

**Nematode Fauna of High Altitude Fishes in
the Garhwal Himalayan Ecosystems**
II. *Ichthyostrongylus bursatus* n. sp. from *Schizothorax richardsonii*

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(Received for publication; May 7, 1986)

Abstract

Ichthyostrongylus bursatus n. sp. has been described from an Indian high altitude cyprinid for the first time. Male worms possess a tightly folded bursa, equal spicules and 3 pairs of prebursal papillae, and females are characterized by an equatorial valva and receptaculum seminis.

Key words: *Ichthyostrongylus bursatus*, Ichthyostrongylidea, prebursal papillae, equatorial vulva.

Introduction

Yamaguti (1961) proposed a new order Ichthyostrongylidea to accommodate worms of family Ichthyostrongylidae (Yamaguti, 1961) bearing distinct oral lips and without buccal capsule, as well as Cylicostromylidae (Yamaguti, 1961) possessing well developed buccal capsule but lacking oral lips. The morphological examination of the worms under study revealed these to belong to genus *Ichthyostrongylus* Mawson (1954) of the family Ichthyostrongylidae.

Materials and Methods

Parasitological examination of one out of 200 *Schizothorax richardsonii* yielded 5 male and 3 female round worms. These were fixed and preserved by the standard method (Rautela and Malhotra, 1984). Morphometric measurements of the worms were recorded in mm. and expressed as ranges followed by mean \pm S.E. in the text. Camera lucida drawings were prepared.

Ichthyostrongylus bursatus n. sp.
(Figs. 1 A–F)

Worms small. Head with slight cuticular inflation at the anterior extremity appearing like a cap. Mouth with 3 cuticularized lips bearing 4 minute oral papillae. Oesophagus muscular. Tail short.

Male

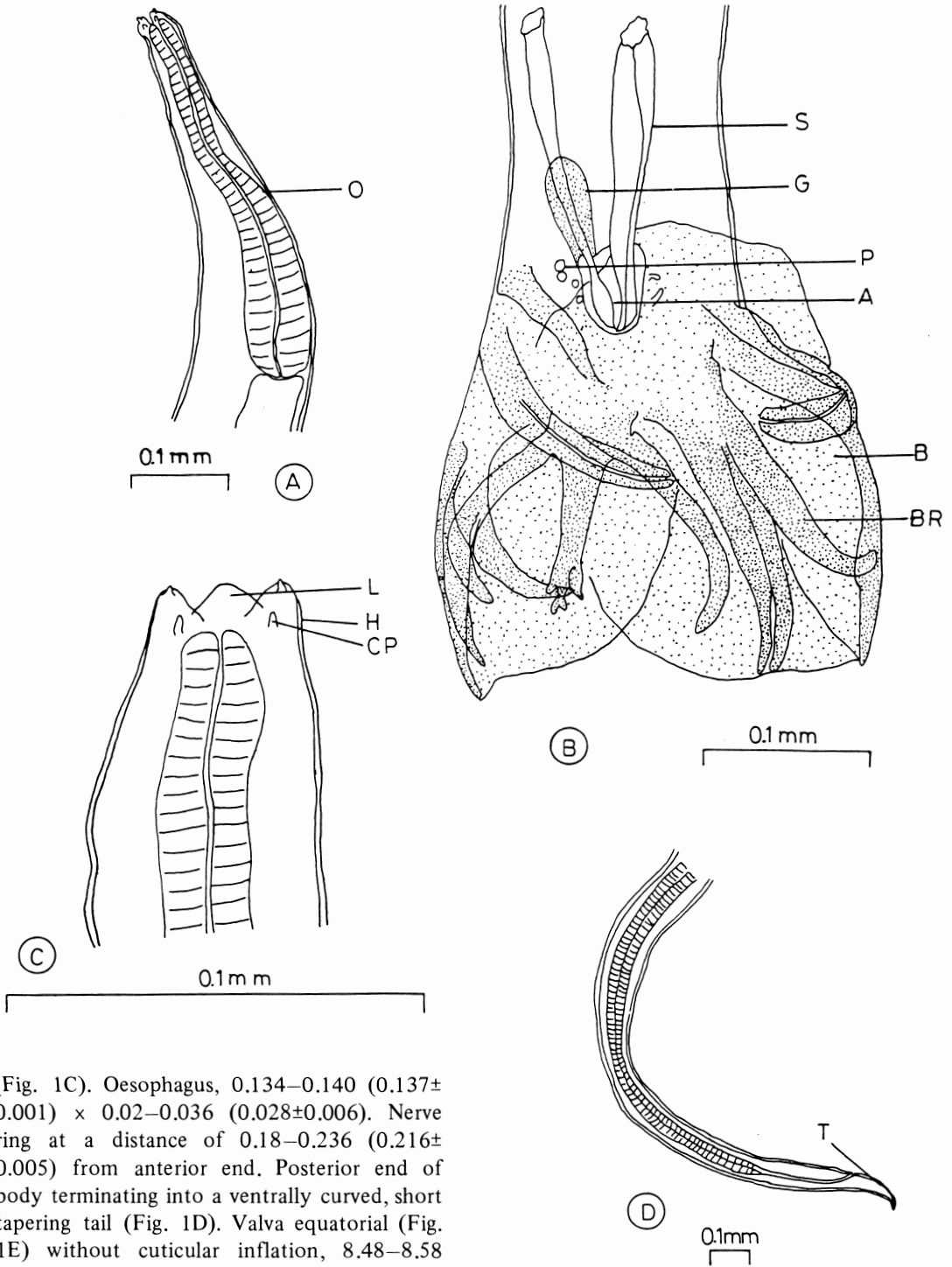
Body, 7.52–8.224 (7.872 \pm 0.249) \times 0.039–0.208 (0.15 \pm 0.019). Head (Fig. 1A), 0.016–0.028 (0.022 \pm 0.004) \times 0.008–0.044 (0.03 \pm 0.009). Oesophagus, 0.376–0.444 (0.408 \pm 0.016) \times 0.028–0.088 (0.049 \pm 0.007). Nerve ring at a distance of 0.06–0.072 (0.066 \pm 0.004) from anterior end. Posterior extremity modified into trilobed bursa (Fig. 1B). Prebursal papillae 3 pairs. Bursa tightly folded; ventral rays wide apart, externolateral and mediolateral close together to the tip and dorsal rays divided distally three times. Spicules two, equal terminating distally into a spine with single pointed tip. Right spicule, 0.21–0.26 (0.212 \pm 0.002) \times 0.004–0.026 (0.016 \pm 0.003) and left spicule, 0.2–0.228 (0.214 \pm 0.009) \times 0.005–0.02 (0.017 \pm 0.001). Gubernaculum plate like, 0.049–0.068 (0.064 \pm 0.002) \times 0.01–0.025 (0.023 \pm 0.001).

Female

Body, 16.62–17.36 (16.99 \pm 0.262) \times 0.048–0.416 (0.208 \pm 0.062). Head, 0.011–0.04 (0.03 \pm 0.007) \times 0.027–0.044 (0.042 \pm 0.001)

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Supported by UGC, India major research project code no. F 23-245/SR-II/84.



(Fig. 1C). Oesophagus, 0.134–0.140 (0.137 ± 0.001) \times 0.02–0.036 (0.028 ± 0.006). Nerve ring at a distance of 0.18–0.236 (0.216 ± 0.005) from anterior end. Posterior end of body terminating into a ventrally curved, short tapering tail (Fig. 1D). Valva equatorial (Fig. 1E) without cuticular inflation, 8.48–8.58 (8.54 ± 0.08) from anterior end and 7.65–8.22 (8.08 ± 0.019) from posterior end of body. Receptaculum seminis, 0.06–0.08 (0.076 ± 0.002)

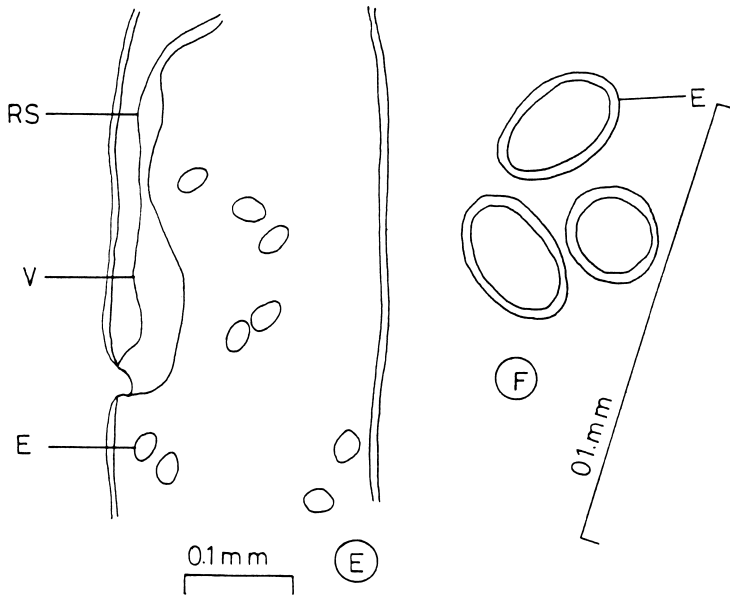


Fig. 1A–F. *Ichthyostrongylus bursatus* n. sp. A. Anterior extremity of male $\times 150$, B. Posterior bursate end of male $\times 270$, C. Anterior end of female $\times 900$, D. Posterior end of female $\times 60$, E. Middle part of body of female showing vulva and receptaculum seminis $\times 150$, and F. Eggs $\times 675$.

Abbreviations:

A, anus; B, bursa; BR, bursal ray; CP, cephalic papilla; E, egg; G, gubernaculum; H, head; L, lip; O, oesophagus; P, prebursal papilla; RS, receptaculum seminis; S, spicule; T, tail; V, vagina.

$\times 0.02$ – 0.03 (0.028 ± 0.002). Oviparous; eggs oval to round, embryonated, 0.02 – 0.024 (0.022 ± 0.001) $\times 0.018$ – 0.04 (0.026 ± 0.006). Anus at 0.08 – 0.13 (0.093 ± 0.04) distant from the tail tip.

Discussion

Family Ichthyostrongylidae was created by Yamaguti (1961) to accommodate the only known genus *Ichthyostrongylus*. He proposed the inclusion of the only known species at that time, *I. clelandi* described by Mawson (1954), under this genus. Later Nikolaeva (1969) added another species, *I. thunni* to this genus and in 1971 transferred *Trichostrongylus* s.l. *maci* (Travassos, 1937) to the genus *Ichthyostrongylus* as *I. scorpaenaecirrrosae* restoring the original name of the species. Nikolaeva (1971) also gave a key to species of *Ichthyostrongylus* and an amended differentiation of *I. thunni*.

The present form can be distinctly differentiated from *I. clelandi* on the following features: being parasitic in a cyprinid hill-stream fish, greater number of prebursal papillae, larger spicules terminating into a backwardly directed single spiny tip and the disposition of bursal rays in males, and an equatorial vulva lacking the inflation in the surrounding cuticle, a receptaculum seminis and larger eggs in females; from *I. thunni* in being parasitic in hill-stream fish, in possessing larger caudal bursa, larger spicules in males and a receptaculum seminis and an equatorial vulva in female; and from *I. scorpaenaecirrrosae* in being parasitic in hill-stream fish, greater number of caudal papillae, larger spicules terminating into a backwardly directed but not bifurcated spiny tip and in the pattern of bursal rays in male, and possessing receptaculum seminis, equatorial vulva and larger eggs in female. Therefore, on the basis of the distinguishing features of the worms de-

scribed above the authors feel justified to erect *Ichthyostrongylus bursatus* n. sp., named after the bursate nature of the posterior extremity of male worms. This is the first report on the genus from India.

Acknowledgements

We are thankful to University Grants Commission, New Delhi for funding a research project and Om Veer Singh is grateful for the award of Junior Research Fellowship (U.G.C.).

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