

Caballerocotyla lenti n. sp., a Capsalid Monogenean from *Auxis thazard* (Scombridae) from off the Southeastern Coast of Brazil

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Caballerocotyla lenti n. sp. (Monogenea: Capsalidae), recovered from the gills of *Auxis thazard* (Lacépède) captured off the coast of Rio de Janeiro, Brazil, is described using light and scanning electron microscopy. The new species is characterized by: a tegument with 2-5 rows of dorso-marginal, unicuspid spines; 53-54 round testes; a constricted pharynx with numerous papillae on its border; and a haptor with a plicate marginal border, a central polygonal area and seven complete septa. *C. manteri* (Price, 1951) and *C. gouri* Chauhan, 1953 sensu Murugesh (1995) are figured and commented upon.

Key words: Monogenea - *Caballerocotyla lenti* n. sp. - *Auxis thazard* - fish - Brazil

Among the Capsalidae, species of *Caballerocotyla* Price, 1960 are characterized by the position of the numerous testes, which are confined to the intercaecal area, and a pharynx with a typical constriction. The genus contains 26 species mainly reported from scombrid fishes throughout the world, in both tropical and subtropical areas.

Auxis thazard (Lacépède, 1800) is a pelagic, migratory, oceanic fish, that inhabits hot waters in all the tropical and subtropical seas, being commercially explored fresh, cured, tinned or as bait for great tunas fisheries. During a parasitological survey of this scombrid specimens of *Caballerocotyla* were encountered on the gills. These worms are described below as a new species, based on studies using both light and electron microscopy.

MATERIALS AND METHODS

From January to December, 2000, a total of 110 fishes were obtained from fishermen and fish markets at Rio de Janeiro, Brazil, and examined for parasites. Some fish were frozen prior to examination. Some of the worms recovered were fixed and stored in 70% alcohol, stained in Mayer's paracarmine, dehydrated in an ethanol series, cleared in creosote, mounted in Canada balsam and studied using differential interference microscopy. The scale bars are presented in millimeters as the range, with the mean in parentheses. Illustrations were made with the aid of a drawing tube. For scanning electron microscopy (SEM), freshly collected parasites were fixed in a solution of 2.5% glutaraldehyde in 0.2 M cacodylate buffer (pH 8.3), 4% paraformaldehyde in distilled water and washed in PBS. Specimens were post-fixed in 1% osmium tetroxide in 0.1 M cacodylate buffer, dehydrated through a graded etha-

nol series, critically point dried and sputter-coated with gold. They were examined using a JSM-8500 scanning electron microscope at an accelerating voltage of 15kV.

Paratypes of *Caballerocotyla manteri* (Price, 1951) from the US National Parasite Collection (no. 37229) and a specimen of *C. gouri* (Chauhan 1953) from the British Museum (Natural History) Collection at The Natural History Museum, London (BMNH) (1993.5.18.2) were examined. Type and voucher specimens of the present material are deposited in the Helminthological Collection of the Instituto Oswaldo Cruz, Brazil (CHIOC).

RESULTS

Family Capsalidae Price, 1939
Caballerocotyla Price, 1960
Caballerocotyla lenti n.sp.

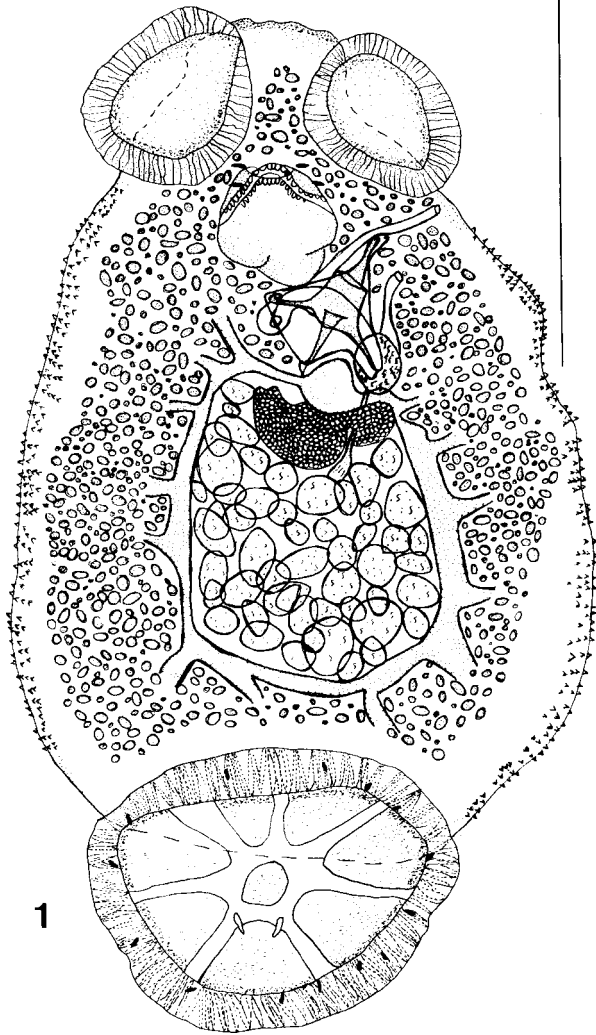
Description (Figs 1-7): based on 6 specimens. Body elongate, 0.520-4.92 (2.31) long; maximum width 0.224-2.310 (1.13). Haptor smaller than maximum width of body. Tegument with 2-5 rows of dorso-marginal unicuspid spines 0.023-0.025 (0.024) long. Anterior region bears 2 ellipsoid suckers, 0.076-0.431 × 0.142-0.585 (0.26 × 0.29), and 2 pairs of eye-spots (Fig. 1). Haptor 0.494-1.503 × 0.437-1.478 (0.793 × 0.830) surrounded by delicate, plicate marginal border. Internal surface of disc divided around central locus into 7 complete, lateral loci. One pair of anchors, 0.029-0.323 (0.290) long. Fourteen marginal hooks 0.011-0.013 (0.013) long. Mouth ventral, situated in between and in plane of posterior region of anterior suckers; pharynx 0.066-0.674 × 0.046-0.674 (0.30 × 0.29) in maximum width, constricted into 2 regions; oesophagus short; caeca with numerous diverticula, united at posterior end of body. Testes 52-54 in number, entire and intercaecal. Cirrus-sac narrow. Genital pore lateral, just posterior to left anterior sucker. Ovary globular, posterior to pharynx, intercaecal, 0.032-0.173 × 0.064-0.228 (0.101 × 0.154). Oviduct short, passes sinistrally towards base of oötype. Two vitelloducts join vitelline reservoir, 0.034-0.136 × 0.062-0.132 (0.082 × 0.107). Vitellarium dendritic, extends from cephalic lobe to haptor in lateral fields of body. Seminal receptacle globular, to left of vitelline reservoir, links to narrow vagina.

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Caballerocotyla lenti n. sp. - Fig. 1: general view. Scale bar = 0.6 mm.

Vaginal pore at 0.21-0.69 (0.52) from genital pore. Eggs 0.073-0.082 × 0.066-0.082 (0.080 × 0.077), with 4 filaments 0.046-0.103 (0.074) long.

SEM: body elongate; antero-ventral region with smooth, cephalic lobe and round anterior suckers; posterior region with septate, disc-like haptor (Fig. 2). Numerous papillae surround triangular margin of pharynx within mouth (Fig. 3). Lateral margins of body with 2-5 dorso-marginal rows of unicuspid spines (Fig. 4). Haptor divided by 7 complete septa which rise from central polygonal area and extend to plicate marginal border (Fig. 5). Tips of anchors rise from base of central polygonal area; equidistant marginal hooks surround inner part of marginal border (Fig. 6).

Type-host: *Auxis thazard* (Lacépède) (Scombridae)

Type-locality: State of Rio de Janeiro, Brazil (22°55'S, 40°18'W)

Habitat: gills

Infection: prevalence 12.73%; mean intensity 1.07; mean abundance 0.14

Type-material: Holotype CHIOC 34938; paratypes CHIOC 34939, 34940 and 34941

Etymology: the new species is named for Prof. Herman Lent, a distinguished Brazilian parasitologist.



Caballerocotyla lenti n. sp. - Fig. 2: general view of body with anterior suckers and posterior haptor with septa.

Caballerocotyla manteri (Price, 1951) Price, 1960

Redescription (Fig. 7): body elongate, 2.35 long × 1.57 wide. Tegument with 1 row of dorso-marginal unicuspid spines. Anterior region bears 2 ellipsoid suckers, 0.39 × 0.42, and 2 pairs of eye-spots. Haptor 0.85 × 0.88. Anchors and marginal hooks (14) not measured. Mouth ventral, pharynx 0.36 × 0.32 in maximum width, constricted into 2 regions. Testes 35 in number, entire and intercaecal. Cirrus-sac narrow. Genital pore lateral. Ovary globular, intercaecal 0.17 × 0.26. Vitelline reservoir 0.11 × 0.18. Eggs not observed.

Type-host: *Euthynnus alletterata* (Rafinesque, 1810) (Scombridae)

Type-locality: Tortugas, Florida

Habitat: gills

Material: paratype USNM Reg. no. 37229

Caballerocotyla gouri (Chauhan, 1953)
sensu Murugesh (1995)

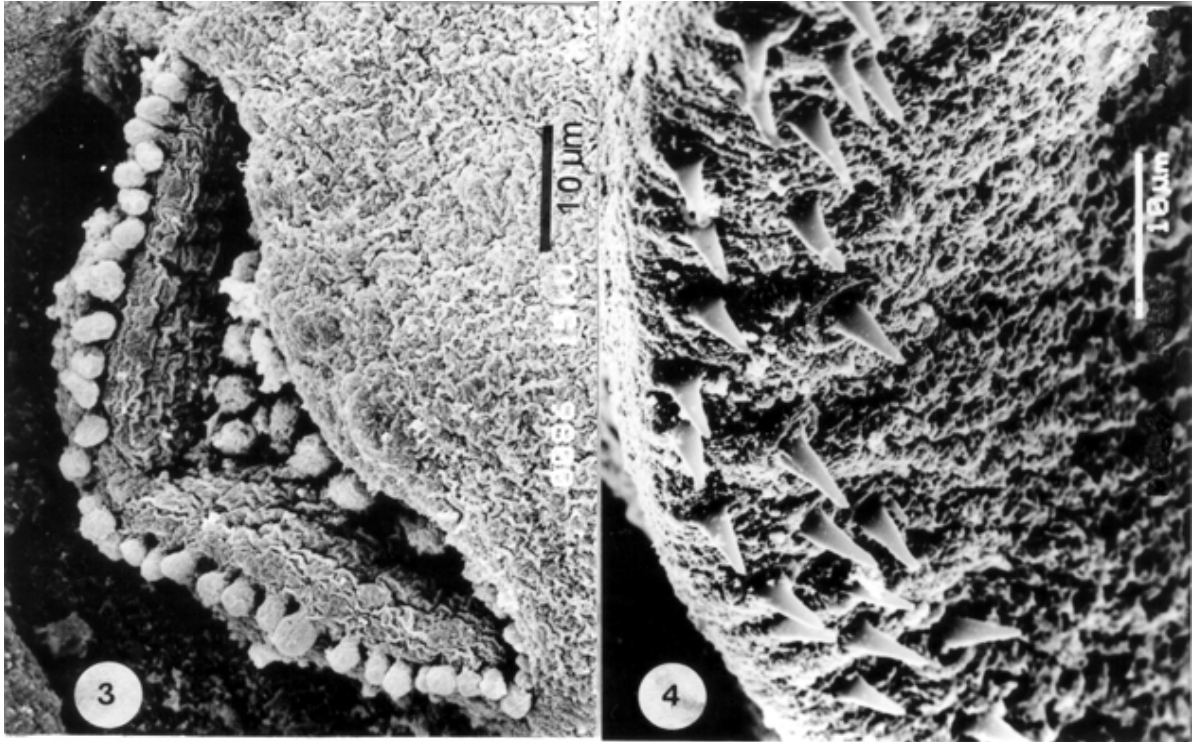
Redescription (Fig. 8): body elongate, 8.2 long, 5.8 wide. Tegument with 5-6 rows of dorso-marginal unicuspid spines. Anterior region bears 2 suckers, 0.86 × 0.83. Haptor 2.6 × 2.4. Anchors and marginal hooks (14) not measured. Pharynx 1.00 × 1.06 in maximum width. Testes > 100 in number, lobed and intercaecal. Cirrus-sac narrow. Genital pore lateral. Ovary lobed, intercaecal 0.66 × 0.75. Vitelline reservoir 0.20 × 0.30. Eggs not observed.

Type-host: unspecified scombrid

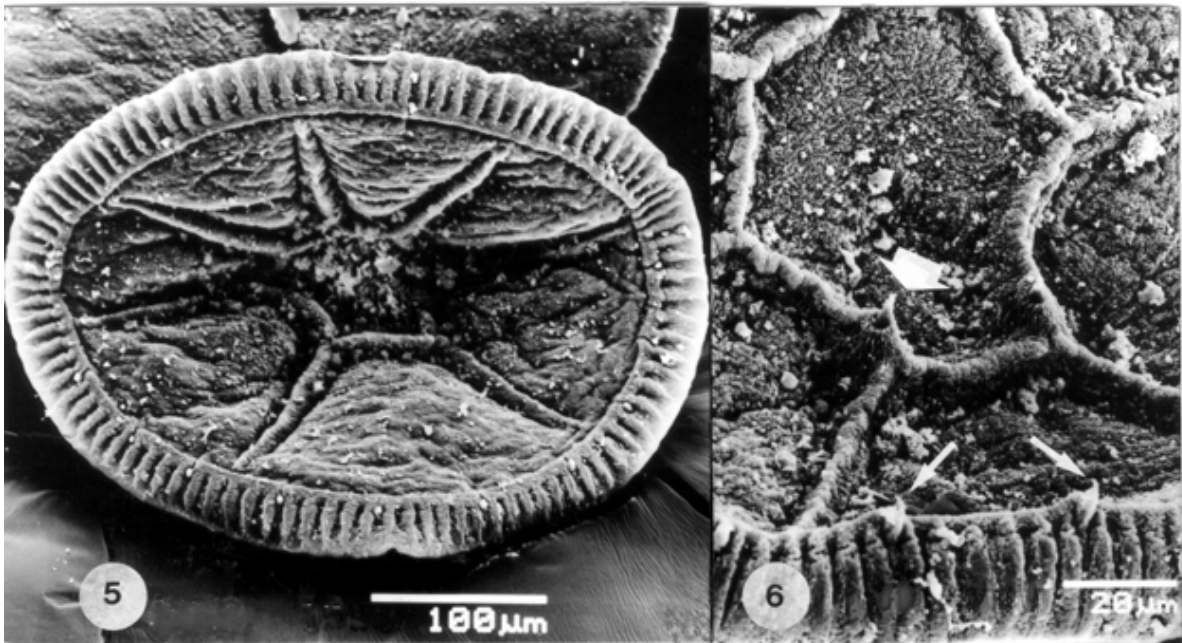
Type-locality: Bay of Bengal

Habitat: gills

Material: voucher BMNH Reg. no. 1993.5.18.2



Caballerocotyla lenti n. sp. Fig. 3: numerous papillae surround triangular margin of pharynx within mouth. Fig. 4: lateral margins of body with 2-5 dorso-marginal rows of unicuspid spines (SEM).

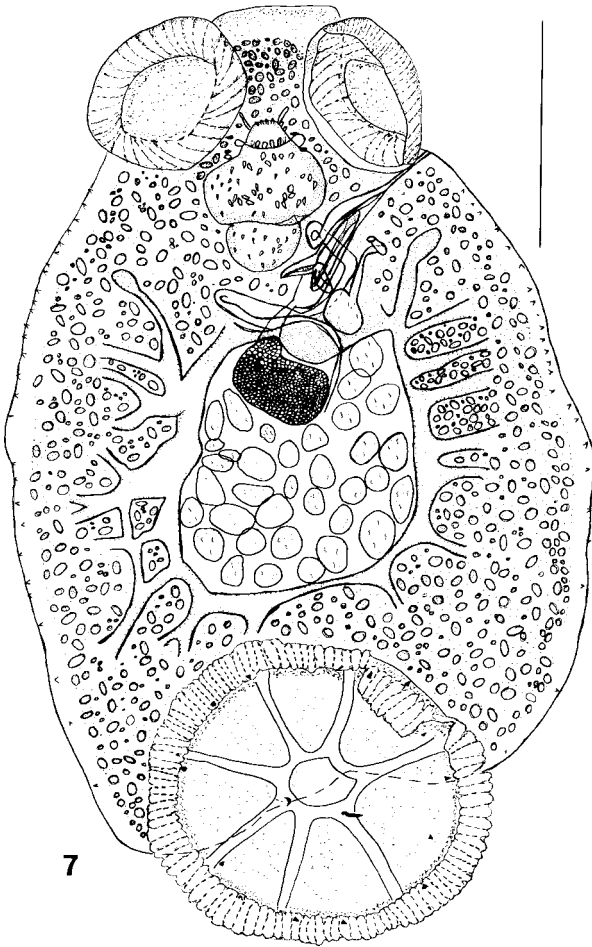


Caballerocotyla lenti n. sp. - Fig. 5: haptor with 7 complete septa rising from central polygonal area, and extending to the plicate marginal border. Fig. 6: tip of anchor (large arrow) rising from base of central polygonal area and marginal hooks on the inner part of marginal border (small arrows) (SEM).

DISCUSSION

Species of *Caballerocotyla* Price, 1960, revised by Lamothe-Argumedo (1997), are characterized by the presence of numerous intercaecal testes, a haptor divided by

septa and a constricted pharynx. Even though in this revision Lamothe-Argumedo indicated that, when body spines are present, they have five or six cusps, they do in fact range from single to multi-cusped.



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Caballerocotyla manteri - Fig. 7: general view of paratype USNPC-37229 with a single row of dorso-marginal unicuspid spines and a reduced number of round testes. Scale bar = 0.6 mm.

The species of the genus include *C. biparasitica* (Goto 1894) Price 1960, *C. andhraensis* (Raju & Rao, 1980) Lamothe-Argumedo, 1997, *C. abdiyani* Bussieras & Laurencin, 1970, *C. albsmithi* Dollfus, 1962, *C. australis* Oliva, 1986, *C. caballeroi* (Winter, 1955) Price, 1960, *C. chilensis* Pillai & Pillai, 1976, *C. foliacea* (Goto, 1894) Price, 1960, *C. gotoi* (Yamaguti, 1968) Oliva, 1986, *C. gouri* (Chauhan, 1951) Price, 1960, *C. gregalis* Wagner & Carter, 1967, *C. katsuomis* (Ishii, 1936) Price, 1960, *C. katuo* (Iwata, 1990) Lamothe-Argumedo, 1997, *C. klawei* Stunkard, 1962, *C. magronum* (Ishii, 1946) Price, 1960, *C. manteri* (Price, 1951) Price, 1960, *C. manteri affinis* Mamaev, 1968, *C. neothonni* (Yamaguti, 1968) Oliva, 1986, *C. notosinensis* Mamaev, 1968, *C. nozawae* (Goto, 1894) Egorova, 1989, *C. paucispinosa* Mamaev, 1968, *C. pelamidys* (Taschenberg, 1878) Price, 1960, *C. phillippina* Velázquez, 1982, *C. pseudomagronum* Bussieras, 1972, *C. thazardi* Pillai & Pillai, 1976 and *C. verrucosa* Bussieras, 1972.

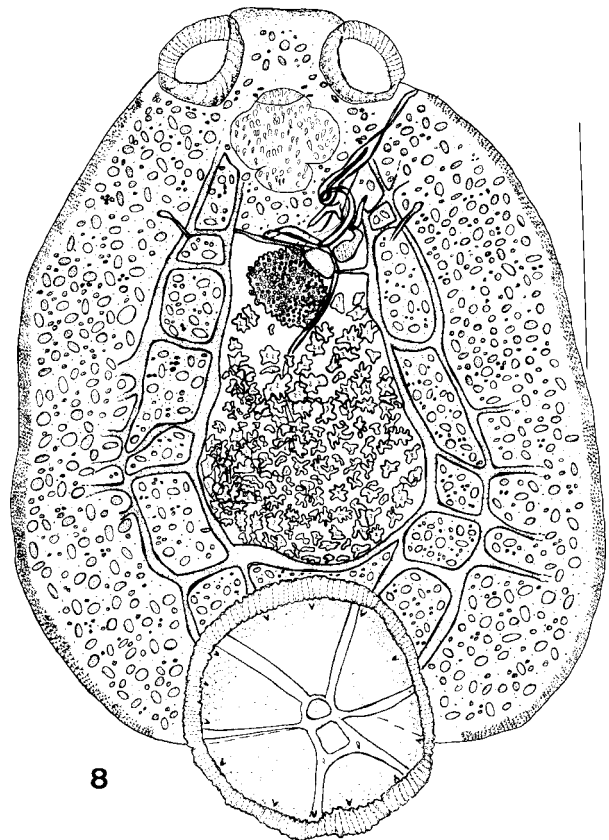
The species of the genus reported from *Auxis thazard* include *C. manteri* Price, 1951 from the Pacific (Williams & Bunkley Williams, 1996), *C. manteri affinis* Mamaev,

1968 and *Caballerocotyla* sp. from South China Sea (Mamaev, 1968), *C. thazardi* Pillai & Pillai, 1976 from Arabian Sea, *C. andhraensis* Raju & Rao, 1980 from Bay of Bengal, India and *C. gouri* (Chauhan, 1953) reported by Muruges (1995) from both the Arabian Sea and Bay of Bengal, India.

C. manteri Price, 1951, first described from *Euthynnus alletterata* of Florida is similar to *C. manteri affinis*, also recorded from *E. affinis*. The types of *C. manteri affinis* could not be examined, but study of the paratype of *C. manteri* (USNM Reg. no. 37229) confirmed the presence of a single row of dorso-marginal unicuspid spines and a reduced number of testes (35) (Fig. 7). The types of *C. thazardi* could also not be obtained, but, based on the original description, this species also differs from *C. lenti* n. sp. in the presence of a single row of dorso-marginal unicuspid spines.

Caballerocotyla sp. of Mamaev (1968) differs from *C. lenti* n. sp. in the presence of dorso-marginal spines with eight or nine cusps.

Chauhan (1953) described *C. gouri* from *E. alletterata* (= *Thynnus thunina*) as having a single row of dorso-marginal spines with five or six cusps each, as well as a globular ovary and testes. Muruges (1995) subsequently reported this species from *E. affinis*, *Thunnus tonggol*, *Sarda orientalis* and *A. thazard*, considering *C.*



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Caballerocotyla gouri - Fig. 8: general view of specimen BMNH-1993.5.18.2 with 5-6 rows of unicuspid spines and a lobed ovary and testes. Scale bar = 2.4 mm.

andhraensis a synonym of *C. gouri*. Nevertheless, while examining the specimens of *C. gouri* studied by Murugesh (1995) (BMNH Reg. no. 1993.5.18.2) (Fig. 8), we found five or six rows of unicuspid spines and a lobed ovary and testes, differing from both *C. gouri* and *C. andhraensis* which have two to four rows of unicuspid spines and globular testes. The synonymy *C. gouri* and *C. andhraensis* is therefore, not considered here as valid.

Therefore, *C. gouri* of Chauhan (1953) differs from *C. lenti* n. sp. in the numbers of rows and spine cusps and by the number and arrangement of haptor septa. *C. andhraensis* from the Bay of Bengal is closer to the new species in relation to its body measurements and the presence of two to four rows of dorso-marginal unicuspid spines. Although the types could not be found, this species differs from *C. lenti* n. sp. by having a body which tapers posteriorly, dorso-marginal spines diminishing in number and size towards the posterior end of body, discontinuous haptor septa, the position of the anchors in the posterior septum and a median septum with a tendency to subdivide.

Considering all the other species of the genus, those which most closely resembles *C. lenti* n. sp. are *C. chilensis* Pillai & Pillai, 1976 from *Sarda chilensis* off the Kerala coast and *C. notosinense* Mamaev 1968 from *Euthynnus affinis* in the South China Sea, both with two to four rows of dorso-marginal unicuspid spines. However, they differ from the new species in having larger body, anchors and marginal hooks. The remaining species can be readily differentiated by the size, shape and

number of spines and cusps, the size of the anchors and the number of testes.

C. lenti n. sp. represents the first species of the genus to be reported off the coast of Brazil.

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