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A NEW SPECIES OF *HETEROSENTIS* VAN CLEAVE, 1931 (ACANTHOCEPHALA, ARHYTHMACANTHIDAE), A PARASITE OF PINGUIPEDID FISHES IN THE SOUTHWEST ATLANTIC

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ABSTRACT: A new species of arhythmacanthid acanthocephalan, *Heterosentis martini* n. sp., parasitic in the Argentinean sandperch *Pseudopercis semifasciata* (Cuvier) (Perciformes, Pinguipedidae) from the coasts of Argentina is described. *Heterosentis martini* n. sp. differs from all congeneric species by having 10 longitudinal rows of hooks in the proboscis, each with 7–8 hooks, consisting of 1 medium apical and 3 larger sub-apical hooks with root, and 3–4 smaller, basal, curved hooks with rudimentary roots and spines in both ventral and dorsal regions of the body. The most similar species, *Heterosentis heteracanthus* (Linstow, 1896) Van Cleave, 1931, and *Heterosentis brasiliensis* Vieira, Felizardo and Luque, 2009, also have 10 longitudinal rows of hooks, but *H. heteracanthus* differs from the new species by having only 3–5 (more frequently 4) hooks in each row, with only the anterior hook large and bearing a developed root. *Heterosentis brasiliensis* differs from the new species by possessing 2 sub-apical hooks in each row (instead of 3), similar body length but shorter proboscis, and trunk spines restricted to the ventral surface of body.

During parasitological surveys carried out on 2 species of sandperches, *Pseudopercis semifasciata* (Cuvier, 1829) (Argentinean sandperch) and *Pinguipes brasilianus* Cuvier, 1829 (Brazilian sandperch) (Perciformes, Pinguipedidae), adult acanthocephalans referable to the arhythmacanthid *Heterosentis* Van Cleave, 1931, were found in Argentinean waters (Timi and Lanfranchi, 2009; Timi et al., 2009, 2010). Members of Arhythmacanthidae Van Cleave, 1931, are characterized by possessing 6 cement glands and an abrupt transition on the proboscis from the small basal rootless hooks (= spines) to larger sub-apical or apical hooks with roots (Pichelin and Cribb, 1999).

The latter authors recognize 6 genera in their review of the family; a seventh genus, *Spiracanthus* Muñoz and George-Nascimento, 2002, was later added to this family (Muñoz and George-Nascimento, 2002). Two genera, *Heterosentis* and *Hypoechinorhynchus* Yamaguti, 1939, are members of the Arhythmacanthinae Yamaguti, 1939, characterized by possessing trunk spines and a globular or claviform proboscis, with a tendency to have either about the same number of large apical hooks as small basal hooks or fewer large hooks than small hooks (Pichelin and Cribb, 1999); however, the validity of subfamilies within Arhytmacanthidae is questioned by the authors.

At present, 13 species make up *Heterosentis;* 12 of which (*Heterosentis heteracanthus* [Linstow, 1896] Van Cleave, 1931, *Heterosentis hirsutus* Pichelin and Cribb, 1999, *Heterosentis paraplagusiarum* [Nickol, 1972] Amin, 1985, *Heterosentis fusiformis* [Yamaguti, 1935] Tripathi, 1959, *Heterosentis plotosi* Yamaguti, 1935, *Heterosentis overstreeti* [Schmidt and Paperna, 1978] Amin, 1985, *Heterosentis parasiluri* Yin and Wu, 1984, *Heterosentis pseudobagri* [Wang and Zhang, 1987] Pichelin and Cribb, 1999, *Heterosentis septacantus* [Sita in Golvan, 1969] Amin, 1985, *Heterosentis thapari* [Gupta and Fatma, 1979] Amin, 1985, *Heterosentis zdzitowieckii* [Kumar, 1992] Pichelin and Cribb, 1999, and *Heterosentis caballeroi* Gupta and Fatma, 1985), are included in a key to species provided by Pichelin and Cribb (1999). The 13th, *Heterosentis brasiliensis* Vieira, Felizardo and Luque, 2009, has recently been described from the pinguipedid *Pseudopercis numida* Miranda Ribeiro, 1903, in Brazilian waters (Vieira et al., 2009). A morphological and morphometric analysis of the present material and comparisons with these species showed that they belong to a new species, which is described herein.

MATERIALS AND METHODS

Acanthocephalans were collected during parasitological studies carried out on the pinguipedids *P. semifasciata* and *P. brasilianus* caught by commercial trawlers in Argentinean waters (Timi and Lanfranchi, 2009; Timi et al., 2009, 2010).

A total of 100 specimens of *P. semifasciata* were examined. Fish were caught in 3 zones along the coast of the Argentine Sea: (1) off the coast of Buenos Aires Province by the commercial fleet operating out of Mar del Plata: Villa Gesell (37°15′S, 57°23′W; n = 20; October–November 2007), (2) the zone between Miramar and Necochea (38°03′S, 57°30′W–38°44′S, 58°44′W; n = 30; November, 2007), and (3) in Patagonian waters, offshore from Península Valdes (42°00′–42°45′S; n = 50; November 2007). Acanthocephalans identified as *Heterosentis* spp. were found in the last 2 samples (Timi and Lanfranchi, 2009).

The entire sample of *P. brasilianus* comprised 310 specimens caught in 4 zones: Villa Gesell (n = 80, October 2006–February 2007), Miramar (n = 130, May–October 2006), San Matías Gulf (42°S, 65°10′W, n = 50, December 2006), and Nuevo Gulf (42°09′S, 64°05′W, n = 50, December 2006). Acanthocephalans identified as *Heterosentis* spp. were found only in the sample from Villa Gesell (Timi et al., 2009).

Fish were either kept fresh or deep frozen in plastic bags at −18 C until examination. After thawing each sandperch was necropsied. Acanthocephalans were recovered from the intestines using a stereoscopic microscope, washed in 0.85% saline, fixed in formaldehyde solution (4%), and preserved in 70% ethanol. For light microscopy, parasites were cleared with lactic acid, and some specimens were stained with Mayer's hematoxylin using standard procedures, cleared in methyl salycilate, and mounted in Canada balsam for examination and measurement. Illustrations were made with the aid of a drawing tube. Measurements are given in micrometers as the mean ± standard deviation, followed in parentheses by the range and the number of specimens measured. Selected specimens were processed for scanning electron microscopy (SEM). Specimens were dehydrated using a series of ethanol washes, dried by evaporation with hexamethyldisilazane, coated with gold palladium (thickness of the coating = 100 Å), and scanned using a JEOL JSM 6460-LV SEM (JEOL, Tokyo, Japan). The studied material was deposited in the Helminthological Collection of the Museo de La Plata (HCMLP), La Plata, Argentina, and in the U.S. National Parasite Collection (USNPC), Beltsville, Maryland.

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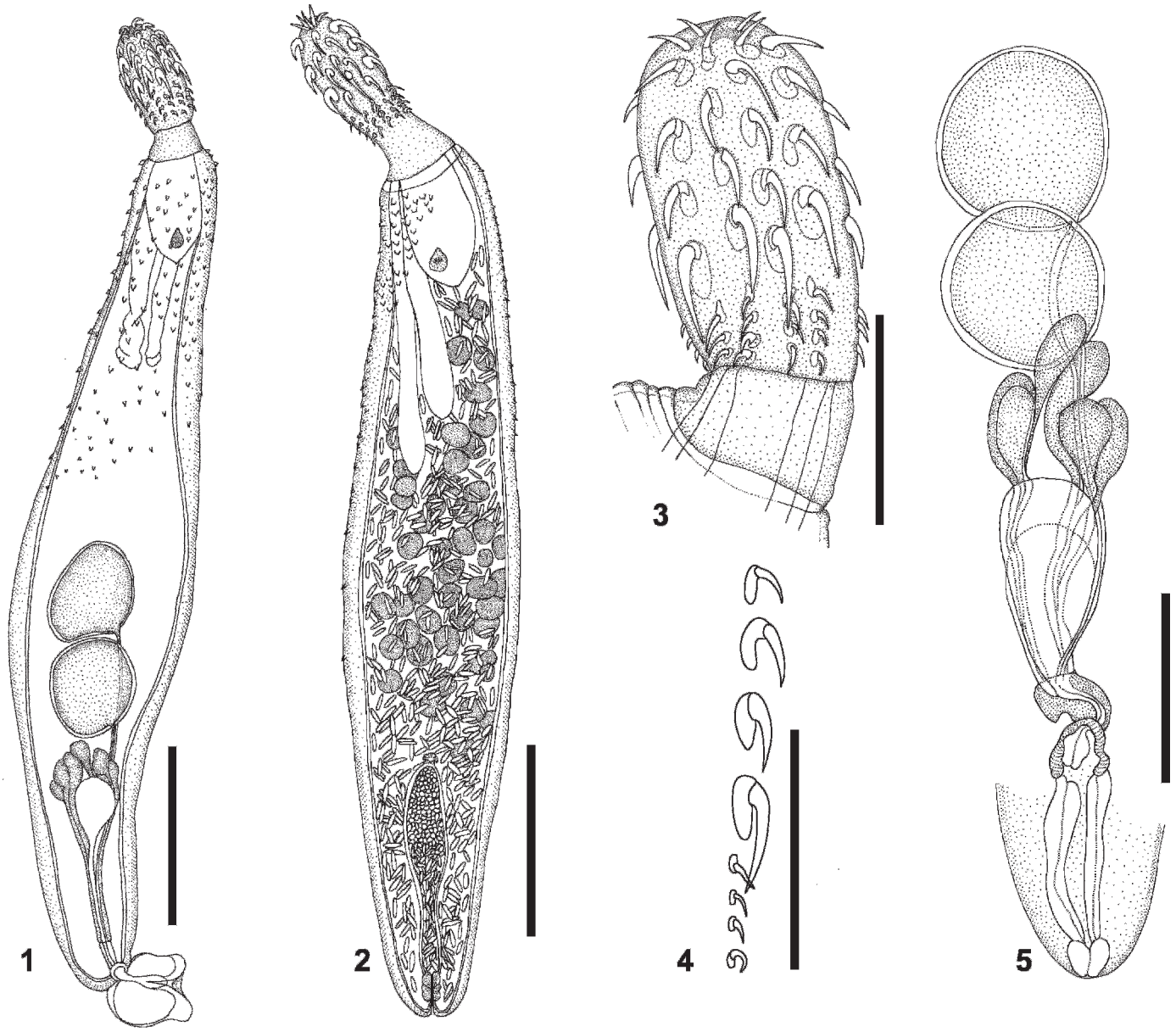


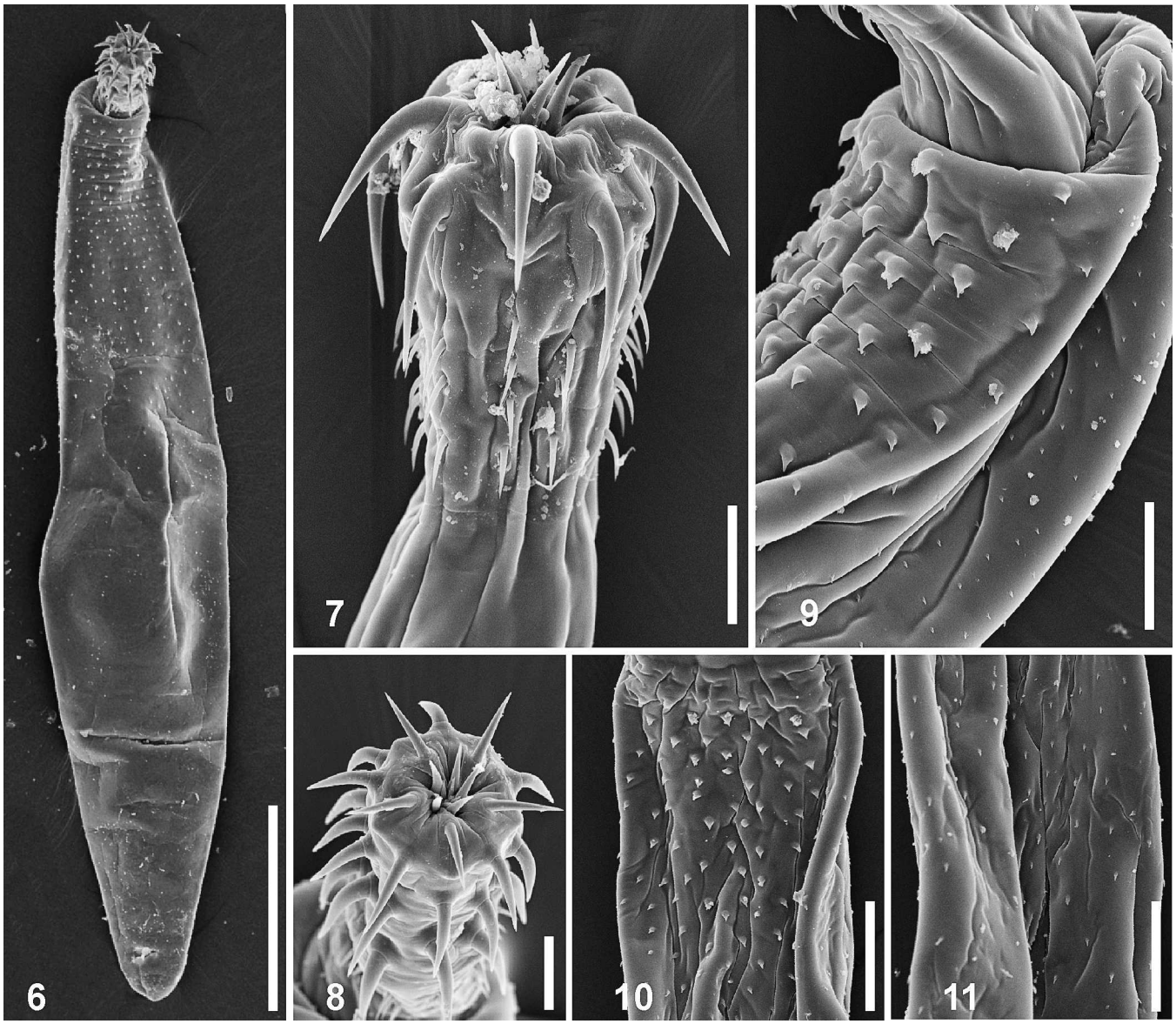
FIGURES 1–5. Line drawings of *Heterosentis martini* n. sp. (**1**) Male, whole mount, lateral view; (**2**) female, whole mount, lateral view; (**3**) proboscis armature, lateral view; (**4**) row of hooks; (**5**) detail of male genitalia. Scale bars: 1, 2: 200 μm; 3, 4: 50 μm; 5: 100 μm.

DESCRIPTION

Heterosentis martini n. sp.
(Figs. 1–11)

General (based on 10 males and 10 females): sexual dimorphism slight, females only slightly larger than males (Figs. 1, 2, 6). Proboscis claviform (Figs. 3, 7, 8), armed with 10 longitudinal rows, each with 7–8 hooks consisting of 1 apical hook with root, 3 larger sub-apical hooks with root (third hook largest), and 3–4 smaller, basal, curved hooks with rudimentary roots. Rudimentary root of anterior basal hook directed anteriorly, roots directed posteriorly in the rest (Fig. 4). Neck unarmed, slightly curved toward ventral side. Trunk fusiform; anterior region covered both ventrally and dorsally by spines of different size, all pointing posteriorly; triangular patch of larger spines ventrally, extending from anterior end of trunk to beyond posterior margin of proboscis receptacle (Figs. 1, 2); spines decrease in size both posteriorly and dorsally (Figs. 9–11). Proboscis receptacle double-walled, with cephalic ganglion at base. Lemnisci elongated, roughly equal in length (Figs. 1, 2), extend beyond posterior margin of proboscis receptacle. Genital spines absent.

Male (based on 10 mature adults): Trunk 2,286 ± 138 (2,080–2,512; n = 10) long, 469 ± 47 (400–536; n = 10) wide. Proboscis 358 ± 48 (304–448; n = 10) long (representing 15.7 ± 2.3% of trunk length), 130 ± 6 (120–136; n = 10) wide (measurements of hooks given in Table I). Proboscis receptacle 374 ± 74 (240–480, n = 10) long, 127 ± 18 (104–160, n = 10) wide. Lemnisci 779 ± 98 (604–868, n = 20) long, 64 ± 8 (52–80, n = 20) wide. Posterior-most ventral trunk spines 851 ± 108 (664–1,000, n = 10) from anterior end of trunk, representing 37.1 ± 3.1% of trunk length. Reproductive system post-equatorial (Fig. 5). Testes roughly oval, in tandem. Anterior testis 266 ± 60 (176–352, n = 10) long, 208 ± 30 (152–248, n = 10) wide. Posterior testis 261 ± 44 (200–336, n = 10) long, 211 ± 32 (160–264, n = 10) wide. Cement glands 6 in number, pyriform, with long ducts, 105.8 ± 145 (88–128, n = 7) long, 60.4 ± 9 (48–72, n = 7) wide. Säefftigen's pouch and seminal vesicle partially obscured by cement glands and their ducts. Copulatory bursa 166 ± 26 long, 213 ± 4 (n = 2) wide when everted.



FIGURES 6–11. Scanning electron micrographs of *Heterosentis martini* n. sp. (**6**) Female, ventral view. (**7**) Proboscis, ventral view showing alternate rows of 3 and 4 basal hooks. (**8**) Proboscis, sub-apical view showing partially extruded apical hooks. (**9**) Anterior region of trunk, lateral view showing patch of large ventral spines (left) and small dorsal spines (right). (**10**) Anterior region of trunk, ventral view showing spines decreasing in size both laterally and posteriorly. (**11**) Medial region of trunk, ventral view showing sparse small spines Scale bars: 6: 500 μm; 7, 8, 9: 50 μm; 10, 11: 100 μm.

TABLE I. Measurements of the proboscis hooks of *Heterosentis martini* sp. n. from *Pseudopercis semifasciata,* mean in μm ± standard deviation (range).

	Male			Female		
Hook	n	Blade	Root	n	Blade	Root
Apical	2	37 ± 2 (36–38)	21 ± 0 (21–21)	2	35 ± 10 (27–42)	21 ± 0 (21–21)
Subapical I	3	46 ± 6 (40–52)	38 ± 0 (38–38)	10	59 ± 9 (46–76)	38 ± 6 (29–48)
Subapical II	4	57 ± 10 (46–69)	37 ± 3 (34–40)	11	69 ± 9 (53–82)	39 ± 4 (34–46)
Subapical III	7	88 ± 5 (84–97)	47 ± 6 (42–59)	15	104 ± 9 (86–124)	52 ± 13 (32–84)
Basal I	7	33 ± 7 (25–44)	18 ± 4 (11–21)	15	35 ± 7 (23–46)	16 ± 5 (8–25)
Basal II	7	28 ± 3 (23–32)	16 ± 5 (8–23)	15	29 ± 6 (19–40)	14 ± 5 (8–22)
Basal III	7	30 ± 3 (27–36)	16 ± 5 (8–23)	15	29 ± 5 (21–40)	14 ± 5 (8–25)
Basal IV	2	26 ± 1 (25–27)	13 ± 3 (10–15)	10	29 ± 5 (21–38)	13 ± 4 (8–21)

Female (based on 10 mature adults): Trunk 2,600 ± 470 (1,810–3,400; n = 10) long, 580 ± 80 (432–720; n = 10) wide. Proboscis 401 ± 39 (336–472; n = 10) long (representing 15.9 ± 3.1% of trunk length), 158 ± 15 (128–184; n = 10) wide (measurements of hooks provided in Table I). Proboscis receptacle 372 ± 87 (280–504, n = 10) long, 162 ± 22 (168–200, n = 10) wide. Lemnisci 893 ± 159 (592–1,172, n = 20) long, 66 ± 12 (44–84, n = 20) wide. Posterior-most ventral trunk spines 1,088 ± 149 (864–1,400, n = 10) from anterior end of trunk, representing 42.7 ± 7.4% of body length. Reproductive system post-equatorial. Genital complex (from anterior border of uterine bell up to genital opening) 760 ± 181 (560–1,080, n = 7) long, representing 29.8 ± 7.3% of body length. Anterior vaginal sphincter 37 ± 9 (29.4–40, n = 8) long, 49 ± 5 (42–56.7, n = 8) wide. Posterior vaginal sphincter 33 ± 4 (29–40, n = 4) long, 31 ± 5 (25.2–37.8, n = 4) wide. Mature eggs fusiform, 82 ± 3 (78–86, n = 20) long, 17 ± 1 (15–19, n = 20) wide.

Taxonomic summary

Type host: Pseudopercis semifasciata (Cuvier, 1829) (Perciformes, Pinguipedidae) (Argentinean sandperch).

Type locality: Coast of Miramar and Necochea, Buenos Aires Province, Argentina (38°03′S, 57°30′W–38°44′S, 58°44′W).

Additional host: Pinguipes brasilianus Cuvier, 1829 (Perciformes, Pinguipedidae) (Brazilian sandperch).

Additional locality: Offshore from Península Valdes (42°00′–42°45′S); coast of Villa Gesell, Buenos Aires Province, Argentina (37°15′S, 57°23′W).

Site of infection: Rectum.

Prevalence: Eleven of 30 (36.7%) in *P. semifasciata* from Miramar and Necochea, 1 of 50 (2%) in *P. semifasciata* from Península Valdes, 2 of 80 (2.5%) in *P. brasiliensis* from Villa Gesell.

Mean intensity of infection (range): 12.5 ± 23.9 (1–83) in *P. semifasciata* from Miramar and Necochea, 2 ± 0 (2–2) in *P. semifasciata* from Península Valdes, and 1.5 ± 0.7 (1–2) in *P. brasiliensis* from Villa Gesell.

Type specimens: Holotype, male whole mount (HCMLP coll. no. 6255); allotype, female whole mount (HCMLP coll. no. 6256); paratypes, 4 males and 4 females, whole mounts (HCMLP coll. no. 6257), 2 males and 2 females (USNPC coll. no. 103473).

Etymology: The new species is named after our son Martín Timi.

Remarks

At present, *Heterosentis* includes 13 valid species (Pichelin and Cribb, 1999; Vieira et al., 2009). Specimens of *Heterosentis martini* n. sp. possess 10 longitudinal rows of hooks on the proboscis. According to the key for species of *Heterosentis* given by Pichelin and Cribb (1999), only 5 species have been described with less than 12 longitudinal rows of hooks, namely, *H. heteracanthus, H. overstreeti, H. thapari, H. caballeroi,* and *H. pseudobagri.* However, only in *H. heteracanthus* do the trunk spines extend well posterior to the proboscis receptacle, a pattern similar to that of the new species. *Heterosentis heteracanthus* was originally described from *Atherinichthys microlepidotus* (Jenyns) (= *Basilichthys microlepidotus*) from Tierra del Fuego, southern Argentina, redescribed from notothenioid Antarctic fishes by Zdzitowiecki (1984), and recently found in other notothenioid fish in the Beagle Channel (Laskowski and Zdzitowiecki, 2009). Both *H. heteracanthus* and the new species have longitudinal 10 rows of hooks on the proboscis, but *H. heteracanthus* is readily distinguished from the new species by having only 3–5 (more frequently 4) hooks each, with only the anterior hook large and bearing a developed root, rather than of rows with 7–8 hooks, consisting of 1 medium apical and 3 larger sub-apical hooks with root, and 3–4 smaller, basal, curved hooks with rudimentary roots. *Heterosentis martini* can be further distinguished from *H. heteracanthus* based on a shorter trunk (2,080–2,510 vs. 3,130–3,970 in males and 1,800–3,400 vs. 6,120 in females) and a longer proboscis (304–448 vs. 224–252 in males and 336–472 vs. 264 in females) (Zdzitowiecki, 1984).

A thirteenth species, *H. brasiliensis,* was recently described from *P. numida* from southeastern Brazilian coasts (Vieira et al., 2009) and reported from *P. brasilianus* (Timi et al., 2010) in the same region. The new species shares with *H. brasiliensis* the presence of 10 longitudinal rows of hooks in the proboscis. However the Brazilian species has 2 subapical hooks in each row (instead of 3), similar body length but shorter proboscis in females (280 vs. 336–472), trunk spines restricted to the ventral body surface, and shorter (54–59 vs. 78–86) and wider (19–22 vs. 15–19) eggs (Vieira et al., 2009).

DISCUSSION

The latest available revision of the Arhythmacanthidae (Yamaguti, 1935) was provided by Pichelin and Cribb (1999). The 2 most characteristic features of the family, as defined by these authors, are the abrupt transition from small basal hooks (spines) without roots to larger apical (or sub-apical if present) hooks with roots on the proboscis and the possession of 6 cement glands. This diagnosis was largely based on the amended diagnosis of the family by Golvan (1969), which was devoted mainly to reviewing the Arhythmacanthidae and assessing the validity of its subfamilies and genera.

Most of the family-level features are present in the specimens studied herein, with the exception that in *H. martini* the small basal hooks have rudimentary roots. This fact, however, does not preclude the inclusion of the newly described species in this family, since the presence of rudimentary roots in basal hooks was included in the emendation of the family by Golvan (1969) but omitted by Pichelin and Cribb (1999). In fact, roots of basal hooks are clearly depicted by Golvan (1969) for the neoacanthocephaloidine arhythmacanthids *Acanthocephaloides incrassatus* (Molin, 1858) and *Acanthocephaloides distinctus* Golvan, 1969.

By having trunk spines and a claviform proboscis with the same number of large apical hooks as small basal hooks, the new species is clearly a member of the Arhythmacanthinae Yamaguti, 1935. This subfamily is currently represented by 2 genera, *Heterosentis* and *Hypoechinorhynchus* Yamaguti, 1939. The latter was considered as a member of Hypoechinorhynchidae Golvan, 1980, by Amin (1985) and de Buron (1988), a family later regarded as a junior synonym of Arhythmacanthidae (Pichelin, 1999).

According to the key for genera of Arhythmacanthidae given by Pichelin and Cribb (1999), *Hypoechinorhynchus* can be distinguished from *Heterosentis* by having an antero-dorsal trunk curvature. However, an antero-dorsal curvature is also present in the trunk of some species of *Heterosentis,* such as *H. heteracanthus* (Zdzitowiecki, 1984) and the new species herein described. This character should, therefore, be considered an unreliable diagnostic character at the generic level. Nevertheless, *Hypoechinorhynchus* differs from all other arhythmacanthid genera by having longitudinal rows of hooks with alternate presence and absence of a middle spine (Pichelin, 1999).

Members of *Heterosentis* apparently have a variable degree of host specificity, with some species, such as *H. plotosi,* being known from a single host species in different localities (Pichelin and Cribb, 1999), whereas others, such as, *H. heteracanthus,* have been reported in several fish species of different families, although fish of the same superfamily seems to be the main definitive hosts (Laskowski and Zdzitowiecki, 2009). The new species and *H. brasiliensis* are parasites of pinguipedid fish in the southwestern Atlantic. The latter was recently described from *P. numida* from southeastern Brazilian coasts (Vieira et al., 2009). *Pseudopercis numida* is distributed in southern Brazil from Rio de Janeiro to the state of Santa Catarina (Menezes and Figueiredo, 1985), where it is sympatric with *P. semifasciata* and *P. brasilianus;* however, it does not reach the Argentinean Sea, although there is a record of a single specimen of this species in Nuevo Gulf,

Patagonia, Argentina, which can be considered an accidental introduction (Venerus et al., 2007). The absence of *H. heteracanthus* in *P. semifasciata* from Brazil (Luque et al., 2008) could indicate a strong specificity of these arhythmacanthids. The presence of *H. brasiliensis* in *P. brasilianus* from Brazil (Timi et al., 2010) and of *H. martini* in the same host species from Argentina could represent accidental infections given their low values of intensity in both regions (Timi et al., 2010).

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LITERATURE CITED

Amin, O. M. 1985. Classification. *In* Biology of the Acanthocephala, D. W. T. Crompton, and B. B. Nickol (eds.). Cambridge University Press, Cambridge, U.K., p. 27–72.

de Buron, I. 1988. *Hypoechinorhynchus thermaceri* sp. n. (Acanthocephala: Hypoechinorhynchidae) from the deep-sea zoarcid fish *Thermaceres andersoni* Rosenblatt and Kohen, 1986. Journal of Parasitology **74:** 339–342.

Golvan, Y. J. 1969. Systématique des Acanthocéphales (Acanthocephala Rudolphi 1801) Première Partie. L'Ordre des Palaeacanthocephala Meyer 1931. Premier fascicule. La Superfamille des Echinorhynchoidea (Cobbold 1876) Golvan et Houin 1963. Memoires du Museum National d' Histoire Naturelle, Zoologie, Serie A **57:** 1–373.

Laskowski, Z., and K. Zdzitowiecki. 2009. Occurrence of acanthocephalans in notothenioid fishes in the Beagle Channel (Magellanic subregion, sub-Antarctic). Polish Polar Research **30:** 179–186.

Luque, J. L., N. N. Felizardo, and L. E. R. Tavares. 2008. Community ecology of the metazoan parasites of namorado sandperches, *Pseudopercis numida* Miranda-Ribeiro, 1903 and *P. semifasciata* Cuvier, 1829 (Perciformes: Pinguipedidae), from the coastal zone of the State of Rio de Janeiro, Brazil. Brazilian Journal of Biology **68:** 269–278.

Menezes, N. A., and J. L. Figueiredo. 1985. Manual de peixes marinhos do sudeste do Brasil. V. Teleostei (4). Museu de Zoologia, Universidade de São Paulo. São Paulo, Brazil, 105 p.

Muñoz, G., and M. George-Nascimento. 2002. *Spiracanthus bovichthys* n. gen. n. sp. (Acanthocephala: Arhythmacanthidae), a parasite of littoral fishes of the central south coast of Chile. Journal of Parasitology **88:** 141–145.

Pichelin, S. 1999. *Hypoechinorhynchus robustus* sp. n. from *Notolabrus parilus* (Labridae) from Western Australia with a discussion on the validity of the Hypoechinorhynchidae (Acanthocephala: Paleoacanthocephala). Folia Parasitologica **46:** 311–315.

———, and T. H. Cribb. 1999. A review of the Arhythmacanthidae (Acanthocephala) with a description of *Heterosentis hirsutus* n. sp. from *Cnidoglanis macrocephala* (Plotosidae) in Australia. Parasite **6:** 293–302.

Timi, J. T., and A. L. Lanfranchi. 2009. The metazoan parasite communities of the Argentinean sandperch *Pseudopercis semifasciata* (Pisces: Perciformes) and their use to elucidate the stock structure of the host. Parasitology **136:** 1209–1219.

———, ———, and J. A. Etchegoin. 2009. Seasonal stability and spatial variability of parasites in Brazilian sandperch from the northern Argentine sea: Evidence for stock discrimination. Journal of Fish Biology **74:** 1206–1225.

———, ———, and J. L. Luque. 2010. Similarity in parasite communities of the teleost fish *Pinguipes brasilianus* in the southwestern Atlantic: Infracommunities as a tool to detect geographical patterns. International Journal for Parasitology **40:** 243–254.

Venerus, L. A., D. E. Galván, A. J. Irigoyen, and A. E. Gostonyi. 2007. First record of the namorado sandperch, *Pseudopercis numida* Miranda-Ribeiro, 1903 (Pinguipedidae; Osteichthyes), in Argentine waters. Journal of Applied Ichthyology **23:** 110–112.

Vieira, F. M., N. N. Felizardo, and J. L. Luque. 2009. A new species of *Heterosentis* Van Cleave, 1931 (Acanthocephala: Arhythmacanthidae) parasitic in *Pseudopercis numida* Miranda Ribeiro, 1903 (Perciformes: Pinguipedidae) from southeastern Brazilian coastal zone. Journal of Parasitology **95:** 747–750.

Zdzitowiecki, K. 1984. Description of *Heterosentis heteracanthus* (Linstow, 1896) from Antartic fishes, and remarks of the taxonomic status of *Heterosentis* Van Cleave, 1931 (Acanthocephala, Arythmacanthidae). Acta Parasitologica Polonica **29:** 111–115.