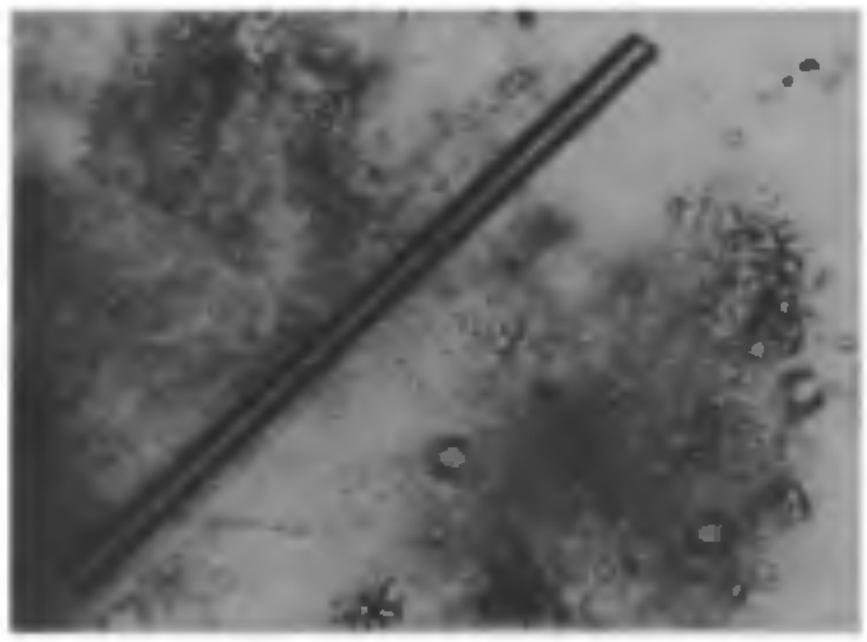
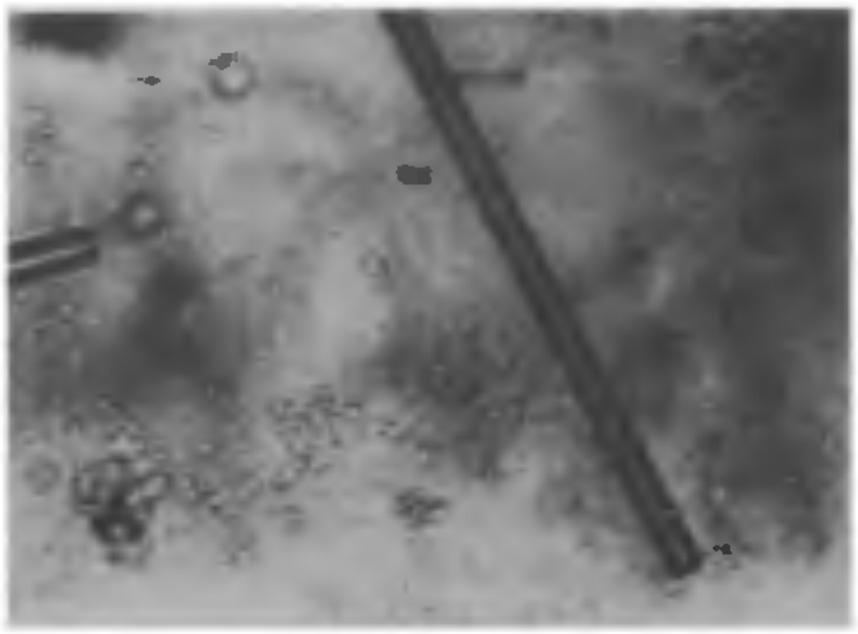
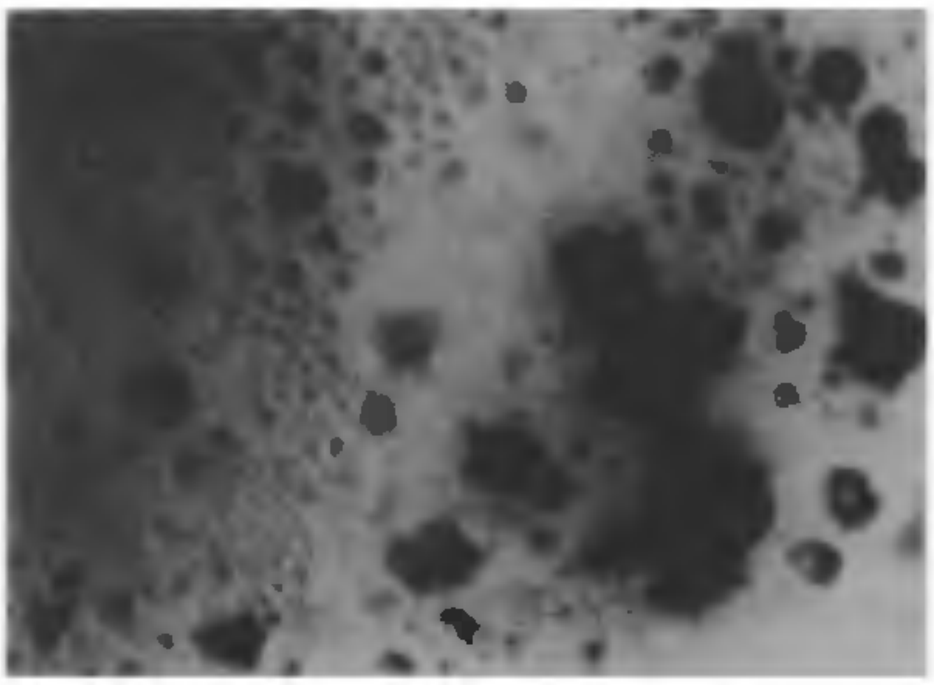
Type: O



Type: A



Type: C



Type: Asia-I

Figure 1. Foot-and-mouth-disease virus crystals.

potassium phosphate buffer (pH 7.8) before use in tests such as PAGE and ELISA. Infectivity of the crystals was established by inoculation into BHK_{21} cell cultures.

As depicted in the figure, crystals of the different virus serotypes had different morphologies. Type O crystals were hexagonal bipyramids 0.03 mm long and 0.02 mm in diameter. Crystals of types A and C were elongated needles measuring 0.21 mm in length and 0.24 mm across. Type Asia I crystals were rectangular and square plates of 0.03 mm size. When mounted for X-ray diffraction, the crystals seemed to be destabilized by X-rays. Further work is in progress.

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CHAROPHYTA FROM NINIYUR FORMATION, ARIYALUR, TAMIL NADU

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THE biohermal limestones of Niniyur Formation, Ariyalur area, are known to contain algae, foramini-

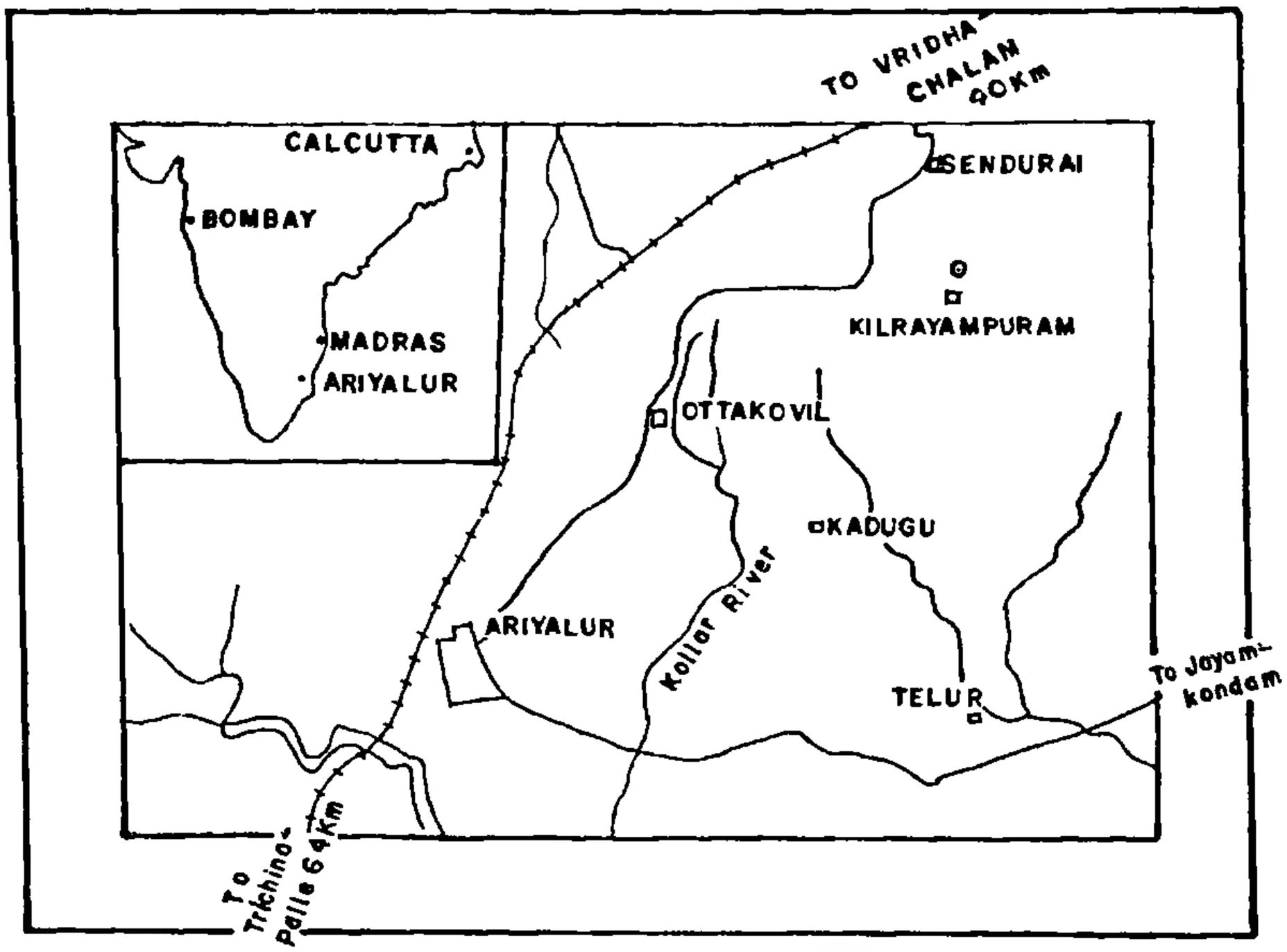

Figure 1. Location map.

fera, bryozoa, corals, etc. of Palaeocene age[1–3]. This note records details of calcified oogonia of Charophyta recovered from biohermal limestone samples of Niniyur Formation, subcropping in a well about 1 km north-east of Kilrayampuram village, Ariyalur area (figure 1).

The fully preserved oogonia are ellipsoidal in shape, anisopolar, with projected charoid apices (figure 2). Five spiral bands join completely at the summit. Spiral cells show reduced thickness and width at apex without any apical depressions. Base is narrow and projected. Length, 450–500 μm; width, 275–300 μm; intercellular width, 60–70 μm; width of spiral bands, 15–20 μm; number of spiral bands, 9.

The oogonia are assigned to the genus *Chara* on the basis of the charoid apex, shape and size. It may be mentioned that there is only a cursory mention of the occurrence of Gyrogonites in Niniyur cherts[4]; no further details are known.

The record of *Chara* indicates the admixture of fresh to brackish water forms in the Niniyur Formation, which was earlier known to be exclusively marine.

Figure 2. *Chara* sp. Lateral view (× 378).

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16 August 1988

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BIOLOGY AND PATHOGENIC POTENTIAL OF BLACK SPOT TREMATODES IN HIGH ALTITUDE FISHES OF INDIA

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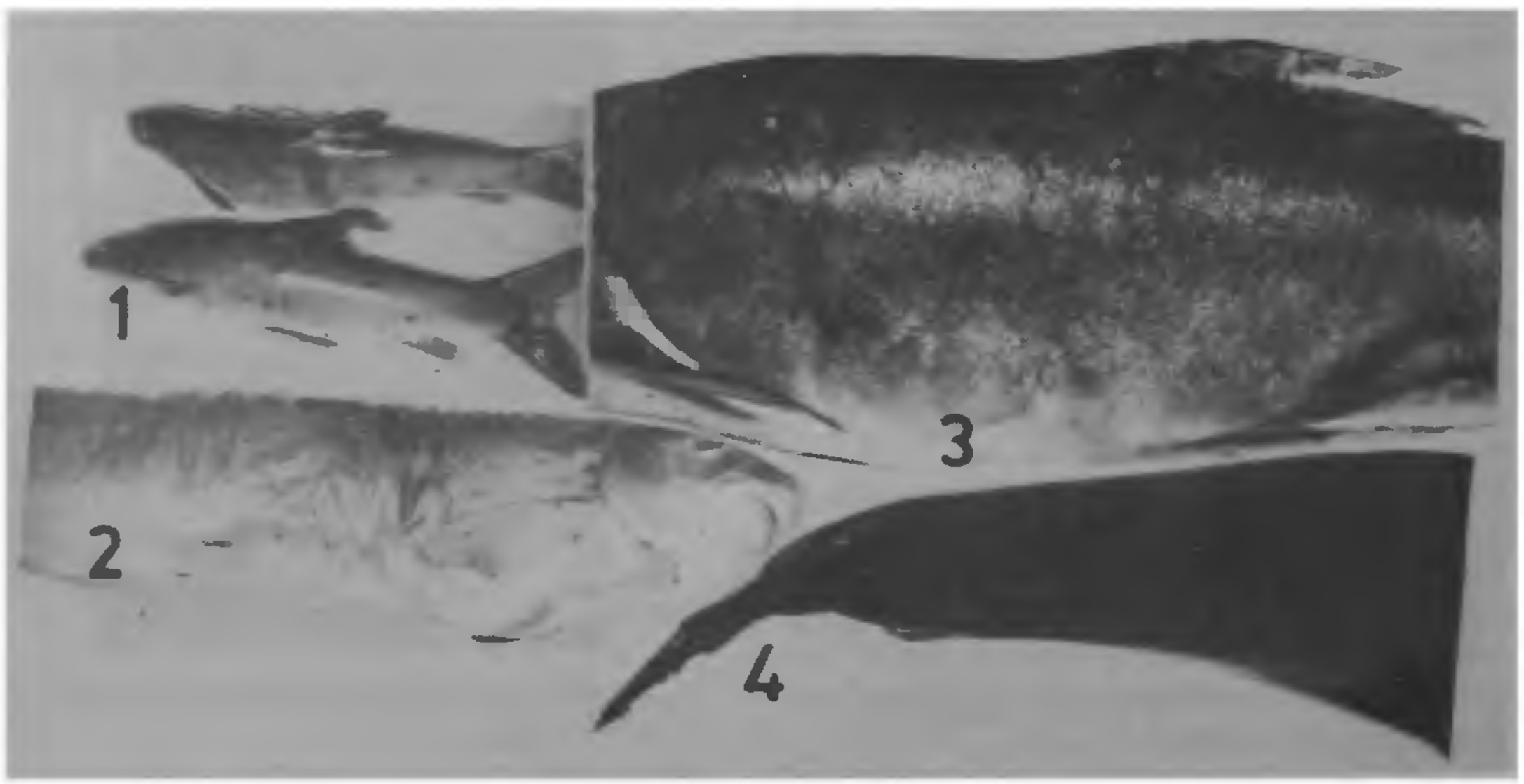
METACERCARIAE of *Neascus vetestai*[1–3] are known to cause black spot disease (figures 1–4) in Indian hill-stream fishes but explicit host responses induced by them, including pigmentation patterns on skin and viscera, have not been reported[2,4]. This investigation records the maximum outer host cyst size ever reported[5] (Meyer, pers. commun.). In a total sample of 3000 *Schizothorax richardsonii* inhabiting the rain-fed river Nayar in Garhwal Himalayas at 750 ± 100 MSL during 1982–1988, we recorded host cysts 0.13–3.7 mm in diameter encircling the parasite cyst (figure 5), 0.3–0.56 mm in diameter. Cysts consist of an outer thick cellular layer (host origin) and an inner thin non-cellular layer (parasite origin). Several parasite cysts occurred collectively engulfed in a host cyst during periods of extensive invasion, and their presence underneath the skin evoked extensive pigmentation response from the hosts. Details of *in vitro* excystment and cyst morphology have been reported only for *N. pyriformis*[6] till date. Though cyst and larval morphology of *N. vetestai* appeared to be similar to those of *N. pyriformis*[6] and another black spot trematode, *Uvulifer ambloplitis*[7], the larvae infrequently occupied the parasite cyst completely and the forebody was folded back on itself (figure 5). In early stages of infection, very small host cysts 0.13–1.73 mm in diameter were observed scattered all over the body surface in appreciably high frequency (figure 3). Each small host cyst usually contained one parasite cyst. In later phases of extensive invasion (figures 1, 2), frequency of cyst occurrence was low



Figures 1–4. **1** and **2.** Black spots in neasciasis of *Schizothorax richardsonii* showing low frequency of congregated cyst pattern; **3.** Black spots showing high frequency of low intensity on *S. richardsonii*; **4.** Black spot disease showing "skin burns" on tail of *S. richardsonii*.