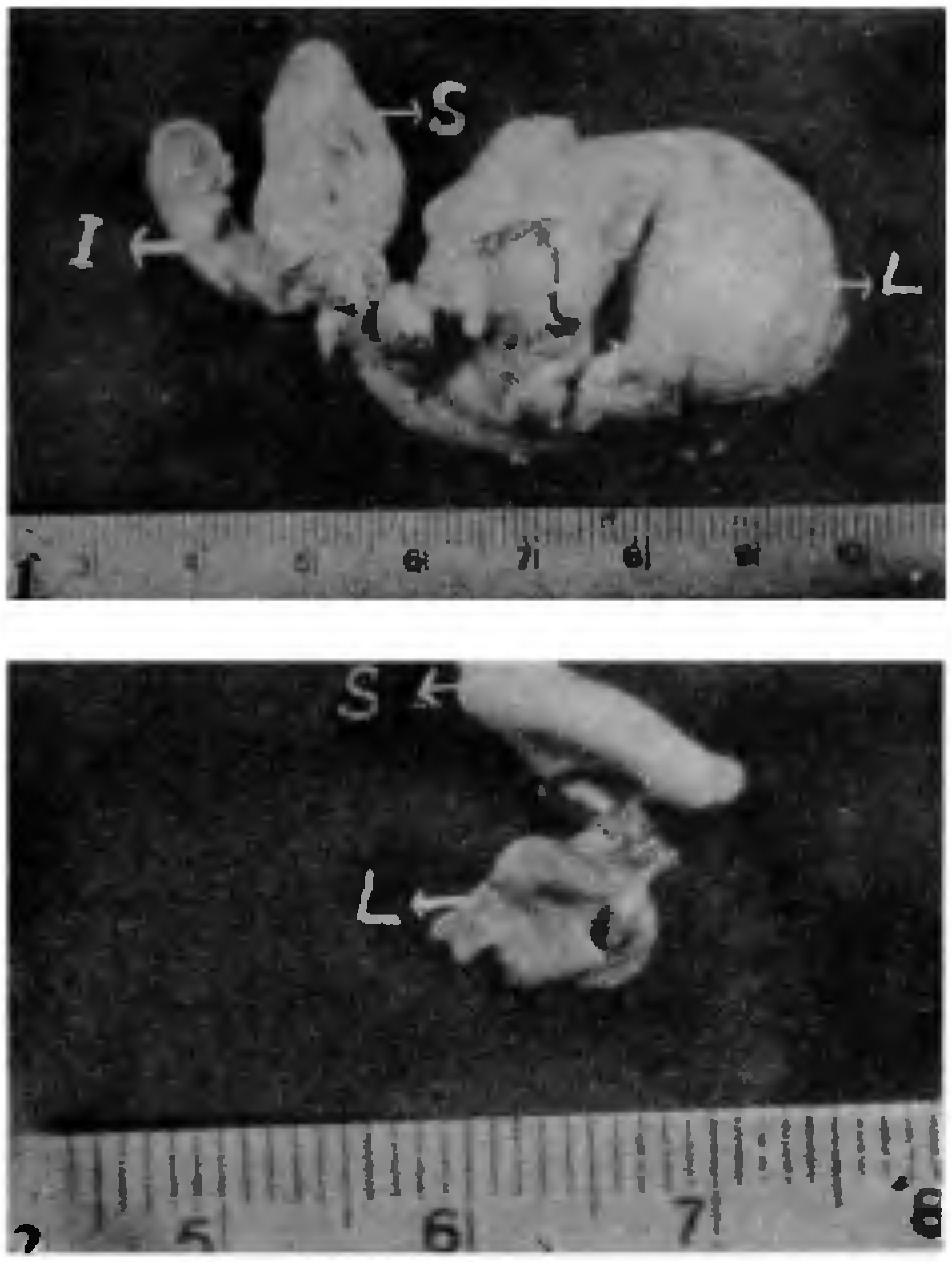

Figures 1 & 2 1. Hepatic Hyperplasia in *Mystus gulio*. **2.** Normal size of liver in *Mystus gulio* (11.5cm) I = Intestine; L = Liver; S = Stomach.

margins of the lobes, which are thin and incompletely separate from one another, cover the anterior part of the stomach.

The abnormally enlarged liver had no distinct lobes. The entire liver was a hardened mass, greyish in colour, filling up the body cavity up to half the length of the intestine. There were nodules of different sizes on the surface of the liver. They were greyish white in colour. Obviously the enlargement of the liver is an instance of spontaneous hyperplasia.

The neighbouring organs, namely, the kidneys and ovaries also showed discolouration. Kidneys were grayish unlike the normal reddish colour. Gonads were also grayish compared to the normal yellow colour.

Earlier reports on liver tumours[4] were mostly from salmonids, sometimes reaching epidemic proportions (nearly 100%) in private fish hatcheries, due to the presence of aflatoxins in pelleted diet. Hepatic Neoplasia in bony fish other than salmonids were observed in bottom feeding *Catostomus commersoni* and *Ictalurus nebulosus* of which the latter is a cat fish. *M. gulio* is also a bottom feeder. Liver tumours were experimentally induced to develop in *Brachydanio rerio* by adding diethylnitrosamine to aquarium water. The tumours developed between the 10th and 30th weeks of the experiment. Thus, although experimentally liver tumours can be induced to develop spontaneous Hepatic Neoplasia were very rare in teleosts other than salmonids.

In the present study the occurrence of Hepatic Hyperplasia in *M. gulio* may be attributed to the high concentrations of zinc and iron in the harbour waters, resulting from the effluents of neighbouring zinc plant and iron ore shipment. Zn is 100 times more concentrated (dissolved fraction) and Fe is 10-20 times more concentrated (particulate fraction)in harbour waters than in the costal waters [5].

Further experimental studies on aquarium reared fish, subjected to high concentration of zinc and iron, may reveal the actual carcinogenic element responsible for the development of hepatic tumour in *M. gulio*.

Details of the histological investigations on the different organs of the affected fish are in progress. A preliminary study shows that the observed hyperplasia is a case of Neoplasia.

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NANOPLANKTON: CHIEF PRIMARY PRODUCERS IN LAKE NAINITAL

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NANOPLANKTERS are not only the chief primary producers in aquatic ecosystems[1-7], but also constitute an important component of the aquatic food webs[8].

The contribution of nanoplankton towards total primary production in the marine and estuarine waters has been studied[5-7], but no attempt has so far been made to evaluate its role in the lacustrine systems in India. The present report outlines the contribution of nanoplankton to total phytoplankton biomass production in Lake Nainital (Kumaun Himalaya).

Phytoplankton abundance was measured by filtering the samples through Whatman 44 filter paper and counted using a Haemocytometer. By routine measurement of the size of phytoplankton organisms, the total abundance of nanoplankton and the different size fractions of nanoplankton were estimated. Primary productivity was measured by light and dark bottle technique. Nanoplankton activity was determined by fractional filtration method, using a very fine mesh net (20 μ).

Figure 1(A) indicates that nanoplankton (< 60 μ, according to Rodhe[1]) accounted for a major part of the phytoplankton standing stock (both density and biomass); these organisms occur in great abundance during the rainy, spring and summer seasons contributing 69.2 and 57.6% to the total phytoplankton in terms of density and biomass, respectively. Breakdown of nanoplankton into various size groups (*viz.*, <10, 10–20, 20–40 and 40–60 μ) reveals that the 10–20 μ size class is most abundant during the greater part of the year. The organisms falling in this size class are: *Chlorella vulgaris*, *C. conglomerata*, *Chlorococcum humicola* and *Chlamydomonas* sp. The mean composition (density, biomass) of various size classes was: 10 μ, (9.6, 2.2%); 10–20 μ (41.5, 28.8%); 20–40 μ (13.4, 6.4%) and 40–60 μ (6.8, 25%).

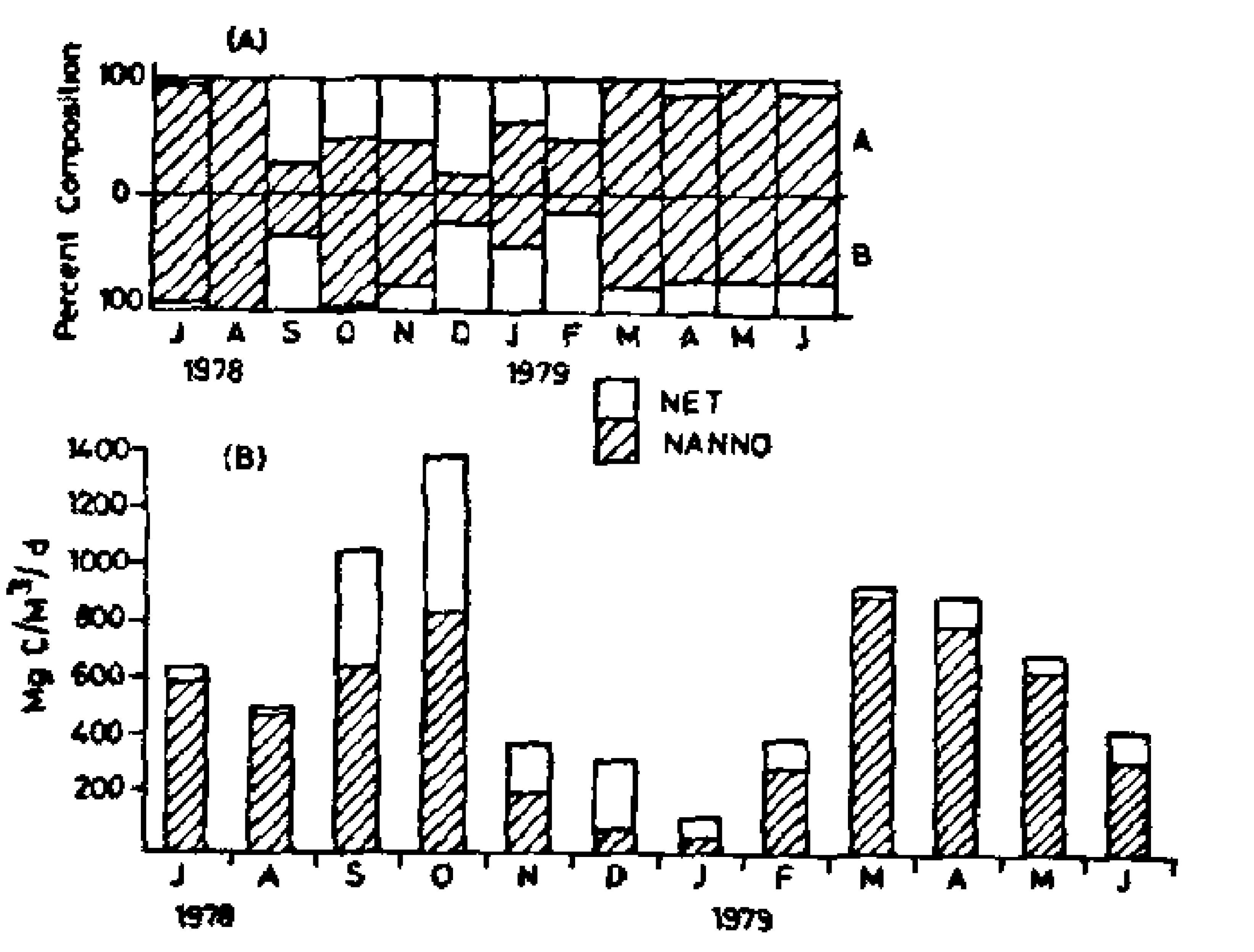

Figure 1. Percent contribution of nano-(hatched bar) and net phytoplankton (open bar) to (A) total density and (B) total biomass of phytoplankton [Contribution of nanoplankton to total phytoplankton production.]

The greater dominance of nanoplankton is also substantiated by greater nanoplankton production (59.8 to 920 mg $cm^{-3}d^{-1}$; figure 1(B). During the rainy season, nanoplankton is responsible for ≥90% of the total primary production. However, nanoplankton activity decreases in autumn and winter, increases thereafter, culminating in a peak in March. The nanoplankton is 440 g $cm^{-2}yr^{-1}$ against the total primary production. The average annual production of nanoplankton is 440 g $cm^{-1}yr^{-1}$ against the total primary production of 630 g $cm^{-2}yr^{-1}$[9].

In neritic and oceanic waters, nanoplankton contributes, between 80 and 100% of the total production[10-12] and in the mangroves and backwaters of Portonovo, 80.5 and 62.1%[13], respectively. In the Cochin backwaters, nanoplankton accounted for 74.5%[7] and in certain eutrophic lakes about 90%[14], 80%[15] and 50%[2] of the total phytoplankton.

Thus, it is apparent that nanoplankters (10–20 μ size class in particular) which dominate the phytoplankton community in terms of standing stock are the chief producers of organic matter in Lake Nainital. The dominance of these organisms in this eutrophic lake is a limnological paradox. Generally these organisms are abundant in nutrient poor waters where they materially affect the absorption of nutrients and their subsequent transfer to the higher trophic levels. In eutrophic lakes, the phytoplankton succession culminated into a bloom of blue-green algae (*Anabaena*, *Microcystis*, *Aphanocapsa*) and nanoplankton becomes a poor component of the system. On the contrary, in the present study, eutrophic nature of the water body *i.e.* the restricted light penetration[9], high detritus content and community metabolism, appears to be conducive to greater growth and activity of these organisms.

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SOME NEW RECORDS OF FRESHWATER OSTRACODA (CRUSTACEA: ENTOMOSTRACA) FROM INDIA

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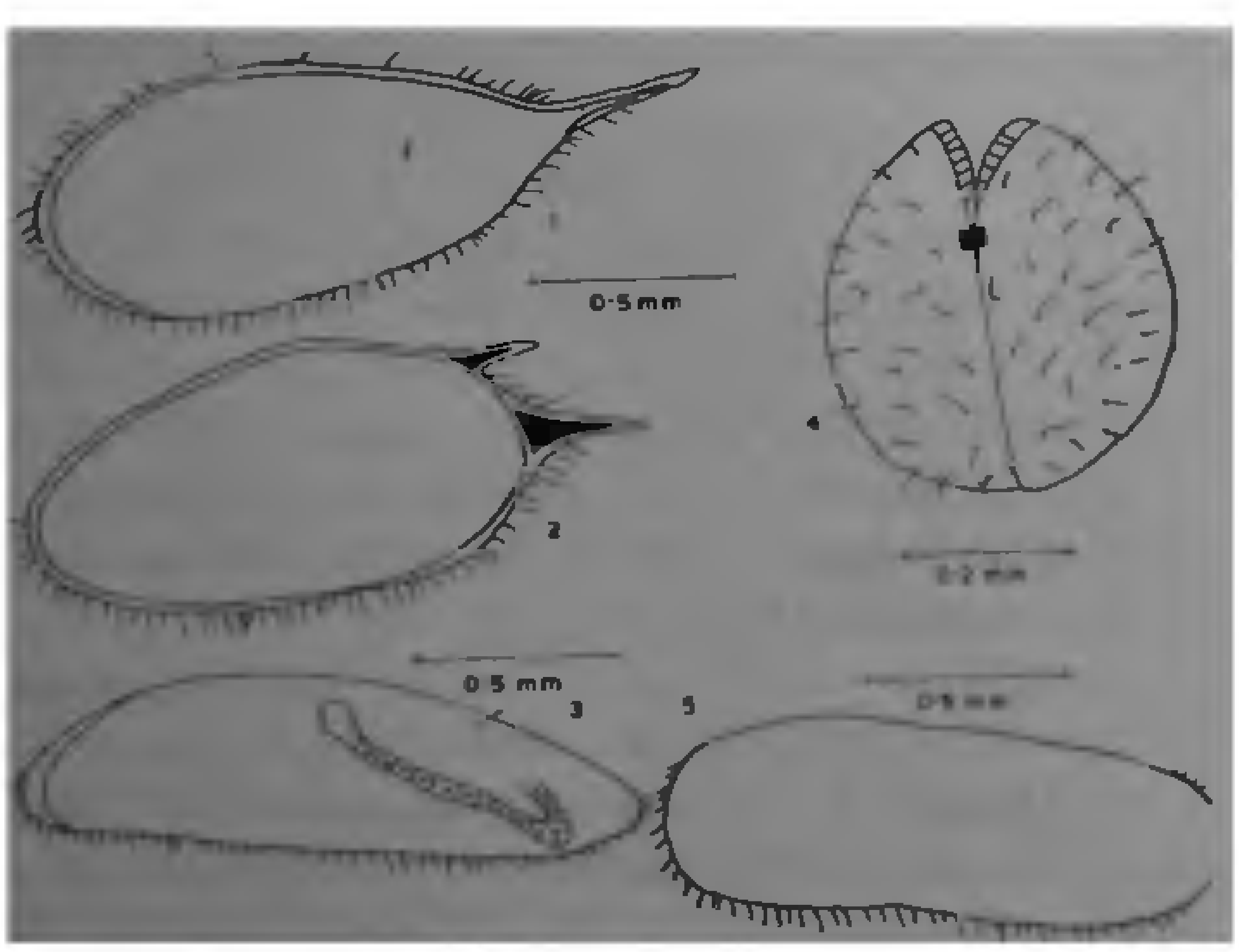
THE present communication reports four new records of freshwater ostracods from India. These are *Strandesia webri*[1], *Dolerocypris sinensis* Sars 1903, *Cypretta globosa*[2] and *Tanycypris pellucida*[3] (Klie) 1932.

Strandesia webri was originally collected and described by Moneiz[1] as *Cypris webri* from Luwa, Celebes. It is a distinct species having one posterior spine on the right valve and two smaller anterior spines on the left; the valve surface with depressions and colour is brownish, with blue spots. Victor and Fernando[4] who redescribed this species as *Strandesia webri* recorded it to be very common in West Malaysia (Malaya) and the Philippines; 28 specimens were collected from a freshwater tank of Jabalpur, Madhya Pradesh. The length of valves varied from 1.08 to 1.18 mm (figures 1 and 2).



Figures 1–5. 1 & 2. *Standesia webri* (Moniez) **1.** Right valve. **2.** Left valve. **3.** *Dolerocypris sinensis* Sars, external view. **4.** *Cypretta globosa* Brady. **5.** *Tanycypris pellucida* (Klie) external view.

Dolerocypris sinensis is a South African species. Delorme[5] also discovered a single species from Holocene sediments of South Saskatchewan, Canada. The genus *Dolerocypris* was reported from Kashmir, (India) by Singh[6] but species identification was not provided. Valves, elongate spindle-shaped, posterior end somewhat pointed. Furca strongly developed; furcal rammi symmetrical. Only four specimens were found in the freshwater tank of Jabalpur. Length of valves varied from 1.5 to 1.6 mm for Indian specimens (figure 3).

Cypretta globosa originally described by Brady[2] as *Cypridopsis globosa* from Sri Lanka (Ceylon). Neale[7] referred *Cypridopsis globosa* to the genus *Cypretta* due to the presence of septa on the margins of both the valves and weakly developed leg-like furca. *Cypretta Globosa* is peculiar in having valve surface pitted, with short strong spine-like bristles. It appears to be a widely distributed species in South-east Asia[4]. Valve length varies between 0.54–0.56 mm for Indian species (figure 4). Only 3 specimens were collected.

Although the genus *Tanycypris* has been reported by Battish[8] from Ludhiana (Punjab) yet the species has not been identified. *Tanycypris pellucida* (Klie)[3] 1932 was collected from a pond in Amarkantak, Shahdol, Madhya Pradesh, India in the month of February 1980; 57 specimens were collected. Valve elongate-oval in lateral view; both the anterior and posterior ends rounded; surface sparsely hairy. Furcal ramii symmetrical. Valve length varies between 1.18–1.23 mm (figure 5).

Of these, the first three species were collected from freshwater tanks at Jabalpur, (altitude 402 m) and the last one *Tanycypris pellucida* was collected from a hilly area at Amarkantak (altitude 1850 m).

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