

***Pseudorhabdosynochus capurroi* sp. n. (Monogenea: Diplectanidae) from the gills of *Mycteroperca bonaci* (Pisces: Serranidae) of the Yucatan Peninsula, Mexico**

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Key words: Monogenea, Diplectanidae, Serranidae, *Mycteroperca bonaci*, Peninsula of Yucatan, Southern Mexico

Abstract. A new monogenean species, *Pseudorhabdosynochus capurroi* sp. n., is described from the gills of the black grouper, *Mycteroperca bonaci* (Poey) (Serranidae), from the Yucatan Peninsula, Mexico. The new species can be differentiated from all other known species of *Pseudorhabdosynochus* Yamaguti, 1958 by being the largest one recorded until now (1162-1535 µm body length). Moreover, the vagina of *P. capurroi* has a small funnel-shaped opening with a non sclerotized vesicle from which a fine sclerotized duct leads proximally to a sclerotized seminal receptacle, and the testis is bilobate. The squamodiscs have 14 to 16 rows of rods, of which 3 to 5 rows are closed.

Serranids provide an important fishery resource of the Peninsula of Yucatan, where at least 6 species of *Epinephelus* (*E. drummondhayi*, *E. flavolimbatus*, *E. guttatus*, *E. morio*, *E. nigritus* and *E. niveatus*), and 2 species of *Mycteroperca* (*M. bonaci* and *M. microlepis*) are commercially exploited as food and game fish (Nakamura 1976, PESCA 1994). Knowledge of the parasites of serranids in the Yucatan Peninsula is limited and restricted to some helminths of *E. morio*, the most important fishery resource in the Peninsula (Moravec et al. 1995, 1997, Vidal-Martínez et al. 1995, 1997). During studies of the helminth fauna of *Mycteroperca bonaci* (Poey), the black grouper, a new species of Diplectanidae (Monogenea) was found parasitizing the gills. In this paper, this species is described and data about its distribution along the coast of the State of Yucatan are provided.

MATERIALS AND METHODS

The monogeneans were collected from 20 black groupers, *Mycteroperca bonaci*, from 3 localities, Chuburna (21°16'N; 87°47'W), Celestun (20°45'N; 90°15'W) and Progreso (21°17'N; 89°40'W), along the coast of the Yucatan State, with help of the artisanal fishing fleet. Methods of collection and measurement of helminths were those of Oliver (1968). The material was processed by the ammonium-picrate technique for sclerotized structures (Ergens 1969) and Gomori's trichromic staining technique for soft structures (Kritsky et al. 1978). Measurements are in micrometres (µm); the mean is followed by the standard deviation; the range and the number of specimens measured are given in parentheses.

RESULTS

***Pseudorhabdosynochus capurroi* sp. n. Fig. 1**

Description (based on 20 specimens): Diplectanidae, Diplectaninae. Tegument smooth, lacking scales on posterior of body. Body 1334 ± 126 (1162-1535; n = 11) long, fusiform; greatest width 496 ± 114 (250-669; n = 12) near midlength. Two terminal, bilateral cephalic lobes moderately developed. Cephalic glands lateral to pharynx, both with ducts leading to 6 paired head organs. Two pairs of eye spots. Mouth sub-terminal, ventral; pharynx subspherical, 62 ± 6 (55-69; n = 12) long, 97 ± 13 (65-115; n = 14) wide; oesophagus short to absent. Crura not united posteriorly (Fig. 1A). Elongate peduncle; haptor 257 ± 23 (225-320; n = 12) wide, with two conspicuous bilateral lobes. Squamodiscs elliptical, overlying distal peduncle and the medial portion of haptor; ventral squamodisc 105 ± 8 (91-122; n = 12) in diameter, with 14-16 semicircular rows of rods; 4-5 innermost rows closed. Dorsal squamodisc 119 ± 11 (98-136; n = 10) in diameter, with 14-15 semicircular rows of rods; 3-4 innermost rows closed. Ventral hamuli 48 ± 3 (38-54; n = 20) long, with well-developed roots, bent shaft, short point; dorsal hamuli 36 ± 1 (34-39; n = 15) long, with large elongate deep root, incipient superficial root, straight shaft, short point. Ventral bar 116 ± 7 (106-130; n = 8) long, with tapered ends; dorsal bar 71 ± 5 (65-69; n = 12) long, twisted near midlength. Seven pairs of similar hooks; 5 pairs lying on lateral haptor lobes and 2 pairs under the dorsal bars; each hook 12 ± 1 (11-13; n = 10) long, with curved shank, perpendicular thumb, delicate shaft,

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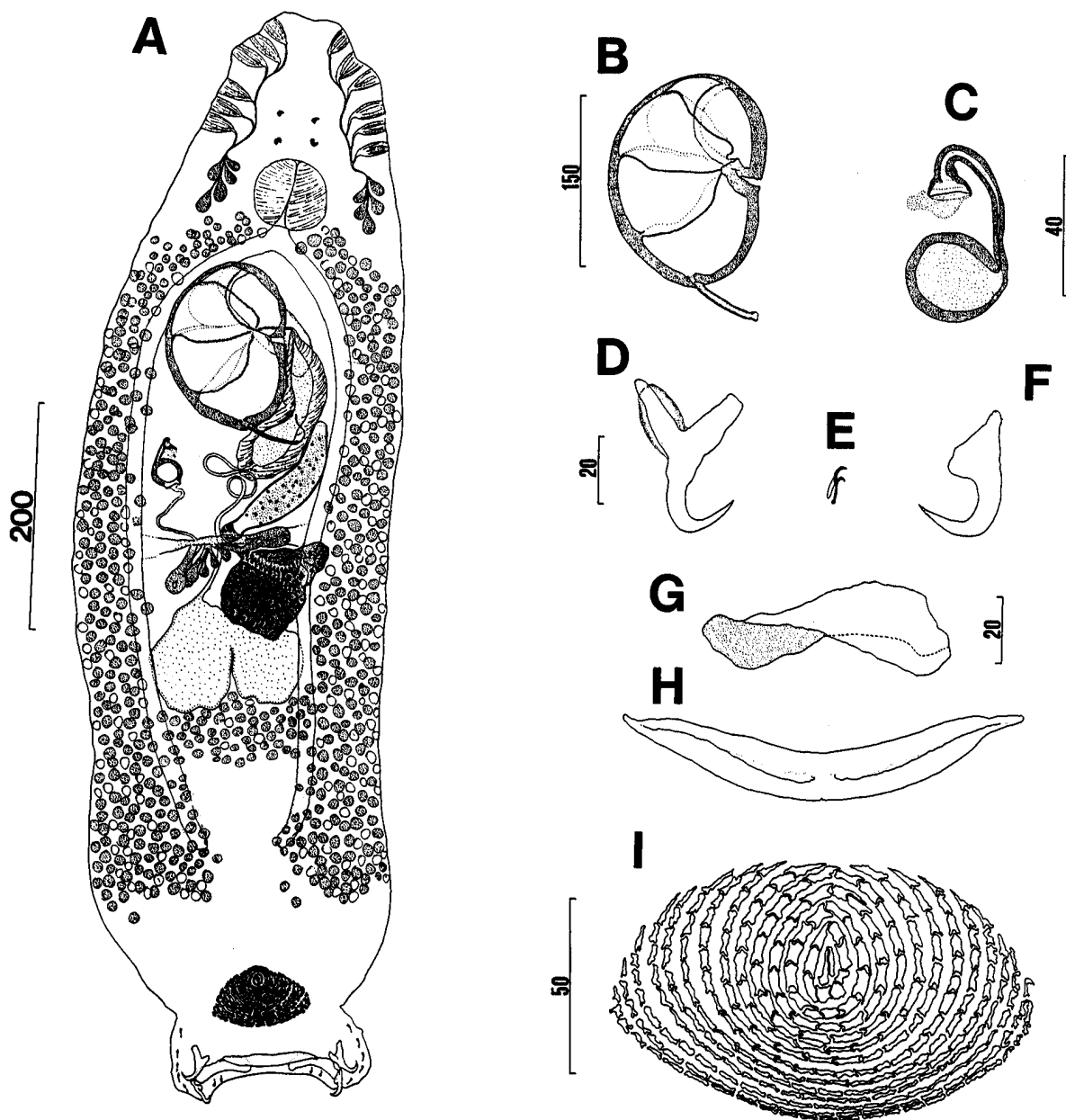


Fig. 1. *Pseudorhabdosynochus capurroi* sp. n. **A** - entire worm, dorsal view (holotype); **B** - male copulatory organ, lateral view; **C** - vagina, dorsal view; **D** - ventral anchor; **E** - hook; **F** - dorsal anchor; **G** - dorsal bar; **H** - ventral bar; **I** - squamodisc, pattern of rows.

and point. Male copulatory organ 229 ± 16 (200-250; $n = 16$) long, with large bulbous sclerotized base divided into four compartments. Distal compartment with curved spicular tube 10 ± 3 (8-14; $n = 3$) long. Gonads slightly overlapping. Testis postovarian, bilobate; vas deferens conspicuous, dextral to midline; seminal vesicle a conspicuous dilation of vas deferens, 180 ± 25 (148-218; $n = 6$) long; prostatic reservoir pyriform. Ovary pyriform, looping right intestinal crus, 75 ± 21 (50-101; $n = 8$) maximum width. Vagina sinistral, comprising bell-shaped opening with small non-

sclerotized vesicle, fine sclerotized duct leading proximally to sclerotized seminal receptacle. Duct from seminal receptacle opening near ootype; Mehlis' gland surrounding ootype; uterus opens at genital pore; genital pore dextral, posterior to male copulatory organ; vitellaria coextensive with intestine.

Type host: *Mycteroperca bonaci* (Poey) (Serranidae: Perciformes).

Site of infection: Gills.

Type locality: Chuburna, Yucatan, Mexico (5 April and 14 May 1996).

Other localities: Celestun (7 July 1995; 14 May 1996) and Progreso (5 April and 2-3 May 1996) (all Yucatan State).

Deposition of types: Holotype and one paratype in the Instituto de Biología, Universidad Nacional Autónoma de México (Coll. No. 3172 and 3173); 2 paratypes in the Institute of Parasitology, Academy of Sciences of the Czech Republic, in České Budějovice (Helm. Coll. No. M-350); 2 paratypes in CINVESTAV-IPN Unidad Mérida, Yucatan, Mexico (Coll. No. 170) and 3 paratypes in the U.S. National Parasite Collection, Beltsville, Maryland, USA (USNPC 87300).

Occurrence: This monogenean infected *M. bonaci* in low numbers in the localities studied (number of fish infected/number of fish examined [range of the number of monogeneans in parentheses]): Chuburna 1/2 (0-80); Celestun 2/3 (8-18); Progreso 3/15 (7-28).

E t y m o l o g y: This species is dedicated to Dr. Luis René Capurro Filograsso in recognition to his guidance, kindness and support of Mexican students.

DISCUSSION

Pseudorhabdosynochus capurroi differs from all other species in the genus by having a vagina with a bell-shaped opening with a small non-sclerotized vesicle and a fine sclerotized duct leading proximally to a sclerotized seminal receptacle. Both squamodiscs of *P. capurroi* have 14 to 16 rows of rods, of which 3 to 5 inner rows are closed. *Pseudorhabdosynochus capurroi* is the largest species described of *Pseudorhabdosynochus* (1162-1535 µm total body length), and it is the only one with a bilobate testis.

Pseudorhabdosynochus capurroi resembles *P. kritskyi* Dyer, Williams et Bunkley-Williams, 1995 and *P. yucatanensis* Vidal-Martínez, Aguirre-Macedo et Mendoza-Franco, 1997 by possessing a sclerotized tubular vagina leading to an oval-shaped sclerotized reservoir. The number of rows in the squamodiscs in *P. capurroi* (14-16) and *P. kritskyi* (11-15) is similar, but differs from that of *P. yucatanensis* (10-12). However, *P. capurroi* has a small non-sclerotized vesicle associated with the vaginal opening, a bilobate testis and twisted dorsal bars, characteristics absent in both *P. kritskyi* and *P. yucatanensis* (Dyer et al. 1995, Vidal-Martínez et al. 1997). The similarity in the morphology of these species is not surprising as they parasitize hosts that are close ecologically and phylogenetically: *P. capurroi* on *Mycteroperca bonaci*, *P. kritskyi* on *M. microlepis* and *P. yucatanensis* on *Epinephelus morio*. Furthermore, the three species occur sympatrically in the Gulf of Mexico.

Prevalence and intensity of infection of *P. capurroi* on *M. bonaci* presented low values, which in turn is related to the small number of fish examined (see occurrence in the Results section). However, in Progreso, where 15 fish were examined, only 3 fish

were infected with *P. capurroi*, suggesting that the percentage of infected hosts in nature is rather low. This becomes evident when prevalence in black groupers is compared with prevalence of *P. yucatanensis* on red grouper *E. morio* along the coast of the Yucatan Peninsula. Vidal-Martínez et al. (1997) found that for sample sizes as small as 13 to 15 red groupers, *P. yucatanensis* showed prevalence of 85% to 100%. It is probable that factors such as age and the distance at which the fish were caught from the coast could be affecting prevalence and abundance of *P. capurroi*. An increase in the number of localities and individual hosts examined will be necessary to determine the influence of these factors upon the infection parameters of *P. capurroi*.

During the last 15 years, there have been problems with respect to the morphological characteristics to be used for separating genera and species in the family Diplectanidae. Beverley-Burton and Suriano (1981) suggested that the terminal genitalia are important, while Oliver (1987) proposed that genitalia should be used to separate species rather than genera. He also suggested that the adhesive accessory organs (such as the squamodiscs) are a more important characteristic for separating genera. Utilization of certain subsets of characters (i.e., hook numbers, bar shape, adhesive accessory organs, etc.) and denial of the importance of other subsets has been a current practice in monogenean classification schemes during a number of years. However, there is a danger in giving more importance to one subset of characters than to others, and ignoring the fact that homologies could occur in other characters. Therefore, we suggest that both, the terminal genitalia and the adhesive accessory organs should be used in classification, as well as all other possible characters. To determine which would be the best set of characters, it will be necessary to perform a comprehensive cladistic analysis. If a set of characters is ignored, the resulting classification is likely to be an artificial one. Finally, we agree with Kritsky and Beverley-Burton (1986) that *Cycloplectanum* Oliver, 1968 is a junior synonym of *Pseudorhabdosynochus* Yamaguti, 1958, due to a misleading interpretation of the International Code of Zoological Nomenclature (ICZN).

Acknowledgments. The authors wish to thank David González Solís, Ana María Sánchez Manzanilla, Jorge Güemez Ricalde and Gregory Arjona Torres for their assistance in field and laboratory work, and Dr. Delane Kritsky for critical and useful comments concerning this paper. This work was supported by a grant from the Consejo Nacional de Ciencia y Tecnología (CONACyT), Mexico, No. 4689-N9406.

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Received 12 June 1997

Accepted 17 October 1997