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A NEW SPECIES OF *CAPILLOSTRONGYLOIDES* (NEMATODA: CAPILLARIIDAE) PARASITIZING THE HORSEFISH, *CONGIOPODUS PERUVIANUS* (PISCES: CONGIOPODIDAE), FROM ARGENTINA

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ABSTRACT: A new species of parasitic nematode, *Capillostrongyloides congiopodi* n. sp. (Capillariidae), is described based on specimens collected from the gall bladder of the horsefish, *Congiopodus peruvianus* Cuvier and Velenciennes (Congiopodidae, Scorpaeniformes), from the Patagonian Shelf, Argentina (45–48°S; 60–64°W). Among the 9 species described so far in the genus, the new species most closely resembles *C. norvegica* Moravec and Karlsbakk, 2000, by the presence of its conspicuously elevated anterior vulvar lip in females; however, it is readily distinguished from it by having a larger body size, larger eggs with protruding polar plugs, the shape and length of the spicule, and mainly by the general morphology of the caudal bursa of males. In addition, the site of infection, i.e., stomach versus gall bladder. This is the first *Capillostrongyloides* species reported from fishes in the southern Atlantic Ocean.

Capillostrongyloides Freitas and Lent, 1935 comprises 9 species (3 of them provisionally included in the genus), all parasitizing fresh water and marine fishes (Moravec, 2001; Portes Santos et al., 2008). As a result of a parasitological survey of specimens of *Congiopodus peruvianus* Cuvier and Velenciennes, caught on the Patagonian Shelf, Argentina, parasitic nematodes consistent with the diagnosis of *Capillostrongyloides* were found in the gall bladder of fishes; these parasites are herein described as a new species, which represent the first record of a representative of this genus in the southern Atlantic Ocean.

MATERIALS AND METHODS

Sixty-four specimens of *C. peruvianus*, caught during a research cruise on the Patagonian Shelf, Argentina (45–48°S; 60–64°W) during July 2007, were examined for parasites. Fishes were necropsied, and gall bladders were removed and examined using a stereoscopic microscope. In total, 374 capillariid nematodes was collected, fixed in 4% formaldehyde solution, transferred to 70% ethanol for storage, cleared in glycerine-ethanol, and then studied and measured using light microscopy. Drawings were made using a drawing tube. For scanning electron microscopy (SEM), specimens were dehydrated using a series of ethanol washes, dried by evaporation with hexamethyldisilazane, coated with gold palladium, and scanned in a JEOL JSM 6460-LV scanning electron microscope (JEOL, Tokyo, Japan).

All measurements are given in micrometers, unless otherwise indicated. Prevalence and mean intensity were calculated according Bush et al. (1997). Type material was deposited in the Helminthological Collection of the Museo de La Plata (HCMLP), La Plata, Argentina, and in the Helminthological Collection of the Institute of Parasitology, Biology Centre of ASCR in České Budějovice, Czech Republic.

DESCRIPTION

Capillostrongyloides congiopodi n. sp.

(Figs. 1–25)

General: Medium-sized nematodes, males smaller than females. Anterior end of the body narrow and rounded. Cephalic papillae indistinct. Cuticle smooth. Two wide lateral bacillary bands present, extending along whole length of body. Nerve ring (difficult to observe) located between first and second third of muscular esophagus. Muscular esophagus relatively short, representing 6–10% of total esophagus length. Muscular oesophago-stichosome junction oblique. Stichosome uniform in color, consisting of single row of 29-38 large, elongate stichocytes, each subdivided into approximately 8–12 transverse annuli, bearing a large and irregular central nucleus. Two distinct wing-like glandular cells present at esophago-intestinal junction.

Males (based on 11 specimens; means followed by range in parentheses): Body 16.47 (14.20–19.83) mm long and 67.3 (53–88) at widest body regions. Bacillary bands 25.0 (23–28) wide at the widest region of body. Nerve ring situated at 112 (108–118) from anterior extremity (observed in 5 specimens). Entire esophagus 4.95 (3.86–6.22) mm long, representing 30 (26–35)% of body length. Muscular esophagus 406.7 (313–523) long; stichosome 4.54 (3.47–5.73) mm long, composed by 31–38 stichocytes. Intestine joining cloaca at level of ejaculatory duct. Cloaca 1,510.9 (1,283–1,680) long, representing 9 (8–11)% of body length, anterior cloaca 236.6 (205–310) long, posterior cloaca 1,274.3 (1,140–1,405) long. Spicular canal absent. Spicule smooth, well sclerotized, with expanded, funnel shaped anterior end, slight constriction at mid-length and posterior end rounded; 1,140.0 (1,050–1,230) long, representing 7 (6–8)% of body length. Spicule 10.9 (10–13) wide at anterior end, 5.7 (5–8) at mid-length, and 8.8 (8–10) near tip, in ventral view. Spicular sheath nonspinous, transversally striated when invaginated; no specimens with evaginated spicular sheath observed. Cloacal opening subterminal. Posterior end of body rounded, provided with well developed membranous bursa, supported by 2 wide, almost spherical, lateral lobes, each bearing large papilla. Tail 19.6 (13–25) long.

Females (based on 11 specimens; means followed by range in parentheses): Gravid females body 27.82 (21.36–32.44) mm long and 98.0 (83–115) at widest body regions. Bacillary bands 38.8 (30–50) wide at vagina-uterus junction. Nerve ring situated at 107.5 (95–118) from anterior extremity (observed in 6 specimens). Entire esophagus 6.13 (4.34–6.91) mm long, representing 22 (20–24)% of body length. Muscular esophagus 510.9 (390–640) long; stichosome 5.62 (3.92–6.44) mm long, composed of 29–37 stichocytes. Vulva with conspicuously elevated anterior lip, situated at 62.5 (20–113) from posterior end of esophagus. Vagina directed posteriorly from vulva, 390.5 (338–450) long, with eggs arranged in single file in anterior part of uterus, in 2 files more posteriorly. Eggs nonembryonated, barrel shaped, with slight equatorial constriction and slightly protruding polar plugs. Size of fully mature eggs 89.2 (80–103) long, 31.1 (28–38) wide; polar plugs 8.9 (8–10) high, 8.8 (8–10) wide. Ovary extending to near distal end of intestine. Rectum 77.5 (70–88) long. Posterior end of body rounded; anus subterminal; tail 15.5 (10–20) long.

Taxonomic summary

Type host: Congiopodus peruvianus Cuvier and Velenciennes (Congiopodidae, Scorpaeniformes).

Site: Gall bladder.

Type locality: Patagonian Shelf, Argentina (45–48°S; 60–64°W).

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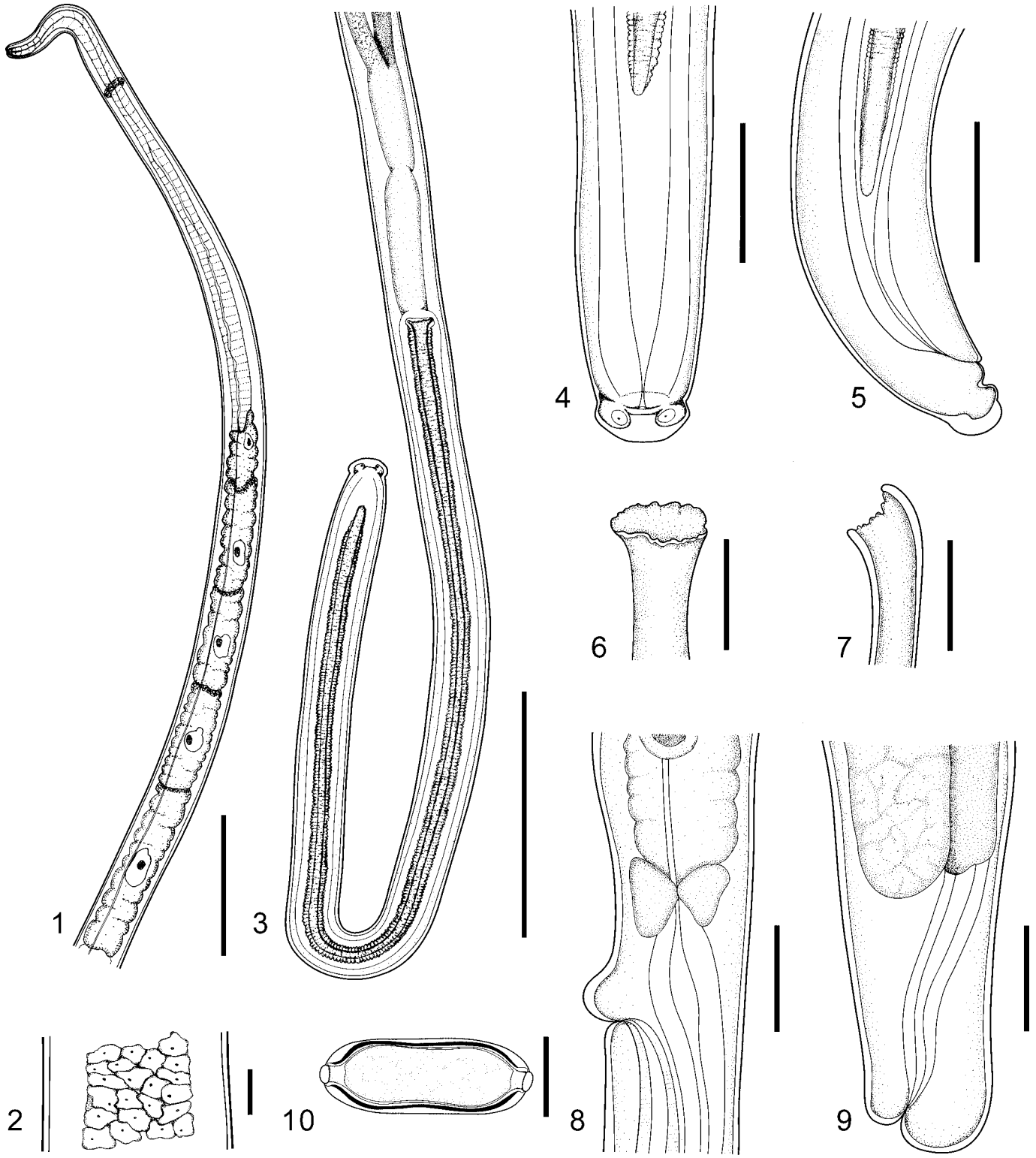
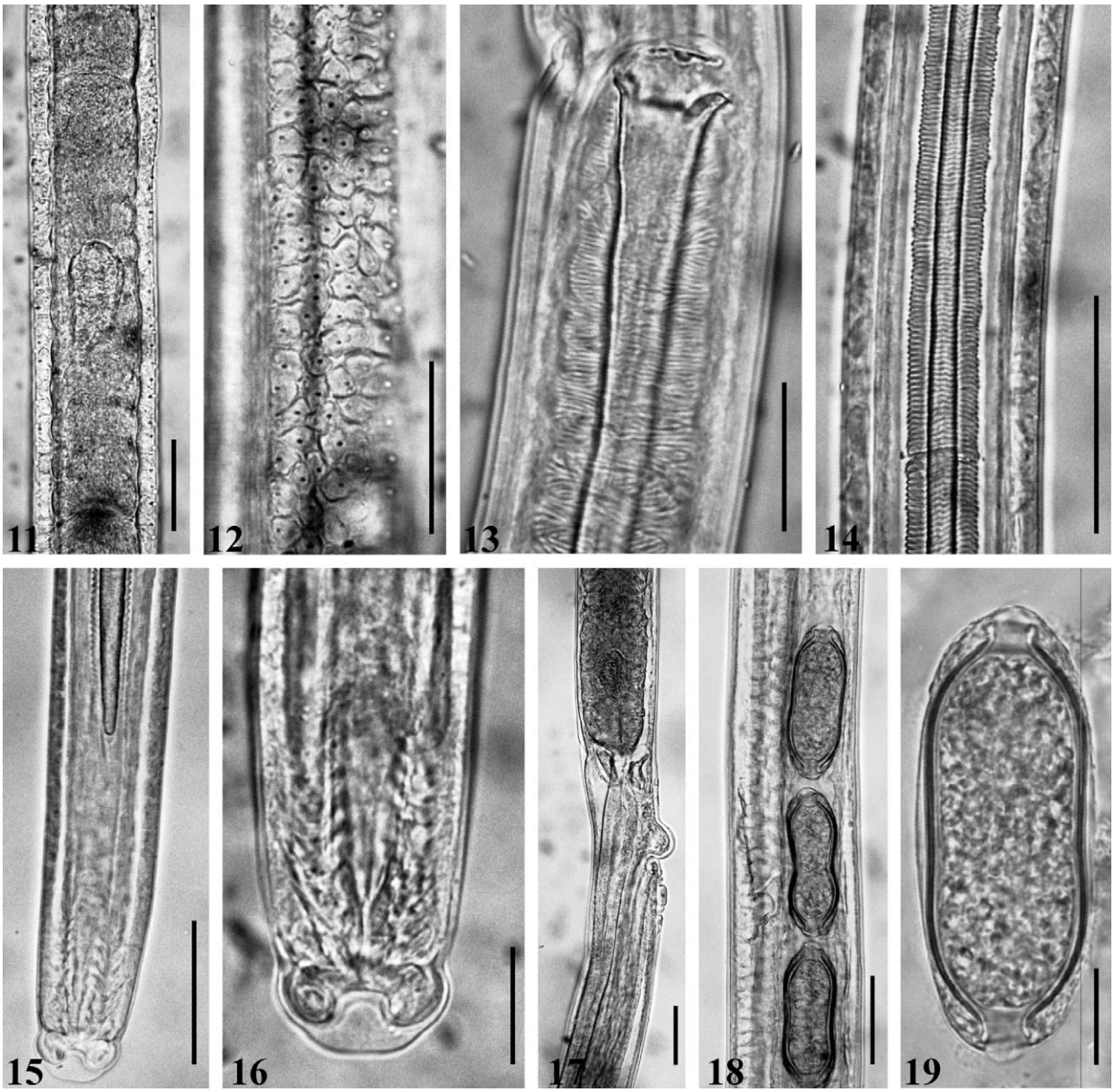


FIGURES 1–10. *Capillostrongyloides congiopodi* n. sp. (**1**) Anterior end. (**2**) Bacillary band. (**3**) Male posterior end, ventral view. (**4**) Male tail, ventral view. (**5**) Male tail, lateral view. (**6**) Proximal end of spicule, ventral view. (**7**) Proximal end of spicule, lateral view. (**8**) Female vulvar region, lateral view. (**9**) Tail of female, lateral view. (**10**) Egg. Bars: 1 and 3: 100 μm; 4, 5, 8, and 9: 50 μm; 6, 7, and 10: 30 μm; 2: 20 μm.



FIGURES 11–19. *Capillostrongyloides congiopodi* n. sp. (**11**) Stichocyte, showing central nucleus. (**12**) Bacillary band. (**13**) Spicule, proximal end, ventral view. (**14**) Medial region of spicule and detail of striated spicular sheath, ventral view. (**15**) Male caudal end, showing spicule tip, ventral view (**16**) Detail of male caudal end, showing the bursa, ventral view. (**17**) Female vulvar region, lateral view. (**18**) Eggs in uterus (**19**) Detail of egg. Bars: 11, 12, 14, 15, 17, and 18: 50 μm; 13, 16, and 19: 20 μm.

Type specimens: Holotype: 1 male (HCMLP coll. no. 5875). Allotype: 1 female (HCMLP coll. no. 5876). Paratypes: 10 males and 10 females (HCMLP coll. no. 5877); also 10 males and 10 females in the Helminthological Collection of the Institute of Parasitology, Biology Centre, ASCR, České Budějovice (Coll. N-910).

Prevalence: 56%.

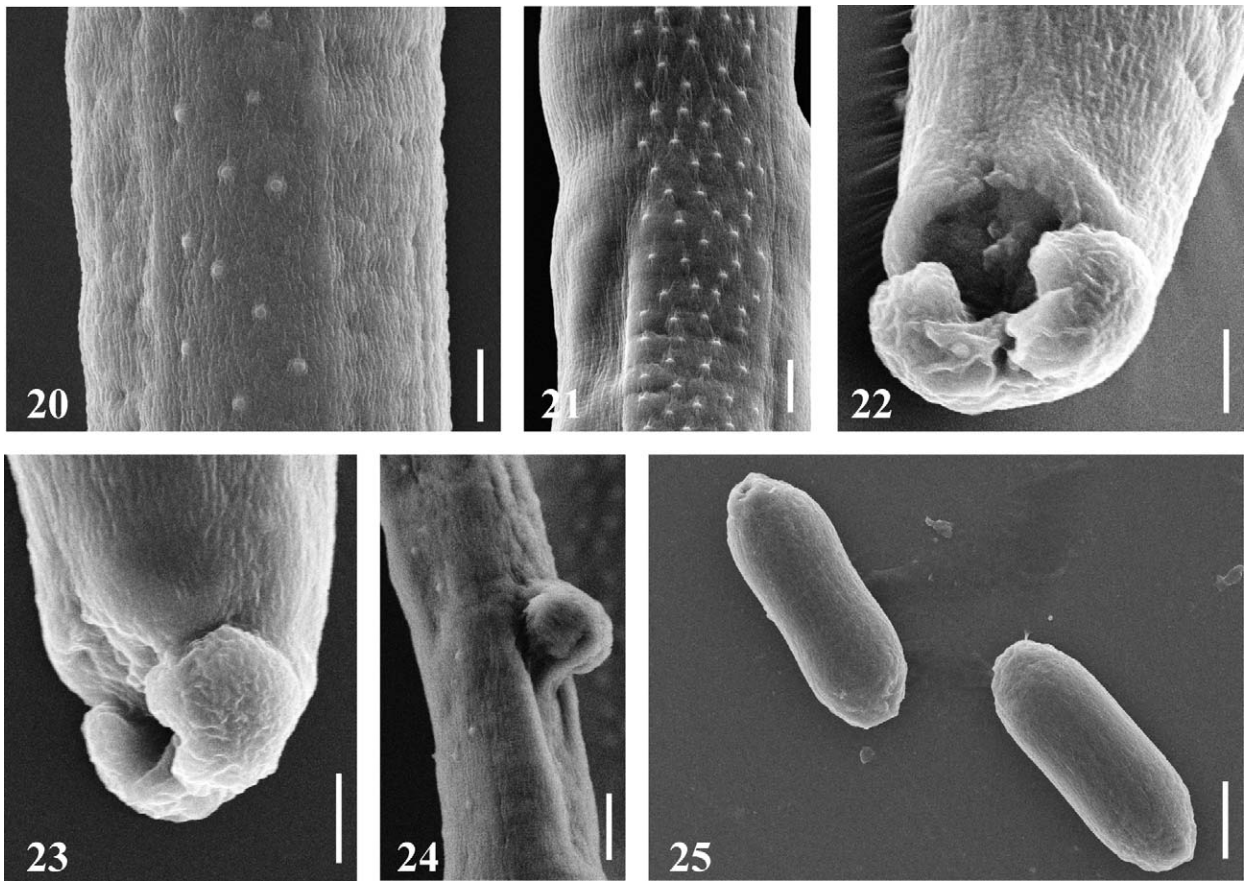
Mean intensity ± SD (range): 10.4 ± 17.4 (1–80).

Etymology: The specific name refers to the generic name of the host.

Remarks

Following the classification criteria for distinguishing among genera of Capillariidae Railliet, 1915 provided by Moravec (2001), the new species is included in *Capillostrongyloides* Freitas and Lent 1935, because of its general morphology, particularly the presence of a nonspiny spicular sheath, a spicule without rough transverse grooves on its surface, and a well-developed membranous bursa supported by 2 wide, almost spherical, lateral caudal lobes, each of them bearing a papilla. At present, *Capillostrongyloides* comprises 9 species, parasitizing fresh water and marine fishes in South America, Africa, Australia, and Europe (Moravec, 2001; Portes Santos et al., 2008). According to both, the key provided by Moravec (2001) and the recent description of *C. arapaimae* Portes Santos, Moravec and Venturieri, 2008 (Portes Santos et al., 2008), the new species most closely resembles *C. norvegica* Moravec and Karlsbakk 2000, the only species of the genus having a conspicuously elevated anterior vulvar lip in adult females.

Capillostrongyloides norvegica is a parasite of the stomach of the gadiform marine fish *Enchelyopus cimbrius* (Linnaeus) (Lotidae) from Raunefjorden, western Norway (Moravec and Karlsbakk, 2000). However, the new species is readily distinguished from *C. norvegica* by its larger body size (males 14.20–19.83 mm, females: 21.36–32.44 mm vs. males 4.01–5.74 mm, females: 7.83–12.28 mm), larger eggs (80–103 × 28–38 vs. 63–75 × 27–33) with slightly protruding polar plugs, by



FIGURES 20–25. *Capillostrongyloides congiopodi* n. sp. (**20**) Bacillary band at stichosome region. (**21**) Bacillary band, posterior to vulvar region. (**22**) Detail of male caudal end, showing the bursa, ventral view. (**23**) Detail of male caudal end, showing the bursa, sublateral view. (**24**) Female vulvar region, lateral view. (**25**) Eggs. Bars: 20, 22, and 23: 5 μm; 21 and 24: 10 μm; 25: 20 μm.

the spicular morphology (having a medial constriction in *C. congiopodi* vs. straight in *C. norvegica*), and by the general morphology of male bursa.

DISCUSSION

Capillostrongyloides congiopodi n. sp. is the first member of the genus reported from a congiopodid host and in the gall bladder of fishes. In fact, the gall bladder is an unusual microhabitat for fish capillariids. Only 1 species, *Pseudocapillaria* (*Pseudocapillaria*) *sphyraeni* (Parukhin, 1971) Moravec, 1982, is so far known to parasitize this organ in a marine fish, *Sphyraena quenie*, from the northeastern Indian Ocean (Moravec, 2001). At present, only 3 species of *Capillostrongyloides* are known as parasites of marine fishes (Moravec, 2001); however, the present finding represents the first record of this genus in the southern Atlantic Ocean.

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