

*Pseudorhabdosynochus monaensis* n. sp.  
(Monogenea: Diplectanidae) on Rock Hind from  
Mona Island, Puerto Rico

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**Abstract.**—*Pseudorhabdosynochus monaensis* n. sp. from rock hind *Epinephelus adscensionis* (Perciformes: Serranidae) of Mona Island, Puerto Rico, differs from all known species by the shape of the vagina. It may be further differentiated from *P. amplidiscatum*, *P. beverleyburtonae*, *P. bocquetiae*, *P. caballeroi*, *P. cupatum*, *P. epinepheli*, *P. lantauensis*, *P. melanesiensis*, *P. querni*, *P. serrani*, *P. summanae*, and *P. vagampullum* in having a greater number of rows of scales in each squamodisc. This new species is most similar to *P. americanum*, *P. lateri*, *Cycloplectanum magnisquamodiscum*, and *Cycloplectanum riouxi* in having 20 or more squamodisc rows, but may be separated by differences in squamodisc morphology, male copulatory organ size, and differently shaped hamuli and dorsal bars.

We have been surveying the species, abundance, localities and pathological effects of helminths of Caribbean fish over the last 20 years. Most reports have been concerned with digeneans and only recently with monogeneans (Dyer et al. 1992a, 1992b). This report is concerned with the description of a new species of *Pseudorhabdosynochus* from an epinephelid fish.

#### Methods

A 41.1-cm (total length) rock hind *Epinephelus adscensionis*—was speared in 15 m of water in coral-covered broad rock ridges off Playa Sardinera, Mona Island (81 km west of southwestern Puerto Rico). The fish was held in a plastic bag within a mesh dive bag approximately 50 min before being brought to the surface. It was then brought immediately to the laboratory aboard the research vessel (RV *Crawford*) anchored above the dive site. A stereomicroscope was used to examine the fish for metazoan parasites. Monogeneans were fixed in 5% formalin and later mounted in glycerin jelly and studied, under oil immersion, by phase contrast microscopy. All measurements reported for the new species were taken from six adult worms.

For comparative purposes holotype and paratype specimens were borrowed from the U.S. National Museum (USNM), Beltsville, Maryland; the Museum National d'Histoire Naturelle (MNHN), Paris; the Universidad Nacional Autonoma de

Mexico (UNAM), Mexico City; and the Meguro Parasitological Museum (MPM), Tokyo (Table 1). Differentiation of the new species from *Diplectanum lateri* Oliver, 1984, *Cycloplectanum beverleyburtonae* Oliver, 1984, *Cycloplectanum caballeroi* Oliver, 1984, *Diplectanum serrani* Yamaguti, 1953, *Cycloplectanum magnisquamodiscum* Aljoshkina, 1984, and *Cycloplectanum riouxi* Oliver, 1986, for which no type materials were available, was based on published descriptions. The first four species have since been reclassified as *Pseudorhabdosynochus* spp.

#### Characteristics of

##### *Pseudorhabdosynochus monaensis* n. sp.

**Description** (Figures 1-8): Diplectanidae Bychowsky, 1957; *Pseudorhabdosynochus* Yamaguti, 1958. Body elongated fusiform, 344-700  $\mu$ m long, 147-180  $\mu$ m wide at level of testis. Tegument with anteriorly directed scales in posterior third of body region. Head trapezoidal, 54-70  $\mu$ m wide at base. Two pairs of eyespots dorsal to anterior half of pharynx. Cephalic glands lateral to pharynx; ducts leading to paired head organs. Haptor 48-60  $\mu$ m long; 118-197  $\mu$ m wide, with two pairs of hamuli terminating in pointed tips and three separate bars; dorsal hamuli with reduced superficial root, 30-42  $\mu$ m long from tip of dorsal root to outer curve of blade; ventral hamuli with elongated deep root, 30-40  $\mu$ m long from tip of deep root to outer curve of blade; dorsal bar

TABLE 1.—Holotype (H) and paratype (P) specimens used in classification of the new species. Species designations are given as in their respective collections. All of the following have since been reclassified as *Pseudorhabdosynochus* spp.

Species designation	Collection and number	Specimen type
<i>Diplectanum americanum</i> Price, 1937	USNM 35703	H, P
<i>Diplectanum amplidiscatum</i> Bravo-Hollis, 1954	UNAM 24-8	P
<i>Diplectanum bocquetae</i> Oliver and Paperna, 1984	MNHN 112 TC-96 Tu	H
<i>Diplectanum cupatum</i> Young, 1969	USNM 63138	P
<i>Diplectanum epinepheli</i> Yamaguti, 1938	MPM 22259	H, P
<i>Pseudorhabdosynochus epinepheli</i> Yamaguti, 1958	MPM 22375	H, P
<i>Cycloplectanum hongkongensis</i> Beverly-Burton and Suriano, 1981	USNM 76726	P
<i>Cycloplectanum lantauensis</i> Beverly-Burton and Suriano, 1981	USNM 76719	H, P
<i>Diplectanum melanesiensis</i> Laird, 1958	USNM 38304	H
<i>Diplectanum querni</i> Yamaguti, 1968	USNM 63662	H
<i>Diplectanum summanae</i> Young, 1969	USNM 63144	P
<i>Diplectanum vagampullum</i> Young, 1969	USNM 63146	P

50–65  $\mu\text{m}$  long with paddle shaped medial extremities and posteriorly directed lateral protuberances; ventral bar 70–82  $\mu\text{m}$  long, 10–14  $\mu\text{m}$  wide at median, boomerang-shaped with narrow terminals; 14 hooks, 9–10  $\mu\text{m}$  long; dorsal and ventral squamodiscs 56–82  $\mu\text{m}$  in diameter, consisting of 20–24 open-ended rows of scales forming a narrow “U” anteriorly and forming progressively straighter rows posteriorly. Mouth ventral leading directly to pharynx. Pharynx 36–48  $\mu\text{m}$  long, 33–42  $\mu\text{m}$  wide; esophagus short; ceca simple, terminating separately at anterior of posterior third of body. Testis oval, 48–52  $\mu\text{m}$  long, 52–67  $\mu\text{m}$  wide, in posterior half of body; vas deferens emerging anteriorly and passing medially to form seminal vesicle; muscular ejaculatory duct opening into basal bulb of male copulatory organ along with prostatic reservoir. Male copulatory organ sclerotized, proximal region reniform, 53–79  $\mu\text{m}$  long, and divided into four compartments; distal region consisting of a curved tube, 20–37  $\mu\text{m}$  long, narrowing progressively as it approaches genital pore. Ovary pyriform, 80–92  $\mu\text{m}$  long, 28–40  $\mu\text{m}$  wide, located immediately anterior to testis, swollen at base; distal portion curving dorso-ventrally around right cecum. Vagina a sclerotized tube opening to left of median line directly behind male copulatory organ; vaginal duct forming two

loops resembling a “g.” Ducts from seminal receptacle opening near ootype, which is surrounded by Mehlis’ gland; uterus opening at genital pore. Vitellaria lateral, overlapping ceca. Eggs not observed.

*Host:* Rock hind *Epinephelus adscensionis* (Serranidae), 41.1 cm total length.

*Locality:* Sardinera, Mona Island, Puerto Rico (18°04'12"N, 67°57'36"W), 13 April 1975.

*Site of infestation:* Gill fillaments.

*Etymology:* The parasite is named for the locality.

*Type material:* Specimens have been deposited in the U.S. National Museum Helminthological Collection, holotype 82789, paratype 82790.

## Discussion

*Pseudorhabdosynochus monaensis* may be differentiated from all previously described species on the basis of differences in the shape of the vagina. Furthermore, because *P. monaensis* has 20–24 rows of scales in each squamodisc, it is dissimilar to *P. amplidiscatum*, *P. beverleyburtonae*, *P. bocquetae*, *P. caballeroi*, *P. cupatum*, *P. epinepheli*, *P. lantauensis*, *P. melanesiensis*, *P. querni*, *P. serrani*, *P. summanae*, and *P. vagampullum*, all of which possess 17 or less rows.

FIGURES 1–8.—*Pseudorhabdosynochus monaensis* n. sp. **Figure 1.** Entire worm, dorsal view (composite from holotype and paratypes). Scale bar (to upper right of the worm) = 100  $\mu\text{m}$ . **Figure 2.** Dorsal squamodisc. Scale bar (right) = 25  $\mu\text{m}$ . **Figure 3.** Ventral bar. Scale bar (below) = 50  $\mu\text{m}$ . **Figure 4.** Dorsal bar. Scale bar (below) = 50  $\mu\text{m}$ . **Figure 5.** Vagina. Scale bar (right) = 50  $\mu\text{m}$ . **Figure 6.** Dorsal hamulus. Scale bar (right) = 25  $\mu\text{m}$ . **Figure 7.** Male copulatory organ. Scale bar (right) = 25  $\mu\text{m}$ . **Figure 8.** Ventral hamulus. Scale bar (right) = 25  $\mu\text{m}$ .



Examination of the type material of *P. americana* by Beverley-Burton and Suriano (1981) revealed the presence of  $20 \pm 2$  rows (mean  $\pm$  SD) in the squamodiscs, instead of 20, 18, and 7–17 rows as reported by Price (1937), Caballero and Bravo-Hollis (1961), and Oliver (1968), respectively. Our examination concurs with that of Beverley-Burton and Suriano (1981). *Pseudorhabdosynochus monaensis* is differentiated from *P. americanum* in having all the squamodisc rows open, and smaller and differently shaped ventral hamuli and dorsal bars.

Of the remaining three similar species, *Pseudorhabdosynochus latesi* resembles *P. monaensis* in having 16–20 squamodisc rows but differs in having differently shaped haptor bars and a male copulatory organ terminating in a straight tube. *Cycloplectanum magnisquamodiscum* also resembles *P. monaensis* in having 20 squamodisc rows but differs in the shape of the dorsal and ventral hamuli and the larger size of the male copulatory organ. *Cycloplectanum riouxi* resembles *P. monaensis* in having 11–22 squamodisc rows but differs in having the first two rows closed and also in having ventral hamuli of a different shape.

The new monogenean may be specific to the rock hind. This species was not found on numerous specimens of the very similar red hind *Epinephelus guttatus* examined either from the same locality where *P. monaensis* was found or from other localities. Also, this parasite did not occur on 30 other species of Caribbean sea basses examined.

The rock hind has been characterized as a shallow-water species in numerous Caribbean fish books, but we occasionally seen larger individuals of this fish (15–25 cm total length) on coral reefs off the mainland of Puerto Rico, and off Mona Island and Barbados.

Examination of diplectanid monogeneans from serranid fishes by Kritsky and Beverley-Burton (1986) revealed a taxonomic problem concerning the status of the genera *Pseudorhabdosynochus* Yamaguti, 1958, and *Cycloplectanum* Oliver, 1968. After these two researchers reviewed the histories of the taxa, they concluded that *Cycloplectanum* should be considered a junior subjective synonym of *Pseudorhabdosynochus*. Examination of holotypes and paratypes of *Diplectanum epinepheli* Yamaguti, 1938, of *P. epinepheli* Yamaguti, 1958, and of *C. hongkongensis* Beverley-Burton and Suriano, 1981, revealed their conspecificity; hence, *P. epinepheli* (Yamaguti, 1938) Kritsky and Beverley-Burton, 1986, was designated

the valid name of the species. We came to the same conclusion after our examination of type materials of these three "species."

The review by Kritsky and Beverley-Burton (1986) also included a list of 14 described species of *Pseudorhabdosynochus* along with their synonyms. Our review of the literature revealed two additional species—namely, *Cycloplectanum magnisquamodiscum* Aljoshkina, 1984, from *Chaetodon hoefleri* off the coast of southwestern Africa and *Cycloplectanum riouxi* Oliver, 1986, from *Epinephelus guaza* in the Mediterranean Sea (off France) and the Atlantic Ocean (off Ireland). The published descriptions by Aljoshkina (1984) and Oliver (1986) indicated to us that both species should be transferred to *Pseudorhabdosynochus*; however, because we have been unable to obtain types or paratypes for examination, we hesitate to make a more definitive recommendation at this time.

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