J. Parasitol., 90(4), 2004, pp. 823–834

SIMILASCAROPHIS N. GEN. N. SPP. (NEMATODA: CYSTIDICOLIDAE) PARASITIZING MARINE FISHES OFF THE CHILEAN COAST

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ABSTRACT: *Similascarophis* (Cystidicolidae) n. gen. is proposed. In the mouth of specimens of this genus, submedial labia are absent and pseudolabia do not have any part projecting toward the central oral opening. These nematodes were obtained from the alimentary tract of 7 marine fish species along the coast of Chile: *Bovichthys chilensis* Regan, *Eleginops maclovinus* (Cuvier), *Pinguipes chilensis* (Valenciennes), *Cilus gilberti* (Abbott), *Cheilodactylus variegatus* Valenciennes, *Girella laevifrons* (Tschudi), and *Graus nigra* Philippi. Morphology and morphometry are compared between 2 new *Similascarophis* species: *Similascarophis maulensis* n. sp. and *S. chilensis* n. sp., which differ in the presence of sublabia and in the length of the glandular esophagus and left spicule. We also recorded *Similascarophis* sp. in 2 other host species, which showed some distinct proportional measurements, although these differences were not sufficiently clear to identify them as a new species.

There are few records of nematodes of the Cystidicolidae in Chile (Balboa and George-Nascimento, 1998; González and Acuña, 1998, 2000; Garcías et al., 2001; Muñoz et al., 2001, 2002) and only 1 species description (Muñoz and George-Nascimento, 2001). Over the past 5 yr, a marine fish study has revealed that of 45 fish species, 18 harbored at least 1 specimen that belonged to this family. Some species belong to *Ascarophis* van Beneden (not considered in this study), whereas others, although similar to *Ascarophis*, exhibit morphological differences in the mouth. The aim of the present study was to propose a new genus, *Similascarophis*. A comparison of morphology and morphometry is used to describe 2 new species in the genus.

MATERIALS AND METHODS

Eighty nematodes were collected from 7 species of marine fish in samples taken between 1998 and 2000 along the Chilean coastline. The fish species studied were: *Bovichthys chilensis* Regan, *Eleginops maclovinus* (Cuvier), *Pinguipes chilensis* (Valenciennes), *Cilus gilberti* (Abbott), *Cheilodactylus variegatus* Valenciennes, *Girella laevifrons* (Tschudi), and *Graus nigra* Philippi. Each fish was dissected, and its parasites were extracted from the digestive tract. The nematodes were fixed and preserved in 10% formaldehyde. Most individuals were clear enough to be observed and measured directly, usually at ×400 magnification. Some nematodes were also cleared with lactophenol. Drawings were made using a camera lucida attached to a light microscope. The prevalence and abundance in each host species were calculated according to the methods of Bush et al. (1997).

Morphometry of nematodes was measured in microns (μm) unless otherwise stated. In addition, 9 proportional morphometric characters were calculated by dividing each absolute measurement by the total body length (L): body width (BW/L), buccal cavity (BC/L), nerve ring position from anterior end (NR/L), muscular esophagus (ME/L), glandular esophagus (GE/L), anus position from posterior end (A/L), left spicule (LS/L), right spicule (RS/L), and vulva position from posterior end (V/L).

Between 4 and 6 individual worms from each host species were prepared for scanning electron microscopy (SEM). Specimens were dehydrated through an alcohol series and critical point dried in CO_2, using a Balzers Union machine. They were then sputter-coated with gold making a layer of 500 Å using a model Edwards Sputter Coater S150. Finally, they were examined with an Etec-Autoscan SEM.

Received 1 November 2002; revised 23 October 2003; accepted 23 October 2003.

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DESCRIPTIONS

Similascarophis n. gen.

Diagnosis: Body filiform and small. Females longer and wider than males. Posterior portion of the body in males usually coiled. Cuticular transverse striations present, well defined from anterior extremity to tail. Four cephalic papillae located ventrolaterally and dorsolaterally. Mouth elongated along dorsoventral axis. Submedial labia absent. Sublabia present, but thin to weakly developed. Two pseudolabia each with conical anterior protrusion. Pseudolabia bases connected to buccal wall, either completely or in halves. Medial portion of pseudolabia without projections toward the central oral opening. Amphids lateral to pseudolabia. Oral opening followed by buccal cavity and esophagus (muscular and glandular portions). Glandular esophagus approximately 2–9 times longer than muscular portion. Excretory pore posterior to nerve ring. Deirids between beginning of muscular esophagus and nerve ring level. Phasmids present. Males possess 2 spicules differing in length. Both spicules tubular. Left spicule 2–7 times longer than right. Monorchic. Four pairs of preanal papillae; 5 pairs of postanal papillae. Caudal alae narrow. Uterus didelphic and amphidelphic. Each ovary followed by uterus. Vulva postequatorial, in approximately third posterior portion of body. Eggs thick shelled; only embryonated eggs bear filaments, variable in number. Parasites of digestive tract of marine fishes.

Type species: Similascarophis maulensis n. sp.

Other species: Similascarophis chilensis n. sp., *S. marina* (Szidat, 1961) n. comb., and *S. nasonis* (Machida, 1981) n. comb.

Etymology: This new name is a combination of the generic name *Ascarophis* and the Latin term ''similis'' meaning similar because the morphology of the new genus is close to *Ascarophis*.

Taxonomic remarks

The Cystidicolidae includes 16 genera (Chabaud, 1975; Machida, 1976; Margolis, 1977; Appy and Anderson, 1982; Ko et al., 1985). Among these, *Ascarophis* van Beneden, *Neoascarophis* Machida, *Pseudascarophis* Ko, Margolis, and Machida, *Caballeronema* Margolis, and *Capillospirura* Skrjabin are closely related to *Similascarophis* n. gen. All these genera exhibit similar morphology under light microscopy, in the form of simple cuticular striations (no spines or denticulate rings; no

expansions, collarettes or furrows of cuticula at cervical region), simple buccal cavity, conical protrusions of pseudolabia, and a maximum of 10 caudal papillae in males.

In general, important differences among these genera occur in the cephalic region, specifically on the buccal structure (Figs. 1–6). *Ascarophis* has submedial labia and projections of pseudolabia toward the oral opening center (see Ko, 1986, Fig. 2) unlike those of *Similascarophis* n. gen. (Fig. 1). *Neoascarophis* possesses a buccal structure similar to that of *Ascarophis*, according to the drawing provided by Machida (1976). However, the buccal description is unclear when he said that ''*Neoascarophis* bears 3 pairs of pseudolabia.'' In any case, *Neoascarophis* has medial projections of pseudolabia, submedial labia, and a short and wide buccal cavity (Machida, 1976). In contrast, *Capillospirura* and *Caballeronema* possess similar buccal structures (Figs. 3, 4). These species also possess a ''bidentate platelike structure'' that refers to a projection of the inner buccal wall (Appy and Anderson, 1982), which is not present in *Similascarophis* n. gen. Moreover, there is a ridge apex in each pseudolabium in *Capillospirura* (Appy and Anderson, 1982). *Caballeronema* has a bilobed sublabia, and a large body length is exhibited by *Caballeronema* specimens (Margolis, 1977). Unlike *Similascarophis* n. gen., *Pseudascarophis* spp. does not have cephalic papillae or submedial labia and has buccal processes that are small and digitiform (Figs. 5, 6).

Ascarophis is the genus most morphologically similar to *Similascarophis* n. gen. Also, *Ascarophis* has many species and a wide distribution in the world (Ko, 1986). Under light microscopy, it is possible to distinguish these genera by observing the morphology of the mouth. The submedial labia and midprojections of pseudolabia are distinct in *Ascarophis* at ×1,000 magnification. These structures are absent in *Similascarophis* n. gen.

Similascarophis maulensis n. sp.

(Table I; Figs. 7–13)

General: Filiform worms. Cuticular striations well defined from anterior extremity to tail. Four cephalic papillae located ventrolaterally and dorsolaterally. Oral opening large, elongated along dorsoventral axis. Submedial labia absent; sublabia reduced to folds (Fig. 7). Two pseudolabia each with an anterior protrusion of conical shape. Medial portion of pseudolabium base connects to buccal wall (Fig. 7). No midprojection of pseudolabia. Amphids lateral to base of pseudolabia. Deirids close to beginning of muscular esophagus (Fig. 9). Absolute morphometric measurements for male and female nematodes in Table I.

Male (6 individuals): Glandular esophagus 4.4–6.9 times longer than muscular portion. Left spicule tubular, 6.5–7.5 times longer than right. Four pairs of preanal papillae and 5 pairs of postanal papillae (Fig. 13). Papillae pedunculate (Fig. 8). Cuticular elevations of area rugosa long and flat (Fig. 8). Area rugosa distribution 0.55–0.69 mm long (Fig. 13). Proportional measurements (range): BW/L 0.006–0.012, BC/L 0.013–0.023, NR/L 0.014–0.027, ME/L 0.043–0.071, GE/L 0.213–0.383, A/L 0.010–0.020, LS/L 0.068–0.099, and RS/L 0.009–0.015.

Female (11 individuals): Glandular esophagus 3.8–7.7 times longer than muscular portion. Uterus amphidelphic. Each ovary followed by the uterus (Fig. 10). Anterior ovary near middle of glandular esophagus; posterior ovary some distance from anus (Fig. 11). Vulva in third posterior portion of body (at 35.5–47.7% of body length from posterior end). Some individuals with tip at end of tail. Embryonated eggs bearing small knob at each pole (Fig. 12). Most eggs with 2 filaments in each pole connected to each egg knob; some eggs with 2 thick filaments in 1 pole and a tuft of thin filaments in other one. Proportional measurements (range): BW/L 0.005–0.009, BC/L 0.008–0.013, NR/L 0.005–0.017, ME/L 0.026–0.050, GE/L 0.165–0.261, and A/L 0.004–0.011.

Taxonomic summary

Type host: Adults of *B. chilensis* Regan (Bovichthydae).

Locality: Maule (36°40′S, 73°10′W), south-central coast of Chile.

Host habitat: Subtidal.

Site of infection: Intestine.

Prevalence and abundance: See Table II.

Etymology: The specific name of this species relates to the locality where they were collected, i.e., ''Maule.''

Deposition of specimens: Museo Nacional de Historia Natural, Chile: MHN Nem No. 11417 (paratypes).

Taxonomic remarks

This species resembles *Ascarophis nasonis* Machida from *Naso unicornis* (Forsskål) off Japan (Machida, 1981). The mouth was drawn in that study, although it was based on a scanning electron micrograph. According to the drawing, the buccal characteristics are very similar to those of *S. maulensis* n. sp. However, *S. maulensis* n. sp. is half the size of *A. nasonis*. As a result, all absolute morphometric measurements are different. The most important and remarkable characteristics of *S. maulensis* n. sp. relative to *A. nasonis* are the muscular esophagus is longer in males and females, even if they are smaller; eggs with filaments; and a postequatorial position of the vulva.

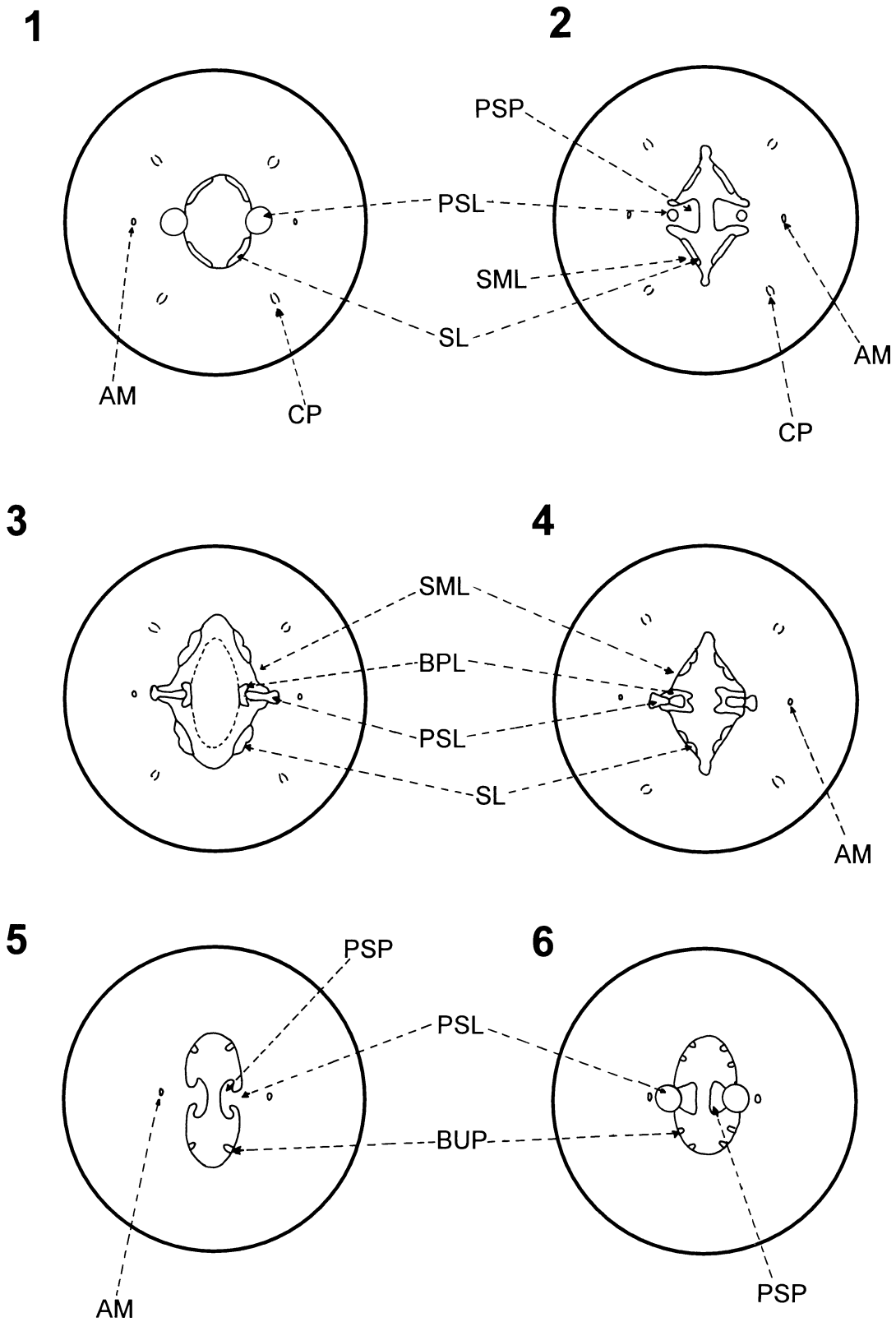
The left spicule in *A. nasonis* is longer in absolute measurement; however, in proportional measurements (according to body length of nematodes) it is longer in *S. maulensis* n. sp. (see Machida, 1981 and Table I).

Similascarophis chilensis n. sp.

(Table III; Figs. 14–24)

General: Filiform worms. Cuticular striations well defined from anterior extremity to tail (Fig. 14). Four cephalic papillae located ventrolaterally and dorsolaterally. Oral opening slightly elongated along dorsoventral axis. A pair of lateral pseudolabia with conical apex (Fig. 15). Pseudolabia base connected completely to buccal wall, without medial projection (Fig. 15). Amphids lateral to base of pseudolabia. Submedial labia absent. Four thin sublabia present, 2 dorsally and 2 ventrally (Fig. 15). Deirids slightly anterior to nerve ring level. Excretory pore posterior to nerve ring (Fig. 20). Absolute morphometric measurements in Table III.

Male (10 individuals): Glandular esophagus 2.5–4.4 times longer than muscular portion. Left spicule tubular and longer than the right one by 2–6.8 times. Area rugosa distributed between the anus up to posterior end of left spicule level (Fig. 24). Cuticular elevations of area rugosa long and plain, about 2–6 length (Fig. 16). Four pairs of preanal papillae and 5 pairs



FIGURES 1–6. Generalized morphology of the apical view of some cystidicolids. **1.** *Similascarophis* n. gen. **2.** *Ascarophis*. **3.** *Caballeronema*. **4.** *Capillospirura*. **5–6.** *Pseudascarophis*. Abbreviations: PSL: pseudolabium, PSP: pseudolabium projection to the middle of oral opening, SL: sublabium, CP: cephalic papilla, AM: amphid, SML: submedial labium, BPL: bidentate plate, BUP: buccal process, - - -: some part of the inner wall (in Fig. 3). Drawings based on photographs in published literature (Margolis, 1977; Appy and Anderson, 1982; Ko et al., 1985; Ko, 1986; Muñoz and George-Nascimento, 2001).

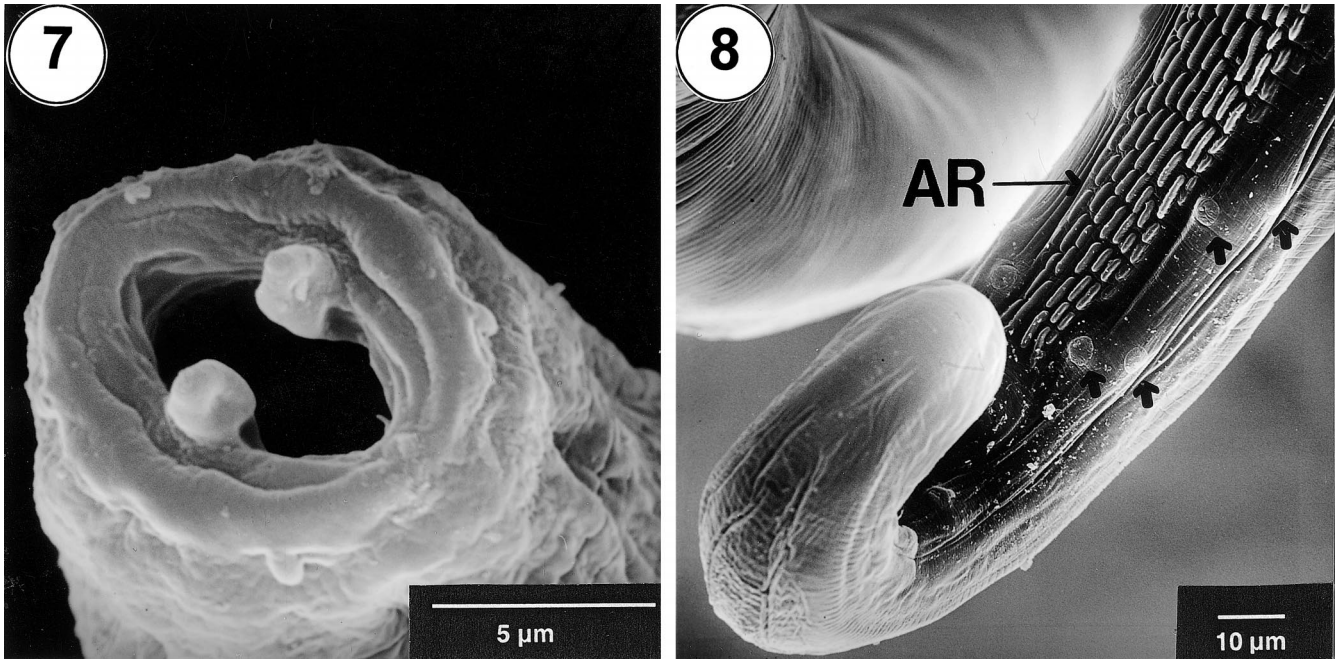
TABLE I. Range of values for the morphological and morphometrical characteristics of male and female *Similascarophis maulensis* n. sp. (host species: *Bovichthys chilensis*). The measurements are in micrometers, unless otherwise stated.

	Male (n = 6)	Female (n = 11)
Body length (mm)	6.77–9.84	8.05–17.30
Body width	55–88	67–123
Buccal cavity	120–153	87–163
Position of the nerve ring*	135–183	120–199
Muscular esophagus	427–488	290–613
Glandular esophagus (mm)	2.09–3.23	2.10–3.26
Excretory pore*	225–245	215–258
Deirids	†	97–111
Anus‡	93–168	55–85
Left spicule	652–708	
Right spicule	90–103	
Pairs of preanal papillae	4	
Pairs of postanal papillae	5	
Posterior tip		Some
Position of vulva (mm)‡		3.17–7.25
Egg length		36–41
Egg width		20–24
Polar filaments		Variable; 2 filaments in each polar egg, 2 filaments in 1 pole and a tuft on the other.

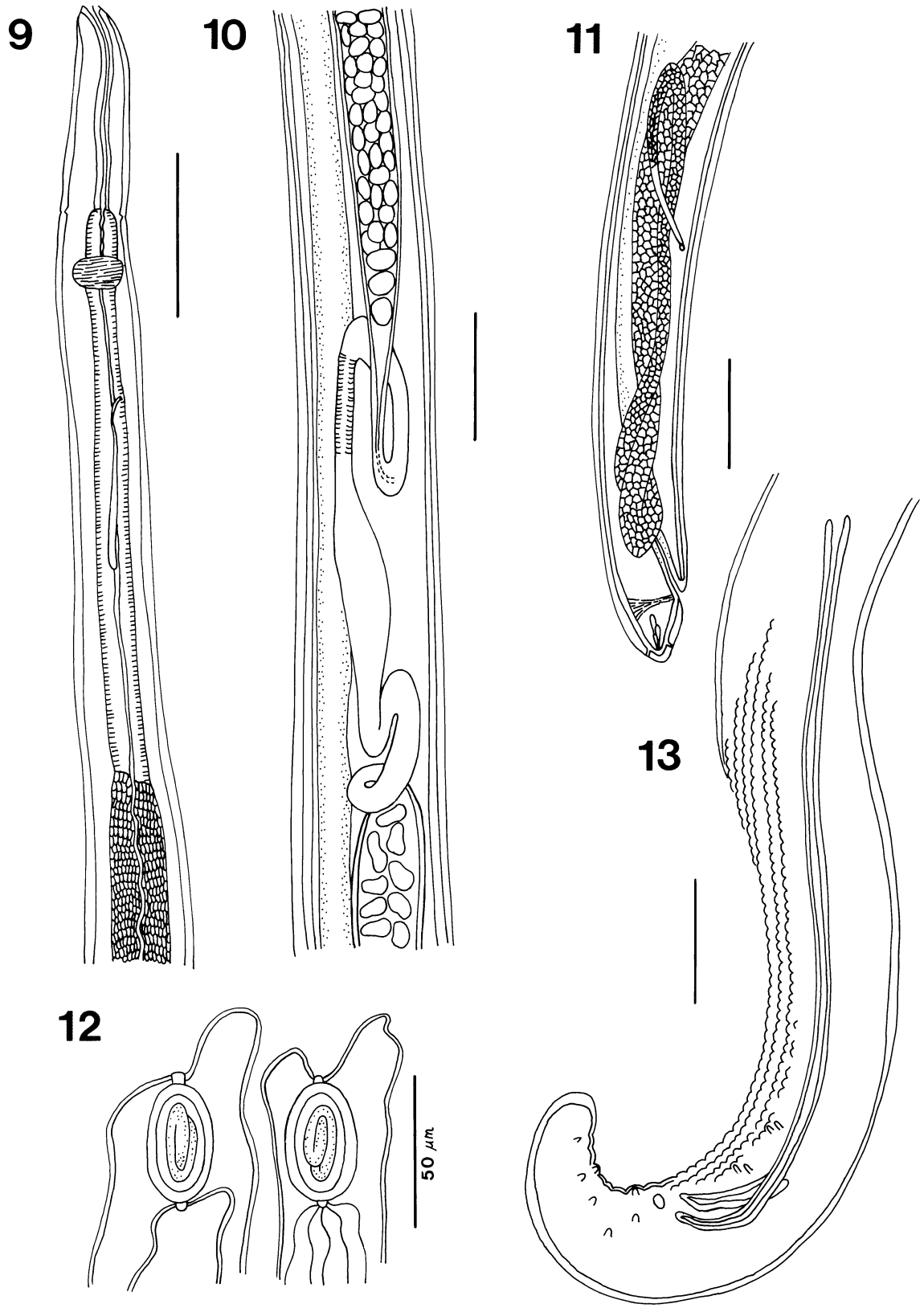
* Distance from anterior extremity.
† Measurement not taken.
‡ Distance from the posterior extremity.

of postanal papillae (Figs. 17, 24). Phasmids at same level of last pair of postanal papillae (Fig. 17). Proportional morphometry (range): WB/L 0.008–0.011, BC/L 0.015–0.023, NR/L 0.020–0.029, ME/L 0.043–0.063, GE/L 0.161–0.203, A/L 0.010–0.014, LS/L 0.040–0.082, and RS/L 0.008–0.014.

Female (16 individuals): Glandular esophagus 2.6–5.7 times longer than muscular portion. Uterus amphidelphic. Anterior ovary between middle to end of glandular esophagus (Fig. 21). Posterior ovary up to anus level (Fig. 23). Vulva (Fig. 22) near third portion of body, at 31–44% of body length from posterior end. Embryonated eggs bearing small knob at each pole. Two types of eggs were distinguished, according to filaments: 1 with 2 thick filaments on 1 pole and tuft of thin filaments on the other; another type of filament distribution with a tuft of thin filaments on each pole. Some individuals with small knob at tail end. Tail end is different looking among specimens from



FIGURES 7–8. SEM of *Similascarophis maulensis* n. sp. **7.** Oral opening. **8.** Area rugosa (AR) and preanal papillae (indicated by arrows).



FIGURES 9–13. Drawings of the morphology of *Similascarophis maulensis* n. sp. **9.** Anterior portion of the body. **10.** Ovary and uterus. **11.** Posterior portion of female. **12.** Embryonated eggs. **13.** Tail of male. Bar = 100 μm, unless otherwise stated.

TABLE II. Host species collected from different localities in Chile, number of host individuals (n) in each species, mean abundance ($\bar{x}$), and prevalence of *Similascarophis* n. gen.

Host species	Locality (°S)	n	$\bar{x}$	Prevalence (%)	Species of *Similascarophis* n. gen.
Bovichthys chilensis	Maule (36)	14	15.0	86	*S. maulensis*
Girella laevifrons	El Tabo (33)	40	1.0	43	*S. chilensis*
Graus nigra	El Tabo (33)	23	1.1	30	*S. chilensis*
Cheilodactylus variegatus	Chome (36)	13	1.1	77	*S. chilensis*
Pinguipes chilensis	Talcahuano (36)	29	2.3	31	*S. chilensis*
Eleginops maclovinus	Talcahuano (36)	5	6.6	80	*Similascarophis* sp.
Cilus gilberti	Talcahuano (36)	29	1.1	41	*Similascarophis* sp.

different host species (Figs. 18, 19). Proportional morphometry (range): WB/L 0.005–0.009, BC/L 0.007–0.011, NR/L 0.011–0.015, ME/L 0.022–0.041, GE/L 0.096–0.176, and A/L 0.004–0.007.

Taxonomic summary

Type host: Juveniles of *G. laevifrons* (Tschudi) (Kyphosidae).

Other hosts: Juveniles of *G. nigra* Philippi (Kyphosidae), adults of *P. chilensis* (Valenciennes) (Pinguipedidae), and *Chielodactylus variegatus* Valenciennes (Cheilodactylidae).

Type locality: El Tabo (33°27′S, 71°37′W), central coast of Chile.

Other locality: Talcahuano (36°40′S, 73°10′W), south-central coast of Chile.

Host habitat: Intertidal and subtidal.

Site of infection: Principally intestine for all species, although *G. laevifrons* and *G. nigra* also harbored specimens in the stomach.

Prevalence and abundance: See Table II.

Etymology: The specific name of this species relates the country where they were found, i.e., ''Chile.''

Deposition of specimens: Museo Nacional de Historia Natural, Chile: MHN Nem No. 11418, MHN Nem No. 11419, MHN Nem No 11420 (paratypes).

Taxonomic remarks

Similascarophis chilensis n. sp. possesses a small mouth, sublabia more developed, and pseudolabia base completely inserted in the buccal wall in comparison with *S. maulensis* n. sp. (Figs. 7, 15). Both species have similar body length ranges, which make them comparable in other morphometric measurements. *Similascarophis chilensis* n. sp. has a glandular esophagus shorter than that of *S. maulensis* n. sp. in males and females (Tables I, III). Also, the left spicule and the tail length in males are longer in *S. maulensis* n. sp.

Ascarophis marina is similar to *S. chilensis* n. sp. in buccal structure (see Ivanov et al., 1997). However, *A. marina* is twice as long as or longer than the species described here. Even though the length of buccal cavity, position of nerve ring, and muscular esophagus exhibit a similar range of measurements, the proportions (relative to body length) are smaller than for *Similascarophis* spp.

Similascarophis sp.

(Table IV; Figs. 25–28)

A previous multivariate analysis done on *Similascarophis* spp. revealed that specimens from *E. maclovinus* and *C. gilberti* are very close in morphometric measurements (analysis not shown here). The following description considers the nematodes collected from these 2 hosts species together.

General: Filiform worms. Cuticular striations well defined from anterior extremity to tail. Four cephalic papillae ventrolaterally and dorsolaterally. Oral opening slightly elongated along dorsoventral axis. Amphids lateral to base of pseudolabia. Pseudolabia with conical apex (Figs. 25, 27). Pseudolabia base totally connected to buccal wall, without medial projection. Submedial labia absent. Four sublabia present, 2 dorsally and 2 ventrally (Figs. 25, 27). Location of deirids not determined. Excretory pore posterior to nerve ring.

Male (10 individuals, Table IV): Glandular esophagus 3.8–8.8 times longer than muscular portion. Left spicule 2.4–6 times longer than right one, although with some variation in range in nematodes from different host species (Table IV). Four pairs of preanal papillae and 5 pairs postanal papillae. Cuticular elevations of the area rugosa present, semirounded, 1.5–4 length (Fig. 28). Proportional morphometry (range): WB/L 0.009–0.016, BC/L 0.016–0.031, NR/L 0.021–0.040, ME/L 0.037–0.059, GE/L 0.204–0.325, A/L 0.015–0.024, LS/L 0.047–0.111, and RS/L 0.010–0.023.

Female (3 individuals, Table IV): Glandular esophagus 3–4 times longer than muscular portion. Uterus amphidelphic. Postequatorial vulva, at 32–41% of body length from posterior end. Only 1 female with embryonated eggs; 2 females with immature eggs. Embryonated eggs bearing small knob at each pole. Two filaments in both poles of eggs connected to each egg knob. Some individuals bearing a small tip on end of tail (Fig. 26). Proportional morphometry (range): WB/L 0.007–0.011, BC/L 0.011–0.018, NR/L 0.019–0.025, ME/L 0.031–0.043, GE/L 0.109–0.166, and A/L 0.006–0.014.

Taxonomic summary

Host: Adults of *E. maclovinus* (Cuvier) (Eleginopsidae) and *C. gilberti* (Abbott) (Sciaenidae).

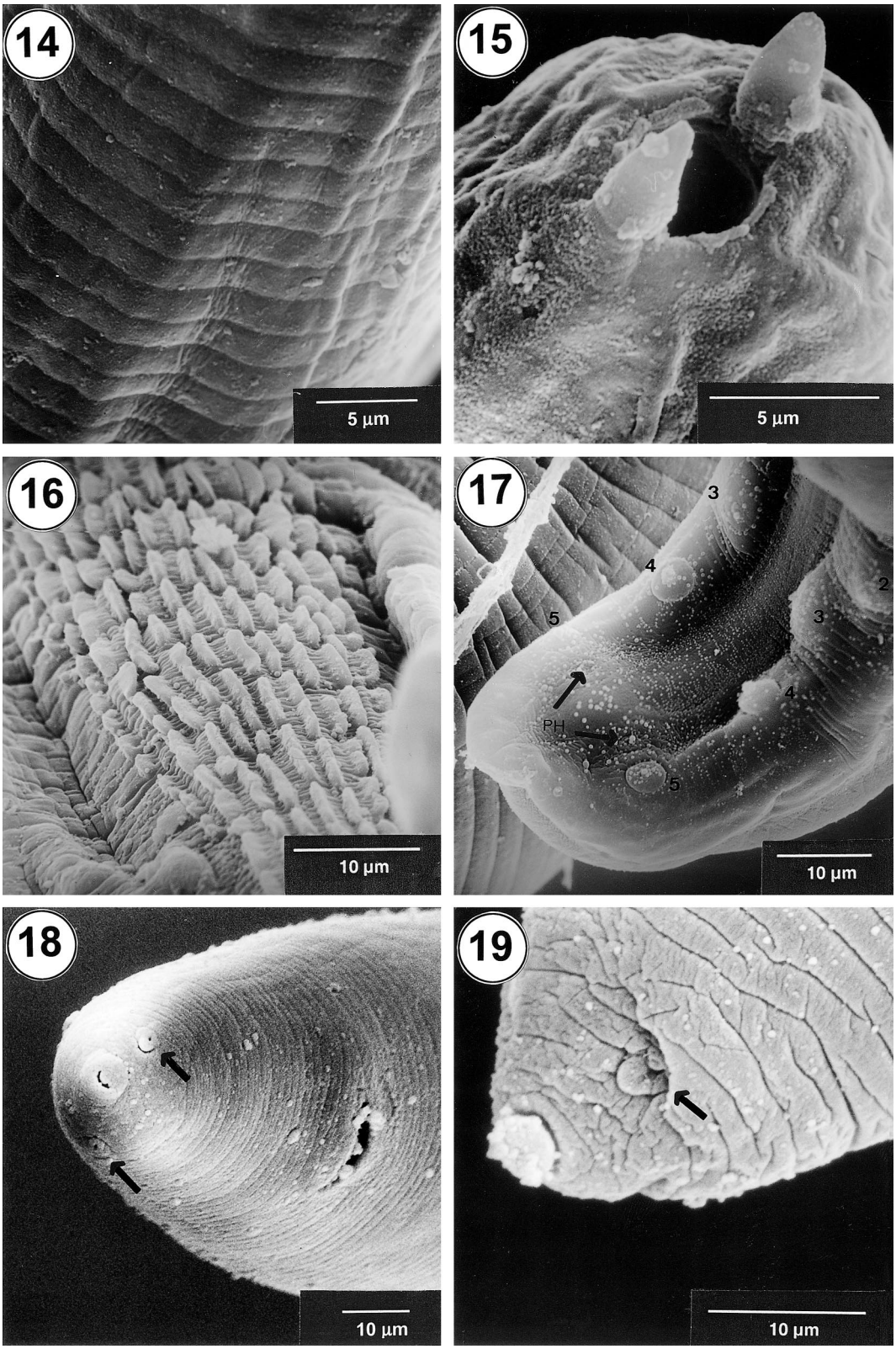
Locality: Talcahuano (36°40′S, 73°10′W), south-central coast of Chile.

Host habitat: Upper and lower subtidal.

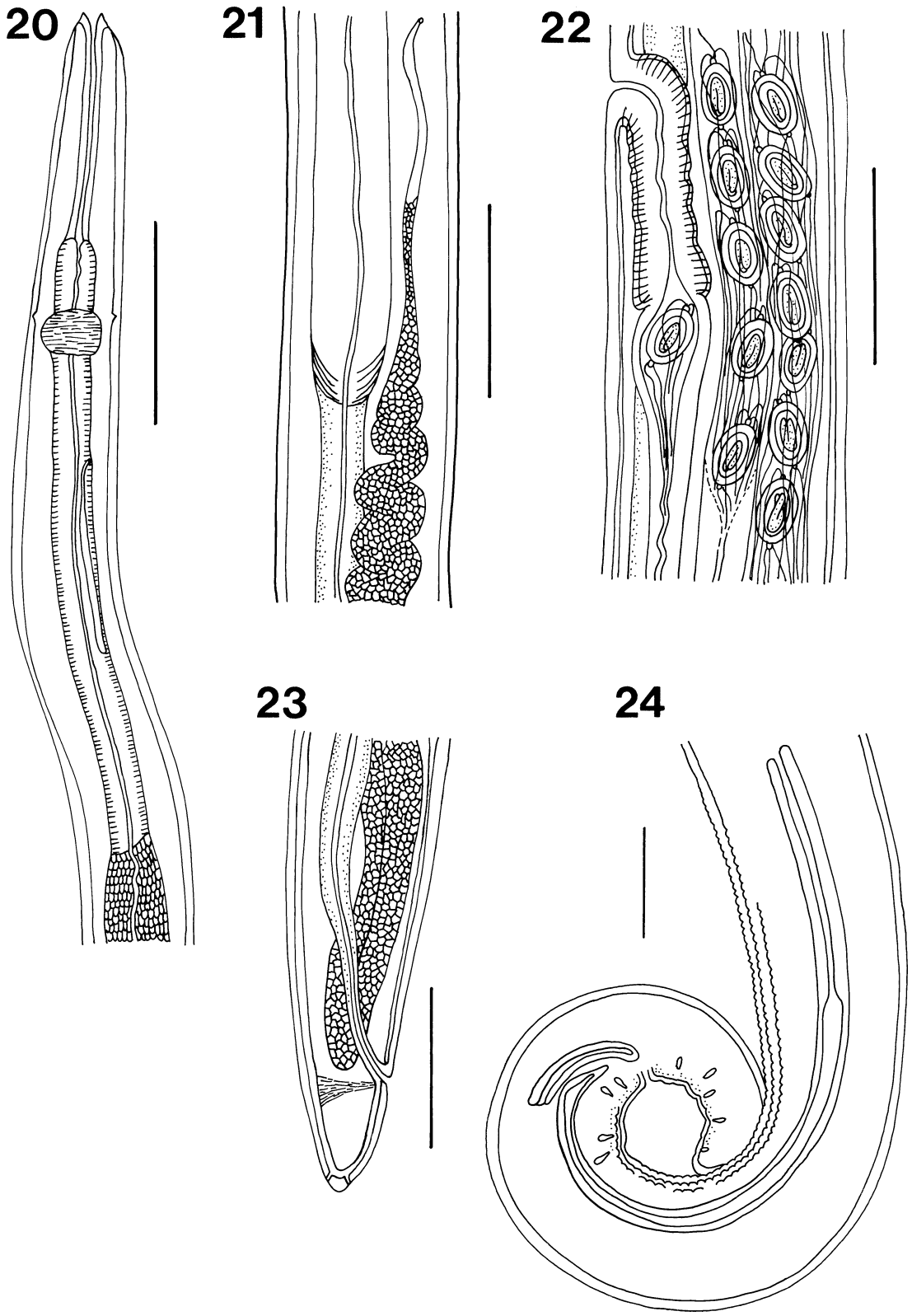
TABLE III. Range of values for morphological and morphometrical characteristics from male and female of *Similascarophis chilensis* n. sp. found from 4 fish species. The measurements are in micrometers unless otherwise stated.*

	A		B		C		D	
	Male (n = 10)	Female (n = 16)	Male (n = 4)	Female (n = 4)	Male (n = 4)	Female (n = 2)	Male (n = 5)	Female (n = 5)
Body length (mm)	4.15–8.47	11.38–18.50	5.50–10.13	9.55–14.35	5.65–10.13	10.63–11.5	4.76–7.05	7.15–19.58
Body width	45–95	60–113	63–90	75–94	60–75	81–88	70–90	88–163
Buccal cavity	93–133	109–143	105–153	100–138	88–163	115–130	115–130	100–158
Position of nerve ring†	125–193	155–190	130–193	125–163	140–215	173–175	135–170	130–222
Muscular esophagus	243–388	318–493	263–425	333-393	288–463	325–430	210–263	188–333
Glandular esophagus (mm)	0.84–1.67	1.25–2.10	1.27–2.70	1.00–1.60	1.47–2.12	2.23§	0.95–1.37	1.01–1.85
Excretory pore†	188–203	205–275	190	185–253	213–313	‡	235–260	255–350
Deirids	‡	160§	‡	153§	‡	‡	137–145	145§
Anus‖	80–109	50–95	96–132	75–88	70–150	83–88	100–113	78–123
Left spicule	300–443		449–509		159–380		365–464	
Right spicule	64–100		84–90		50–82		55–88	
Pairs of preanal papillae	4		4		4		4	
Pairs of postanal papillae	5		5		5		5	
Posterior tip		Some		Some		Present		Some
Position of vulva (mm)‖		3.85–6.88		3.43–5.35		3.60–4.00		2.87–7.70
Egg length		35–39		40–41		37–39		34–38
Egg width		21–24		23–28		21–23		19–22
Polar filaments		Present, but variable in number and type of filament.		Two filaments in 1 pole and several thinner ones in the other.		Two filaments in 1 egg pole.		Two filaments in each egg pole.

* Host species in column A, *Girella laevifrons*; B, *Graus nigra*; C, *Pinguipes chilensis*; D, *Cheilodactylus variegatus*.
† Distance from anterior extremity.
‡ Measurement not taken.
§ Measured in only 1 specimen.
‖ Distance from the posterior extremity.



FIGURES 14–19. SEM of *Similascarophis chilensis* n. sp. **14.** Cuticular striations (third anterior portion of the body). **15.** Oral opening. **16.** Area rugosa. **17.** Tail of male and postanal papillae (3, third pair, 4, fourth pair, and 5, fifth pair). **18–19.** Tails of females (arrows indicate phasmids).



FIGURES 20–24. Drawings of the morphology of *Similascarophis chilensis* n. sp. **20.** Anterior portion of the body. **21.** The beginning of anterior ovary. **22.** Vulva. **23.** Posterior portion of female. **24.** Tail of male. Bar = 100 μm.

TABLE IV. Range of values for morphological and morphometrical characteristics of male and female *Similascarophis* sp. in 2 host species. The measurements are in micrometers, unless otherwise stated.*

	A		B	
	Male (n = 7)	Female (n = 1)	Male (n = 3)	Female (n = 2)
Body length (mm)	4.00–5.77	9.55	5.00–6.00	7.13–7.38
Body width	50–68	103	75–80	50–70
Buccal cavity	95–138	133	123–135	75–135
Position of nerve ring†	123–178	180	153–183	138–183
Muscular esophagus	193–268	295	245–278	255–320
Glandular esophagus (mm)	0.82–1.88	1.17	1.05–1.35	0.78–1.22
Excretory pore†	193–295	283	230–280	193–263
Deirids	‡	‡	‡	‡
Anus§	75–109	105	100–108	45–100
Left spicule	309–487		235–338	
Right spicule	42–93		82–98	
Pairs of preanal papillae	4		4	
Pairs of postanal papillae	5		5	
Posterior tip		Present		Some
Position of vulva (mm)§		4.0		2.31–2.45
Egg length		33–34		Immature eggs
Egg width		21–22		
Polar filaments		Two filaments in each pole.		

* Host species in column A, *Eleginops maclovinus*; B, *Cilus gilberi*.
† Distance from anterior extremity.
‡ Measurement not taken.
§ Distance from the posterior extremity.

Site of infection: Intestine.

Prevalence and abundance: See Table II.

Deposition of specimens: Museo Nacional de Historia Natural, Chile: MHN Nem No. 11421 (voucher specimens).

Taxonomic remarks

Similascarophis sp. has the same characteristics with respect to the mouth of *S. chilensis* n. sp. The ranges of absolute measurements for almost all morphometric characteristics were also similar. However, most nematodes found in *E. maclovinus* and *C. gilberti* were immature. Only 1 mature female and 2 gravid ones were found in these fish species. Because several males were immature, i.e., the spicules were indistinct although caudal papillae were visible, they were not included in the Table IV. In general, the body length of these nematodes was shorter than that of other *Similascarophis* spp. (Tables I, III, IV). This raises doubts about stage of maturation. The proportional morphometry of male *Similascarophis* sp. showed more differences; for example, it possessed a larger proportional body width and glandular esophagus and an anus position, as well as a nerve ring position, more posterior than in *S. chilensis* and *S. maulensis*. Also, the area rugosa was round, with cuticular elevations that look different from those of other *Similascarophis* spp. On the other hand, the female buccal cavity was larger and the anus position was more anterior than in other species. These differences are not strong enough to describe these worms as a new species.

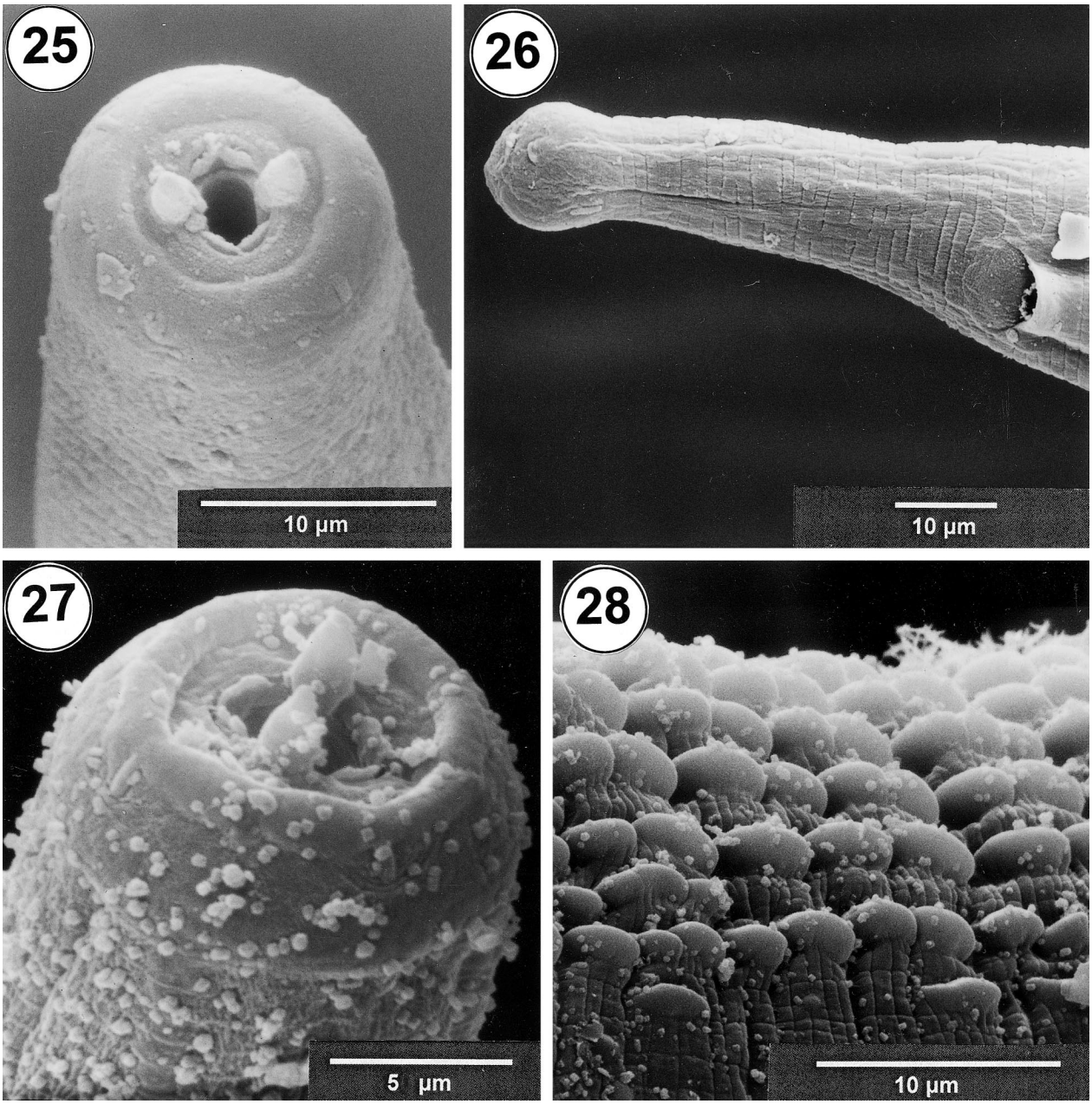
DISCUSSION

Cephalic and sexual characteristics are important to identify nematodes (see Chabaud, 1975). The mouth morphology, especially, has received a lot of attention because of its variety. For example, Campana-Rouget (1955) and Dollfus and Campana-Rouget (1956) provided the first comparisons and drawings of oral openings of some cystidicolids, including *Ascarophis* spp. In general, functions of submedial labia, as well as midprojections of pseudolabia, are unknown. Ko (1986) suggested that sublabia could help to close the oral opening. However, whatever is the specific function of each buccal part, they are related to the kind of food ingested or the way in which the food is ingested (or both).

Several *Ascarophis* spp., whose drawings, micrographs, or descriptions of the mouth have been provided in published studies, exhibit the general morphology illustrated in Figure 2. *Ascarophis nasonis* and *A. marina* possess the *Similascarophis* n. gen. mouth morphology shown in Figure 1. Consequently, we propose that they belong to *Similascarophis* n. gen., and we therefore propose the new combinations *S. marina* and *S. nasonis*.

The egg filaments have been considered as a taxonomic character. However, the number and kind of filaments vary within the same species (Ko, 1986). In addition, Margolis (1977) and Appy (1981) have described variations in the egg filament numbers in other species of the other the cystidicolid genera. Thus, it seems that the most important taxonomic character is the presence or absence of filaments, although Appy (1981) suggested that the arrangement of filaments (1 or both egg poles) could be a more consistent characteristic.

Similascarophis chilensis n. sp. exhibited varied morphometric measurements in nematodes collected from different host species (Table III). Some differences in the absolute morphometric ranges were found in different nematode groups; for instance, the left spicule length had a smaller range in specimens



FIGURES 25–28. SEM of *Similascarophis* sp. **25.** Oral opening. **26.** Tail of female of nematodes from *Eleginops maclovinus*. **27.** Oral opening. **28.** Area rugosa of nematodes from *Cilus gilberti*.

from *P. chilensis* and a larger range in those from *G. nigra* (Table III). Other differences included larger eggs and the existence of a tip on the tail of female nematodes from *G. nigra* (Figs. 18, 19). These differences could be influenced by the specific identity of the host. There are studies that indicate that host species offer different kinds of microhabitats and that these variations influence morphologies (e.g., Downes, 1990; George-Nascimento et al., 1992; George-Nascimento and Muñoz, 1997). Moreover, different maturity stages may vary within different host species. For this reason, we could not determine whether *Similascarophis* sp. represents a new species (Table IV).

Problems in the taxonomy of helminth parasites in marine hosts are diverse (Gibson, 1992). Taxonomy based on molecular methods has frequently pointed to the existence of sibling species between synxenic and alloxenic parasites (Renaud and Gabrion, 1988; Väinölä et al., 1994). As a consequence, the trend in the literature has been to suspect that each host species may harbor a different species of parasite. Thus, morphometry does not always clearly identify species because there are sometimes overlaps in morphometric measurements among species or there may even be large variation within a single host species. In the future, molecular analysis could be applied to improve distinctions among species, especially among small parasites, like those in this study.

ACKNOWLEDGMENTS

We appreciate the assistance provided by Viviana Olmos in scanning electron micrographs, as well as by Claudio Valdovinos who sponsored this study partially with the grant FONDECYT 1000526. This study was also supported in part by the grants FONDECYT 1980442, and FONDAP, Program 3: Marine Biology and Conservation (by M. George-Nascimento). We thank Craig Hayward and Tom Cribb for reviewing the manuscript. We also appreciate valuable comments and suggestions of Mark Siddall (American Museum of Natural History) and 2 anonymous reviewers.

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