

NOTE

NEW RECORDS FOR THREE SPECIES OF MONOGENEANS (PLATYHELMINTHES) OF MARINE FISHES IN THE GULF OF NICOYA, COSTA RICA

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ABSTRACT

Three monogenean taxa (*Hargicola oligoplites*, *Mazocraes* sp., and *Neohexostoma euthynni*) are recorded for marine fishes from the Gulf of Nicoya, Costa Rica. Two of them (*Mazocraes* sp. and *N. euthynni*) represent new records for the helminth fauna of Costa Rica.

Key words: *Hargicola oligoplites*, *Mazocraes* sp., Monogenea, *Neohexostoma euthynni*

RESUMEN

Nuevos registros para tres especies de monogeneos (Platyhelminthes) de peces marinos en el Golfo de Nicoya, Costa Rica. En esta contribución se registran tres taxones de monogeneos (*Hargicola oligoplites*, *Mazocraes* sp., and *Neohexostoma euthynni*) de peces marinos del Golfo de Nicoya, Costa Rica; de estas, *Mazocraes* sp. y *N. euthynni* representan nuevos registros para la fauna de Costa Rica.

Palabras clave: *Hargicola oligoplites*, *Mazocraes* sp., Monogenea, *Neohexostoma euthynni*

Costa Rica possesses a large tradition in the study of parasites of domestic and wildlife vertebrates (Solano-Trejos, 2010). However, the study of monogeneans has been relatively neglected; to date, only 23 species have been recorded parasitizing vertebrates in this country (Rodríguez-Ortiz *et al.*, 2004). Type and voucher specimens of these records have been deposited in foreign collections, mainly at the Colección Nacional de Helmintos (CNHE), Mexico City, Mexico (Rodríguez-Ortiz *et al.*, 2004). In this note, we examined some unidentified voucher specimens of monogeneans collected in Costa Rica, but deposited at CNHE, in order to establish the taxonomic identity of these worms, and to add new

data about the diversity of this group of helminths in marine fishes from Costa Rica.

Monogeneans examined were found in 1982 from the fish species *Oligoplites* sp. (sierrita, leatherjacket), *Anchovia macrolepidota* (Kner, 1863) (sardinita, bigscale anchovy), and *Euthynnus lineatus* Kishinouye, 1920 (atún, black skipjack), collected from the Gulf of Nicoya, Costa Rica (Fig. 1). Site of collection was not geo-referred. Worms were stained and mounted in Canada balsam, then were deposited at CNHE remaining unidentified until now. We perform the taxonomic work for that material; once identified, each specimen was re-deposited at the CNHE.

The monogenean associated to *Oligoplites* sp. was identified as *Hargicola oligoplites* (Hargis, 1957) (Allodiscocotylidae, CNHE 9983, Figs. 2a and 2b). The specimen presents an elongated, asymmetrical body (2.99 mm long), width at level of vitellaria 0.23 mm, mouth subterminal, pharynx ovoid (0.04 long by 0.03 wide), a pair of hemispherical buccal suckers in lateral funnel walls, 0.03 long by 0.02 wide; haptor no clearly separated from rest of body, with 3 clamps on the anterior edge (0.044-0.046 long by 0.052-0.055 wide), and 4 clamps on the posterior (0.066-0.073 long by 0.068-0.073 wide). End of the body armed with a pair of anchors (0.03 long). Vitellaria follicular, extending from level of seminal receptacles to anterior clamps. Egg 0.14 long by 0.06 wide, with filaments at both ends.

The identification of *H. oligoplites* was mainly based in the morphological features presented by Hargis (1957) in the original description of the species (as *Vallisia oligoplites* Hargis, 1957), but also in Bravo-Hollis (1989) and Takemoto *et al.* (1996). This monogenean species has been mainly recorded for carangid fishes of the genus *Oligoplites* from Mexico, Brazil and Costa Rica (Bravo-Hollis, 1989; Takemoto *et al.*, 1996; Rodríguez-Ortiz *et al.*, 2004; Cohen *et al.*, 2013), and seems to be specific to this fish genus, even if has also been recorded for the serranid fish *Epinephelus marginatus* (Lowe, 1834) (Kohn *et al.*, 1996).

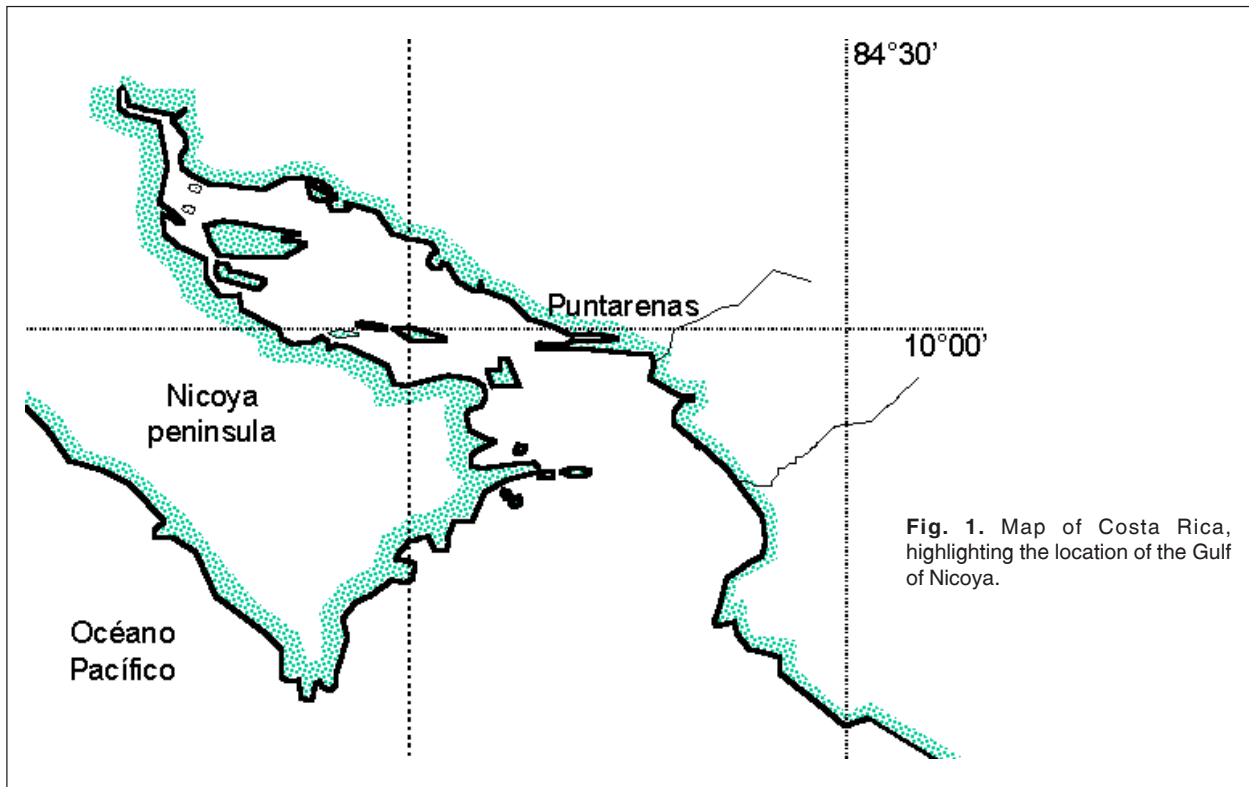


Fig. 1. Map of Costa Rica, highlighting the location of the Gulf of Nicoya.

The specimen collected from *A. macrolepidota* is an unidentified species of the genus *Mazocraes* (Mazocraeidae, CNHE 9984, Fig. 2c and 2d). This specimen has an elongate body (0.77 long), tapering at anterior end (0.07 wide); haptor rounded (0.16 by 0.24), with four pairs of clamps, two anterior pairs 0.059-0.065 long by 0.067-0.07 wide, two posterior pairs 0.045 by 0.062. Buccal organs septate, 0.034-0.035 long by 0.025-0.028 wide, open laterally to a subterminal buccal cavity. Pharynx almost oval (0.035 long by 0.029 wide).

Following to Timi *et al.* (1999), the morphologic traits of the studied specimen correspond to the genus *Mazocraes*. This genus is composed by seven species, which are parasites of clupeid or cyprinid fishes around the world (Bychowsky, 1961; Yamaguti, 1963; Reed *et al.*, 2012; Chaudhary *et al.*, 2013). The present record of *Mazocraes* sp. is the first for the engraulid fish *Anchovia macrolepidota*, and is also the first mention of this monogenean genus for Costa Rica. A previous record for *Mazocraes* in Engraulidae (as *M. australis*) was provided by Timi *et al.* (1999); however, some important morphological characteristics that would allow identifying the specimen studied at specific level are not evident in the material here studied.

The specimen from *E. lineatus* was identified as *Neohexostoma euthynni* (Meserve, 1938) (Hexostomatidae, CNHE 9985, Fig. 2e, 2f and 2g). This parasite has an elongated body (6.37 long by 0.55 at level of the haptor). Oral suckers 0.19 and 0.21 long by

0.20 wide, pharynx 0.4 long by 0.23 wide. Haptor with four pairs of suckers arranged in two longitudinal rows, three anteriormost pairs co-equal (0.134-0.137 long by 0.189-0.207 wide), posterior most pair smaller (0.105 and 0.115 long by 0.164 and 0.167 wide). End of haptor armed with two pairs of hooks, large pair 0.108 long, and small pair situated between larger pair 0.016 long.

The specimen of *N. euthynni* described here is slightly smaller than other morphological characterizations made for this species (Millemann, 1956; Castillo-Sánchez, 1994; Justo & Kohn, 2015), however, arrangement and proportions of suckers of opisthaptor, along with shape of sclerites of haptoral suckers allow us to confirm its specific identity. This monogenean species is commonly found parasitizing little tunas (Scombridae) around the world (Williams & Bunkley-Williams, 1996). In the Americas, this worm species has previously been recorded from *Euthynnus* spp. and other scombrid fishes from the United States and Puerto Rico (Hendrix, 1994; Williams & Bunkley-Williams, 1996), Mexico (Castillo-Sánchez *et al.*, 1997), Galapagos (Cohen *et al.*, 2013), and Brazil (Cohen *et al.*, 2013; Justo & Kohn, 2015). Present record represents the first for Costa Rica.

Since the high number of monogenean species from other Neotropical places such as Mexico or South America (Luque *et al.*, 2017; Mendoza-Garfias *et al.*, 2017;), a significant increase in the Costa Rican monogenean diversity is expected. There are still a relatively low number of studies about these worms, derived from a very low

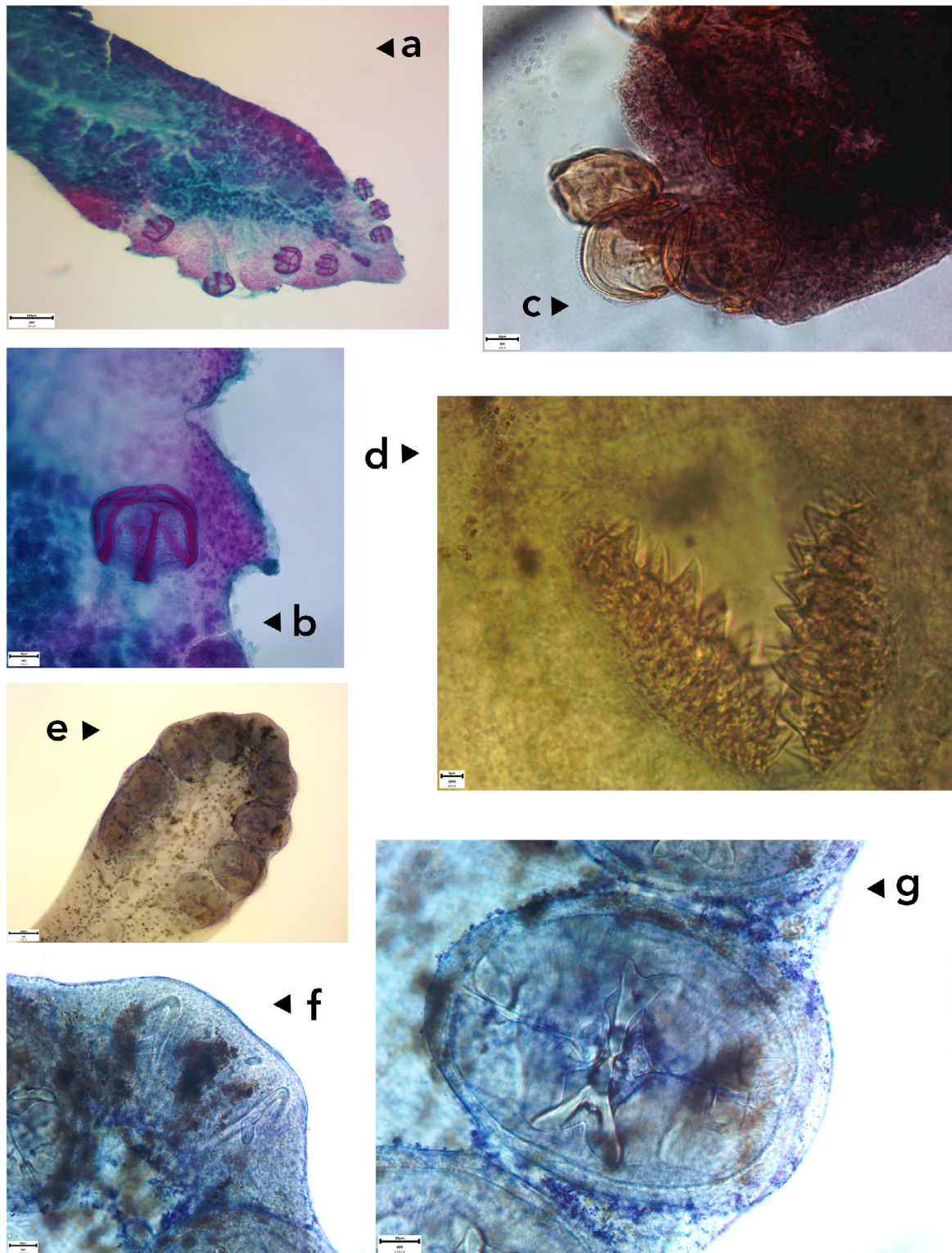


Fig. 2. *Hargicola oligoplites*: Haptor; scale bar: 100 μ (a). Detail of a clamp; scale bar: 20 μ . (b) (Photos by P. Marcotegui). *Mazocraes* sp.: Detail of a clamp; scale bar: 20 μ (c). Copulatory organ; scale bar: 5 μ . (d) (Photos by P. Marcotegui and R. Aguilar-Aguilar). *Neohexostoma euthynni*: Haptor; scale bar: 100 μ . (e). Detail of hooks; scale bar: 20 μ . (f). Detail of a clamp; scale bar: 20 μ . (g) (Photos by S. Martorelli, R. Aguilar-Aguilar and P. Marcotegui).

number of studied fish host species. For this reason, the strengthening of the taxonomic work about helminth species parasitizing fish hosts in the country is widely recommended. In this sense, this study represents an additional piece of information contributing to the inventory of parasite fauna in the region.

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