

NEOTROPICAL MONOGENOIDEA. 43. *DIPLECTANUM MONTICELLII* N. SP. (DIPLECTANIDAE) FROM THE GILLS OF *CYNOSCION LEIARCHUS* (PERCIFORMES: SCIAENIDAE) IN BRAZIL

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ABSTRACT: *Diplectanum monticellii* n. sp. is described from the gills of *Cynoscion leiarchus*, a marine Sciaenidae, from Itacuruçá, Rio de Janeiro (type locality); Baía de Guaratuba, Paraná; and Pontal do Sul, Paraná in Brazil. The new species is characterized by the following features: bell-shaped male copulatory organ with a sleeve-like base, accessory piece absent, vas deferens looping left intestinal cecum, vaginal aperture sinistroventral, and ventral anchor with elongate superficial and deep roots.

Diplectanidae Monticelli, 1903 is composed of approximately 175 species (Desdevises et al., 2001). In South America, 8 species of *Diplectanum* Diesing, 1858, 3 species of *Pseudorhabdosynochus* Yamaguti, 1958, 3 species of *Rhabdosynochus* Mizelle and Blatz, 1941, 6 species of *Rhamnocercus* Monaco, Wood, and Mizelle, 1954, and 1 species of *Rhamnocercoides* Luque and Iannaccone, 1991, all diplectanids, are reported from the gills of perciform fishes (Zambrano, 1997; Kohn et al., 1998; Chaves et al., 1999; Santos et al., 2000; Kritsky et al., 2001; Santos et al., 2002). In the present article, a new species of *Diplectanum* is described from the gills of *Cynoscion leiarchus* (Cuvier, 1830), a marine Sciaenidae, from several localities in southeast and south Brazil.

MATERIALS AND METHODS

Cynoscion leiarchus were collected by cast or gill nets from Itacuruçá, State of Rio de Janeiro (June and October 1990), and from Baía de Guaratuba (November 2000) and Pontal do Sul (July 2001), State of Paraná. Gill arches were removed and placed in vials containing a hot solution of 5% formalin (around 55°C). In some cases, the gill arches were placed in vials containing 1:4,000 formalin for 1 hr, after which sufficient formaldehyde was added to obtain a 5% solution. In the laboratory, the contents of each vial were examined under a dissecting microscope, and helminths were collected with the aid of probes. Some specimens were stained with Gomori trichrome for the study of internal morphology; others were mounted unstained in Hoyer mounting medium or in Gray and Wess medium for the study of the sclerotized parts, as described in Kritsky et al. (1986) (see Humason 1979 for preparation of stains and mounting media). Measurements, in micrometers (μm), were taken with an ocular micrometer and according to Kritsky et al. (1986); the average is followed by the range and number of measured structures (n) in parentheses. Illustrations were prepared with the aid of a camera lucida attached to a phase contrast–differential interference contrast microscope. Type specimens and vouchers are deposited in the parasite collections of Coleção Helminológica da Fundação Instituto Oswaldo Cruz (CHIOC), Rio de Janeiro, Rio de Janeiro, Brazil; United States National Parasite Collection (USNPC), Beltsville, Maryland; and Harold W. Manter Laboratory of Parasitology Collection (HWML), University of Nebraska, Lincoln, Nebraska, as indicated in the taxonomic section. The following types also have been studied for comparative reasons: *D. bilobatum* Hargis, 1955 (USNPC 49344) and *D. squamatum* Santos, Timi e Gibson, 2002 (CHIOC 34538 a–d).

DESCRIPTION

Diplectanum monticellii n. sp. (Figs. 1–9)

Body 964 (776–1168; n = 9) long, fusiform; greatest width 204 (165–254; n = 10) at level of germarium. Tegument scaled; scales plate-

like with round anterior margins, lightly sclerotized, directed anteriorly, easily lost in preserved specimens. Two terminal, 2 bilateral cephalic lobes poorly developed. Four bilateral pairs of head organs; cephalic glands at level of pharynx. Eyes 4, equidistant; eye granules small, elliptical; accessory granules absent or few throughout cephalic region. Mouth subterminal; pharynx 60 (57–79; n = 10) in diameter; esophagus short; intestinal caeca nonconfluent, not extending into peduncle. Peduncle tapered posteriorly. Haptor 64 (60–79; n = 8) long, 143 (120–165; n = 8) wide, expanded laterally; squamodiscs similar, each 56 (36–89; n = 8) long, 76 (54–102; n = 9) wide, with 14–20 concentric rows; dumbbell-shaped rodlets comprise anterior, medial rows; scalelike rodlets comprise posterior rows. Ventral anchor 46 (41–52; n = 21) long, with elongate roots, evenly curved shaft, recurved point tip; proximal portion of superficial root slightly overlapping deep root; anchor base 22 (18–26; n = 14) wide. Dorsal anchor 39 (35–46; n = 23) long, with greatly reduced superficial root, long deep root, evenly curved shaft, point; anchor base 17 (14–20; n = 18) wide. Ventral bar 84 (64–102; n = 18) long, slender, with tapered ends, ventral longitudinal groove. Paired dorsal bar 52 (43–64; n = 19) long, medial end expanded, slightly bilobed. Hooks similar, each 11 (10–12; n = 55) long, with protruding depressed thumb, delicate point, shank; hook pair 1 near tip of ventral bar; pairs 2–4 (ventral), 6–7 (dorsal) submarginal to marginal in lateral haptor lobes; pair 5 posterior to ends of ventral bar. Male copulatory organ (MCO) bell-shaped, anterior to genital pore, 42 (33–55; n = 15) long, with weakly sclerotized sleeve-like base. Accessory piece absent. Testis postgerminal, intercecal, 46 (n = 1) long, 29 (n = 29) wide, subovate; vas deferens loops left intestinal cecum; seminal vesicle a dilation of vas deferens, sigmoid. Prostatic reservoir fusiform, lateral to MCO. Germarium 121 (113–135; n = 3) wide, lobed; oviduct loops right intestinal cecum; ootype not observed. Vaginal vestibule lightly sclerotized, cup-shaped; vaginal duct lightly sclerotized, distally bulbous; vaginal aperture sinistroventral, submarginal. Vitellaria throughout trunk, except in regions of major reproductive organs. Eggs not observed.

Taxonomic summary

Type host: *Cynoscion leiarchus* (Cuvier, 1830) (Sciaenidae), “Pescada-branca.”

Type locality: Itacuruçá, Rio de Janeiro, Brazil (6 June 1990 and 30 October 1990; 22°55'S, 43°55'W).

Other localities: Baía de Guaratuba, Paraná, Brazil (25 November 2000; 25°53'S, 048°38'W) and Pontal do Sul, Paraná, Brazil (July 2001; 25°29'S, 048°33'W).

Site of infestation: Gills.

Specimens studied: Holotype, CHIOC 34962; paratypes (n = 12), CHIOC 34963 a and b, 34964 a–c; HWML 17604, USNPC 092600, 092601. Vouchers: CHIOC 34965; HWML 17605, USNPC 092602.

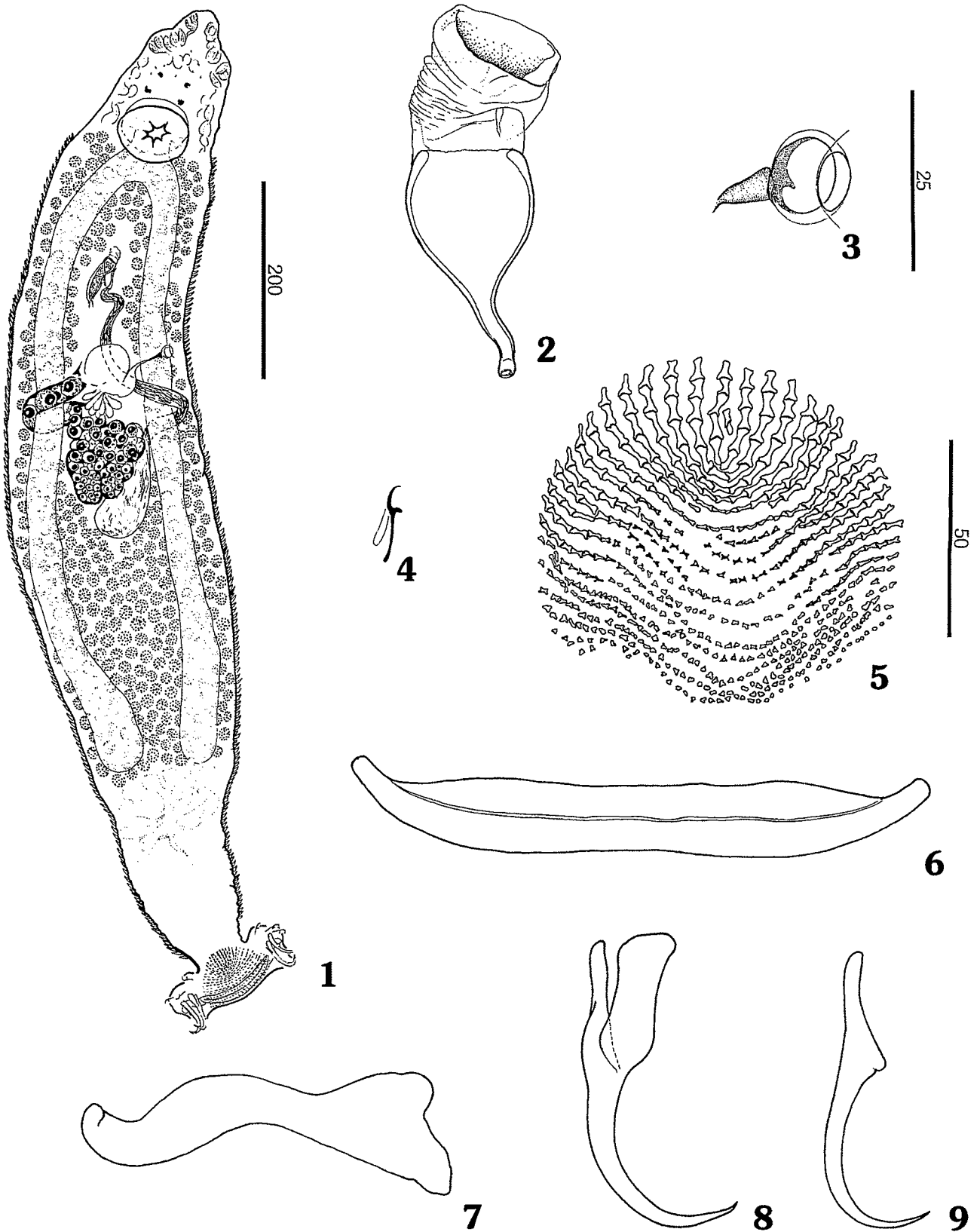
Etymology: The specific epithet is proposed for F. S. Monticelli in recognition of his contribution to the taxonomy of Diplectanidae.

DISCUSSION

Thirty species of *Diplectanum* are reported from marine or freshwater sciaenid hosts (Santos et al., 2002). *Diplectanum monticellii* most closely resembles *D. bilobatum*; both are parasites of species of *Cynoscion*, from the northern and south-

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FIGURES 1-9. *Diplectanum monticellii* n. sp. 1. Whole-mount, composite (ventral). 2. MCO. 3. Vagina. 4. Hook. 5. Squamodisc. 6. Ventral bar. 7. Dorsal bar. 8. Ventral anchor. 9. Dorsal anchor. 1. Bar = 200 μm. 2-4, 6-9. Bar = 25 μm. 5. Bar = 50 μm.

western Atlantic Ocean, respectively. The original description and the restudy of the only type apparently available in a helminthological collection (USNPC 49344) of *D. bilobatum* provide some characters that allow distinction of these species. The enlarged proximal portion of the MCO is diamond-shaped in *D. bilobatum*, whereas it is bulbous in the new species. The distal, tapering portion of the MCO of *D. bilobatum* is about twice longer than the enlarged proximal portion, whereas in *D. monticellii* this portion is shorter than the bulbous proximal portion. Furthermore, *D. monticellii* shows no evidence of an accessory piece (reported in the original description of *D. bilobatum*; see Hargis, 1955) and has more robust dorsal and ventral bars.

In the Neotropics, only *D. squamatum* is reported from an exclusively marine sciaenid. *Diplectanum monticellii* differs from this species by having a bell-shaped MCO with a sleeve-like base (MCO tubular in *D. squamatum*), a vagina with a distal bulb (absent in *D. squamatum*), and squamodiscs with 14–20 concentric rows (23–29 in *D. squamatum*).

Although *D. bilobatum* and *D. squamatum* were originally described as having intercecal vas deferens, the use of this character to differentiate these species and *D. monticellii* is inappropriate. Although the presence of intercecal vas deferens is considered by some as a diagnostic feature for the Diplectaninae (see Oliver, 1987), some species of *Diplectanum* (see Kritsky and Boeger, 1989) and of other genera (Oliver, 1987; Zambrano, 1997; Kritsky et al., 2000) have vas deferens looping the left intestinal cecum. Indeed, Kritsky and Boeger (1989) assumed that the presence of a looping vas deferens is plesiomorphic for the Diplectanidae, suggesting that the intercecal vas deferens reported for many species of the family may represent erroneous interpretations. The finding of the looping vas deferens in *D. monticellii* further supports this hypothesis and indicates the need for reexamination of previously described species of Diplectaninae. However, observation of the vas deferens is often difficult, and study of the available specimens of *D. bilobatum* and *D. squamatum* did not allow confirmation of the state of this character reported by their respective authors.

Santos et al. (2002) suggested that the presence of scales on the body of a range of diplectanids, including members of subfamilies proposed by Oliver (1987), may indicate that some of these subfamilies comprising the Diplectanidae may be unnatural. We have observed that the presence of scales on the body of *D. monticellii* appears dependent on the fixation–killing. Scales are absent or scarce in specimens killed in 1:4,000 formalin; they are abundant and easily observed in specimens killed and fixed in hot 5% formalin. Thus, the presence of scales is probably symplesiomorphic to the Diplectanidae.

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