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## ON THE TYPE MATERIAL OF *SCYLLARIDES DECEPTOR* HOLTHUIS, 1963 (CRUSTACEA: DECAPODA: SCYLLARIDAE)

MARCOS TAVARES<sup>1</sup>  
WILLIAM SANTANA<sup>1</sup>  
ALLYSSON PINHEIRO<sup>1</sup>

### ABSTRACT

*The only specimen listed in the original description of Scyllarides deceptor Holthuis, 1963 is the holotype from São Paulo, Brazil, presently housed in the Leiden Museum. From the original description, however, it is clear that the new species was actually based on a number of additional specimens. Six of them exist in the collections of the Museum of Zoology in São Paulo, and are shown herein to be paratypes of S. deceptor. Scyllarides deceptor and S. brasiliensis Rathbun, 1906, continue to be confounded with one another, in consequence of their very similar color patterns and locally sympatric distributions. As many as 251,786 tons of slipper lobsters have been landed in Santa Catarina between 2000 and 2007. These catches have been attributed to S. deceptor alone and did not take into consideration the existence of a second species in the area, S. brasiliensis. Correct recognition of slipper-lobe species will be critical to properly evaluate the lobster stocks in southeastern Brazil. An opportunity is taken herein to elaborate on the taxonomy of S. deceptor and S. brasiliensis.*

KEYWORDS: Slipper lobsters; *Scyllarides deceptor*; *Scyllarides brasiliensis*; Taxonomy; Fishery; Sympatry.

### INTRODUCTION

The hooded slipper lobster *Scyllarides deceptor* Holthuis, 1963 is an endemic of the southwestern Atlantic Ocean. *S. deceptor* preferably inhabits sandy bottoms between 30 and 300 meters depth, and is also found on rocky shores, hidden in crevices (Oliveira *et al.*, 2008 and references therein). *Scyllarides deceptor* was first mentioned from the southwestern Atlantic Ocean by Ramos (1951: 126) as *S. brasiliensis* Rathbun, 1906. Later on, one male of *S. deceptor* was recorded from Argentina by Balech (1962), who likewise

attributed the Argentinean specimen to *S. brasiliensis*. Ramos (1951) obtained from Kossako Kikuchi 13 specimens from the north coast of São Paulo, Brazil, trawled by the fishing boat 'Dois Irmãos'. They are as follows: 2 males and 3 females from Ubatuba, and 4 males and 4 females from nearby Ilha Vitória, north of Ilha de São Sebastião. A comparison of an extensive material from São Paulo, including specimens seen by Ramos (1951) with the type material of *S. brasiliensis* Rathbun, 1906, from northeastern Brazil (Bahia) led Holthuis (1963: 57) to consider the southeastern Brazilian specimens as a new species, *S. deceptor* Holthuis,

1. Laboratório de Carcinologia, Museu de Zoologia, Universidade de São Paulo, Caixa Postal 42.494, 04218-970, São Paulo, SP, Brasil.  
E-mails: [mdst@usp.br](mailto:mdst@usp.br); [william\\_santana@yahoo.com.br](mailto:william_santana@yahoo.com.br); [allyssonpp@yahoo.com.br](mailto:allyssonpp@yahoo.com.br)

1963. Holthuis (1963) only listed the holotype from Ubatuba (female RMNH D. 15451, cl 86 mm), but left it clear that his new species was based on several individuals, including specimens seen and figured by Ramos (1951: 127, pl. 1-2). Indeed, Fransen *et al.* (1997: 64) listed eight paratypes of *S. deceptor* in the Leiden Museum, all of them from São Paulo. In the National Museum of Natural History (Smithsonian Institution) in Washington there is one male of *S. deceptor* labeled "paratype" (USNM 105810) by L. B. Holthuis himself and sent to the Washington museum on 11 October 1960. Part of Ramos' (1951: 127) material exists in the collections of the Museum of Zoology of the University of São Paulo and are herein shown to be paratypes of *S. deceptor* Holthuis, 1963 as well.

As a result of their very similar color pattern and locally sympatric distribution, *Scyllarides brasiliensis* Rathbun, 1906 and *S. deceptor* Holthuis, 1963, continue to be confounded with each other. An opportunity is taken herein to elaborate on the taxonomy of both species.

Descriptive terminology follows that used by Holthuis (1991). Carapace length (cl) was taken from the base of the rostrum to the posterior margin of the carapace. Abbreviations used includes: IOUSP (Oceanographic Institute of the University of São Paulo); MZUSP (Museum of Zoology of the University of São Paulo); RMNH (National Museum of Natural History, Leiden); USNM (National Museum of Natural History, Smithsonian Institution, Washington, D.C.); P1, first pereopod.

## RESULTS AND DISCUSSION

### *Scyllarides deceptor* Holthuis, 1963 (Figures 1A, 2, 3C-D, 4B)

*Scyllarides brasiliensis* – Ramos, 1951: 125, pl. 1-2; Balech, 1962: 82 [not *Scyllarides brasiliensis* Rathbun, 1906].

*Scyllarides deceptor* Holthuis, 1963: 57.

*Scyllarides deceptor* – Boschi, 1973: 15, fig. 1; 1979: 137; Burukovsky, 1983: 145; Coelho & Ramos-Porto, 1983/85: 60; 1998: 388; Williams, 1986: 27, fig. 67; Holthuis, 1991: 186, fig. 353; Boschi *et al.* 1992: 41, fig. 37; Fransen *et al.*, 1997: 64; Spivak, 1997: 73; D'Incao, 1999: 341, fig. 4A; Melo, 1999: 450, fig. 304; Spanier & Lavalli, 2006: 464: fig. 14.1; Santana *et al.*, 2007: 1; Oliveira *et al.*, 2008: 1433-1440.

*Type material:* Brazil, São Paulo, São Sebastião, Ilha Vitória, shrimp boat "Dois Irmãos", K. Kikuchi coll.,

16.iv.1951: 1 female paratype (MZUSP 4803); 1 male paratype (MZUSP 7083); 1 female paratype (MZUSP 7085); 1 male paratype (MZUSP 7086); 1 female paratype (MZUSP 7089); 1 male paratype (MZUSP 7090). São Paulo, Santos, Farol da Moela, vessel "Emilia" 21.ix.1959: 1 male paratype (USNM 105810).

## Comparative Material

*Scyllarides brasiliensis* – Brazil, Bahia, R/V "Albatross" 21.x.1887: female holotype (USNM 21612). Espírito Santo, Guarapari, 21°36'40.0"S-40°21'0.0"W, vessel "Mona Lisa", 24.ix.2008, 27 m: 1 ovigerous female (MZUSP 15548). Santa Catarina, Ilha do Arvoredo, Baía do Farol, G. de Oliveira and P.R.K Bertuol coll., 19.x.2003: 1 female (MZUSP 16260).

*Scyllarides deceptor* – Brazil, Rio de Janeiro, Projeto Sol, station 1483, 23°00'S-42°10'W, 10.iii.1971, 64 m: 2 males (MZUSP 7070); 2 males (MZUSP 7073). Rio de Janeiro, Farol de São Tomé, off Barra do Furado, vessel "Vô Vinagre", 21.ix.2008, 33-40 m: 1 ovigerous female (MZUSP 15549). Rio de Janeiro, Guaratuba, C. Magenta coll., vii.1999, 50-70 m: 4 males (MZUSP 13017). São Paulo, Litoral Norte, Ubatuba, Projeto Biota/Fapesp, station SnC 34, 23°26'14"S-44°50'39"W, A. Fransozo coll., v.2001, 34.2 m: 1 male (MZUSP 14091). São Paulo, Litoral Norte, Ubatuba, Projeto Biota/Fapesp, station SnC 1, 23°32'24"S-44°47'19"W, A. Fransozo coll., ii.2001, 43.9 m: 3 males (MZUSP 14088). São Paulo, Ubatuba, Praia Grande, M.A. Pinheiro coll., viii.1996/vii.1997: 1 juvenile (MZUSP 13093). Projeto Sol, station 1469, 23°44'S-44°36'W, 07.iii.1971, 60 m: 1 male (MZUSP 7077). São Paulo, Litoral Norte, Caraguatatuba, Projeto Biota/Fapesp, station SnC 16-17, between 23°44'04"S and 23°47'34"S and between 45°01'15"W and 45°07'50"W, A. Fransozo coll., iv.2001, 36-39 m: 2 juveniles (MZUSP 14089). São Paulo, Litoral Norte, São Sebastião, Projeto Biota/Fapesp, station SnC 21, 23°58'10"S-45°29'44"W, A. Fransozo coll., iv.2001, 45.6 m: 1 female and 1 juvenile (MZUSP 14090). São Paulo, Ilha Vitória, 08.x.1987: 1 juvenile (MZUSP 9420). São Paulo, Ilha Alcatrazes, Instituto de Pesca coll., viii.1965: 1 male (MZUSP 7071). São Paulo, Ilha Alcatrazes, Instituto de Pesca coll., 10.vi.1965: 2 males (MZUSP 2054).

**TABLE 1:** Total length (tl) and carapace length (cl) of specimens of *Scyllarides deceptor* Holthuis, 1963 from both Ramos' (1951: 128, table not numbered) and the MZUSP collections.

MZUSP holdings	Sex	tl (mm)	cl(mm)	Ramos' specimens (1951)	Sex	tl(mm)	cl(mm)
4803	♀	270	101	06	♀	270	104
7090	♂	171	71	07	♂	168	72
7083	♂	154	64	08	♂	152	65
7089	♀	170	72	09	♀	171	72
7085	♀	169	72	10	♀	168	72
7086	♂	150	64	11	♂	147	65

São Paulo, Santos, Barra de Santos, Nupec coll., 1999, 50-70 m: 2 males (MZUSP 13059). São Paulo, Santos: 1 male (MZUSP 575). Projeto Sol, station 781, 25°20'S-47°05'W, 14.xii.1969, 59-60 m: 1 female (MZUSP 7078). Rio Grande do Sul, Projeto GEDIP, station 1863, 31°15'S-50°27'W, 07.viii.1972, sand and mud, 85 m: 1 male (MZUSP 7093). Projeto GEDIP, station 452, 32°07'S-51°04'W, 08.xii.1968, 68 m:

1 male (MZUSP 7074). Projeto GEDIP, R/V "Prof. W. Besnard", station 1477: 1 male (MZUSP 8657). Projeto GEDIP, R/V "Prof. W. Besnard", station 1145, 08.viii.1970: 3 males, 1 female (MZUSP 8658). Rio Grande do Sul, Torres, São Tomé, station 2222, 24.ii.1975, 19-20 m: 1 male and 1 female (MZUSP 7084). Southeast coast of Brazil, 1975: 1 male (MZUSP 7079). Southeast coast of Brazil, vi.1976: 1 male



**FIGURE 1A-B:** Habitus, dorsal view. A, *Scyllarides deceptor* Holthuis, 1963, female paratype cl 101 mm (MZUSP 4803). B, *Scyllarides brasiliensis* Rathbun, 1906, female holotype (USNM 21612). Scale bars: 50 mm.

(MZUSP 7082). Locality unknown: 1 male (MZUSP 7076); 1 female (MZUSP 7164); 1 male (MZUSP 7087).

**Distribution:** Southwestern Atlantic from Rio de Janeiro to the Buenos Aires Province (approximately between 23.5°S to 39°S). The record from Pernambuco (Oliveira *et al.*, 2008: 1433) is most certainly mistaken.

**Remarks:** Francisco de Paula Andrade Ramos was a former researcher at the IOUSP, who conducted many field trips along the northern coast of São Paulo State. There the IOUSP constructed a marine laboratory facility in Ubatuba in 1955 (Paiva, 1996: 83-84). Parts of the collections assembled by Ramos were later transferred from the IOUSP to the MZUSP. Among the transferred collections were 3 males and 3 females of *S. deceptor* Holthuis, 1963 (labeled as *S. brasiliensis*), including the female MZUSP 4803 depicted by Ramos (1951: pl. 1-2) and mentioned by Holthuis (1963: 57): "This species [*Scyllarides deceptor* new species] was described and figured by Andrade Ramos (1951, p. 125, pl. 1)." The evidence that the female depicted by Ramos and the female MZUSP 4803 are the same is as follows: (i) both the female figured by Ramos (1951: pl. 1-2) and the female MZUSP 4803 were caught by the fishing boat "Dois Irmãos" at Ilha

Vitória, northern coast of São Paulo, and donated to Ramos by Kossako Kikuchi (Ramos, 1951: 126-127). Ramos (1951) did not mention the date of collection of his material. According to the labels in the jars, all six specimens from Ilha Vitória were collected on April 16, 1951; (ii) fluke characteristics in the form of the left exopod and both endopods of the uropods outline in the female depicted by Ramos (1951: pl. 2) and the female MZUSP 4803 perfectly match one another (Figs. 1, 2); (iii) according to Ramos (1951: 127-128), the largest female obtained by him was 270 mm long, measured from the proximal end of the distal antennular peduncle to the posterior margin of telson, the same as the female MZUSP 4803. From the extremely poor scale bar provided by Ramos we infer that the female figured by him was about 270 mm long (*see* Ramos, 1951: pl. 1-2). Because the female MZUSP 4803 and the female depicted by Ramos (1951: pl. 1-2) and mentioned by Holthuis (1963: 57) are the same, and according to the ICZN (2005: Art. 72.4.1.1), the female MZUSP 4803 is regarded herein as a paratype of *S. deceptor* Holthuis, 1963.

Besides the female MZUSP 4803, three males and two additional females of *S. deceptor* in the MZUSP holdings are considered herein to be from Ramos' (1951) collection, and are therefore treated as paratypes of *S. deceptor* Holthuis, 1963 as well. As in Ramos (1951: 127), all the above five specimens are labeled "Ilha Vitória, fishing boat 'Dois Irmãos', north of Ilha de São Sebastião, north coast of São Paulo, Kossako Kikuchi coll." Ramos (1951: 128, table not numbered) provided body measurements for all his specimens, but except for the total length of the body, he did not detail how the measurements were taken. Although it is difficult to accurately compare our measurements and his, body measurements of the three males and the two additional females in the MZUSP holdings are very close to Ramos' specimens 6 to 11 (Table 1).

Until recently, *S. deceptor* was regarded as being too rare to be of economic interest (Holthuis, 1991: 186). Nevertheless, important fishing grounds have recently been discovered in Santa Catarina (28°S) and Rio Grande do Sul (29°S) (Perez *et al.*, 2003). There is no special fishery devoted to this species, and in southeastern Brazil *S. deceptor* is caught during shrimp trawling operations between 40 and 70 meters deep (Perez *et al.*, 2001). Still, between 2000 and 2007 as much as 251,786 tons has been landed in Santa Catarina (GEP/CTTMAR/UNIVALI, 2009). These catches were attributed to *S. deceptor* alone and did not take into consideration the existence of a sec-

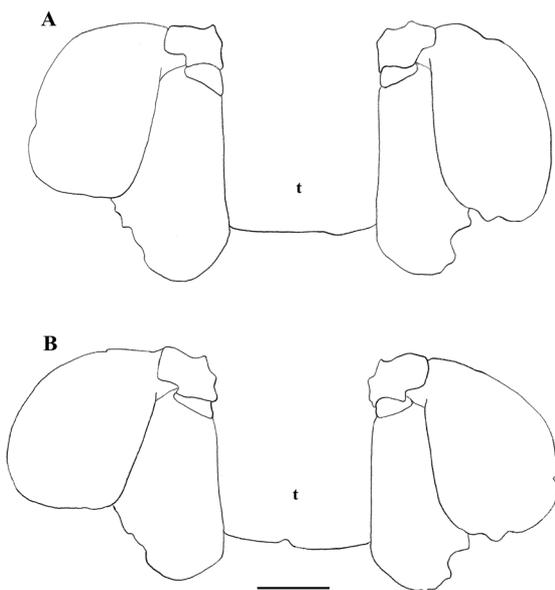


FIGURE 2: Outline drawing of the uropod and telson of *Scyllarides deceptor* Holthuis, 1963 in ventral view. A, Female depicted by Ramos (1951: pl. 2). B, Female paratype cl 101 mm (MZUSP 4803). Scale bars: 20 mm; t, telson.

ond species in the area, *S. brasiliensis*, which can occur as south as Santa Catarina (Dall’Occo, 2005) (see also material examined). Perez *et al.* (2001: 33) stressed that *S. deceptor* is a growing resource in southeastern

Brazil, and recommended evaluation of its stocks. Correct recognition of slipper-lobster species will be critical to properly evaluate the slipper-lobster stocks in southeastern Brazil.

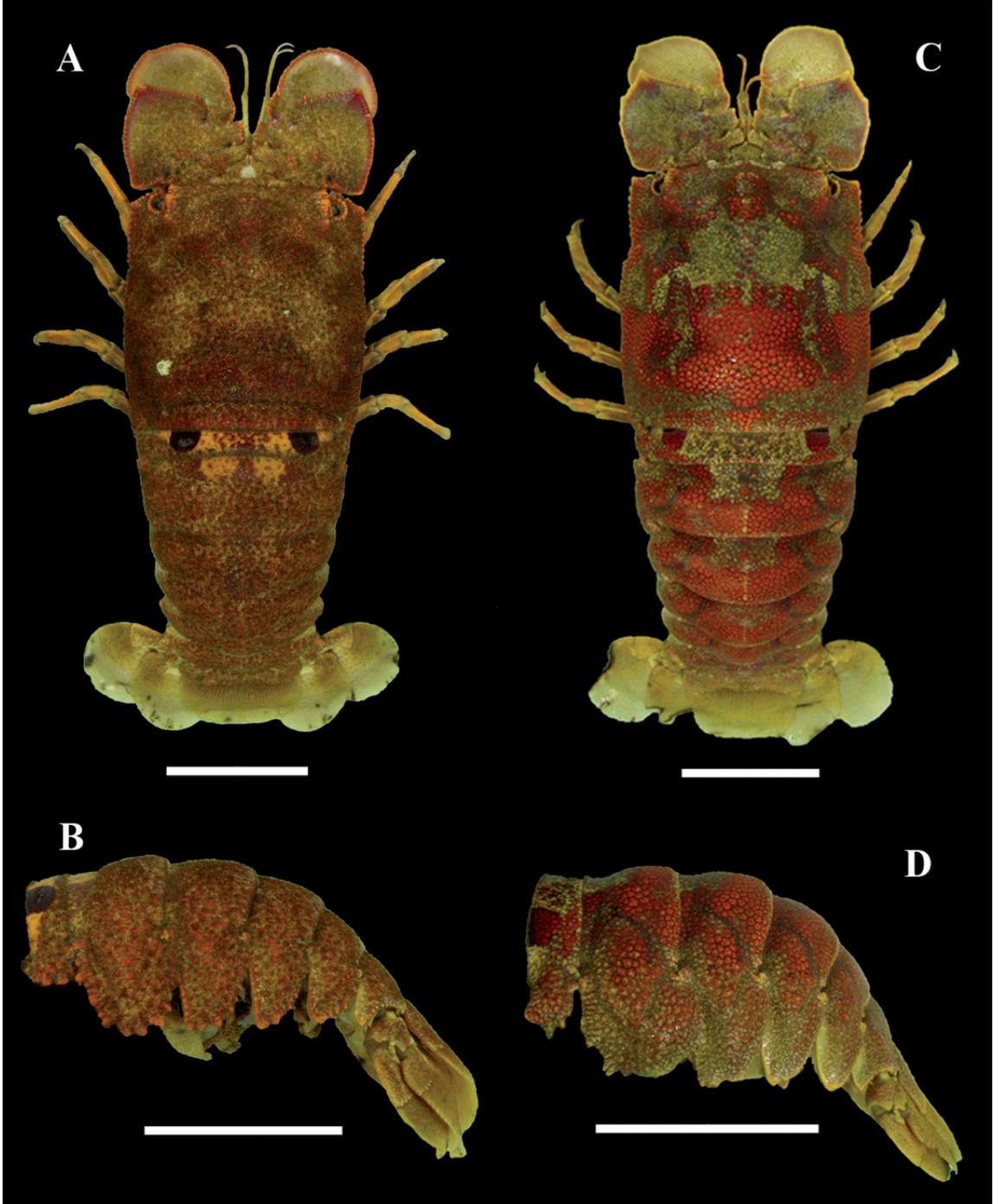


FIGURE 3: A-B. Color pattern in *Scyllarides brasiliensis* Rathbun, 1906 (MZUSP 15548). Body velvet not visible. A, *habitus*, dorsal view. B, lateral view of the abdomen. C-D. Color pattern in *Scyllarides deceptor* Holthuis, 1963 (MZUSP 15549). C, *habitus*, dorsal view. D, lateral view of the abdomen. Scale bars: 40 mm.

*Scyllarides deceptor* and *S. brasiliensis* continue to be confounded with one another in consequence of their very similar color patterns and locally sympatric distributions. Indeed, both species share two very distinct, sharply defined, lateral spots on the dorsal surface of the first abdominal somite (Figs. 3A, C). *S. brasiliensis* has been recorded as far south as Santa Catarina (Dall'Occo, 2005) (see also Material Examined). Holthuis (1963) showed that *S. deceptor* and *S. brasiliensis* can be distinguished from each other by: (i) the shape of the distal part of the pleural posterior margin of the second abdominal somite, which is distinctly concave in *S. deceptor* and is evenly convex in *S. brasiliensis* (see Holthuis, 1991: figs. 333, 336), and (ii) the carpus of P1, which possesses a very shallow longitudinal groove and is devoid of adjacent ridges in *S. deceptor*, and has a deep longitudinal groove flanked by two distinct ridges in *S. brasiliensis* (Figs. 4 A-B). Actually in some specimens of *S. deceptor*, the groove of the carpus of P1 is almost imperceptible. Rathbun (1906) referred to *S. brasiliensis* as "very hairy"

(Fig. 1B). Indeed, the most striking characteristic of *S. brasiliensis* is its body and appendages covered with a distinct velvet, which is absent in *S. deceptor*. Additionally, *S. deceptor* and *S. brasiliensis* differ from each other by *S. deceptor* having (i) a deeper cervical incision (much shallower in *S. brasiliensis*, figs. 3A-B); (ii) the tubercles on the dorsal surface of both the carapace and the abdomen placed close together (distinctly more spaced in *S. brasiliensis*, figs 3A-D); and (iii) both pre-gastric and gastric teeth strong (markedly weaker in *S. brasiliensis*, figs. 3 A-B).

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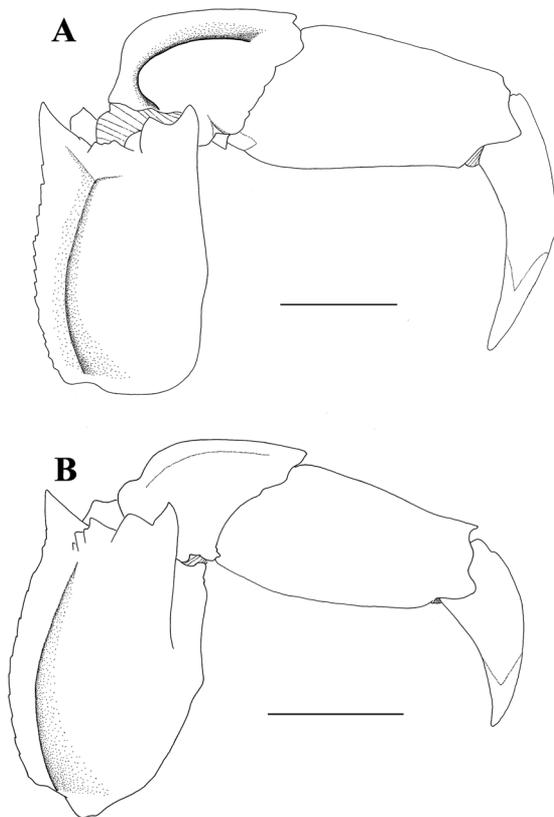


FIGURE 4: Outline drawing of the merus, carpus, propodus, and dactyl of the first pereiopod. A, *Scyllarides brasiliensis* Rathbun, 1906 (MZUSP 15548). B, *Scyllarides deceptor* Holthuis, 1963 (MZUSP 15549). Scale bars: 10 mm.

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All contributions must follow the International Code of Zoological Nomenclature. Relevant specimens should be properly curated and deposited in a recognized public or private, non-profit institution. Tissue samples should be referred to their voucher specimens and all nucleotide sequence data (aligned as well as unaligned) should be submitted to GenBank ([www.ncbi.nlm.nih.gov/Genbank](http://www.ncbi.nlm.nih.gov/Genbank)) or EMBL ([www.ebi.ac.uk](http://www.ebi.ac.uk)).

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**Submission of Manuscripts:** Manuscripts should be sent to the SciELO Submission (<http://submission.scielo.br/index.php/paz/login>), along with a submission letter explaining the importance and originality of the study. Address and e-mail of the corresponding author must be always updated since it will be used to send the 50 reprints in titled by the authors. Figures, tables and graphics should not be inserted in the text. Figures and graphics should be sent in separate files with the following formats: ".jpg" and ".tif" for figures, and ".xls" and ".cdr" for graphics, with 300 dpi of minimum resolution. Tables should be placed at the end of the manuscript.

Manuscripts are considered on the understanding that they have not been published or will not appear elsewhere in substantially the same or abbreviated form. The criteria for acceptance of articles are: quality and relevance of research, clarity of text, and compliance with the guidelines for manuscript preparation.

Manuscripts should be written preferentially in English, but texts in Portuguese or Spanish will also be considered. Studies with a broad coverage are encouraged to be submitted in English. All manuscripts should include an abstract and keywords in English and a second abstract and keywords in Portuguese or Spanish.

Authors are requested to pay attention to the instructions concerning the preparation of the manuscripts. Close adherence to the guidelines will expedite processing of the manuscript.

**Manuscript Form:** Manuscripts should not exceed 150 pages of double-spaced, justified text, with size 12 and source Times New Roman (except for symbols). Page format should be A4 (21 by 29.7 cm), with 3 cm of margins. The pages of the manuscript should be numbered consecutively.

The text should be arranged in the following order: **Title Page, Abstracts with Keywords, Body of Text, Literature Cited, Tables, Appendices, and Figure Captions.** Each of these sections should begin on a new page.

(1) **Title Page:** This should include the title, short title, author(s) name(s) and institutions. The title should be concise and, where appropriate, should include mention of families and/or higher taxa. Names of new taxa should not be included in titles.

(2) **Abstract:** All papers should have an abstract in English and another in Portuguese or Spanish. The abstract is of great importance as it may be reproduced elsewhere. It should be in a form intelligible if published alone and should summarize the main facts, ideas, and conclusions of the article. Telegraphic abstracts are strongly discouraged. Include all new taxonomic names for referencing purposes. Abbreviations should be avoided. It should not include references. Abstracts and keywords should not exceed 350 and 5 words, respectively.

(3) **Body of Text:** The main body of the text should include the following sections: **Introduction, Material and Methods, Results, Discussion, Conclusion, Acknowledgments, and References at end.** Primary headings in the text should be in capital letters, in bold and centered. Secondary headings should be in capital and lower case letters, in bold and centered. Tertiary headings should be in capital and lower case letters, in bold and indented at left. In all the cases the text should begin in the following line.

(4) **Literature Cited:** Citations in the text should be given as: Silva (1998) or Silva (1998:14-20) or Silva (1998: figs. 1, 2) or Silva (1998a, b) or Silva & Oliveira (1998) or (Silva, 1998) or (Rangel, 1890; Silva & Oliveira, 1998a, b; Adams, 2000) or (Silva, pers. com.) or (Silva *et al.*, 1998), the latter when the paper has three or more authors. The reference need not be cited when authors and date are given only as authority for a taxonomic name.

(5) **References:** The literature cited should be arranged strictly alphabetically and given in the following format:

- **Journal Article** – Author(s). Year. Article title. *Journal name*, volume: initial page-final page. Names of journals must be spelled out in full.
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**Tables:** All tables must be numbered in the same sequence in which they appear in text. Authors are encouraged to indicate where the tables should be placed in the text. They should be comprehensible without reference to the text. Tables should be formatted with vertical (portrait), not horizontal (landscape), rules. In the text, tables should be referred as Table 1, Tables 2 and 3, Tables 2-6. Use "TABLE" in the table heading.

**Illustrations:** Figures should be numbered consecutively, in the same sequence that they appear in the text. Each illustration of a composite figure should be identified by capital letters and referred in the text as: Fig. 1A, Fig. 1B, for example. When possible, letters should be placed in the left lower corner of each illustration of a composite figure. Hand-written lettering on illustrations is unacceptable. Figures should be mounted in order to minimize blank areas between each illustration. Black and white or color photographs should be digitized in high resolution (300 dpi at least). Use "Fig(s)." for referring to figures in the text, but "FIGURE(S)" in the figure captions and "fig(s)." when referring to figures in another paper.

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