secretion, through the gills of fishes, attracted the attention of a number of workers[2–8]. The cells of the gills involved in the chloride ion secretion were termed as chloride cells. There are other reports[9–11] which show excretion of materials other than the chloride ions through these cells of some freshwater fishes. In the present study, it was observed that chloride cells developed on the gills of two freshwater teleosts *Channa punctatus* (Bl) and *Mystus* (*M*) *vittatus* (Bl) under urea stress.

Thirty specimens of these two species of fishes were collected and acclimatised for 14 days under laboratory conditions. Each group was divided into two batches. One batch was put as control using tap water as the medium, whereas the remaining batches of *C. punctatus* and *M.* (*M.*) *vittatus* were kept in 18000 ppm[12] and 11000 ppm of urea stress respectively. At these urea concentrations, no mortality was observed. The fishes from both the batches were sacrificed after 1 to 7 days. Simultaneously the fishes



Figures 1–4. 1, 2. Gills of *C. punctatus* and *M.* (*M.*) *vittatus* respectively put as control. $AgNO_3/HNO_3$, × 1500. **3.** Gill of *C. punctatus* put under 18000 ppm urea stress for 7 days. $AgNO_3/HNO_3$, × 1500. Note black depositions in the cells of (interlamellar) zone. **4.** Gill of *M.* (*M.*) *vittatus* after 11000 ppm urea stress for 3 days. $AgNO_3/HNO_3$, × 1500. Cells of the basal portion of the secondary gill lamellae and interlamellar zone show positive response to chloride test (black deposit).

kept as control were also sacrificed. Gills from all the sacrificed fishes were removed and were fixed in $AgNO_3/HNO_3$ solution[3].

Paraffin sections were cut, and deparaffined, and mounted in DPX.

On microscopic observations of the gills, no positive response of the chloride test was observed in the control fishes (figures 1, 2). In *M.* (*M.*) *vittatus*, intense positive response (+) of the chloride test (black deposit) was observed after 1 to 3 days of urea stress, whereas, in *C. punctatus* this response was observed in the gills of 1 to 7 days exposed fishes. In both the species, the majority of the cells giving positive response to the chloride test was situated on the basal portions of the secondary gill lamellae and on the interlamellar area (figures 3,4).

The possible involvement of the chloride cells in the excretion of ions other than those of chloride was proposed[9–11]. These specific cells cannot be termed generally as "chloride secreting cells" or "chloride cells", since ions other than chloride are reported to be excreted through these cells. The present study implicates their role in adaptation to urea toxicity. A more generalised name should be given to these specific cells.

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ANNOUNCEMENT

INTERNATIONAL SEMINARS ON FRONTIER AREAS (ISOFA-I, II, III)

Three International seminars on Frontier Areas (ISOFA) will be held at Jorhat, India during 1986–87 to commemorate the Silver Jubilee Year of the establishment of Regional Research Laboratory, Jorhat, a National Laboratory of Council of Scientific & Industrial Research. The three seminars are as follows:—

ISOFA-I: 31 March to 5 April 1986 – Applied Chemical & Engineering Sciences which includes: 1. Chemical Reaction Engineering, 2. FBC (Coal), 3. Pulp & papertechnology, 4. Oil field chemicals and 5. Advances in analytical chemistry.

ISOFA-II: 27–30 October 1986 – Bio & Chemical Sciences which includes: 1. Natural products, 2. Organic synthesis, 3. Medicinal and Economic plants and 4. Biochemistry.

ISOFA-III: 11 to 13 February 1987 – Physical and Engineering Sciences, which includes: 1. Geoscience, 2. Applied Civil Engineering and 3. Mechanical Engineering.

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