

A new species of *Petasiger* (Digenea, Echinostomatidae) parasitizing *Podiceps major* and *Rollandia rolland* (Aves, Podicipedidae) from Buenos Aires Province, Argentina

Lía I. Lunaschi* and Fabiana B. Drago

Laboratorio de Helmintología, División Zoología Invertebrados, Museo de La Plata, Paseo del Bosque S/Nº, 1900 La Plata, Buenos Aires, Argentina

Abstract

Petasiger argentinensis sp. nov. is described from material found in the intestine of the Great Grebe, *Podiceps major* (Boddaert) and the White-tufted Grebe, *Rollandia rolland* Quoy et Gaimard (Podicipediformes, Podicipedidae), from Argentina. The new species is characterized by the head collar armed with 19 spines and by the testes arranged in tandem. These characters are shared with only two Neotropical species of the genus, *P. novemdecim* Lutz, 1928 and *P. combesi* Zamparo, Overstreet et Brooks, 2005. *Petasiger novemdecim* differs from the new species in having a larger body, longer collar spines, larger eggs, a cirrus-sac of similar size to the ventral sucker and almost entirely anterior to it, and vitelline fields confluent ventrally posterior to the ventral sucker. *P. combesi* differs from the new species in most metrical characters, the shape of the body (antero-posteriorly elongate) and the location of the genital pore (dextral) and the excretory pore (dorsal). This is the first record of a member of the genus *Petasiger* parasitizing birds from Argentina.

Keywords

Digenea, Echinostomatidae, *Petasiger argentinensis* sp. nov., *Podiceps major*, *Rollandia rolland*, Argentina

Introduction

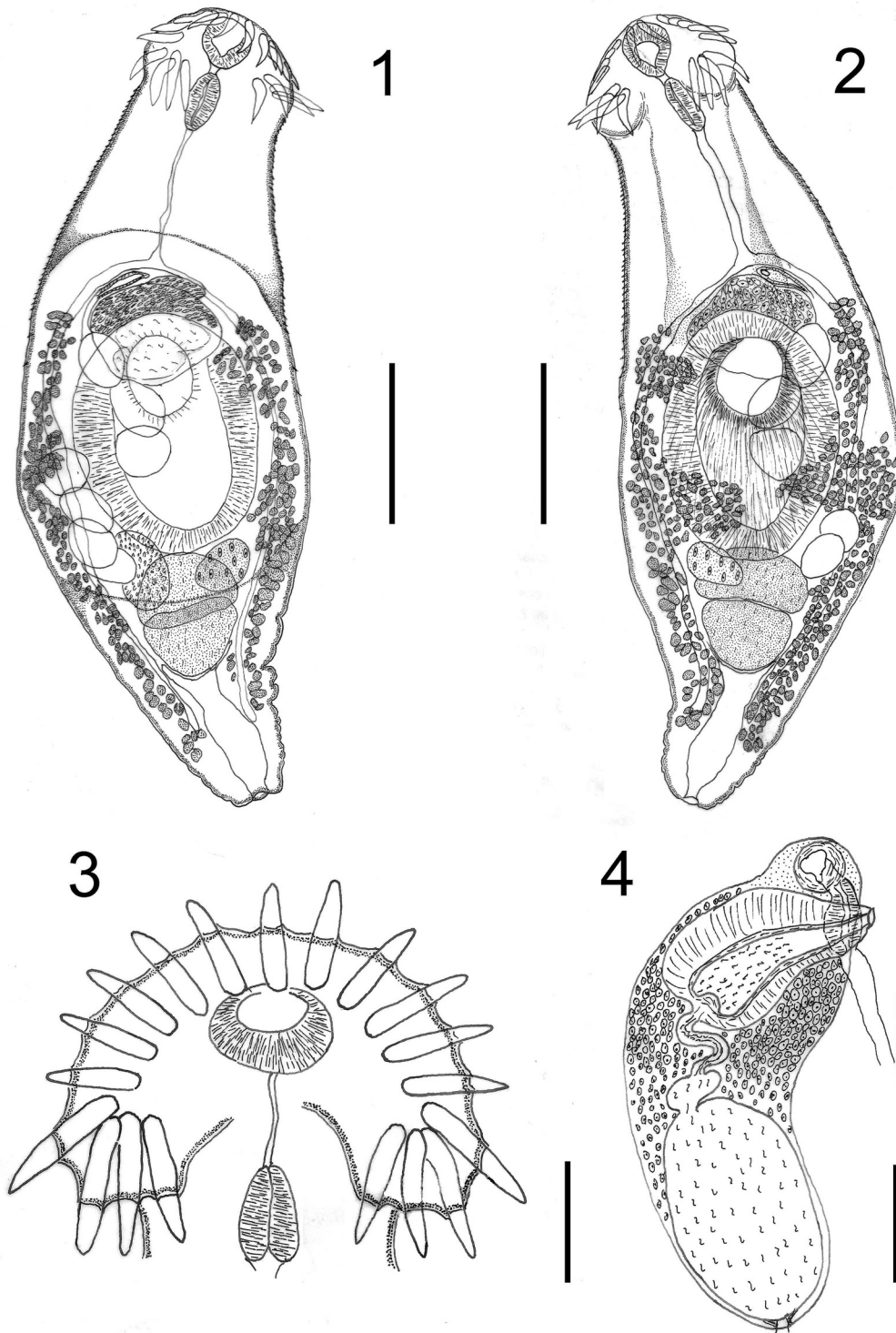
The cosmopolitan genus *Petasiger* Dietz, 1909 consists of a group of digeneans parasitic in fish-eating birds. The main characteristics used to distinguish among its species are the number and the arrangement of collar spines. The number of collar spines varies between 19–27 with dorsal and lateral spines in a single row, and two groups of 3–4 angle spines which are longer than lateral spines. At present, the genus contains 18 species, 5 of them with a head collar with 23 spines [*P. exaeretus* Dietz, 1909, *P. minutissimus* Gogate, 1934, *P. phalacrocoracis* (Yamaguti, 1939), *P. soochowensis* Ku, Chiu, Li et Zhu, 1977 and *P. variospinosus* (Odhner, 1910)] and 13 with 19 spines [*P. australis* Johnston et Angel, 1941, *P. combesi* Zamparo, Overstreet et Brooks, 2005, *P. floridus* Premvati, 1968, *P. grandivesicularis* Ishii, 1935, *P. islandicus* Kostadinova et Skirnisson, 2007, *P. johnstoni* Faltýnková, Gibson et Kostadinova, 2008, *P. megacanthus* (Kotlán, 1922), *P. neocomense* Fuhrmann, 1927, *P. nitidus* Linton, 1928, *P. novemdecim* Lutz, 1928, *P. oschmarini* Kostadinova et Gibson, 1998, *P. pseudoneocomense* Bravo-Hollis, 1969, and

P. pungens (Linstow, 1894)] (Faltýnková *et al.* 2008). As a result of a parasitological survey of birds from Buenos Aires Province, several digeneans with 19 spines in head collar were collected from the intestines of the Great Grebe, *Podiceps major* (Boddaert), and the White-tufted Grebe, *Rollandia rolland* (Quoy et Gaimard). Examination of the material revealed that these specimens belong to a new species of *Petasiger*, which is described and illustrated in the present paper.

Materials and methods

Eight birds (three *Podiceps major* and five *Rollandia rolland*) were shot from May 1999 to September 2004 in Laguna Lacombe (35°49'S; 57°49'W), Chascomús, Buenos Aires Province, Argentina. Birds were dissected in the field and the viscera preserved in 10% formalin and transported to the laboratory for examination. The digeneans were removed, stored in 70% ethanol, stained with a 1:6 dilution in 96% ethanol of hydrochloric carmine, dehydrated and mounted in Canada balsam. In order to facilitate handling and observation, the spec-

*Corresponding author: lunaschi@fcnym.unlp.edu.ar



Figs 1–4. *Petasiger argentinensis* sp. nov. from *Podiceps major*. 1. Holotype, entire worm dorsal view. Scale bar = 200 μ m. 2. Holotype, entire worm ventral view. Scale bar = 200 μ m. 3. Head collar. Scale bar = 200 μ m. 4. Detailed lateral view of terminal genitalia. Scale bar = 50 μ m

Table I. Comparative data for *Petasisger argentinensis* sp. nov. and related species

Species	<i>P. argentinensis</i> sp. nov.		<i>P. novemdecim</i>		<i>P. combesi</i>
Host	<i>Podiceps major</i> <i>Rollandia rolland</i>		<i>Tachybaptus dominicus</i>	Canaries (experimental)	<i>Pelecanus occidentalis</i>
References	Present study	Present study (CHIOC 25675)	Faltýnková <i>et al.</i> (2008)	Nassi (1980)	Zamparo <i>et al.</i> (2005)
	Argentina	Venezuela		Guadeloupe	Costa Rica
	Range (mean)	Type-serie	Neotype	Range	Range (mean)
Body length	890–1060 (970)	1.325–1.741 mm	1.575 mm	1.250–1.580 mm	1.5–1.8 mm (1.6 mm)
width	286–396 (347)	484–503	602	400–520	486–580 (533)
Forebody length	261–420 (340)	–	–	446–623	–
Hindbody length	242–401 (325)	–	–	520–734	–
Collar length	107–131 (115)	–	183	–	–
width	202–226 (214)	–	325	210–270	–
Angle spines	67–95 × 10–19 (80 × 13)	–	96–111 × 17–21	70–95	73–107 × 13–18 (89 × 16)
Lateral spines	48–57 × 7–14 (52 × 10)	–	68–69 × 15–17	–	85–108 × 13–18 (96 × 16)
Dorsal spines	43–62 × 10–12 (52 × 11)	–	84–90 × 15–18	64–79	–
Oral sucker	62–80 × 60–71 (68 × 67)	–	100 × 94	70–90 × 70–106	88–100 × 77–88 (91 × 83)
Ventral sucker	256–338 × 208–314 (306 × 248)	–	301 × 325	235–286 × 235–264	300–380 × 300–350 (337 × 324)
Prepharynx length	19–45 (30)	–	53	–	43–80 (64)
Pharynx	48–77 × 31–40 (63 × 35)	–	83 × 53	57–78 × 41–58	55–77 × 40–58 (63 × 51)
Oesophagus length	119–193 (155)	–	189	–	180–265 (235)
Cirrus-sac	121–167 × 107–195 (138 × 156)	–	293 × 348	–	300–400 × 200–275 (345 × 220)
Anterior testis	68–87 × 119–159 (77 × 138)	–	165 × 277	140–220 × 160–225	140–200 × 175–325 (178 × 271)
Posterior testis	57–101 × 100–126 (82 × 115)	–	183 × 260	144–214 × 180–230	165–250 × 150–295 (195 × 226)
Ovary	54–81 × 52–82 (67 × 66)	–	148 in diameter	95–135 × 100–136	105–225 × 120–250 (131 × 149)
Eggs	75–90 × 36–58 (81 × 48)	80–101 × 58–72	–	70–84 × 48–55	58–75 × 33–50 (70 × 43)
Distances:					
ODIV	231–312 (277)	–	–	–	–
VIT	343–430 (386)	–	–	–	–
Ratios:					
FO/HI	0.8–1.3 (1.1)	–	1.05	–	–
BW/VSW	2.7–3.9 (3.2)	–	1.9*	–	–
VSW/OSW	3.3–4.4 (3.7)	–	3.5*	–	3.3–4.2 (3.9)
VSW/CSW	1.1–2.2 (1.6)	–	0.9*	–	–
OSW/PHW	1.7–2.2 (1.9)	–	1.8*	–	0.52–0.66 (0.60)
BL/E	10–13 (12)	16–20 (18.5)	–	–	–
BL/VSL	2.7–3.9 (3.2)	–	5.2*	–	–

BL/E – body length to egg length; BL/VSL – body/ventral sucker length; BW/VSW – body width to ventral sucker width ratio; FO/HI – forebody length to hindbody length ratio; ODIV – distance from anterior extremity to intestinal bifurcation; OSW/PHW – oral sucker width to pharynx width; VIT – anterior extremity to anterior most vitelline follicle; VSW/CSW – ventral sucker width to cirrus-sac width; VSW/OSW – sucker-width ratio; *calculated from description given by Faltýnková *et al.* (2008).

imens were mounted between two microscope cover slides. Measurements are given in micrometers (μm) unless otherwise stated, as the range followed by mean in parentheses. Drawings were made with the aid of a drawing tube. The material studied was deposited in the Helminthological Collection of Museo de La Plata (MLP), La Plata, Argentina. For comparative purposes, we also examined specimens of *Petasiger novemdecim* Lutz, 1928 from the Helminthological Collection of the Instituto Oswaldo Cruz (CHIOC).

Results

Petasiger argentinensis sp. nov. (Figs 1–4, Table I)

Description (based on 8 ovigerous specimens): Body small, fusiform, ventrally concave; maximum width at level of ventral sucker. Tegument armed with squamous spines, covering densely in forebody and laterally decreasing in size to level of anterior third of ventral sucker. Forebody as long as hindbody, occupying 29–40% (35%) of body length. Oral sucker subterminal, small, surrounded by a well-developed head collar with 19 circumoral spines in a single row; two groups of 4 angle spines, larger than lateral and dorsal spines. Ventral sucker deep, muscular, cup-shaped, much larger than oral sucker, longitudinally elongated. Prepharynx short; pharynx elongate-oval; oesophagus long; intestinal bifurcation anterior to anterior margin of cirrus-sac, at 25–31% (29%) of body length; caeca nearly reaching posterior extremity. Gonads contiguous in posterior third of body. Testes tandem, immediately posterior to ventral sucker; anterior testis round to oval, occasionally overlapping with posterior margin of ventral sucker; posterior testis contiguous or slightly overlapping with anterior testis, somewhat subtriangular. Cirrus-sac large, spherical or elongate-oval, anterodorsal to ventral sucker between intestinal bifurcation and anterior third of the ventral sucker; containing a bipartite seminal vesicle, long pars prostatica, numerous large prostatic cells concentrated anteriorly and a bulb-like cirrus (everted cirrus not seen). Genital pore sinistrally submedian, posterior to intestinal bifurcation. Ovary small, spherical or ovoid, dextral, contiguous with ventral sucker, overlaps with anterior testis. Mehlis' gland compact, sinistral, anterior or contiguous with anterior testis. Laurer's canal not seen. Vitellarium in 2 lateral fields of small follicles overlapping caeca from midlevel of cirrus-sac to posterior extremity; fields convergent, but not confluent, ventrally in posterior region of ventral sucker, occasionally in post-testicular region. Uterus short, containing 1–13 large eggs (in relation to body size). Metraterm muscular, sinistral and anterior to cirrus-sac. Excretory pore terminal; excretory vesicle Y-shaped, stem bifurcating immediately at posterior margin of posterior testis.

Type host: *Podiceps major* (Boddaert) (Podicipediformes, Podicipedidae).

Other host: *Rollandia rolland* (Quoy et Gaimard) (Podicipediformes, Podicipedidae).

Site of infection: small intestine.

Type locality: Laguna Lacombe (35°49'S; 57°49'W), Chascomús, Buenos Aires Province.

Type material: Holotype MLP 6061; 3 paratypes MLP 6062.

Voucher specimens: MLP 6063 from *P. major*; MLP 6064 from *R. rolland*.

Prevalence and intensity: (66.67%), 24–33 (mean 28.5) in *P. major*; (100%), 1–84 (mean 43.8) in *R. rolland*.

Etymology: The specific name is derived from the country where this species was recorded.

Remarks

At present, the genus *Petasiger* contains 13 species with a head collar with 19 spines: *P. floridus*, *P. nitidus* and *P. pseudoneocomense* reported in the Nearctic Region parasitizing podicipediform birds; *P. grandivesicularis*, *P. islandicus*, *P. megacanthus*, *P. neocomense*, *P. oschmarini* and *P. pungens* recovered in the Palearctic Region as parasites of podicipediform, anseriform, pelecaniform, charadriiform and gruiform birds; *P. australis* and *P. johnstoni* as parasites of podicipediforms from the Australian Region; and the 2 remaining species, *P. combesi* and *P. novemdecim*, reported in the Neotropical Region as parasites of podicipediforms (Lutz 1928, Caballero and Díaz-Ungria 1958, Bravo-Hollis 1969, León-Règagnon 1992, Storer 2000, Zamparo *et al.* 2005, Faltýnková *et al.* 2008). Of the five species of *Petasiger* reported in the New World, *P. floridus*, *P. nitidus* and *P. pseudoneocomense* can be easily distinguished from *P. argentinensis* sp. nov. by the position oblique or symmetrical of their testes. Contrary, *P. combesi* and *P. novemdecim* are similar to *P. argentinensis* sp. nov. in having their testes in tandem. *P. combesi* differs from the new species in most metrical characters, it has a larger body, longer spines, smaller eggs, and the intestinal bifurcation is located at 11–15% of body length. Moreover, it differs in the shape of the body (antero-posteriorly elongate), and by the position of the genital pore (dextral) and the excretory pore (dorsal) (Zamparo *et al.* 2005). *P. novemdecim* was described briefly by Lutz (1928) parasitizing to *Tachybaptus dominicus* (L.) from Venezuela. Our examination of the specimens of the type-serie (CHIOC 25675) allowed obtain only some metrical data in few specimens, since these are poorly preserved. These specimens can be distinguished from *P. argentinensis* sp. nov. by having a larger body size and eggs (Table I). In addition, the neotype of *P. novemdecim* described by Faltýnková *et al.* (2008), can be distinguished from the specimens of *P. argentinensis* sp. nov. by having a larger body, longer spines, a cirrus-sac similar in size to the ventral sucker and almost entirely anterior to it; vitelline fields confluent ventrally posterior to the ventral sucker, the forebody represents a greater proportion of the body length (42%) (Table I).

On the other hand, in Argentina were reported larvae of *Petasiger* sp. parasitizing the pharyngeal zone of *Leptodactylus latinasus* Jiménez de la Espada (Amphibia-Leptodactyli-

dae) from Corrientes Province (Hamann *et al.* 2006). Probably these frogs are accidental hosts because the life cycles of *Petasiger* spp. include freshwater teleosts as second intermediate hosts and the Grebes are mainly fish-eating.

Acknowledgements. Special thanks are due to Dr. Marcelo Knoff for the loan of material, to Ing. Agr. Marcelo Martínez Leanes and to Mr. Roberto Aranda for their help and hospitality during our stay in Centro de Pesca San Jorge. The authors, Lía Lunaschi and Fabiana Drago are members of the Comisión de Investigaciones Científicas de la provincia de Buenos Aires (CIC) and Universidad Nacional de La Plata (UNLP), respectively. The present study was funded by CIC (Res. N° 578/08).

References

- Bravo-Hollis M. 1969. *Petasiger* (*Neopetasiger*) *pseudoneocomense* sp. nov. (Echinostomatidae Poche, 1926) del intestino de *Aechmophorus occidentalis* (Lawrence) de Bahía de Todos Santos, Baja California. *Anales del Instituto de Biología. Universidad Nacional Autónoma de México, Ser. Zool.*, 40, 15–20.
- Caballero E., Díaz-Ungria C. 1958. Intento de un catálogo de los tremátodos digéneos registrados en territorio venezolano. *Memoria de la Sociedad de Ciencias Naturales La Salle*, 18, 19–36.
- Faltýnková A., Gibson D.I., Kostadinova A. 2008. A revision of *Petasiger* Dietz, 1909 (Digenea: Echinostomatidae) and a key to its species. *Systematic Parasitology*, 71, 1–40. DOI: 10.1007/s11230-008-9146-6.
- Hamann M.I., González C.E., Kehr A.I. 2006. Helminth community structure of the oven frog *Leptodactylus latinasus* (Anura, Leptodactylidae) from Corrientes, Argentina. *Acta Parasitologica*, 51, 294–299. DOI: 10.2478/s11686-006-0045-1.
- León-Règagnon V. 1992. Fauna helmintológica de algunos vertebrados acuáticos de la ciénaga de Lerma, Estado de México. *Anales del Instituto de Biología, Universidad Nacional de México, Zool.*, 63, 151–153.
- Lutz A. 1928. *Estudios de zoología y parasitología Venezolanas*. Universidad Central de Venezuela, Caracas, 133 pp.
- Nassi H. 1980. Données expérimentales sur le cycle biologique de *Petasiger caribbensis* n. sp. (Trematoda: Echinostomatidae) parasite larvaire de *Biomphalaria glabrata* en Guadeloupe. *Annales de Parasitologie Humaine et Comparée*, 55, 41–55.
- Storer R.W. 2000. The metazoan parasite fauna of grebes (Aves: Podicipediformes) and its relationship to the birds' biology. *Miscellaneous Publications Museum of Zoology, University of Michigan*, 188, 1–90.
- Zamparo D., Overstreet R.M., Brooks D.R. 2005. A new species of *Petasiger* (Digenea: Echinostomiformes: Echinostomatidae) in the Brown Pelican, *Pelecanus occidentalis*, (Aves: Pelecaniformes: Pelecanidae), from the Area de Conservación Guanacaste, Costa Rica. *Journal of Parasitology*, 91, 1465–1467. DOI: 10.1645/GE-3483.1.

(Accepted March 2, 2010)