

## HIMASTHLA ESCAMOSA N. SP. (DIGENEA: ECHINOSTOMATIDAE) FROM THE KELP GULL, *LARUS DOMINICANUS* (CHARADRIIFORMES: LARIDAE), ON THE PATAGONIAN COAST, ARGENTINA

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**ABSTRACT:** In this article, we describe a new species of *Himasthla* Dietz, 1909 (Digenea: Echinostomatidae) from *Larus dominicanus* Lichtenstein (Aves: Laridae) in northern Patagonia, Argentina. We also describe the hosts, localities, and key diagnostic features and the measurements of the so far 25 described species. Of these species, *Himasthla militaris*, *H. leptosoma*, *H. elongata*, *H. secunda*, *H. megacotyla*, *H. multilecithosa*, *H. piscicola*, *H. compacta*, *H. schachtachtinskoi*, *H. littorinae*, *H. continua*, *H. avosettae*, and *H. interrupta* are similar to *H. escamosa* n. sp. in having 29 head collar spines. *Himasthla leptosoma*, *H. piscicola*, *H. multilecithosa*, *H. interrupta*, *H. continua*, and *H. militaris* can be differentiated from the new species mainly by the extension of the vitellaria. *Himasthla avosettae*, *H. megacotyla*, *H. elongata*, *H. compacta*, and *H. littorinae* have a different size or arrangement (or both) of head collar spines compared with *H. escamosa*. *Himasthla secunda* can be distinguished from *H. escamosa* n. sp. in having a larger body, testes, and ovary and a different position of the ovary. The comparison with *H. schachtachtinskoi* could not be done because the bibliography was not available. This is the first record of the genus in Argentina and from *L. dominicanus*.

The 25 presently described species of *Himasthla* Dietz, 1909 (Digenea: Echinostomatidae) are mainly parasites of marine birds. Only 2 of them were found in fishes and 1 in a human; all 3 cases probably were accidental infections (Stunkard, 1960). Of the 14 species reported in the Americas, 3 are from South America, i.e., *H. alincia* Dietz, 1909, and *H. piscicola* Stunkard, 1960, were reported in Brazil (Travassos et al., 1969) and *H. limnodromi* Didyk and Burt, 1997, in Venezuela (Didyk and Burt, 1997).

Knowledge regarding the helminth fauna of Patagonian seabirds is very scarce, including that for the most common gull, *Larus dominicanus* Lichtenstein (Aves: Laridae). The only digeneans registered from birds on the Patagonian coast are the gymnophallid, *Bartolius pierrei* Cremonte, 2001, and the microphallid, *Odhneria odhneri* Travassos, 1921 (Cremonte, 2001; Cremonte and Etchegoin, 2002).

The aim of this study is to describe a new species of *Himasthla* from the Kelp Gull *L. dominicanus* in Patagonia, Argentina. Moreover, we present the hosts, localities, and key diagnostic features and the measurements of all the species of *Himasthla*.

### MATERIALS AND METHODS

From January 1997 to July 2002, 8 specimens of *L. dominicanus* were found dead in the following localities along the Argentinean coast: Balneario Orense (38°42'S, 59°47'W; 1 juvenile); San Blas (40°32'S, 62°21'W; 1 adult); Puerto Madryn (42°47'S, 65°02'W; 3 juveniles); Fracasso Beach (42°25'S, 64°07'W; 2 adults); and Comodoro Rivadavia (45°56'S, 67°30'W; 1 adult). After the birds were dissected, the digestive tract was fixed in 10% formalin. In the laboratory, the adult digeneans that were already fixed were removed, stored in 70% ethanol, stained with Semichon's acetocarmine, mounted in Canada balsam, and studied by light microscopy. In addition, serial histological sections of 2 specimens were made for complete morphological study of the parasites. Drawings were made with the aid of a camera lucida. All measurements are in micrometers except when indicated, with the mean followed by the range in parentheses.

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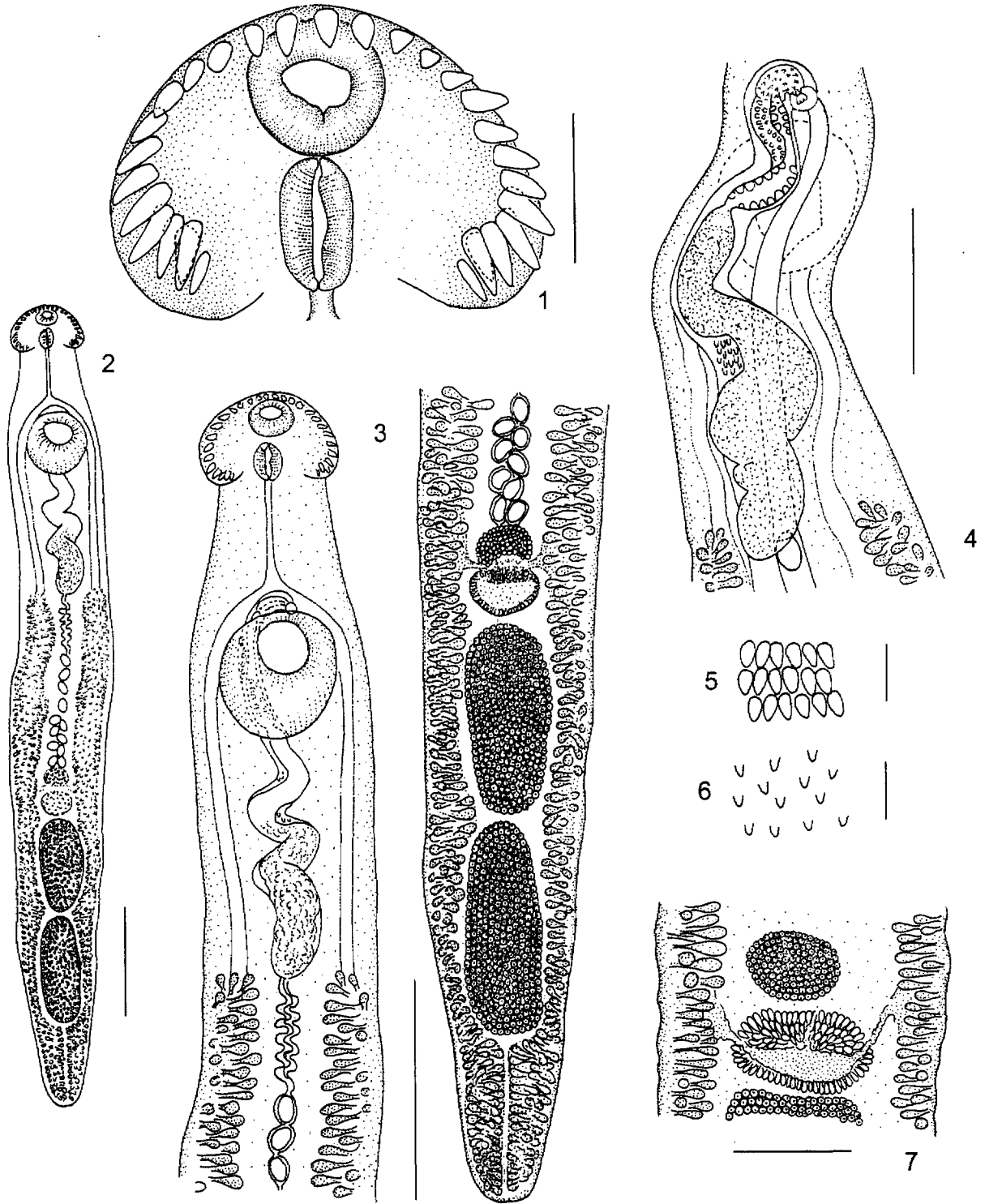
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### DESCRIPTION

#### *Himasthla escamosa* n. sp.

(Figs. 1–8)

**General description (based on 18 specimens):** Echinostomatidae, Himasthlineae, *Himasthla* Dietz, 1909. Elongate body, slender, attenuated forebody (Figs. 2, 3). Tegument covered by scale-shaped spines, transversally arranged, decreasing in size abruptly behind acetabulum and gradually to posterior body end (Figs. 5, 6). Body 3.87 (2.82–5.65) mm long by 326 (240–400) wide at acetabulum level. Forebody (distance from anterior end to anterior edge of acetabulum) 576 (350–840) long. Oral sucker subterminal 87 (65–110) long by 77 (50–90) wide. Reniform head collar 287 (200–330) wide, bearing 29 spines arranged in a single continuous row of 25, with 2 additional corner spines on each side (Fig. 1); the median one smaller, measuring 34 (30–40) long by 8 (5–11) wide, the other corner spine overlapped the first spine of the single collar row, measuring 43 (34–53) long by 12 (10–16) wide; rest of collar spines measuring 53 (48–66) long by 13 (10–16) wide. Acetabulum 262 (195–320) long by 240 (150–300) wide, located in the upper seventh of the body length (Fig. 2). Sucker ratio (oral sucker width to acetabulum width) 1:3.1 (1.3–1.3.3). Prepharynx very short. Pharynx 96 (84–120) long by 44 (30–65) wide. Esophagus 368 (225–600) long, bifurcating immediately anterior to acetabulum; ceca long, nearly reaching posterior end. Testes smooth, in tandem, close to posterior end; anterior testis 323 (200–470) long by 193 (120–315) wide; posterior testis slightly larger, 363 (220–600) long by 205 (100–330) wide (Fig. 3). Cirrus sac 880 (680–1,110) long by 117 (70–250) wide, extending from some distance anterior to acetabulum and surpassing it 507 (230–870). Seminal vesicle long, sinuous, enclosed in cirrus sac, occupying about two thirds of its total length. Seminal vesicle continued by long prostatic duct surrounded by prostatic cells, ending in armed cirrus with conspicuous spines. Genital pore on ventral midline of body surface, near anterior edge of acetabulum (Fig. 4). Ovary smooth, rounded to oval, 110 (50–160) long by 138 (70–170) wide, distant 141 (60–200) from anterior edge of anterior testis. Ootype situated immediately posterior to ovary (Fig. 7). Vitellaria in lateral fields, extending from end of cirrus sac, sometimes lightly



FIGURES 1-7. *Himasthla escamosa* n. sp. from *Larus dominicanus*. 1. Head collar and spine arrangement, showing oral sucker and pharynx, ventral view. 2. Schematic view of whole worm, ventral view. 3. Whole worm, ventral view. 4. Details of cirrus sac showing seminal vesicle, pars prostatica, armed cirrus, and genital pore, dorsal view. 5. Preacetabular spines, scale-shaped. 6. Postacetabular spines, scale-shaped. 7. Details of ootype region, showing ovary, Mehlis' gland, ootype, vitellaria, and vitelline ducts, ventral view. Scale bars: 1 = 100  $\mu$ m; 2 and 3 = 500  $\mu$ m; 4 = 300  $\mu$ m; 5 and 6 = 10  $\mu$ m; 7 = 200  $\mu$ m.

TABLE 1. Species of *Himasthla* (Digenea: Echinostomatidae) reported from America, their hosts, localities, and key diagnostic features and measurements.

Species	<i>Himasthla rhigedana</i> Dietz, 1909	<i>Himasthla alincia</i> Dietz, 1909	<i>Himasthla quissetensis</i> (Miller and Northup, 1926) Stunkard, 1938	<i>Himasthla incisa</i> Linton, 1928
References	Dietz (1909), Dronen et al. (1998)	Didyk and Burt (1997)	Stunkard (1938)	Linton (1928), Stunkard (1938)
Type host†	<i>Numenius arquatus</i> or <i>N. arabicus</i>	<i>Tringa cinclus</i>	( <i>Larus argentatus</i> )	<i>Oidemia deglandi</i>
Other hosts	<i>Numenius</i> spp.	<i>Tringa</i> spp., <i>Calidris pusilla</i>	—	—
Locality	United States and Israel	Brazil and United States	United States	United States
Body length (mm)	9–37.5	10.5–20.5	5–10.2	9
Body width‡	—	390–530	500–750	630
Head collar W	—	220	300	—
Number of collar spines	34–38	28–31	31	27–31
Median corner spines L × W	—	34–39 × 11	—	39 × 12
Lateral corner spines L × W	—	—	—	—
Longer collar spines L × W	—	36–47 × 8–14	45–58 × 14–20	51 × 18
Oral sucker L × W	—	82–98 × 65–84	70–125 × 100–135	110 × 100
Ventral sucker L × W	—	200–333 × 200–307	Ø 200–400	Ø 380
Sucker ratio§	—	1:3–3.6	1:2–2.9	1:3.8
Pharynx L × W	—	—	100–130 × 60–90	90 × 56
Anterior testis L × W	720–1,870 × 320–460	462–770 × 283–390	500–1,000 × 250–330	1,120 × 350
Posterior testis L × W	720–1,870 × 320–460	539–850 × 283–390	700–1,100 × 200–260	1,050 × 400
Cirrus sac L × W	—	2,040–2,148 × 112–153	—	—
Cirrus	—	Armed	Armed	—
Ovary L × W	—	Ø 140–192	Ø 100–220	Ø 280
Eggs L × W	74–82 × 54–61	103–123 × 65–78	100–125 × 60–80	112 × 57
Forebody	—	—	—	350

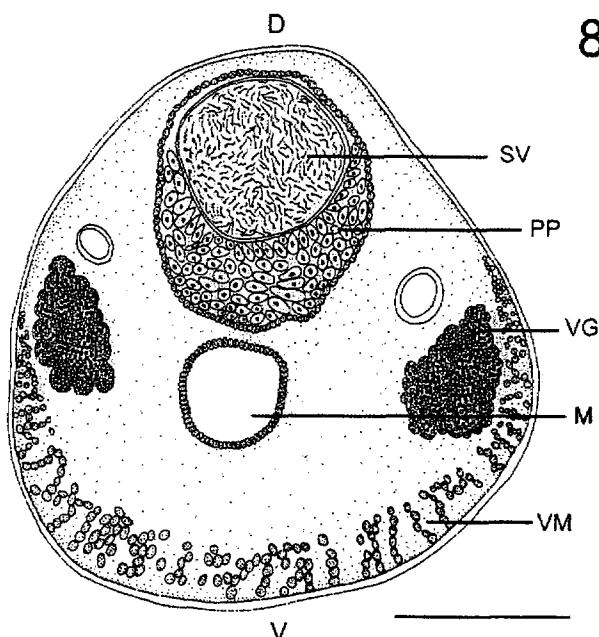
\* References: (sensu lato *H. rhigedana* Adams and Martin, 1963) Deblock, 1966.

† Parentheses indicates experimental host.

‡ May correspond to any body level.

§ Oral sucker wide/ventral sucker wide, L × W = length by width.

Ø Diameter.



overlapping it, and reaching the posterior end, stretched in testicular region and expanding posteriorly to testes occupying entire body width (Fig. 3). Posterior margin (or edge) of cirrus sac can overlap the anterior margin (or edge) of vitelline follicles by 150 long or to be separated by 220 long (mean of overlapping = 12.5). Vitelline follicles measuring 51 (60–45) long by 20 (25–15) wide. Vitelline ducts joining in ovary–ootype zone (Fig. 7). Uterus essentially preovarian, intercecal, ending in long metraterm, ventrally situated from cirrus sac (Fig. 8), containing 47 (19–100) eggs. Eggs 77 (62–92) long by 50 (38–61) wide.

#### Taxonomic summary

*Type host:* *Larus dominicanus* Lichtenstein (Aves: Laridae).

*Site of infection:* Intestine, mainly in the middle portion.

*Type locality:* Puerto Madryn (42°47'S, 65°02'W), Chubut province, Argentina.

FIGURE 8. Histological cross section (HE stain) of *Himasthla escamosa* n. sp. from *Larus dominicanus* showing the relative positions of metraterm and cirrus sac. References: sv, seminal vesicle; pp, pars prostatica; vg, vitelline glands; m, metraterm; vm, ventral body musculature; v, ventral; d, dorsal. Scale bar = 100 µm.

TABLE I. Extended.

<i>Himasthla muehlensi</i> Vogel, 1933	<i>Himasthla mcintoshi</i> Stunkard, 1960	<i>Himasthla californiensis</i> *	<i>Himasthla limnodromi</i> Didyk and Burt, 1997	<i>Himasthla catoptrophori</i> Dronen, Badley, and Wardle, 1998	<i>Himasthla leptosoma</i> (Creplin, 1829) Dietz, 1909
Mendheim (1940), Stunkard (1960)	Stunkard (1938)	Adams and Martin (1963)	Didyk and Burt (1997)	Dronen et al. (1998)	Mendheim (1940, 1943), Loos-Frank (1967)
<i>Homo sapiens</i>	<i>Numenius americanus</i>	( <i>Gallus domesticus</i> )	<i>Limnodromus griseus</i>	<i>Catoptrophorus semipalmatus</i>	?
—	—	—	—	—	<i>Tringa</i> spp., <i>Calidris</i> spp.
United States	United States	United States	Venezuela and United States	United States	United States and Europe
11–12	6–11	4.55–11.5	21.8	9–32	5.34–13.4
400–480	500–700	440–1,110	316–512	373–980	243–462
—	—	—	279–380	—	202–301
31	35	38	31	40	29
—	55 × 16	24 × 15	30–50	—	32–39 × 7–9
—	55 × 16	24 × 15	42–50	—	39–48 × 10–13
—	78–84 × 20	45 × 15	45–56	40–50	37–48 × 9–11
—	Ø 130–160	Ø 80–140	70–104 × 65–92	100–155 × 110–165	Ø 61–93
—	330–390 × 310–350	Ø 188–388	225–372 × 233–365	Ø 240–330	180–260 × 180–231
—	1:2.2–2.4	1:2.3–2.8	1:3.6–4	1:2.0–2.1	1:2.5–3
—	140 × 100	120 × 89	60–108 × 50–90	110–135 × 70–95	60–83 × 40–51
—	560–650 × 220–280	567 × 308	470–874 × 280–493	570–1,500 × 230–350	289–723 × 144–254
—	560–650 × 220–280	630 × 316	577–930 × 298–502	690–1,490 × 235–345	295–786 × 150–260
—	—	—	1,200–2,700 × 33–149	510–1,050 × ?	—
—	Armed	—	Unarmed	—	—
—	Ø 180–200	132 × 190	120–232 ts 140–260	110–290 × 130–325	Ø 100–193
—	100 × 76	112 × 65	80–106 ts 40–64	90–115 × 60–92	79–96 × 45–62
—	—	—	550–840	600–1,125	—

*Specimens deposited:* Holotype 5233 and paratypes 5234 in the Helminthological Collection of Museo de La Plata (CHMLP), Museo de La Plata, La Plata, Argentina.

*Prevalence and intensity of infection:* Of 8 hosts examined, only 1 juvenile from Puerto Madryn was found to be parasitized by 18 worms.

*Etymology:* The species name refers to the appearance of the tegument covered by the scale-shaped spines (*escamosa* means scaly in Spanish).

## DISCUSSION

Tables I and II summarize hosts, localities, and key diagnostic features and measurements of all *Himasthla* species. The main characteristics used to distinguish species in the genus *Himasthla* are the number, size, and arrangement of head collar spines; the vitellaria extension with respect to the cirrus sac; and egg size (Tables I and II). However, there are different opinions about the number of valid species in the genus and the characters used to distinguish them (Stunkard, 1960). Moreover, there is no general agreement about which measurements must be taken for species differentiation and how, e.g., distance between ending of cirrus sac and beginning of vitellaria, size of head collar spines; some authors did not describe any additional diagnostic features, e.g., cirrus sac length, sucker ratio, cirrus armed or not.

Of the 25 species of *Himasthla* reported to date, the following 12 can be distinguished from *H. escamosa* n. sp. by the possession of more than 29 head collar spines (31, 32, 35, 38, or 40; see Tables I and II and references therein): *H. rhigedana* Dietz, 1909; *H. alincia* Dietz, 1909; *H. harrisoni* Johnston, 1916; *H. quissetensis* (Miller and Northup, 1926) Stunkard, 1938; *H. incisa* Linton, 1928; *H. muehlensi* Vogel, 1933; *H. ambigua* Palombi, 1934; *H. kusasigi* Yamaguti, 1939; *H. mcintoshi* Stunkard, 1960; *H. californiensis* Deblock, 1966 (= *H. rhigedana* sensu Adams and Martin, 1963); *H. limnodromi* Didyk and Burt, 1997; and *H. catoptrophori* Dronen, Badley, and Wardle, 1998. The remaining species, *H. militaris* (Rudolphi, 1802) Dietz, 1909; *H. leptosoma* (Creplin, 1829) Dietz, 1909; *H. elongata* (Mehlis, 1831) Dietz, 1909; *H. secunda* (Nicoll, 1906) Dietz, 1909; *H. megacotyla* Yamaguti, 1939; *H. multilecithosa* Mendheim, 1940; *H. piscicola* Stunkard, 1960; *H. compacta* Stunkard, 1960; *H. schachtachtinskoi* Petrov and Sidov, 1961; *H. littorinae* Stunkard, 1966; *H. continua* Loos-Frank, 1967; *H. avosettae* Loos-Frank, 1967; and *H. interrupta* Loos-Frank, 1967, are similar to *H. escamosa* n. sp. as they have 29 head collar spines. *Himasthla leptosoma*, *H. piscicola*, and *H. multilecithosa* can be differentiated from the new species because in the first 2 species the vitellaria begin well behind the posterior margin to the cirrus sac, and in the last species the vitellaria reach the posterior border of

TABLE I. Extended.

Species	<i>Himasthla piscicola</i> Stunkard, 1960	<i>Himasthla elongata</i> (Mehlis, 1831) Dietz, 1909	<i>Himasthla compacta</i> Stunkard, 1960	<i>Himasthla littorinae</i> Stunkard, 1966	<i>Himasthla escamosa</i> n.sp.
References	Stunkard (1960), Kohn and Fernandes (1981)	Mendheim (1940, Skrjabin (1964), Stunkard (1960), Loos-Frank (1967)	Stunkard (1960)	Stunkard (1966)	Present study
Type host†	<i>Arapaima gigas</i>	<i>Larus</i> sp.	( <i>Larus argentatus</i> )	( <i>Larus argentatus</i> )	<i>Larus dominicanus</i>
Other hosts	<i>Osteoglossum bicir- rhosum</i>	<i>Larus</i> spp.	—	—	—
Locality	Brazil	United States and Europe	United States	United States	Argentina
Body length (mm)	8.2–11.71	6.3–6.8	3–4.3	2–5.4	2.82–5.65
Body width‡	980	564–590	350–440	300–410	240–400
Head collar W	875–1060	353–376	—	—	200–330
Number of collar spines	29	29	29	29	29
Median corner spines L × W	—	34–48 × 7–8	26–32 × 9	25–30 × 9	30–40 × 5–11
Lateral corner spines L × W	—	39–53 × 9–15	26–32 × 9	—	34–53 × 10–16
Longer collar spines L × W	56–97 × 22–26	40–65 × 8–14	54–62 × 12–14	42–50 × 14	48–66 × 10–16
Oral sucker L × W	180–210 × 190	∅ 119–129	∅ 75–90	∅ 81–110	65–110 × 50–90
Ventral sucker L × W	∅ 450–500	347–358	200–260 × 180–220	∅ 200–250	195–320 × 150–300
Sucker ratio§	1:2.4	1:2.8–2.9	1:2.4	1:2.3–2.5	1:3–3.3
Pharynx L × W	240–260 × 110–180	100–130 × 50–90	60–75 × 40–50	70–90 × 42–48	84–120 × 30–65
Anterior testis L × W	875–910 × 200–440	330–860 × 200–400	360–490 × 180–210	200–350 × 160–240	200–470 × 120–315
Posterior testis L × W	890–950 × 200–410	370–960 × 200–400	400–580 × 180–210	200–350 × 160–240	220–600 × 100–330
Cirrus sac L × W	2,700 × 340	—	—	—	680–1,100 × 70–250
Cirrus	Unarmed	—	Armed	—	Armed
Ovary L × W	180–290 × 200–340	∅ 170–200	60–130 × 80–160	∅ 60–80	50–160 × 70–170
Eggs L × W	97–114 × 64–71	115–129 × 67–77	85–90 × 50–58	92–98 × 60–62	62–92 × 38–61
Forebody	—	300–730	—	—	350–840

the ventral sucker (Tables I, and II and references therein). *Himasthla interrupta* has the vitellaria interrupted at level of ovary; also, it is different from *H. escamosa* n. sp. in having larger body (5.7–10.2 mm vs. 2.82–5.65 mm), testes (540–839 × 168–257 vs. 210–535 × 110–322), and ovary (162–237 in diameter vs. 50–160 × 70–170) (Loos-Frank, 1967). In addition to having the vitellaria reaching about the middle of the cirrus sac, *H. continua* also differs from the species described in this study in having a larger body (4.76–10.7 mm vs. 2.82–5.65 mm), testes (584–873 × 207–373 vs. 210–535 × 110–322), and ovary (149–225 × 163–225 vs. 50–160 × 70–170) (Loos-Frank, 1967). *Himasthla militaris* can be distinguished from *H. escamosa* by its asymmetrical vitellaria, much longer body (6.15–13.17 mm vs. 2.82–5.65 mm), and slightly lobated testes (Loos-Frank, 1967). The body, testes, and ovary of *H. secunda* are larger than in the new species (5.4–7.3 mm vs. 2.82–5.65 mm, 730 × 410 vs. 210–535 × 110–322, and 220 × 270 vs. 50–160 × 70–170, respectively). Moreover, in comparison with *H. escamosa*, the latter 2 species have the ovary clearly separated from testes (Loos-Frank, 1967). *Himasthla avosettae* has smaller head collar spines than *H. escamosa* (median corner spines 19–24 × 4–6 vs. 30–40 × 5–11 and longer spines 28–41 × 6–7 vs. 48–66 × 10–16), except the lateral one that is similar in size (Loos-Frank, 1967). *Himasthla megacotyla* and *H. elongata* can be distin-

guished from *H. escamosa* in having 4 grouped spines in each corner of the head collar (Skrjabin, 1964). In addition, *H. elongata* also differs because it is larger (6.3–6.8 mm vs. 2.82–5.65 mm) and has larger eggs (115–129 × 67–77 vs. 62–92 × 38–61) (Table I and references there). In *Himasthla compacta* the median corner spine of the head collar is smaller than in *H. escamosa* n. sp. (26–32 vs. 30–40), the pharynx is shorter (60–75 vs. 84–120), and testes are notched (Stunkard, 1960). *Himasthla littorinae* has the cirrus sac sinuous, slender, and extending well posterior to acetabulum so that the expanded portion containing S-shaped seminal vesicle is situated between anterior ends of vitelline fields. Moreover, in *H. littorinae*, the smallest head collar spine is even smaller than in *H. escamosa* n. sp. (25–30 vs. 30–40), and the eggs are larger (92–98 × 60–62 vs. 62–92 × 38–61) (Stunkard, 1966). Additionally, in *H. compacta* and *H. littorinae*, the sucker ratio is smaller than in the present species (1:2.4 and 1:2.3–2.5 vs. 1:3–3.3, respectively). Unfortunately, the species described in this study could not be compared with *H. schachtachtinskoi* Petrov and Sidov, 1961, because bibliography was not available and there is no available data either in Yamaguti (1971) or Skrjabin (1964).

This is the first record of *Himasthla* in Argentina and from the host *L. dominicanus*.

TABLE II. Species of *Himasthla* (Digenea: Echinostomatidae) reported from Europe and Asia, their hosts, localities, and key diagnostic features and measurements.

Species	<i>Himasthla militaris</i> (Rudolphi, 1802) Dietz, 1909	<i>Himasthla secunda</i> (Nicoll, 1906) Dietz, 1909	<i>Himasthla megacotylo</i> Yamaguti, 1939
References	Loos-Frank (1967), Sitko (1993)	Loos-Frank (1967), Sitko (1993)	Yamaguti (1971), Skrjabin et al. (1964)
Type host*	<i>Numenius arquatus</i>	<i>Larus ridibundus</i>	<i>Erolia alpina</i>
Other hosts	Several Charadriiformes	<i>Larus</i> spp., <i>Sterna hirundo</i> , <i>Haematopus ostralegus</i> , and <i>N. arquatus</i>	—
Locality	Europe and Asia	Europe	Japan, Siberia
Body length (mm)	6.15–13.17	5.4–7.3	6.1–8.5
Body width†	301–406	700	500–650
Head collar W	202–312	330	—
Number of collar spines	29	29	29
Median corner spines L × W	32–42 × 12	—	—
Lateral corner spines L × W	50 × 15	—	—
Longer collar spines L × W	45–55 × 13–15	—	—
Oral sucker L × W	67–92 × 65–81	∅ 110	—
Ventral sucker L × W	202–260 × 116–243	∅ 330	—
Sucker ratio‡	1:3–3.3	1:3.3	—
Pharynx L × W	73–95 × 45–65	100 × 50	—
Anterior testis L × W	300–682 × 120–289	660 × 400	—
Posterior testis L × W	312–809 × 120–243	800 × 420	—
Cirrus sac L × W	522–1,033 × 63–88	—	—
Cirrus	—	—	—
Ovary L × W	126–184 × 108–184	220 × 270	—
Eggs L × W	70–88 × 41–59	82–93 × 53–62	81–93 × 74–92
Forebody	—	—	—

\* Parentheses indicates experimental host.

† May correspond to any body level.

‡ Oral sucker wide/ventral sucker wide, L × W = length by width.

∅ Diameter.

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TABLE II. Extended.

<i>Himasthla multilecithosa</i> Mendheim 1940	<i>Himasthla schachtachtinskoi</i> Petrov and Sidov, 1961	<i>Himasthla continua</i> Loos-Frank, 1967	<i>Himasthla avosettae</i> Loos-Frank, 1967	<i>Himasthla interrupta</i> Loos-Frank, 1967
Mendheim 1940, Skrjabin et al. (1964)	Yamaguti (1971)	Loos-Frank (1967)	Loos-Frank (1967)	Loos-Frank (1967)
<i>Goura coronata</i>	<i>Larus ridibundus</i>	<i>Larus argentatus</i>	<i>Recurvirostra avosetta</i>	<i>Larus argentatus</i>
—	—	<i>Larus</i> spp., ( <i>Arenaria interpres</i> )	—	<i>Larus</i> spp., ( <i>L. ridibundus</i> )
Europe	Russia	Europe	Europe	Europe
5.28	—	4.76–10.7	1.9–6.5	5.7–10.2
288	—	368–751	214–376	376–624
—	—	240–350	214–283	260–376
29	—	29	29	29
—	—	35–38 × 6–9	19–24 × 4–6	29–39 × 6–8
—	—	42–48 × 6–15	30–41 × 7–9	42–48 × 11–14
—	—	44–62 × 11–14	28–41 × 6–7	39–58 × 8–14
—	—	65–111 × 85–111	Ø 73–95	Ø 69–121
—	—	Ø 260–350	Ø 205–274	Ø 225–306
—	—	1:3.2–3.1	1:3.5	1:2.53–3.26
92 × 60	—	88–129 × 46–70	76–97 × 47–70	83–104 × 53–68
360 × 120	—	563–820 × 202–370	218–538 × 116–202	670–810 × 162–260
280–400 × 120	—	605–925 × 212–365	225–520 × 116–206	410–867 × 173–254
—	—	—	—	—
—	—	—	—	—
—	—	149–225 × 163–225	87–150 × 87–127	Ø 162–237
80–93 × 41–58	—	73–91 × 39–53	65–82 × 38–48	88–92 × 44–47
—	—	—	—	—

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from the Kelp Gull, *Larus dominicanus* (Charadriiformes:  
Laridae), on the Patagonian Coast, Argentina

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