Acta Scientiarum

http://www.uem.br/acta
ISSN printed: 1679-9283
ISSN on-line: 1807-863X
Doi: 10.4025/actascibiolsci.v39i2.34100

First record of *Hamaticolax scutigerulus* (Copepoda: Bomolochidae) in Brazil, ectoparasite of the spotted goatfish *Pseudupeneus maculatus* (Actinopterygii: Mullidae)

Lucas Cardoso[1*], Mauricio Laterça Martins[1], Ana Carolina Figueiredo Lacerda[2], Douglas Ismael Cadorin[1], Carolina Nunes Costa Bonfim[3] and Ricardo Luís Mendes de Oliveira[3]

*[1]Laboratório de Sanidade de Organismos Aquáticos, Departamento de Aquicultura, Universidade Federal de Santa Catarina, Rodovia Admar Gonzaga, 1346, 88040-900, Florianópolis, Santa Catarina, Brazil. [2]Departamento de Ecologia e Sistemas, Universidade Federal da Paraíba, João Pessoa, Paraíba, Brazil. [3]Departamento de Engenharia Pesqueira e Aquicultura, Centro de Ciências Agrárias Aplicadas, Universidade Federal de Sergipe, São Cristóvão, Sergipe, Brazil. *Author for correspondence. E-mail: lucas.cardoso@ufsc.br*

ABSTRACT. Bomolochidae Claus, 1875 is a copepod family with worldwide distribution that parasitizes marine fishes. This study provides the first report of *Hamaticolax scutigerulus* (Wilson, 1935) (Copepoda: Bomolochidae) in the spotted goatfish *Pseudupeneus maculatus* (Bloch, 1793), in the coastal waters of Pernambuco, northeastern Brazil. Prevalence of 35%, mean intensity of infestation of 1.9±1.3 and mean abundance of 0.7±1.2 were found. The setae and spines of the leg armor of the *Hamaticolax* species were analyzed to identify the present species.

Keywords: Marine fish, ectoparasites, coast of Pernambuco.

Primeiro registro de *Hamaticolax scutigerulus* (Copepoda: Bomolochidae), parasito de saramunete *Pseudupeneus maculatus* (Actinopterygii: Mullidae), no Brasil

RESUMO. Bomolochidae Claus, 1875, é uma família de copépodes cujas espécies encontram-se amplamente distribuídas pelo mundo e são parasitas de peixes marinhos. Este estudo relata, pela primeira vez, *Hamaticolax scutigerulus* (Wilson, 1935) (Copepoda: Bomolochidae) no saramunete *Pseudupeneus maculatus* (Bloch, 1793) do litoral de Pernambuco, nordeste do Brasil. Prevalência de 35%, intensidade média de infestação de 1,9±1,3 e abundância média de 0,7±1,2 foram observadas. As setas e os espinhos da armadura das pernas do parasito das espécies de *Hamaticolax* foram analisadas para identificar a presente espécie.

Palavras-chave: peixe marinho, ectoparasitas, litoral de Pernambuco.

Introduction

Copepods comprise the second most frequent parasites of marine fishes in the Neotropical region (Luque & Poulin, 2007). The family Bomolochidae Claus, 1875 has at least 20 genera and the species are characterized by specialized structures on the body for attachment and feeding on their hosts, generally on the gills, branchial cavity and noses (Kim & Moon, 2013, Maran, Moon, Adday, Khamees, & Myoung, 2014, Walter & Boxshall, 2015).

The genus *Hamaticolax* Ho and Lin (2006) was proposed together with *Cresseyus* Ho and Lin (2006), to accommodate some orphan species previously allocated to the genus *Holobomolochus* Vervoort (1969). *Hamaticolax* differs from the genera *Cresseyus* and *Holobomolochus* in having a pair of rostral hooks (Ho & Lin, 2006). To make a taxonomic identification of *Hamaticolax*, several characteristics need to be taken into consideration. However, the leg armor (Le), i.e. leg composition in terms of setae and spines, are the feature that has been most characterized in previous descriptions (Kabata, 1971).

The spotted goatfish *Pseudupeneus maculatus* (Bloch, 1793) is a demersal marine fish that is frequently found in shallow coral reef waters, along the entire western Atlantic seaboard from New Jersey, USA, to Santa Catarina, Brazil (Lessa & Nóbrega, 2000, Hostim-Silva et al., 2006). This species is caught mainly by means of trap fishing on the coast of the state of Pernambuco, Brazil, and its meat has been appreciated in both the national and the export market. Hence, this fish is economically valuable (Lessa & Nóbrega, 2000).

The aims of this study were to provide the first report of occurrences of the parasite *Hamaticolax scutigerulus* (Wilson, 1935) in *Pseudupeneus maculatus*

caught in the state of Pernambuco, northeastern Brazil, and to present information on the leg armor of this parasite, in comparison with 10 described species.

Material and methods

A total of 120 fish were obtained for parasite evaluation between October 2012 and September 2013. They were caught by an artisanal fisherman at a mean depth of 20 m, in an area comprising the following coordinates: site 1 (7° 37' 28.43" S; 34° 1' 10.24" W), offshore from the municipality of Goiana; site 2 (7° 37' 50.34" S; 34° 43' 41.73" W), in the metropolitan region of Recife; and site 3 (8° 54' 41.79" S; 33° 57' 23.45" W), offshore from the municipality of São José da Corôa Grande (Figure 1).

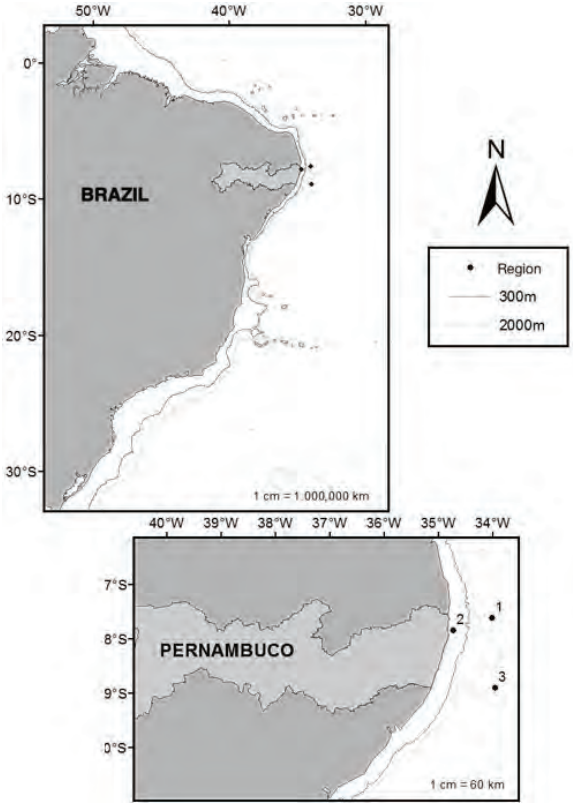

Figure 1. Location of the three sites (1, 2 and 3) of capture of 120 specimens of *Pseudupeneus maculatus* used in this study.

The fish were stored in thermal boxes with ice and were transported to the Marine Fish Farm Laboratory of the Fisheries and Aquaculture Department of the *Universidade Federal Rural de Pernambuco* (UFRPE) for necropsy. The gills were collected and fixed in 70% alcohol, and were slightly agitated to detach the parasites (Eiras, Takemoto, & Pavanelli, 2006, Jerônimo, Martins, Ishikawa, Ventura, & Tavares-Dias, 2011) for subsequent analysis.

The copepods were clarified in lactic acid (Humes & Gooding, 1964), and then dissected and observed on compressed slides under a DIC Iamger.A2 microscope equipped with Axio Cam MRc camera. The adult specimens were identified as described by Vervoort (1969), Ho and Lin (2006) and Morales-Serna and Gómez (2010). The composition of the setae and spines of the leg armor was compared with previous studies on 10 described species in the genus *Hamaticolax*. Prevalence, mean intensity of infestation and mean abundance were calculated as described by Bush, Lafferty, Lotz, and Shostak (1997).

Results and discussion

A total of 80 copepods were collected, comprising 77 females and three males in hosts of both sexes. Nine gravid females and three males were measured (Table 1) and identified as *Hamaticolax scutigerulus* (Wilson, 1935) (Figure 2).

The total length was 1480±70 μm for females and 549±32 μm for males, and the greatest width was about 993±67 μm for females and 290±20 μm for males.

The measurements and characteristics of the setae and spines on the legs of the present material were compared with those of another species (Table 2). The prevalence of *Hamaticolax scutigerulus* in the fish examined here was 35%; its mean intensity was 1.9±1.3 and its mean abundance was 0.7±1.2.

The present specimens were similar to the specimens of *H. scutigerulus* that were observed parasitizing *P. maculatus* in Piscadera Bay, Curaçao, by Vervoot (1969). On the other hand, our specimens and those reported by Vervoot (1969) showed larger measurements (total length, greatest width, length and width of somites and furcal rami, and length of longest furcal seta) than those found by Cressey (1983).

However, some differences in comparison with other species of the genus *Hamaticolax* need to be emphasized (Table 1). Females of *H. scutigerulus* showed shorter total body length than those of *H. attenuatus* and *H. paralabracis*, longer total body length than those of *H. embiotocae* and similar total body length to those of *H. galeichthyos*, *H. occultus*, *H. spinulus*, *H. unisagittatus* and *H. prolixus*.

The body width of the specimens collected in Pernambuco was similar to the width in *H. attenuatus*, *H. paralabracis* and *H. spinulus* and greater than in *H. galeichthyos*, *H. unisagittatus* and *H. prolixus*. The long seta length was shorter than in *H. attenuatus*, *H. galeichthyos*, *H. occultus* and *H. spinulus* and longer than in *H. paralabracis* and *H. unisagittatus*. The male specimens in the present study had shorter body length than in *H. galeichthyos* and *H. prolixus*, but their length resembled the body length

of *H. embiotocae*. However, the body width was shorter than that found in *H. galeichthyos*.

The legs of copepods in the genus *Hamaticolax* have distinct composition in terms of the number of segments (proximal, medial and distal articulations) that form the endopodite and exopodite rami. The number of setae and spines of these rami differ among *Hamaticolax* species and the findings from the present study are in agreement with those from previous studies (Table 2). Vervoort (1969) argued that the exopodite of the first legs (Le1) in females of *H. scutigerulus* possess one segment with six setae and five spines, thus differing from the other species. Moreover, male specimens present distal segments of the Le1 exopodite (three setae and three spines) that differ from those of other species.

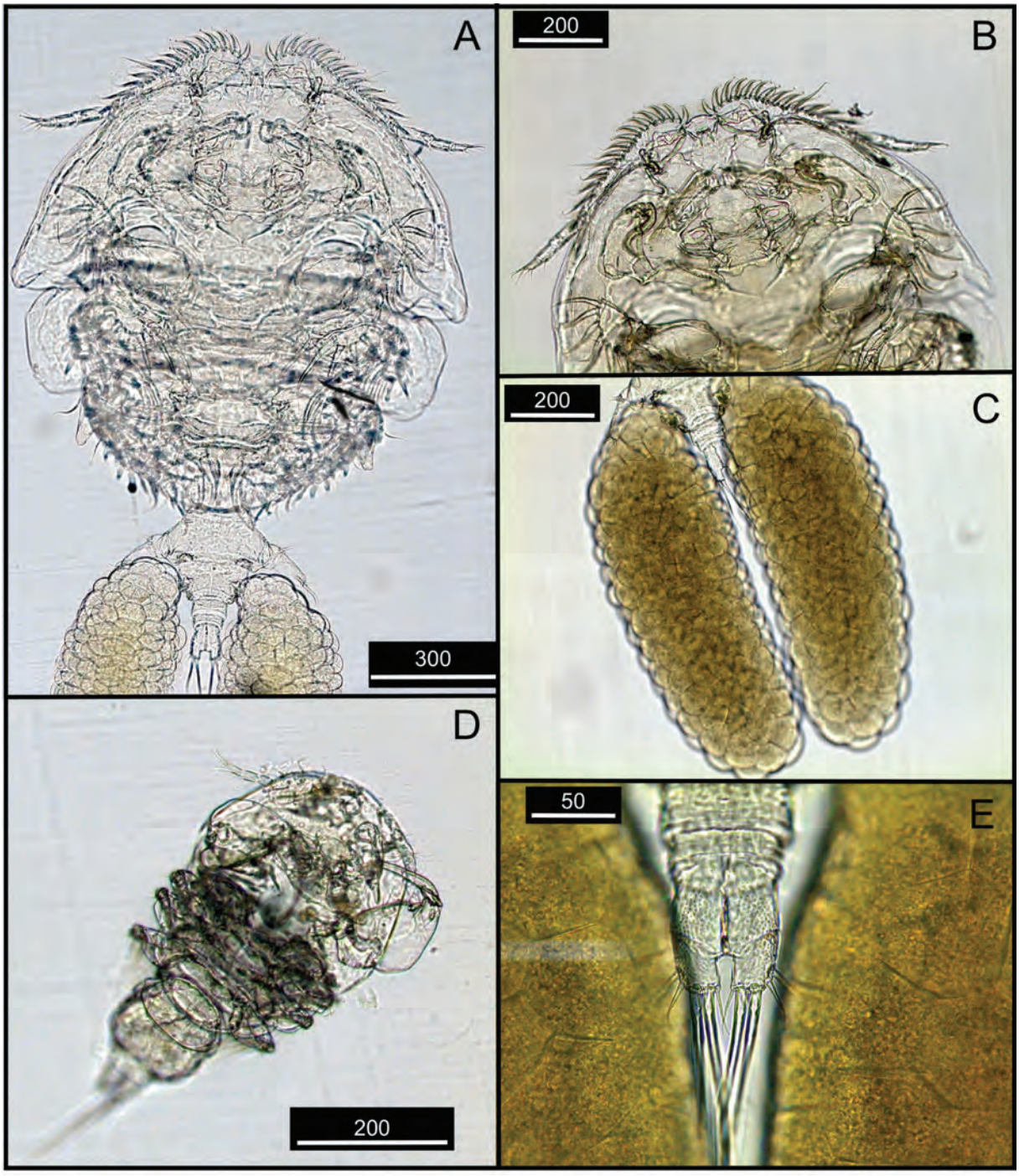

Figure 2. *Hamaticolax scutigerulus*, ventral view: (A) female and its (B) anterior portion, (C) egg sacs and (D) uropods; (E) male.

Table 1. Comparative values (mean values ± standard deviation, in μm) of measurements of *Hamaticolax* species, especially *Hamaticolax scutigerulus* from the gills of *Pseudupeneus maculatus* captured in the Coast of Pernambuco State, Brazil, and other regions. Length (L), Width (W), and minimum and maximum values between parentheses.

Species	*Hamaticolax scutigerulus*[a]		*Hamaticolax scutigerulus*[b]		*Hamaticolax scutigerulus*[c]		*Hamaticolax attenuatus*	
Author	Vervoort (1969)		Cressey (1983)		Currentstudy		Vervoort (1969)	
Measurements	♀	♂	♀	♂	♀	♂	♀	♂
Total length	1640	611	1116	-	1480±70	549±32	2280	-
Greatestwidth	1000	286	750	-	993±67	290±20	860	-
L/ W of cephalic somite	419/ 999	226/ 286	-/ -	-/ -	488±67/ 992±70	211±14/ 286±13	500/ 860	-/ -
L/ W of second thoracic somite	338/ 850	61/ 231	-/ -	-/ -	279±59/ 883±65	65±3/ 238±14	176/ 675	-/ -
L/ W of third thoracic somite	284/ 601	50/ 198	-/ -	-/ -	217±32/ 618±62	49±8/ 203±18	242/ 567	-/ -
L/ W of fourth thoracic somite	176/ 338	44/ 138	-/ -	-/ -	164±31/ 355±34	50±5/ 143±10	135/ 324	-/ -
L/ W of fifth thoracic somite	135/ 243	55/ 126	-/ -	-/ -	130±14/ 267±41	55±10/ 112±2	149/ 243	-/ -
L/ W of genital complex	216/ 473	121/ 132	83/ 130	-/ -	174±43/ 349±106	119±20/ 143±4	257/ 257	-/ -
L/ W of third abdominal somite	95/ 243	-/ -	33/ 71	-/ -	93±8/ 205±60	-/ -	257/ 176	-/ -
L/ W of fourth abdominal somite	68/ 216	39/ 72	21/ 59	-/ -	76±6/ 189±69	36±9/ 74±3	230/ 149	-/ -
L/ W of fifth abdominal somite	95/ 176	22/ 55	56/ 53	-/ -	75±14/ 137±35	28±7/ 63±11	162/ 135	-/ -
L/ W of furcal rami	68/ 81	22/ 19	-/ -	-/ -	74±8/ 76±5	29±11/ 20±3	-/ 122	-/ -
Length of longest furcal seta	210	200	150	-	196±15	225±10	608	-
L/ W ofovisac	837/ 270	-/ -	-/ -	-/ -	768±124/ 296±61	-/ -	2200/ 160	-/ -

Parasite of *Pseudupeneus maculatus* from Curaçao[a], Belize[b] and Brazil[c].

Species	*Hamaticolax galeichthyos*		*Hamaticolax maleus*		*Hamaticolax occultus*		*Hamaticolax paralabracis*	
Author	Luque and Bruno (1990)		Oldewage (1994)		Kabata (1971)		Luque and Bruno (1990)	
Measurements	♀	♂	♀	♂	♀	♂	♀	♂
Total length	1542 (1425-1750)	1025 (1000-1075)	-	-	1390-1920	-	2525 (2375-2725)	-
Greatestwidth	517 (425-575)	342 (325-350)	-	-	-	-	925 (875-975)	-
L/ W of cephalic somite	-/ -	-/ -	-/ -	-/ -	508/ 894	-/ -	-/ -	-/ -
L/ W of second thoracic somite	-/ -	-/ -	-/ -	-/ -	127/ 834	-/ -	-/ -	-/ -
L/ W of third thoracic somite	-/ -	-/ -	-/ -	-/ -	179/ 597	-/ -	-/ -	-/ -
L/ W of fourth thoracic somite	-/ -	-/ -	-/ -	-/ -	127/ 241	-/ -	-/ -	-/ -
L/ W of fifth thoracic somite	-/ -	-/ -	-/ -	-/ -	89/ 236	-/ -	-/ -	-/ -
L/ W of genital complex	157 (140-190)/ 190 (150-210)	-/ -	-/ -	-/ -	165/ 241	-/ -	207 (200-220)/ 217 (210-230)	-/ -
L/ W of third abdominal somite	107 (100-120)/ 120 (110-140)	60 (50-70)/ 70	-/ -	-/ -	76/ 165	-/ -	166 (120-190)/ 135 (130-150)	-/ -
L/ W of fourth abdominal somite	90 (70-110)/ 107 (100-120)	47 (40-50)/ 57 (50-60)	-/ -	-/ -	63/ 140	-/ -	160 (150-170)/ 120 (110-130)	-/ -
L/ W of fifth abdominal somite	67 (60-80)/ 97 (90-110)	-/ -	-/ -	-/ -	63/ 114	-/ -	130 (120-150)/ 103 (90-120)	-/ -
L/ W of furcal rami	67 (60-80)/ 50 (40-60)	-/ -	-/ -	-/ -	51/ 38	-/ -	113 (100-130)/ 43 (40-50)	-/ -
Length of longest furcal seta	390 (340-430)	-	-	-	394	-	50 (45-55)	-
L/ W ofovisac		-	-/ -	-/ -	1079/ 240	-/ -	-	-/ -

Species	*Hamaticolax spinulus*		*Hamaticolax unisagittatus*		*Hamaticolax prolixus*		*Hamaticolax embiotocae*	
Author	Cressey (1969)		Tavares and Luque (2003)		Cressey (1969) and Ho (1972)		Hanan (1976)	
Measurements	♀	♂	♀	♂	♀	♂	♀	♂
Total length	1490	-	1240 (1020-1380)	-	1600-1870	710-780	938±125	507±59
Greatestwidth	870	-	614.2 (540.6-690.1)	-	580	-	-	-
L/ W of cephalic somite	-/ 870	-/ -	-/ -	-/ -	-/ -	-	-/ -	-/ -
L/ W of second thoracic somite	-/ -	-/ -	-/ -	-/ -	-/ -	-	-/ -	-/ -
L/ W of third thoracic somite	-/ -	-/ -	-/ -	-/ -	-/ -	-	-/ -	-/ -
L/ W of fourth thoracic somite	-/ -	-/ -	-/ -	-/ -	-/ -	-	-/ -	-/ -
L/ W of fifth thoracic somite	-/ -	-/ -	-/ -	-/ -	-/ -	-	-/ -	-/ -
L/ W of genital complex	200/ 200	-/ -	132.8 (90.7-172.5)/ 182.4 (130.4-198.4)	-/ -	132/ 103	-	-/ -	-/ -
L/ W of third abdominal somite	224/ -	-/ -	63.6 (51-73.7)/ 86.4 (73.7-90.7)	-/ -	118/ -	-	-/ -	-/ -
L/ W of fourth abdominal somite	200/ -	-/ -	54.5 (51-56.7)/ 79.4 (62.3-96.3)	-/ -	94/ -	-	-/ -	-/ -
L/ W of fifth abdominal somite	112/ -	-/ -	62.3 (51-90.7)/ 75.1 (68-90.7)	-/ -	118/ -	-	-/ -	-/ -
L/ W of furcal rami	142/ 60	-/ -	73.4 (68-85)/ 34.7 (34-39.7)	-/ -	100/ 65	38/ 23	-/ -	-/ -
Length of longest furcal seta	768	-	88.5 (68-107.7)	-	-	-	-	-
L/ W ofovisac	950/ -	-/ -	-/ -	-/ -	-/ -	-/ -	-/ -	-/ -

In contrast to that related by Vervoort (1969), the textual information and drawings from Cressey (1983) showed an Le4 endopodite with one seta and no spines, both in proximal and medial segments, and three setae and no spines in the distal segment. Also, Le5 had four setae and no spines in the distal segment was reported in *H. scutigerulus* females.

In the present study, it was found that the medial segment of the Le4 endopodite of the *H. scutigerulus* females had one element, which was probably a spine and not a seta as proposed by Cressey (1983), and the distal segment of Le5 had four setae, as also observed by Cressey (1983). In addition, for the

males, the distal segment of the Le4 endopodite had one seta and one spine, according to Cressey (1983). In the present study, it was not possible to discern whether there were two or three elements in the distal segment of the Le4 endopodite for the males.

Table 2. Setation of legs (Le) of the *Hamaticolax* species (setae in arabic, spines in roman numerals).

Species		*Hamaticolax prolixus* ♀			*Hamaticolax prolixus* ♂		
Author		Cressey (1969)			Ho (1972)		
Host		*Pleuronichthy coenosus* Giard, 1854			*Paralichthys californicus* Ayres, 1859		
Site		gillcavity			gillcavity		
Locality		La Jolla, California			Anaheim Bay, California		
Le	Rami	Segments					
		1	2	3	1	2	3
Le1	exopodite	I-0	I-1	III-5	I-0	I-1	II-I-4
	endopodite	0-1	0-1	0-5	0-1	0-1	I-5
Le2	exopodite	I-0	I-1	IV-5	I-0	I-1	II-I-5
	endopodite	0-1	0-2	II-3	0-1	0-2	II-3
Le3	exopodite	I-0	I-1	III-5	I-0	I-1	II-I-5
	endopodite	0-1	0-2	II-2	0-1	0-2	II-2
Le4	exopodite	I-0	I-1	III-5	I-0	0-1	II-I-4
	endopodite	0-1	0-1	I-1-I	0-1	I-1-I	-
Le5	-	0-1	*-1	-	0-1	0-2	-
Le6	-	Three long setae at area of ovisac attachment			Lacking		
Species		*Hamaticolax scutigerulus* ♀			*Hamaticolax scutigerulus* ♂		
Author		Vervoort (1969)			Vervoort (1969)		
Host		*Pseudupeneus maculatus*			*Pseudupeneus maculatus*		
Site		gill			gill		
Locality		Piscadera Bay, Curaçao			Piscadera Bay, Curaçao		
Le	Rami	Segments					
		1	2	3	1	2	3
Le1	exopodite	V-6	-	-	I-0	I-1	III-3
	endopodite	0-1	0-1	5	0-1	0-1	I-5
Le2	exopodite	I-0	I-1	III-5	I-0	I-1	III-4
	endopodite	0-1	0-2	II-3	0-1	0-1	II-3
Le3	exopodite	I-0	I-1	III-5	I-0	0-1	III-4
	endopodite	0-1	0-2	II-2	0-1	0-1	II-2
Le4	exopodite	I-0	I-1	III-5	I-0	0-1	III-4
	endopodite	0-1	0-0	I-1-I	0-1	I-1-I	-
Le5	-	0-1	0-3	-	0-1	0-2	-
Le6	-	Three naked setae at area ovisac attachment			Lacking		
Species		*Hamaticolax galeichthyos* ♀			*Hamaticolax galeichthyos* ♂		
Author		Luque and Bruno (1990)			Luque and Bruno (1990)		
Host		*Galeichthys peruvianus* Lütken, 1874			*Galeichthys peruvianus* Lütken, 1874		
Site		gill			gill		
Locality		Chorrillos, Peru			Chorrillos, Peru		
Le	Rami	Segments					
		1	2	3	1	2	3
Le1	exopodite	I-0	III-6	-	I-0	III-6	-
	endopodite	0-1	0-1	0-5	0-1	0-1	0-5
Le2	exopodite	I-0	I-1	IV-5	I-0	I-1	III-6
	endopodite	0-1	0-2	II-3	0-1	0-2	II-3
Le3	exopodite	I-0	I-1	III-5	I-0	I-1	III-5
	endopodite	0-1	0-2	II-2	0-1	0-2	II-2
Le4	exopodite	I-0	I-1	III-4	I-0	0-1	III-4
	endopodite	0-1	0-1	0-2	0-1	0-2	-
Le5	-	0-1	II-I-I-0	-	I-1	-	-
Le6	-	Three pinnate setae at area ovisac attachment			Lacking		
Species		*Hamaticolax embiotocae* ♀			*Hamaticolax embiotocae* ♂		
Author		Hanan (1976)			Hanan (1976)		
Host		*Cymatogaster aggregata* Gibbons, 1854			*Cymatogaster aggregata* Gibbons, 1854		
Site		nasalcavity			nasalcavity		
Locality		Anaheim Bay and Huntington Harbor, California			Anaheim Bay and Huntington Harbor, California		
Le	Rami	Segments					
		1	2	3	1	2	3
Le1	exopodite	I-0	I-1	7	0-1**	I-1	III-4
	endopodite	0-1	0-1	5	0-1	0-1	1-5**
Le2	exopodite	I-0	I-1	I-III-5	I-0	I-1	III-5
	endopodite	0-1	0-2	II-3	0-1	0-2	II-3
Le3	exopodite	I-0	I-1	III-4	I-0	I-1	III-4
	endopodite	0-1	0-2	II-2	0-1	0-2	II-2
Le4	exopodite	I-0	I-1	III-4	I-0	I-II-3	-
	endopodite	0-1	0-1	I-1-I	0-1	I-1-I	-
Le5	-	0-1	I-1-I-III		0-1	I-1**	-
Le6	-	Three long setae at genital complex			Lacking		

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Species		*Hamaticolax attenuatus* ♀			*Hamaticolax unisagittatus* ♀		
Author		Vervoort (1969)			Tavares and Luque (2003)		
Host		*Scorpaena plumieri* Bloch, 1789			*Centropomus undecimalis* Bloch, 1792		
Site		gill and inner operculum			gill		
Locality		Montego Bay, Jamaica; Piscadera Bay, Curaçao			Angra dos Reis, Rio de Janeiro, Brazil		
Le	Rami	Segments					
		1	2	3	1	2	3
Le1	exopodite	I-0	I-0	III-6	0-3	0-4	-
	endopodite	0-1	0-1	0-5	0-1	0-1	0-5
Le2	exopodite	I-0	I-1	IV-5	I-0	I-1	IV-3
	endopodite	0-1	0-2	II-3	0-1	0-1	0-5
Le3	exopodite	I-0	I-1	III-5	I-0	I-1	III-4
	endopodite	0-1	0-2	II-2	0-1	0-1	0-4
Le4	exopodite	I-0	I-1	III-5	I-0	I-1	III-3
	endopodite	0-1	0-1	I-1-I	0-1	0-1	0-3
Le5	-	0-1	I-3	-	0-1	0-4	-
Le6	-	Three setae at area ovisac attachment			Three pinnate setae at area ovisac attachment		
Species		*Hamaticolax maleus* ♀			*Hamaticolax occultus* ♀		
Author		Oldewage (1994)			Kabata (1971)		
Host		*Malacocephalus laevis* Lowe, 1843			*Lyopsettaexilis*, Jordan and Gilbert; *Hippoglossoides elassodon*, Jordan and Gilbert		
Site		Gill and inner operculum			Gill and gill cavity		
Locality		South Africa Coast			West Coast Vancouver Island; Chatham Sound (Border of British Columbia and Alaska)		
Le	Rami	Segments					
		1	2	3	1	2	3
Le1	exopodite	I-0	IV-6	-	V-6	-	-
	endopodite	0-1	0-1	0-5	0-1	0-1	I-5
Le2	exopodite	I-0	I-1	IV-5	I-0	I-1	IV-5
	endopodite	0-1	0-2	II-3	0-1	0-2	II-3
Le3	exopodite	I-0	I-1	III-5	I-0	I-1	III-5
	endopodite	0-1	0-2	II-2	0-1	0-2	II-2
Le4	exopodite	I-0	I-1	II-5	I-0	I-1	III-5
	endopodite	0-1	0-1	V-3	0-1	0-1	I-1-I
Le5	-	0-1	0-4***	-	0-1	III-1	-
Le6	-	Three naked setae			Three pinnate setae at area genital complex		
Species		*Hamaticolax spinulus* ♀			*Hamaticolax paralabracis* ♀		
Author		Cressey (1969)			Luque and Bruno (1990)		
Host		*Scorpaena guttata* Giard, *Oxylebiuspictus*, *Sebastodesmystinus* Jordan and Gilbert 1880, *Sebastodesserranoides* Eigenmann and Eigenmann.			*Paralabraxhumeralis*		
Site		Gill cavity			Gill and inner operculum		
Locality		La Jolla, California			Chorrillos, Peru		
Le	Rami	Segments					
		1	2	3	1	2	3
Le1	exopodite	I-0	I-1	II-5	I-0	III-6	-
	endopodite	0-1	0-1	0-5	0-1	0-1	0-5
Le2	exopodite	I-0	I-1	IV-5	I-0	I-1	III-6
	endopodite	0-1	0-2	II-3	0-1	0-2	II-3
Le3	exopodite	I-0	I-1	III-5	I-0	I-1	II-6
	endopodite	0-1	0-2	II-2	0-1	0-2	II-2
Le4	exopodite	I-0	I-1	III-5	I-0	I-1	II-6
	endopodite	0-1	0-1	I-1-I	0-1	0-1	0-3
Le5		0-1	I-1-I-1****			0-1	-
Le6		Three setae at area ovisac attachment			Three pinnate setae at area ovisac attachment		

*According to Cressey (1969), three terminal spines or setae. **Textual information of Hanan (1976) is different from his schematic drawings. ***According to schematic drawnings of Oldewage (1994). ****According to schematic drawnings of Cressey (1969), setae or spines.

The parasitological indices of *H. scutigerulus* in *P. maculatus* examined in Brazil were lower than those found for *Bomolochus soleae* Claus, 1864, in *Soleasolea* in Portugal (Durieux, Marques, Sasal, Bégout, & Cabral, 2007). Similarly, Tavares and Luque (2003) described *Hamaticolaxunisagittatus* (Tavares & Luque, 2003) (= *Acantholochus unisagittatus* sp. nov.) in *Centropomus undecimalis* in Rio de Janeiro, with high prevalence and mean abundance. *Pseudupeneus maculatus* has also been found to be parasitized by two other species of Bomolochidae: *Orbitacolax analogus* Vervoort (1969) and *Orbitacolax hapalogenyos* (Yamaguti & Yamasu, 1959 – Maran et al., 2014) on the gills of fish in Belize (Cressey & Cressey, 1989). On the other hand, all of the present material examined was *H. scutigerulus*.

The ventral body structures and hooks of the antennae in the family Bomolochidae are adapted so as to allow the parasite to become attached to the host on the gills, internal wall of the operculum, fins and integument, and around the eyes (Radhakrishnan & Nair, 1983, Boxshall, 2005).

Conclusion

In conclusion, some morphometric differences in the composition of the setae and spines of the leg armor can be found in the genus *Hamaticolax*. Nonetheless, these constitute the most valid characteristic for specific identification.

Acknowledgements

The authors thank *Conselho Nacional de Desenvolvimento Científico e Tecnológico* (CNPq) for research grant to M. L. Martins (305869/ 2014-0).

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Received on November 1, 2016.
Accepted on March 21, 2017.