Redescription of *Allobenedenia dischizosepta* (Suriano, 1975) n. comb. (Monogenoidea: Capsalidae: Trochopodinae) from the Gills of Argentine Sea Basses (*Acanthistius*) in the Southwestern Atlantic Ocean

Author(s): Estefanía Bagnato, Stephen A. Bullard, and Florencia Cremonte
Source: Comparative Parasitology, 84(2):111-118.
Published By: The Helminthological Society of Washington
https://doi.org/10.1654/1525-2647-84.2.111
URL: http://www.bioone.org/doi/full/10.1654/1525-2647-84.2.111

Comp. Parasitol.
84(2), 2017, pp. 111–118

Redescription of *Allobenedenia dischizosepta* (Suriano, 1975) n. comb. (Monogenoidea: Capsalidae: Trochopodinae) from the Gills of Argentine Sea Basses (*Acanthistius*) in the Southwestern Atlantic Ocean

Estefanía Bagnato,[1,3] Stephen A. Bullard,[2] and Florencia Cremonte[1]

[1] Laboratorio de Parasitología, Instituto de Biología de Organismos Marinos, Boulevard Brown 2915, U9120ACF Puerto Madryn, Argentina (e-mail: bagnato@cenpat-conicet.gob.ar; fcremont@cenpat-conicet.gob.ar) and
[2] Aquatic Parasitology Laboratory, School of Fisheries, Aquaculture, and Aquatic Sciences, College of Agriculture, Auburn University, 203 Swingle Hall, Auburn, AL 36849, U.S.A. (e-mail: sab0019@auburn.edu)

ABSTRACT: We herein redescribe *Allobenedenia dischizosepta* (Suriano, 1975) n. comb. (Monogenoidea: Capsalidae) based on light microscopic analysis of the holotype and 18 paratypes from the gill of *Acanthistius brasilianus* (Cuvier, 1828) (Perciformes: Serranidae) along with light and scanning electron microscopy of 25 newly collected specimens from the gill of *Acanthistius patachonicus* (Jenyns, 1842) (new host record) in the southwestern Atlantic Ocean off Argentina. Contradicting the original description of this species and its generic diagnosis, all specimens had 5 loculi (2 anterior plus 3 posterior loculi) plus 5 corresponding haptoral septa only (central loculus absent). The original description of this species erroneously specified 6 loculi, including 2 small anterolateral loculi. Because *A. dischizosepta* was the type species for *Tetrasepta* Suriano, 1975 and because it fits the diagnosis of *Allobenedenia* Yamaguti, 1963, the genus therefore is regarded a junior synonym of *Allobenedenia*. *Allobenedenia dischizosepta* differs from its congeners by lacking a haptoral peduncle as well as by having 5 haptoral loculi, accessory sclerites that lack a conspicuous dorsal protuberance and that are weakly bifid, by posssesing robust anterior hamuli that are strongly recurved for half of their total length, by having a male accessory gland reservoir in the extreme posterior portion of the penis sac and lateral to the vitelline reservoir abutting the ovary, and by the presence of a straight (not coiled) proximal portion of the ejaculatory duct within the penis sac.

KEY WORDS: *Allobenedenia dischizosepta*, *Acanthistius patachonicus*, Argentine sea bass, Capsalidae, Trochopodinae, Chubut province, Argentina.

Acanthistius (Perciformes: Serranidae) includes 2 southwestern Atlantic Ocean species: *Acanthistius brasilianus*, which is a rare species in Brazilian waters from Bahia to São Paulo (15–23°S), and *Acanthistius patachonicus*, which is more common and ranges from Rio Grande do Sul (South Brazil, 30°S) to San Jorge Gulf, Argentina (48°S) (Irigoyen et al., 2008).

Suriano (1975) collected several capsalid monogenoids from the gill of *A. brasilianus* (type host) from Mar del Plata (38°S, 57°W) and described a new species (*Tetrasepta dischizosepta* Suriano, 1975) for which she erected the new genus *Tetrasepta* Suriano, 1975. The subfamily Trochopodinae Price, 1936 includes 17 genera that, collectively, comprise species that predominantly infect the gill and buccal cavity of perciforms (Whittington, 2004). They are perhaps the most diverse capsalid subfamily regarding the number of haptoral loculi, the shape of the anterior attachment organ, and the number of testes (Whittington, 2004); perhaps indicating the need for a high degree of intergeneric revisionary systematics work. Only 3 of the 17 accepted trochopodine genera have >3 species (Whittington, 2004), indicating the presence of numerous innominate taxa and perhaps new genera.

Herein, we reassess *T. dischizosepta* based on the study of the holotype and paratypes from *A. brasilianus* as well as analyze newly collected specimens from the cognate, *A. patachonicus*, using light and scanning electron microscopy. Our results extend the taxonomic revision of *Allobenedenia* Yamaguti, 1963 of Yang et al. (2004) and comprise the first report of a trochopodine from *A. patachonicus*.

MATERIALS AND METHODS

During 2013 and 2014, 227 specimens of *A. patachonicus* (112 from San José Gulf [42°25′S, 64°32′W]; 115 from Nuevo Gulf [42°46′S, 64°57′W]) were captured with hook-and-line or spear-fishing in the North Patagonian Gulfs, Chubut Province, Argentina. The gill was examined under a stereo dissecting microscope, and monogenoids were removed using fine forceps, washed several times in fresh water, and fixed in 10% neutral buffered formalin. Later, whole specimens were washed with fresh water and transferred to and held in a vial of 70% ethanol, stained with acetic Carmine or Gomori's trichrome, gradually dehydrated

[3] Corresponding author.

through an ethanol series, cleared in methyl salicylate, and permanently mounted on glass slides using Canada balsam.

The type material was borrowed from the Helminthological Collection of the Museo de La Plata (MLP), La Plata, Buenos Aires Province, Argentina (holotype MLP-He 6425/1 and paratypes MLP-He 6425/2, and vouchers (CNP-Par 35 and 36) from the Parasitological Collection of Instituto de Biología de Organismos Marinos (CNP-Par), Puerto Madryn, Chubut Province, Argentina.

Illustrations of the holotype and paratypes from *A. brasilianus* as well as the newly collected, stained, whole-mounted specimens from *A. patachonicus* were made with the aid of a Leica DM2500 (Leica, Wetzler, Germany) microscope equipped with differential interference contrast (DIC) optical components and a drawing tube. Photographs of whole-mounted specimens were taken with a Leica DFC280 digital camera. Parasite measurements are herein reported in micrometers (μm). Specimens for scanning electron microscopy (SEM) were gradually dehydrated in an ethanol series, immersed in hexamethyldisilazane for 15 min, air dried for 10 min, and sputter-coated with gold palladium. Photomicrographs were obtained with a Jeol JSM-6460LV SEM operating at 15 kV. Prevalence and mean intensity of infection with standard deviation and range in parenthesis were calculated according to Bush et al. (1997). Scientific names for fishes follows Irigoyen et al. (2008). Classification and anatomical terms for the parasites follows Bullard et al. (2004) and Barse and Bullard (2012).

RESULTS

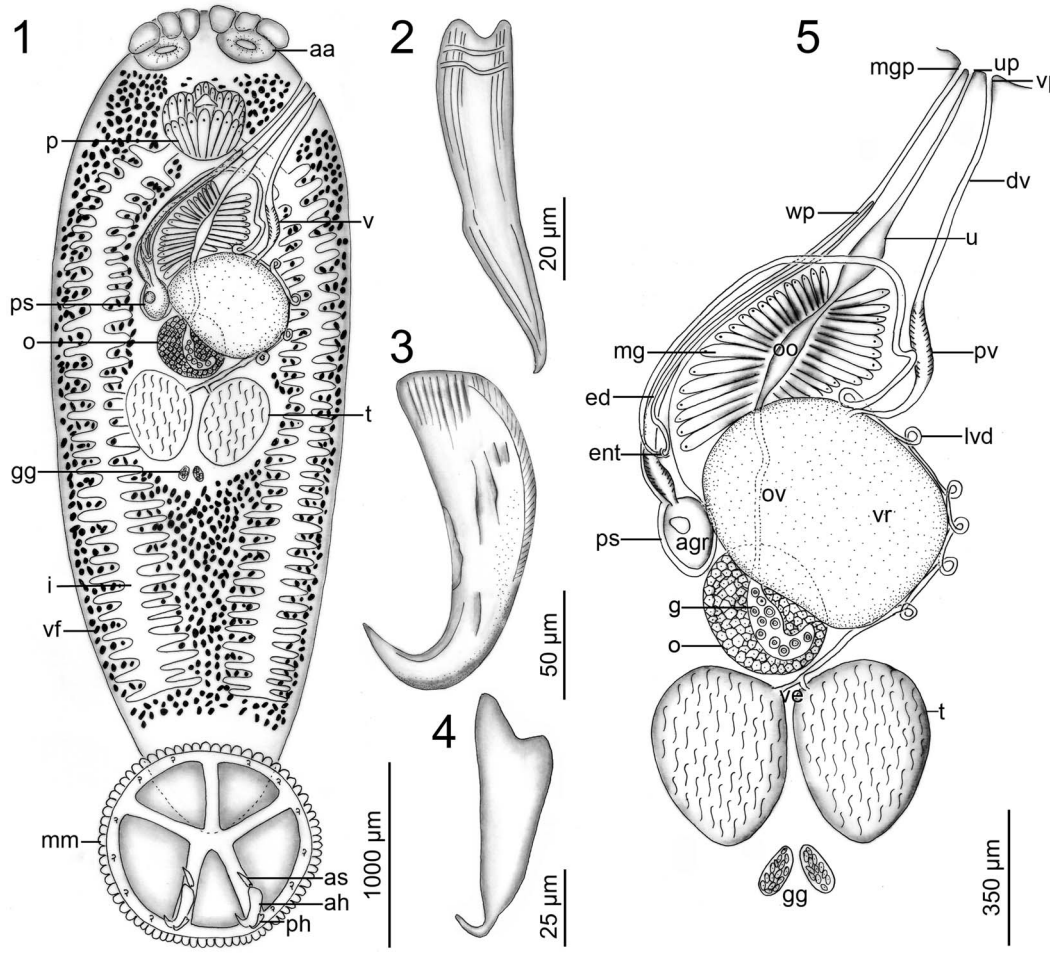
Allobenedenia dischizosepta (Suriano, 1975) n. comb. syn. *Tetrasepta dischizosepta* Suriano, 1975 (Figs. 1–7; Table 1)

Redescription

Based on the holotype plus 18 paratypes and 25 stained, whole-mounted voucher specimens; measurements reported in Table 1: Body opaque in life; body margins smooth-surfaced (lacking scalloped margins), having equally rounded edges; eyespots in 2 pairs, immediately prepharyngeal; posterior pair of eyespots larger than anterior pair. Anterior attachment organs bilaterally symmetrical, appearing glandular, each having 3 glandular pads anteriorly; having 2 submarginal suckers (Figs. 1, 6). Haptor discoid, with 5 loculi formed by 3 anterior and 2 posterior septa (lacking central loculus), having marginal membrane (Figs. 1, 7), with sclerites flanking posteriormost loculus; marginal membrane with approximately 88 scallops; marginal haptoral hooklets 14 in number, comprising 6 hooklets per side of haptor plus 1 pair between level of haptoral sclerites; accessory sclerites (Figs. 1, 2) with proximal end moderately (weakly) bifid, with distal end coming to a sharp point, slightly bent laterad, protruding from haptor ventral surface; anterior hamuli largest, strongly recurved for half of total length (Figs. 1, 3); posterior hamuli approximately triangular in shape, presenting at its distal end a pronounced hook (Figs. 1, 4). Pharynx ovoid, strongly papillate, associated with glandular cells ventral to pharynx. Esophagus indistinct. Intestinal ceca extending posteriad to level of anterior haptoral margin, having extensive laterally directed diverticula, difficult to trace when coursing through vitellarium.

Testes 2 in number, irregularly shaped but predominantly spheroid, longer than wide, intercecal, juxtaposed near middle of body, postovarian (Figs. 1, 5). Vasa efferentia comprising paired ducts extending anteromediad from anterior margin of testes, uniting between testes and posterior to ovary; vas deferens extending anteriad and sinistral to ovary and vitelline reservoir, looping several times along lateral margin of vitelline reservoir, coursing between ootype and proximal vagina before arching anterodextrad around ootype, turning posteriad and coursing along dextral side of ootype before penetrating penis sac medially and meeting with proximal portion of ejaculatory duct (Figs. 1, 5). Penis sac enveloping male accessory gland reservoir, ejaculatory duct, and penis, directing anterosinistrad between pharynx and uterus, opening sinistrally within a common genital atrium at level of pharynx; male genital pore anterior to female pore within the genital atrium (Figs. 1, 5); male accessory gland reservoir spheroid, constricted distally where connecting with ejaculatory duct; ejaculatory duct straight (if penis extruded) or convoluted (if penis withdrawn); penis appendix-like, elongate (Figs. 1, 5). Glands of Goto posteromedial to testes.

Ovary pretesticular and occupying space between male accessory gland reservoir and testes, medial, intercecal, spheroid, enclosing germarium. Oviduct emanating from anterior margin of ovary, extending anteriad along midline and dorsal to vitelline reservoir; vitelline duct extending from dorsal aspect of vitelline reservoir, connecting with oviduct at level of male accessory gland reservoir dorsal to vitelline reservoir to form ovo-vitelline duct; ovo-vitelline duct continuing anteriad along midline before connecting with ootype; ootype occupying space between penis sac and vitelline reservoir, surrounded by Mehlis gland. Uterus extending anterosinistrad, dilated proximally,



Figures 1–5. *Allobenedenia dischizosepta* (Suriano, 1975) n. comb. (Monogenoidea: Capsalidae: Trochopodinae) from gill of Argentine sea bass, *Acanthistius patachonicus* captured in the Southwestern Atlantic Ocean. **1.** Body of adult specimen from gill of *A. patachonicus*, ventral view. **2.** Details of accessory sclerites. **3.** Details of anterior hamulus. **4.** Details of posterior hamulus. **5.** Genitalia of *A. dischizosepta* (Suriano, 1975) n. comb., ventral view. *Abbreviations:* anterior attachment organ (aa), anterior hamulus (ah), distal vagina (dv), ejaculatory duct (ed), entry point of vas deferens to penis sac (ent), germarium (g), glands of Goto-like (gg), haptoral accessory sclerites (as), haptoral marginal membrane (mm), intestine (i), male accessory gland reservoir (agr), male genital pore (mgp), Mehlis' gland (mg), ootype (oo), ovary (o), oviduct (ov), penis sac (ps), pharynx (p), posterior hamulus (ph), proximal vagina (pv), sinistral loop of vas deferens (lvd), testes (t), uterine pore (up), uterus (u), vagina (v), vaginal pore (vp), vasa efferentia (ve), vitelline follicles (vf), vitelline reservoir (vr), withdrawn penis (wp).

opening within a common genital atrium (Figs. 1, 5). Vaginal pore single, immediately posterior to common genital opening; vagina a simple duct extending posteromediad from vaginal pore, comprising a tube-like distal portion plus a laterally expanded proximal portion; proximal portion of vagina thick-walled (likely functioning as seminal receptacle). Vitellarium coextensive with intestine, distributing throughout body from pharynx to haptor (Fig. 1). Egg tetrahedral, with proximal filament.

Taxonomic summary

Type host: Acanthistius brasilianus (Cuvier, 1828) (Perciformes: Serranidae).

Table 1. Measurements (μm) of type material (from Mar del Plata 38°S) with newly collected specimens (from North Patagonian Gulfs 42°S) of *Allobenedenia dischizosepta* (Suriano, 1975) n. comb. from the gill filaments of *Acanthistius patachonicus*. Mean and range in parentheses. *n* = number of measured specimens.*

		Mar del Plata				Nuevo Gulf			San José Gulf		
		Holotype	Paratypes			Newly collected specimens					
Measurements		Mean	Mean	Range	*n*	Mean	Range	*n*	Mean	Range	*n*
Body length	IH	8,800	5,991	(3,340–8,050)	17	5,012	(2,800–6,250)	10	5,641	(3,950–7,450)	14
	EH	7,450	4,896	(2,280–7,200)	17	4,034	(2,300–5,150)	10	4,866	(3,150–6,800)	14
Maximum body width		2,480	2,066	(610–2,850)	18	1,447	(800–2,100)	10	1,488	(880–2,250)	15
Anterior attachment organ	L	300	325	(160–490)	18	315	(200–390)	10	359	(150–520)	13
	W	590	512	(310–650)	18	449	(350–550)	10	459	(370–600)	13
Latter-most pad	L	50	118	(50–170)	14	108	(70–150)	8	153	(100–300)	6
	% of BL	0.60	2.00	(0.90–4.30)	13	2.30	(1.40–3.30)	8	2.60	(1.30–5.40)	6
	W	200	196	(140–250)	14	143	(110–180)	8	168	(100–200)	6
	% of BW	8.10	11	(6.80–25)	14	9.10	(2.90–14)	8	13	(6.50–23)	6
Middle pad	L	70	143	(50–232)	14	139	(95–200)	8	193	(150–300)	6
	% of BL	0.80	2.40	(0.90–4.40)	13	2.90	(2.40–3.40)	8	3.30	(2.30–5.40)	6
	W	190	132	(73–150)	14	126	(85–150)	8	137	(100–190)	6
	% of BW	7.70	6.80	(4.90–12)	14	8.70	(7.00–11)	8	9.70	(7.70–11)	6
Medial pad	L	160	191	(100–300)	14	168	(110–250)	8	250	(200–350)	6
	% of BL	1.80	3.20	(1.70–4.40)	13	3.50	(2.40–4.50)	8	4.10	(2.70–5.00)	6
	W	230	196	(130–318)	14	164	(110–200)	8	175	(120–240)	6
	% of BW	9.30	10	(6.20–25)	14	12	(7.60–14)	8	13	(8.50–18)	6
Submarginal suckers of AAO	L	170	202	(120–310)	17	180	(140–210)	10	233	(150–350)	12
	W	470	376	(250–550)	17	319	(230–400)	10	306	(180–460)	11
Mouth	W	200	164	(50–250)	8	163	(30–300)	6	141	(20–300)	11
Pharynx	L	800	597	(300–850)	18	415	(240–560)	10	473	(350–600)	14
	W	600	607	(220–850)	18	404	(260–500)	10	428	(270–530)	14
Intestine	MW	250	407	(300–646)	9	250	250	3	250	–	1
Vas deferens	L	3,700	2,608	(750–3,911)	18	1,676	(900–2,300)	10	2,027	(1,380–2,980)	14
	% M BW	149	126	(88–151)	18	116	(90–148)	10	133	(93–169)	14
	W	250	24	(14–49)	16	16	(10–20)	4	18	(10–30)	4
Penis sac	L	2,580	1,969	(800–2,660)	18	1,513	(770–2,380)	10	1,445	(930–1,800)	14
	% M BW	104	97	(73–131)	18	104	(83–129)	10	99	(71–140)	14
	MW	250	176	(60–310)	18	161	(80–370)	10	149	(100–240)	14
	TW	20	17	(2.00–30)	15	13	(4.00–20)	6	29	(10–50)	7
MAGR	L	390	227	(80–390)	17	198	(100–400)	10	202	(110–410)	14
	% of PS L	15	11	(8.60–18)	17	13	(6.00–17)	10	14	(6.70–34)	14
	MW	250	175	(50–300)	17	156	(75–350)	10	134	(100–200)	14
Penis	L	1,400	841	(350–1,056)	17	630	(400–1,000)	10	682	(400–850)	14
	W		17	(11–22)	2	27	(18–40)	8	40	(30–50)	4
Male genital pore	L	50	21	(10–50)	17	24	(14–50)	9	28	(10–50)	15
	% of BL from AE	9.60	4.90	(2.60–11)	17	5.80	(3.30–8.80)	9	7.30	(2–20)	14
Ovary	L	550	405	(150–650)	18	277	(110–460)	10	305	(85–450)	15
	% of BL	6.30	6.50	(4–9.80)	17	5.40	(3.80–7.80)	10	5.30	(2.10–7.40)	15
	W	490	377	(160–650)	18	262	(200–440)	10	244	(140–400)	15
	% of BW	20	19	(13–26)	18	18	(14–25)	10	17	(8.80–23)	15
Germarium	L	200	482	(100–1,070)	15	150	150	1	205	(200–210)	2
	W	100	120	(50–250)	15	100	100	1	30		2
Oviduct	L	1,050	620	(250–990)	15	365	(290–440)	2	332	(240–500)	9
	W	20	23	(20–30)	7	23	(20–25)	2	14	(6.00–20)	6
Ootype	L	275	65	(20–200)	14	93	(40–140)	3	67	(60–82)	3
	W	223	54	(15–150)	14	70	(40–90)	3	57	(40–80)	3
Uterus	L	1,312	1,039	(420–1,567)	8	967	(881–1,150)	5	881	(750–1200)	8

Table 1. Continued.

		Mar del Plata				Nuevo Gulf			San José Gulf		
		Holotype	Paratypes			Newly collected specimens					
Measurements		Mean	Mean	Range	*n*	Mean	Range	*n*	Mean	Range	*n*
Vagina	L	1,800	1,452	(900–1,850)	11	965	(600–1,330)	10	1,125	(950–1,350)	8
	DP L	1,125	954	(550–1,500)	10	622	(400–830)	9	759	(600–1,000)	7
	DP W	20	23	(20–30)	8	19	(10–20)	8	22	(10–50)	6
	PP L	680	492	(325–669)	10	338	(120–508)	9	353	(280–480)	7
	PP W	102	77	(50–120)	9	58	(30–110)	6	79	(45–110)	7
Vitellarium	D (each)	85	50	(24–99)	17	36	(8.00–63)	10	39	(20–51)	15
	W (VD)	4.00	3.40	(2.30–7.00)	7	3.40	(2.00–5.00)	4	2.60	(2–3)	5
	AWB	2,100	1,694	(820–2,450)	18	1,171	(720–1,750)	10	1,207	(700–1,750)	15
	% of BW	85	85	(61–134)	18	81	(58–90)	10	82	(71–90)	15
Vitelline reservoir	L	600	691	(370–1,000)	16	433	(150–550)	9	392	(130–750)	13
	W	750	712	(480–1,000)	16	416	(220–600)	9	355	(210–550)	13
Egg	L	–	–	–	–	300	(250–350)	2	278	(200–450)	5
	W	–	–	–	–	125	(100–150)	2	112	(100–130)	5
Testes	L	820	591	(350–850)	18	419	(300–630)	10	463	(290–650)	15
	W	700	489	(290–650)	18	352	(250–500)	10	298	(200–400)	15
Glands of Goto-like	L	150	123	(50–250)	10	113	(100–150)	4	119	(100–160)	6
	W	110	132	(50–202)	10	88	(50–140)	4	85	(50–130)	6
Haptor	L (EMM)	1,350	1,053	(650–1,540)	17	1,092	(700–1,400)	10	909	(550–1,200)	15
	W (EMM)	1,540	1,245	(950–1,700)	17	1,250	(790–1,550)	10	1,321	(1,000–1,550)	15
	% of BL	15	19	(11–27)	17	22	(17–26)	10	16	(8.70–25)	15
	L (IMM)	1,486	1,206	(730–1,720)	15	1,238	(800–1,600)	8	997	(609–1,400)	15
	W (IMM)	1,676	1,400	(1,150–1,900)	15	1,373	(890–1,720)	8	1,430	(1,120–1,700)	15
Marginal membrane	W	136	94	(50–122)	16	86	(50–100)	9	81	(50–100)	15
Accessory sclerites	L	140	121	(100–150)	17	88	(60–110)	10	88	(55–120)	15
	% of H (L or D)	10	12	(7.30–19)	17	8.20	(5.70–14)	10	10	(6.00–17)	15
	T	30	25	(20–40)	17	21	(10–33)	10	21	(10–32)	15
Marginal hooklets	L	–	13	(9.50–15)	3	9.50	(6.00–12)	7	8.60	(4–18)	5
	W	–	3.30	(2.60–4.00)	2	2.40	(2.00–4.00)	5	2.30	(2–3)	3
Anterior hooks	L	510	389	(290–540)	17	396	(283–510)	10	415	(300–520)	15
	W	150	99	(50–120)	17	52	(40–60)	10	63	(40–110)	15
Posterior hooks	L	149	101	(11–155)	15	108	(65–170)	9	112	(63–220)	12
	W	47	30	(10–57)	15	23	(10–40)	9	25	(11–50)	12

* AAO: anterior attachment organ, AE: anterior end, AGR: male accessory gland reservoir, AWB: across width of body, BL: body length, BW: body width, D: diameter; DP: distal portion, EH: excluding haptor, EMM: excluding marginal membrane, H: haptor, IH: including haptor, IMM: including marginal membrane, L: length, M: maximum, MW: maximum width, PS: penis sac, PP: proximal portion, T: thick, TW: thick wall, VD: vitelline ducts, W: width.

Other host: Acanthistius patachonicus (Jenyns, 1842) (present study).

Type locality: Mar del Plata (38°S; 57°W), Buenos Aires province, Argentina.

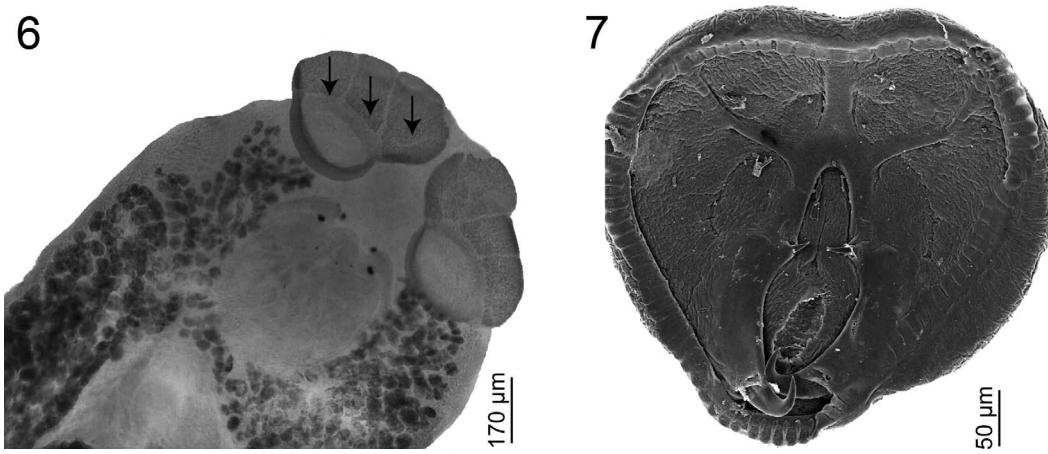
Other localities: San José Gulf (42°25′S, 64°32′W) and Nuevo Gulf (42°46′S, 64°57′W), Chubut province, Argentina (present study).

Site of infection: Gill filaments.

Prevalence and intensity of infection: Fifty-eight of 112 hosts sampled (52%, 2.8 ± 2.1, 1-10) in San José Gulf; 78 of 115 hosts sampled (68%, 3.8 ± 2.9, 1-17) in Nuevo Gulf.

Remarks

Suriano (1975) described the haptor of *T. dischizosepta* as having 6 loculi: 1 anterior plus 3 posterior loculi as well as an additional loculus on each side of the haptor between the anterior loculus and the posterior 3 loculi. The holotype, paratypes and newly collected specimens have 5 loculi only: we did not observe the 2 smaller lateral loculi reported by Suriano (1975). We speculate that she overlooked the vertical septum, perhaps confusing it with the junction of the haptor and body. Moreover, she may have misidentified foldings of the haptor, describing them as accessory branches that subdivided the lateral



Figures 6–7. Light and scanning micrograph images of *Allobenedenia dischizosepta* (Suriano, 1975) n. comb. (Monogenoidea: Capsalidae: Trochopodinae) from gill of *Acanthistius patachonicus* captured in the Southwestern Atlantic Ocean. **6.** Light micrograph of whole-mounted specimen showing pads of anterior attachment organ (arrows) and submarginal suckers. **7.** Scanning electron micrograph of haptor showing marginal membrane, haptoral septa and loculi; ventral view.

septum. The rest of the morphological features and measurements fully agree with the original description by Suriano (1975).

Yang et al. (2004) revised *Allobenedenia* and emended its generic diagnosis. They differentiated the 8 accepted species of the genus based primarily upon characteristics of the sclerites, haptor, and terminal male genitalia. Their diagnosis accommodated species with 5 loculi (*Allobenedenia yamagutii* (Egorova, 1994) Yang, Kritsky and Yuan, 2004; *Allobenedenia convoluta* (Yamaguti, 1937) Yamaguti, 1963; *Allobenedenia pseudomarginata* (Bravo-Hollis, 1958) Yang, Kritsky and Yuan, 2004; and *Allobenedenia zhangi* Yang, Kritsky and Yuan, 2004) or 6 loculi (*Allobenedenia epinepheli* (Bychowsky and Nagibina, 1967) Yang, Kritsky and Yuan, 2004; *Allobenedenia patagonica* (Evdokimova, 1969) Yang, Kritsky and Yuan, 2004; *A. pedunculata* Raju and Rao, 1980; and *Allobenedenia sebastodi* (Egorova, 1994) Yang, Kritsky and Yuan, 2004), a feature that may ultimately warrant splitting the genus accordingly. Regarding congeners with 6 loculi, *A. dischizosepta* further differs from *A. epinepheli* by lacking a conspicuous protuberance on the dorsal surface of the accessory sclerite (present in *A. epinepheli*). Moreover, the accessory sclerites of *A. epinepheli* (180–210 µm) (Bychowsky and Nagibina, 1967) are larger than those of *A. dischizosepta* (60–110 µm). It further differs from *A. patagonica* by having a male accessory gland reservoir that is lateral to, rather than anterior to, the vitelline reservoir (Evdokimova, 1969). It differs from *A. pedunculata* by lacking a haptoral peduncle (present in *A. pedunculata*) and by the sizes of the accessory sclerites, posterior hamuli, and anterior hamuli (Raju and Rao, 1980). It further differs from *A. sebastodi* by the size of the hamuli: the posterior hamuli are larger than the accessory sclerites, which are larger than the anterior hamuli (present in *A. sebastodi*) (Egorova, 1994).

Allobenedenia dischizosepta is most easily differentiated from congeners having 5 loculi by the fine anatomy of the terminal male genitalia. In *A. yamagutii* and *A. convoluta*, the proximal portion of the ejaculatory duct (= "male copulatory organ" of Yang et al., 2004) enveloped by the penis sac (= "male copulatory canal" of Yang et al., 2004) is coiled. Noteworthy, however, is that these species are morphologically similar, and Yang et al. (2004) suspected that existing specimens representing these taxa may in fact be conspecific. *Allobenedenia dischizosepta* is easily differentiated from *A. zhangi* by having a male accessory gland reservoir (= "prostatic reservoir" of Yang et al., 2004) internal to the penis sac; whereas *A. zhangi* has a male accessory gland reservoir that is external to the penis sac. It further differs from *A. pseudomarginata* by the sizes of hamuli: the accessory sclerites are larger than the anterior hamuli, which are larger than the posterior hamuli (present in *A. pseudomarginata*) (Bravo-Hollis, 1958).

Of all accepted species of *Allobenedenia*, *A. dischizosepta* most closely resembles *A. zhangi* by having a male accessory gland reservoir in the extreme posterior portion of the penis sac, lateral to the vitelline

reservoir abutting the ovary. In addition, these 2 species have an elongated penis sac extending from the anterior margin of the ovary to the male genital pore and lack a proximally coiled ejaculatory duct. *Allobenedenia dischizosepta* is readily differentiated from *A. zhangi* by the shape and size of the haptoral sclerites. In addition, the accessory sclerites of *A. dischizosepta* lack a submedial protuberance (present in *A. zhangi*) and are proximally weakly bifid (strongly bifid in *A. zhangi*). Moreover, the anterior hamulus of *A. dischizosepta* is robust and strongly recurved for approximately half of its total length; whereas that of *A. zhangi* is elongate and recurved distally. *Allobenedenia dischizosepta* further differs from *A. zhangi* by having a vas deferens that enters the penis sac mediolaterally, not connecting with the penis sac at its proximal end as in *A. zhangi*.

Yang et al. (2004) considered *Allobenedenia ishikawae* (Goto, 1894) Yamaguti, 1963 as a *species inquirenda*. Later, Deveney and Whittington (2010) reassigned it to *Benedenia* Diesing, 1858. At present, *A. dischizosepta* and *A. patagonica* are the only species of the genus reported in the southwestern Atlantic Ocean (Yang et al., 2004; Cohen et al., 2013).

Suirano's (1975) identification of the type host of *A. dischizosepta* is called into question based on the new information concerning the geographic distribution of *A. brasilianus* and *A. patachonicus*. We suspect that the type host might have been misidentified but we also have no means of determining this because no specimen of the type host was deposited/vouchered in a curated museum. Both species have been colloquially referred to as "Argentine sea bass," and they have likely been misidentified in the fisheries literature (Irigoyen et al., 2008). *Acanthistius patachonicus* is among the most abundant and economically important reef fishes from Argentina's Patagonian Gulfs (Galván et al., 2009). Inhabiting waters up to 130 m, members of this species are long-lived (maximum age recorded for fish ~47 cm in total length was 40–41 years) and slow growing, reaching 65 cm in total length and 4 kg in weight (Irigoyen et al., 2008). It is commercially fished by trawl and longline and recreationally fished by hook and line as well as by spear (Cousseau and Perrotta, 2000; Galván et al., 2009).

Future parasitological collections should assess conspecificity of *Allobenedenia* spp. that infect *Acanthistius* spp. in this portion of the southwestern Atlantic Ocean. Given the high degree of morphological similarity between the *Allobenedenia* species, it would be interesting to test their degree of host specificity. The present study demonstrates that the type materials deposited by Suriano (1975) are morphologically indistinguishable from the monogenoids we collected from *A. patachonicus*.

ACKNOWLEDGMENTS

The authors thank Dr. Atila Gosztonyi (CENPAT) for host identification; Jaime Groizard (SEM unit, Aluminio Argentino) for help with SEM; Ramiro Almirón, Darío Díaz, Julio C. Rúa, and Ricardo Vera for help collecting fish; Dr. Sergio Martorelli (Centro de Estudios Parasitológicos y Vectores) for furnishing Dr. Suriano's paratypes and for depositing them in the collection; Dr. M. Celina Digiani for providing some literature; and Dr. Cristina Damborenea and Dr. Lía Lunaschi from the MLP Helminthological Collection for loaning type material. The field work was conducted in a Protected Natural Area with permits from the Secretaría de Turismo y Áreas Protegidas and the Secretaría de Pesca, Chubut. The present study was funded by the Agencia Nacional de Promoción Científica y Tecnológica and the Proyecto de Investigación Científica y Tecnológica. F.C. is member of the Consejo Nacional de Invesigaciones Científicas y Técnicas and E.B. was supported by a doctoral fellowship financed by the Consejo de Investigaciones Científicas y Técnicas and the Secretaría de Ciencia, Tecnología e Innovación Productiva del Gobierno de Chubut.

LITERATURE CITED

Barse, A. M., and S. A. Bullard. 2012. Redescription and new host record of *Capsala laevis* (Monogenoidea: Capsalidae: Capsalinae) from gill of roundscale spearfish, *Tetrapturus georgii* (Perciformes: Istiophoridae) in the Northwestern Atlantic Ocean. Journal of Parasitology 98:735–745.

Bravo-Hollis, M. 1958. Trematodos de peces marinos de aguas mexicanas. XIV. Cuatro monogeneos de la familia Capsalidae Baird, 1853, de las costas del Pacífico, incluyendo una especie nueva. Anales del Instituto de Biología 28:195–216.

Bullard, S. A., R. R. Payne, and J. S. Braswell. 2004. New genus with two new species of capsalid monogeneans from dasyatids in the Gulf of California. Journal of Parasitology 90:1412–1427.

Bush, A. O., K. D. Lafferty, J. M. Lotz, and A. W. Shostak. 1997. Parasitology meets ecology on its own terms: Margolis et al. revisited. Journal of Parasitology 83:575–583.

Bychowsky, B. E., and L. Nagibina. 1967. New Capsalidae (Monogenoidea) from Pacific fishes. Parazitologiya 1:521–528.

Cohen, S. C., M. C. N. Justo, and A. Kohn. 2013. South American Monogenoidea Parasites of Fishes, Amphibians and Reptiles. Fundaçao Oswaldo Cruz (FIOCRUZ)

and Conselho Nacional de Desenvolvimento Científico e tecnológico, Río de Janeiro, Brazil. 662 pp.

Cousseau, M. B., **and R. G. Perrotta**. 2000. Peces Marinos de Argentina. Biología, Distribución y Pesca. Instituto Nacional de Investigación y Desarrollo Pesquero (INIDEP), Mar del Plata, Argentina. 167 pp.

Deveney, M. R., **and I. D. Whittington**. 2010. Three new species of *Benedenia* Diesing, 1858 from the Great Barrier Reef, Australia with a key to species of the genus. Zootaxa 2348:1–22.

Egorova, T. P. 1994. Composition of the genus *Megalocotyloides* (Capsalidae) and a description of *M. sebastodi* sp. n. from scorpion fishes. Pages 148–153 *in* S. Y. Pozdnyakov, ed. Parasites of Pacific sea and anadromous fishes. Izvestiya of the Pacific Research Institute of Fisheries and Oceanography (TINRO), Vladivostok, Rusia.

Evdokimova, E. B. 1969. New species of monogeneans from bony fishes of Patagon Shelf. Parazitologiya 3:415–419.

Galván, D. E., **L. A. Venerus**, **and A. J. Irigoyen**. 2009. The reef-fish fauna of the Northern Patagonian Gulfs, Argentina, Southwestern Atlantic. The Open Fish Science Journal 2:90–98.

Irigoyen, A. J., **L. Cavaleri Gerhardinger**, **and A. Carvalho-Filho**. 2008. On the status of the species of *Acanthistius* (Gill, 1862) (Percoidei) in the South-West Atlantic Ocean. Zootaxa 1813:51–59.

Raju, V. V., **and K. H. Rao**. 1980. *Capsala andhraensis* n. sp. from *Auxis thazard* and *Allobenedenia pedunculata* n. sp. from *Johnius* sp. Indian Journal of Parasitology 4:1–5.

Suriano, D. M. 1975. *Tetrasepta dischizosepta* gen. et sp. nov. (Monogenea, Monopisthocotylea) parásito branquial de *Acanthistius brasilianus* (Cuvier y Valenciennes, 1828) (Pisces, Serranidae) del océano Atlántico sudoccidental. Physis 34:282–290.

Whittington, I. D. 2004. The Capsalidae (Monogenea: Monopisthocotylea): a review of diversity, classification and phylogeny with a note about species complexes. Folia Parasitologica 51:109–122.

Yang, T., **D. C. Kritsky**, **and S. Yuan**. 2004. Revision of *Allobenedenia* Yamaguti, 1963 (Monogenoidea: Capsalidae) with the description of *A. zhangi* n. sp. from *Epinephelus fasciatus* (Teleostei: Serranidae) in the South China Sea. Systematic Parasitology 59: 223–233.