

TWO NEW SPECIES OF *CHORICOTYLE* VAN BENEDEN & HESSE (MONOGENEA: DICLIDOPHORIDAE), PARASITES FROM *ANISOTREMUS SCAPULARIS* AND *ISACIA CONCEPTIONIS* (HAEMULIDAE) FROM NORTHERN CHILEAN COAST

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ABSTRACT: Two new species, *Choricotyle scapularis* and *Choricotyle isaciensis* (Monogenea: Dicliphoridae), are described from the gills of haemulid fishes, *Anisotremus scapularis* and *Isacia conceptionis*, respectively, in San Jorge Bay, northern Chile (23°42'S, 70°24'W); they are compared with the known species in the genus. Diagnostic characters for *C. scapularis* includes the number of hooks in the male copulatory organ, a developed isthmus, the shape of the haptor, and the number of testes. The diagnostic characters for *C. isaciensis* include the presence of an oval accessory sclerite in the clamps, the number of testes, the number of hooks in the male copulatory organ, and the relative clamp peduncle size.

Knowledge regarding monogenean parasites on marine fishes along the Chilean coast is still scarce. Only 35 species are known (Muñoz and Olmos, 2007); 6 of them belong to Dicliphoridae (González et al., 2002), with *Choricotyle anisotremi* the only representative of the genus known in Chilean marine fishes (Oliva, 1987).

Currently, 15 species are considered as valid in *Choricotyle*, and several of these species are parasites on Haemulidae (Sproston, 1946; Hargis, 1955; Oliva, 1987; Luque et al., 1993; Lamothe-Argumedo et al., 1998). However, the status of 3 of those species has been questioned. Thus, *Choricotyle exilis* Crane, 1972, was transferred to *Orbocotyle* by Mamaev and Aleshkina (1984); Payne (1987) subsequently transferred it back to *Choricotyle*. *Choricotyle cynoscioni* was transferred to *Neoheterobothrium* by Price (1943), but Mamaev (1987) did not recognize this decision and retained it in *Choricotyle*. Finally, *Choricotyle sonorensis* Caballero & Bravo, 1962, was considered as species *inquirenda* by Mamaev (1976) and Oliva (1987). However, Tantalean et al. (1988) reported that this species is a common parasite in the haemulid *Isacia conceptionis* from the central Peruvian coast.

During a routine survey of parasites from marine fishes along the northern Chilean coast, specimens of 2 different dicliphorid monogeneans were found on the gills of the haemulids *Anisotremus scapularis* and *Isacia conceptionis* caught in San Jorge Bay. The characteristics of the specimens obtained from both fish hosts do not agree with those of any known species in the genus and are, therefore, described herein as new species.

MATERIALS AND METHODS

The parasites studied were collected from 33 specimens of *Isacia conceptionis* and 59 from *Anisotremus scapularis* captured in San Jorge Bay (23°42'S; 70°24'W), Chile, during November 2006 and July 2007. Monogeneans were removed from the gills, processed according to traditional techniques (Pritchard and Kruse, 1982), and stained with Gomori's trichrome. Measurements given are in millimeters (mean plus range in parentheses), unless otherwise indicated. Terminology of clamp sclerites follows Euzet and Suriano (1975). The components are abbreviated as follows: Al = lateral sclerite of the anterior jaw, As = axial sclerite of the anterior jaw, Ma = anterior portion of the anterior jaw medial sclerite, Mp = posterior portion of the medial sclerite, Pl = sclerite bordering the lateral portion of the posterior jaw, O = median sclerite of the posterior jaw, and Ps = sclerite bordering the axial portion of the

posterior jaw. Prevalence and intensity of infection were used according to Bush et al. (1997).

DESCRIPTION

Choricotyle scapularis n. sp. (Figs. 1–5)

Diagnosis (based in 18 stained and mounted specimens): Body elongated (Fig. 1), divided, with an isthmus devoid of vitellaria (varying in length with degree of contraction of worms, but always easy to differentiate). Total length 5.78 (3.59–8.50). Maximum width 0.91 (0.37–1.17) at ovarian level. Isthmus devoid of testes. Two well-developed oral suckers 0.18 long by 0.15 width (0.12–0.22 × 0.12–0.19). Subterminal mouth, ovoid pharynx, 0.19 long by 0.13 wide (0.15–0.22 × 0.11–0.15). Intestinal caeca with lateral branches in body proper, extending and anastomosing into opisthaptor, penetrating opisthaptoral peduncles.

Opisthaptor with 8 long and narrow peduncles. Clamps wider than peduncles. Framework of all 4 pairs of haptoral sucker occupying same relative orientation. Terminal lappet not observed. Clamps 0.41 (0.28–0.54) in diameter (Fig. 2), with 2 suckers of dissimilar size in each clamp; large sucker in axial-basal quadrant of clamp. Anterior portion of M sclerite (=Ma) with a projection that reaches midlevel of sclerite As. Sclerite Al with slightly sclerotized portion near to Ma. Ps1 and Pl1 sclerites with elongate process articulated with As and Al sclerites, respectively; do not reach ventrally sclerite Ps2 and Pl2. O sclerite reaches curved projection of Ps2 and Pl2. Clamps with 8–10 concentric arcs of small skeletal rods in dorsal fields of clamp. Medial genital pore. Muscular genital atrium, 0.10 (0.08–0.12) in diameter (Fig. 3), armed with 11–12 curved hooks with bifid base. Testes ovoid 0.10 × 0.09 (0.05–0.14 × 0.05–0.13), intercecal, para and postovarian, 81–166 in number. Vas deferens extending anteriorly and to right of ovary. "U"-shaped ovary (Fig. 4), folded near middle of body. Ootype and Mehli's gland located in posterior space to ovarian branch. Seminal receptacle ovate, paraovarian. Genito-intestinal canal not observed; oviduct curved, running posteriorly. Oviduct joins common vitelline duct near curve. Transverse vitelline ducts join anterior to ovary. Vitellaria not extending into opisthaptor, coextensive with caecal branches. Yellow eggs, with 2 polar filaments, 0.19 long by 0.08 wide (0.16–0.22 × 0.05–0.11) excluding filaments (Fig. 5). A knob at end of both filaments.

Taxonomic summary

Type host: *Anisotremus scapularis* (Tschudi, 1846)

Site: Gill filaments.

Locality: San Jorge Bay, northern Chile (23°42'S, 70°24'W).

Holotype: USNPC 82029 (1 stained and mounted specimen).

Paratype: USNPC 82039 (1 stained and mounted specimen). MZUC/ UCCC 33204–33206 (3 stained and mounted specimens).

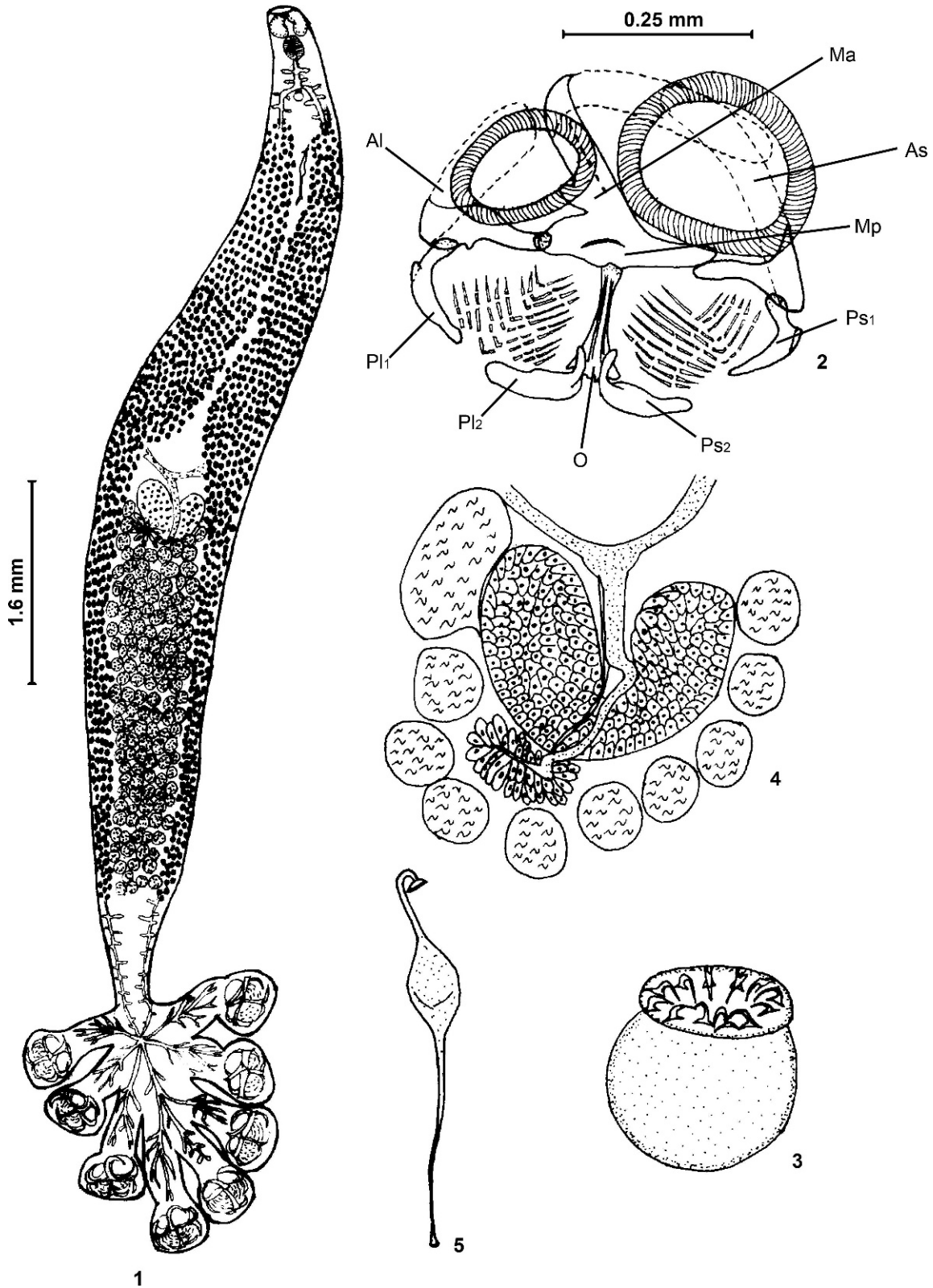
Prevalence: 23.3% (14 infected fishes of 60).

Intensity: 3.0 (1–6) worms per infected fish.

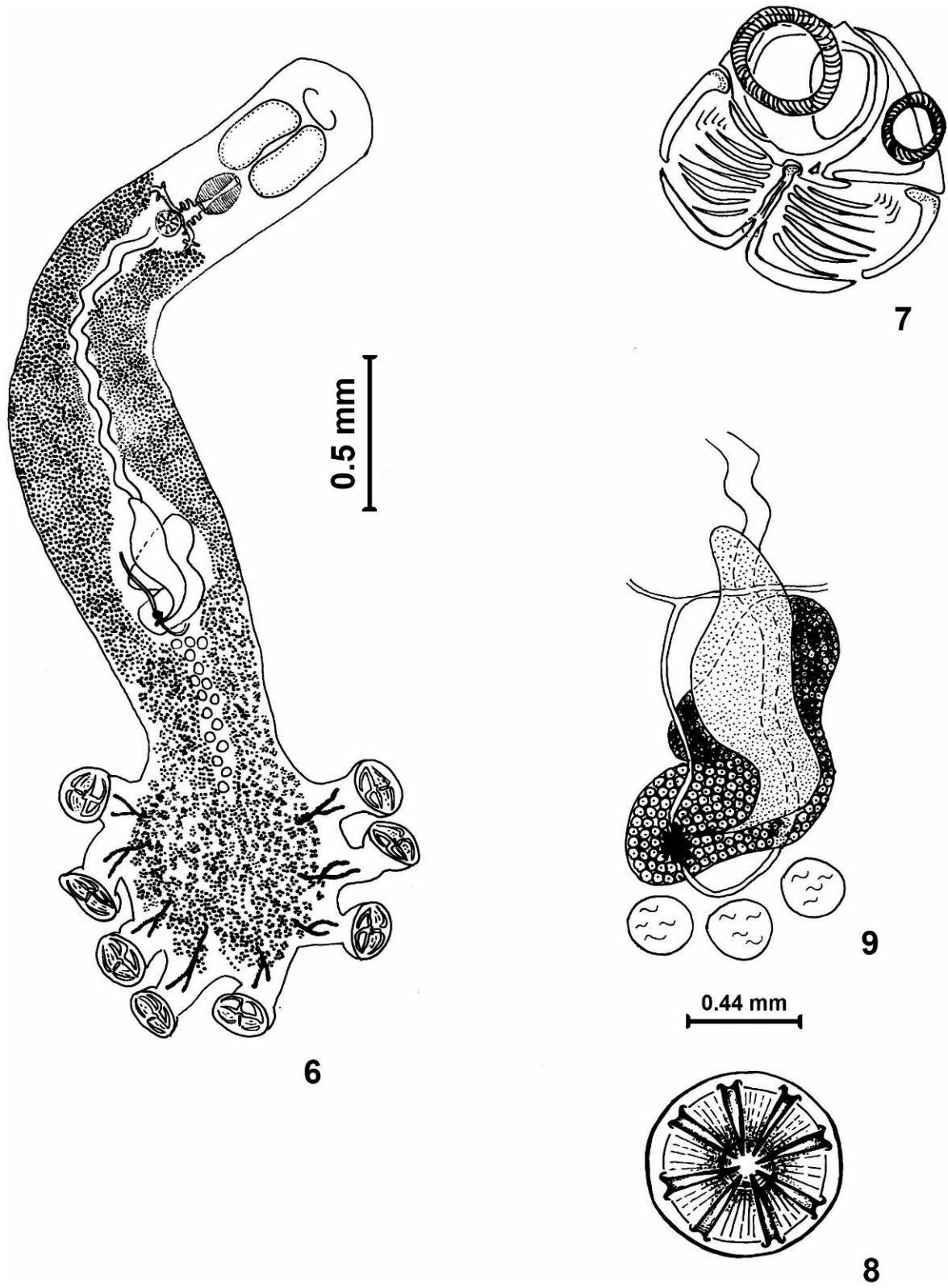
Specimens deposited: Holotypes and paratypes were deposited in the United States National Parasite Collection (USNPC) and Museo Zoología Universidad de Concepción–Chile (MZUC/UCCC).

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DOI: 10.1645/GE-2038.1



FIGURES 1–5. *Choricotyle scapularis* n. sp. (1) Holotype, ventral view. (2) Clamps. (3) Genital atrium. (4) Genitalia. (5) Egg. Clamp components are abbreviated as follows: Al = lateral sclerite of the anterior jaw, As = axial sclerite of the anterior jaw, Ma = anterior portion of the anterior jaw medial sclerite, Mp = posterior portion of the medial sclerite, O = median sclerite of the posterior jaw, Pl = sclerite bordering the lateral portion of the posterior jaw, Ps = sclerite bordering the axial portion of the posterior jaw.



FIGURES 6-9. *Choricotyle isaciensis* n. sp. (6) Holotype, ventral view. (7) Clamps. (8) Genital atrium. (9) Genitalia.

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

Remarks

The new species, *C. scapularis*, can be differentiated among congeners by the number of genital hooks, that is, 8, in several species of the genus (*C. chrysophryi*, *C. elongata*, *C. labracis*, *C. hysteroncha*, *C. australensis*, *C. leonilavasquezae*, *C. pseudosciaena*) and in *C. isaciensis*, while the genital atrium is armed with 12 hooks in *C. anisotremi* and *C. scapularis*. These last 2 species can be easily differentiated by (1) the absence of an oval accessory sclerite in the inner quadrant adjacent to the sucker in *C. scapularis*; (2) vitellaria that extend into the opisthaptor of *C. anisotremi*, but not in the new species; (3) the presence of a isthmus between body proper and opisthaptor in *C. scapularis*, but absent in *C. anisotremi*; (4) the shape (fan-like in *C. anisotremi*) of the opisthaptor; and (5) the number of testes, near 90 in *C. anisotremi* and 81–166 in the new species.

***Choricotyle isaciensis* n. sp.**
(Figs. 6–9)

Diagnosis (based on 22 stained and mounted specimens): Body elongated (Fig. 6), divided into body proper and opisthaptor. Total length, including opisthaptor 2.19 (1.50–3.57). Maximum width 0.41 (0.26–0.67) at ovarian level. Two elongate and well-developed oral suckers, 0.20 long by 0.11 wide (0.13–0.28 × 0.07–0.18). Mouth subterminal, pharynx ovoid, 0.11 long by 0.09 wide (0.09–0.14 × 0.07–0.12). Intestinal caeca with lateral branches in body proper, extending and anastomosing into opisthaptor and opisthaptoral peduncles. Opisthaptor with 4 pairs of short, narrow, and cylindrical peduncles. First pair of peduncles smaller than others. Clamps wider than peduncles. Terminal lappet not observed. Clamps 0.12 (0.09–0.16) in diameter. Clamp similar to the new species described above. Differences of sclerite sizes and presence of an oval accessory sclerite observed adjacent to large sucker (Fig. 7). Medial genital pore. Muscular genital atrium, 0.06 (0.04–0.08) in diameter (Fig. 8), armed with 8–9 curved hooks with a bifid base. Testes ovoid 0.08 × 0.07 (0.04–0.14 × 0.04–0.13), intercecal and postovarian, 13–19 in number. Vas deferens extending ventrally and to left of the ovary. Ovary bilobed, both lobes dissimilar in size (Fig. 9), folded near to the middle of body. Ootype and Mehlis' gland located in space posterior to ovarian branch. Large seminal receptacle, ovate and para-ovarian. Genito-intestinal canal not observed, curved oviduct runs posteriorly, oviduct joins common vitelline duct near curve. Transverse vitelline ducts joined anteriorly to ovary. Vitellaria extending into opisthaptor, coextensive with caecal branches. Eggs not observed.

Taxonomic summary

Type host: *Isacia conceptionis*.

Site: Gill filaments.

Locality: San Jorge Bay, northern Chile (23°42'S; 70°24'W).

Holotype: USNPC 101154.00 (1 stained and mounted specimen).

Paratype: USNPC 101155.00 (2 stained and mounted specimens). MZUC/UCCC 33201–33203 (3 stained and mounted specimens).

Prevalence: 54% (27 infected fishes of 50).

Intensity: 2.0 (1–7) worms per infected fish.

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

Remarks

The new species, *C. isaciensis*, can be easily differentiated among its congeners by the presence of an oval accessory sclerite in the inner quadrant adjacent to the sucker, which has been observed only in 2 other species, that is, *Choricotyle anisotremi* Oliva, 1987, and *Choricotyle aspinochorda* Hargis, 1955. The new species differs from the latter one in several characteristics: (1) the presence of the terminal lappet with larval hooks in *C. aspinochorda*; (2) the vitellaria do not penetrate the opisthaptor in *C. aspinochorda*; (3) the number of testes (42–48) in *C. aspinochorda* is much greater than in *C. isaciensis* (12–19); and (4) the number of genital hooks is 9–10 in *C. aspinochorda*, and 8 in the new species. The distinctive character differences between *C. anisotremi* and *C.*

isaciensis includes (1) the number of genital hooks (12 in *C. anisotremi* and 8 in the new species); (2) the number of testes is approximately 90 in *C. anisotremi* and 12–19 in *C. isaciensis*; and (3) the anterior 3 pairs of opisthaptor peduncles are similar in size and the 4th are smallest in *C. anisotremi*, while the first pair of peduncles are longer than the resting peduncles in *C. isaciensis*.

ACKNOWLEDGMENT

This study was supported by FONDECYT Postdoctoral Grant 3060054 to M.T.G.

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