

**SCYLLARUS RAMOSAE, NEW SPECIES, FROM THE BRAZILIAN CONTINENTAL SLOPE, WITH NOTES ON CONGENERS OCCURRING IN THE AREA (DECAPODA: SCYLLARIDAE)**

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ABSTRACT

*Scyllarus ramosae*, new species, from the Brazilian continental slope closely resembles *Scyllarus faxoni* from the Caribbean Sea, with which it is compared.

Three other species of the genus occur in Brazilian waters, namely, *S. americanus*, *S. chacei*, and *S. depressus*. The old records of *S. arctus* from Brazil belong actually to *S. depressus*. A key for the species of *Scyllarus* from the western Atlantic south of Venezuela is presented.

RESUMO

Uma nova espécie do gênero *Scyllarus* coligida no talude continental brasileiro é descrita e ilustrada, nomeadamente *Scyllarus ramosae*, nova espécie. A nova espécie se assemelha à *S. faxoni*, do mar do Caribe, a qual *S. ramosae* é comparada.

Três outras espécies de *Scyllarus* ocorrem na plataforma continental brasileira, a saber: *S. americanus*, *S. chacei*, and *S. depressus*. Os registros de *S. arctus* para o Brasil devem ser atribuídos a *S. depressus*. Uma chave para as espécies de *Scyllarus* ocorrendo ao sul da Venezuela é apresentada.

A survey of the southeastern Brazilian deep-sea fauna carried out in 1987 by the *Marion Dufresne* (Guille and Ramos, 1988) yielded a male of the locust lobster *Scyllarus ramosae*, new species. The new species is described below and more details are provided on the taxonomy of the other three species of the genus occurring in Brazil, namely *S. americanus* (S. I. Smith, 1869), *S. chacei* Holthuis, 1960, and *S. depressus* (S. I. Smith, 1881).

MATERIALS AND METHODS

Descriptive terminology follows that used by Holthuis (1985). Abbreviations: P2 = second pereopod, P3 = third pereopod, P4 = fourth pereopod, st. = station, CB = Blake dredge, D = biological dredge. Measurements are expressed in millimeters (mm): total length (tl.), from the tip of the rostrum to the extremity of the telson; carapace length (cl.), from the tip of the rostrum to the posterior margin of the carapace. The material herein studied has been deposited in or belongs to the collections of the following museums: MNRJ (Museu Nacional, Rio de Janeiro); MZUSP (Museu de Zoologia da Universidade de São Paulo); RMNH (Nationaal Natuurhistorisch Museum, Leiden); and USNM (National Museum of Natural History, Washington). A detailed account of the cruises of the *Annie* can be found in Miranda Ribciro (1903).

*Scyllarus ramosae*, new species

(Figs. 1 A, B, M; 2 A, C, E; 3 A-F; 4 A, C)

*Type Material*.—TAAF MD55/Brazil 1987: *Marion Dufresne*, 28 May 1987, st. 46—CB80, 18°59'S, 37°49'W,

290–315 m: ♂ holotype tl. 44.9, cl. 15.9 (MNRJ 1584).

The type material was compared with the following specimens of *Scyllarus faxoni* Bouvier, 1917: Florida, *Gerda*, 30 September 1967, st. 935, 27°37'N, 78°52'W, 228–255 m: 1 ♂ tl. 32.5, cl. 12.5 (RMNH 26044), L. B. Holthuis det.—Straits of Florida, *Gerda*, 2 March 1965, st. 510, 26°10'N, 79°08'W, 311–329 m: 1 ♂ tl. 30.5, cl. 11.2 (RMNH 26042), L. B. Holthuis det.—Straits of Florida, off Great Bahama Bank, *Combat*, 23 July 1957, st. 446, 25°10'N, 79°13'W, 450 m: 1 ♂ (USNM 170208), F. A. Chace, Jr., det.—Straits of Florida, *Gerda*, 14 June 1968, st. 1011, 23°36'N, 79°34'W, 159–170 m: 1 ♂ tl. 39.6, cl. 14.5 (RMNH 26040), L. B. Holthuis det.—North of Cuba, Santaren Chanel, *Oregon*, 16 July 1955, st. 1344, 22°50'N, 79°08'W, 360–405 m: 6 ♂♂ and 3 ♀♀ (USNM 128015), W. G. Lyons det.—Yucatan, *Gerda*, 10 September 1967, st. 894, 21°11.5'N, 86°19'W, 95–113 m: 1 ♂ tl. 42.6, cl. 14.1 (RMNH 26039), L. B. Holthuis det.—Yucatan, *Gerda*, 10 September 1967, st. 897, 20°59'N, 86°24'W, 185–200 m: 1 ♂ tl. 32.9, cl. 11.9; 1 ♀ tl. 53, cl. 17 (RMNH 26041), L. B. Holthuis det.—Yucatan, *Gerda*, 10 September 1967, st. 889, 20°55'N, 86°28'W, 97–120 m: 1 ♂ tl. 52; cl. 18.2 (RMNH 26043), L. B. Holthuis det.—Puerto Rico, southwest coast, *Sylver Bay*, 26 October 1963, st. 5193, 18°16'N, 67°22'W, 270 m: 1 ♂ tl. 45, cl. 16 (USNM 128017), W. G. Lyons det.

*Type Locality*.—Brazil, off the coast of Espírito Santo (18°59'S, 37°49'W), 290–315 m.

*Description*.—Carapace: rostrum blunt, slightly constricted behind tip. Rostral tooth small, rounded. Pregastric tooth well developed, with immediately behind it 2 minute, almost contiguous tubercles. Gastric tooth

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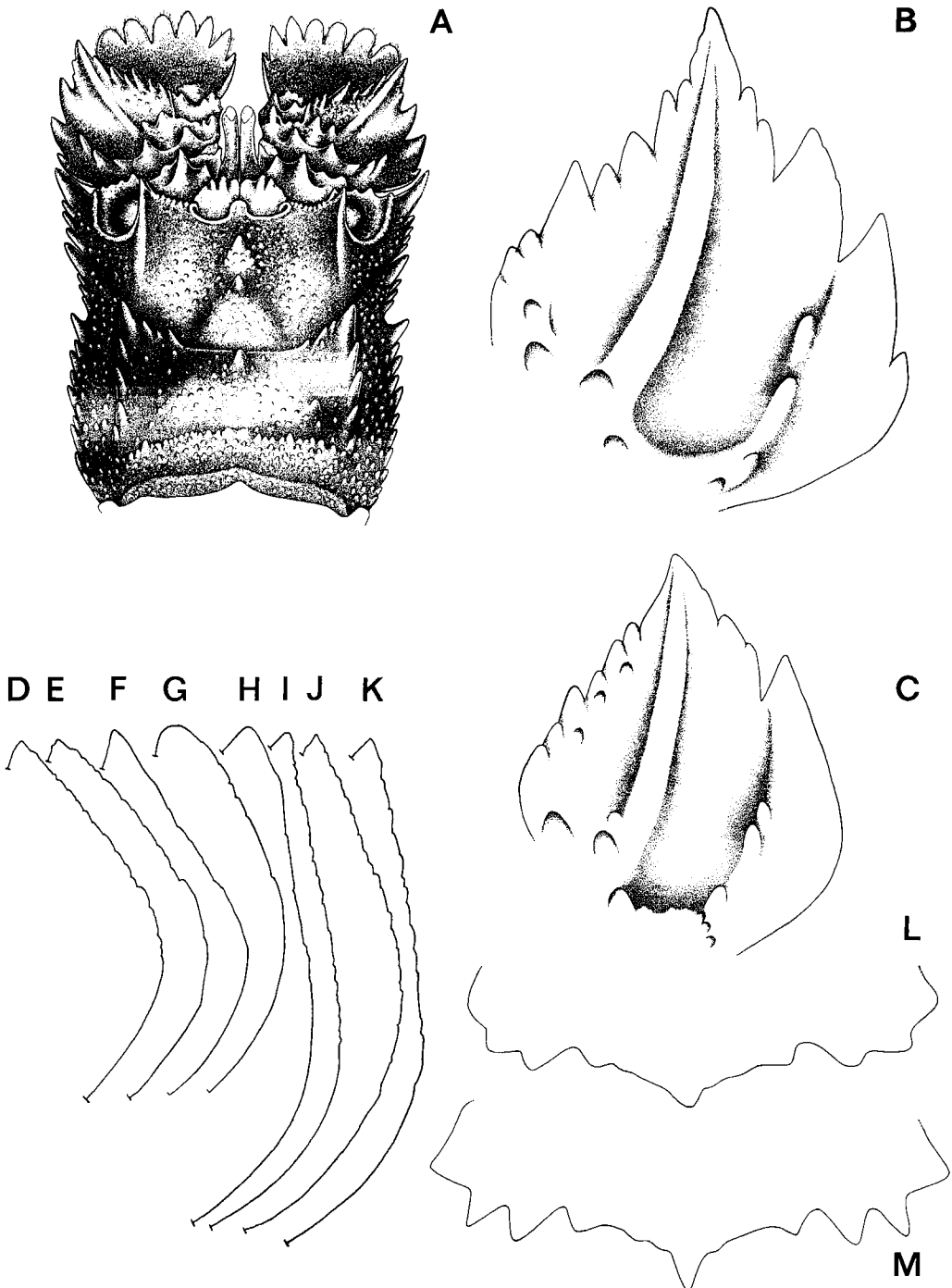


Fig. 1. *Scyllarus ramosae*, new species, holotype. A, dorsal view of the carapace and cephalic appendages. B, semischematic dorsal view of the right fourth antennal segment. *Scyllarus faxoni*: C, ♂ tl. 42.6, cl. 14.1 (RMNH 26039). D–K, schematic view of right half of the right fourth antennal segment. D, *S. faxoni*, ♂ tl. 30.5; cl. 11.2 (RMNH 26042); E, *S. faxoni*, ♂ tl. 32.5; cl. 12.5 (RMNH 26044); F, *S. faxoni*, ♂ tl. 32.9; cl. 11.9 (RMNH 26041); G, *S. faxoni*, tl. 39.6; cl. 14.5 (RMNH 26040); H, *S. faxoni*, ♀ tl. 53; cl. 17 (RMNH 26041); I, *S. faxoni*, ♂ tl. 42.6; cl. 14.1 (RMNH 26039); J, *S. faxoni*, ♂ tl. 45, cl. 16 (USNM 128017); K, *S. faxoni* (RMNH 26043). L, M, contour of the posterior margin of fifth abdominal tergite. L, *S. faxoni* (RMNH 26039); M, *S. ramosae*, new species (MNRJ 1584).

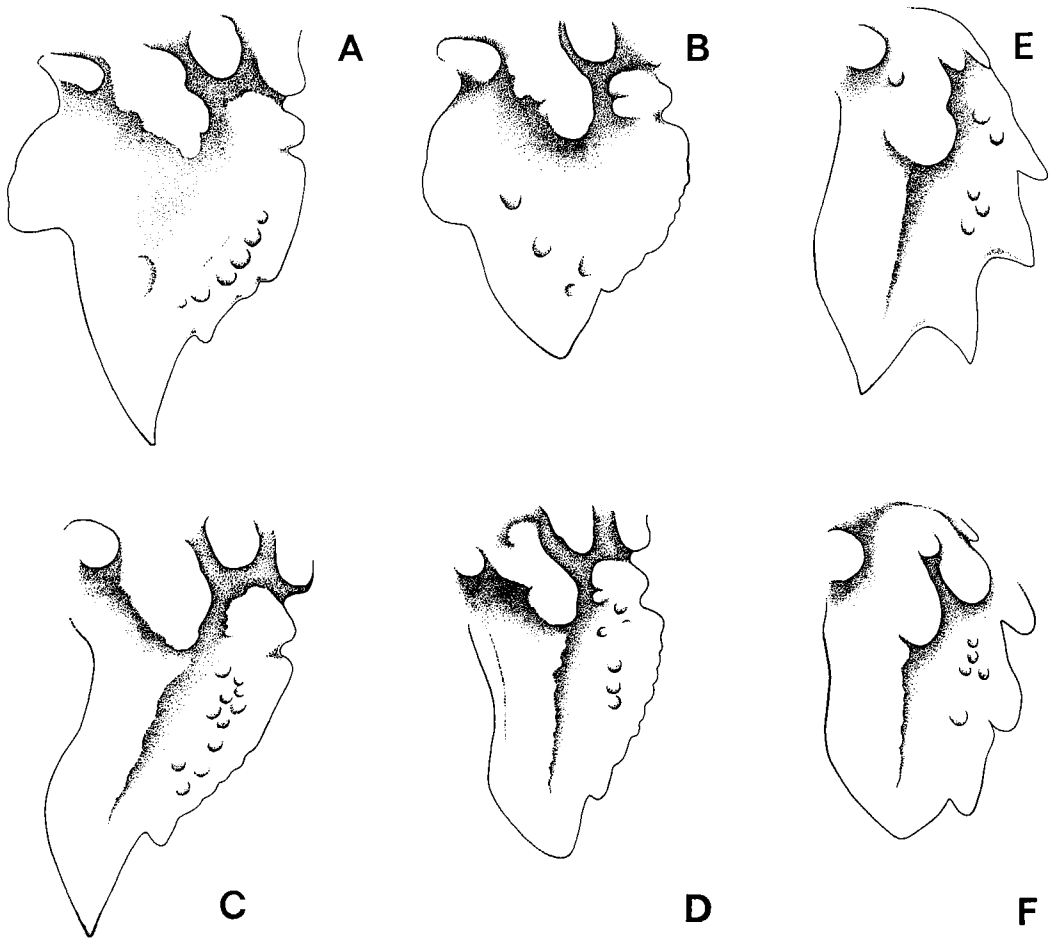


Fig. 2. A–F, semischematic view of the left abdominal pleura 2, 3, and 5. A, C, E, *Scyllarus ramosae*, new species, Brazil, off coast of Espírito Santo (18°59'S, 37°49'W), 290–315 m: ♂ holotype tl. 44.9; cl. 15.9 (MNRJ 1584). B, D, F, *Scyllarus faxoni*, ♂ tl. 42.6; cl. 14.1 (RMNH 26039).

sharp and larger than pregastric tooth, adorned with several small rounded tubercles. Cardiac tooth strong and sharp, positioned immediately behind cervical groove; bearing low small tubercles. Cardiac tooth followed by 3 pairs of low tubercles, one pair behind other. Last pair of tubercles surrounded by several small ones. Anterior submedian ridge represented by few small tubercles. Few rounded tubercles between anterior submedian and anterior branchial ridges. Posterior submedian ridge showing as distinct tubercle surrounded by several low tubercles. Posterior branchial ridge formed by longitudinal row of about 9 tubercles, beginning behind cervical groove and extending backward almost to posterior margin of carapace. First tubercle of posterior branchial ridge large, acute, covered with small granules, followed

by about 8 smaller tubercles. Except for low tubercle located almost between anterior and posterior branchial ridges, cervical groove showing no tubercle. Anterior branchial ridge ending anteriorly in very large sharp spine. Anterior margin of carapace ending laterally in acute tooth. Lateral margin of carapace clearly divided into 3 parts: anterolateral, mediolateral, and posterolateral. Anterior part armed with about 5 anterolateral teeth. First anterolateral tooth very large and sharp, followed by about 4 smaller teeth. First mediolateral tooth large and sharp, but smaller than first anterolateral tooth; behind it 3 small acute teeth. Posterolateral part consisting of about 10 acute teeth, first larger and strongly pointed. Orbit smoothly rimmed, its inner margin meeting first tooth of anterior branchial ridge. Anterior end of orbital margin armed with small

triangular tooth. Between angle formed by anterior branchial ridge and posterior margin of orbit, transverse row of 4 small tubercles. No tubercles immediately behind lateral margin of orbit. Intercervical ridge showing group of about 12 blunt, sometimes fused tubercles. No intestinal tooth. Marginal groove deep and smooth. Immediately behind it, transverse row of low tubercles, often fused. No posteromedian tooth.

Antennule and antenna: anterior margin of antennular somite divided into 3 lobes; mesial lobe more produced and sharper than lateral lobes. Last antennal segment with 7 teeth: first 3 teeth of inner margin acute, following teeth becoming progressively rounded toward outer margin. Anterior margin of fifth antennal segment with strong acute spine on inner angle; 1 small acute tooth placed almost at outer angle. Upper surface of fourth antennal segment bearing 2 strong ridges: median ridge and additional ridge, much shorter than median ridge. Median ridge with well-developed tubercle basally. Basal part of additional ridge with tubercle contiguous to knob on anterior margin of orbit. Outer margin of fourth antennal segment furnished with 4 sharp teeth, 2 of which located behind additional ridge; inner margin provided with about 8 teeth. Inner part of anterior margin of antennal segment 2 + 3 armed with strong sharp tooth.

Thoracic sternum: anterolateral angles of sternite IV produced forward beyond anterior margin. Distinct rounded tubercle immediately behind anterior margin. Sternites belonging to P2–4 bearing strong rounded tubercle on central parts. Sternite VIII armed with sharp tubercle. Otherwise sternites IV–VIII smooth.

Pereiopods: first pereiopod heavier than following legs. Dactylus almost three-fourths as long as propodus and much narrower. Propodus provided with fringe of setae along ventral surface. No grooves present on either propodus or dactylus. Carpus short, bearing few setae on mesial surface. Merus strong, showing shallow groove on lateral surface; provided with ventral fringe of sparse setae. Second to fourth pereiopods similar. Dactylus slender, with very shallow groove on lateral and ventral surfaces. Propodus furnished with rather dense fringe of setae on ventral surface. Ventral part of merus densely covered with fringe of setae; sparsest dorsally.

Carpus covered with scattered setae dorsally; ventrally smooth. Fifth pereiopod smaller and more slender than in preceding legs. Segments furnished with scattered delicate setae. Dactylus simple, not chelate.

Abdomen: first abdominal somite with transverse row of low tubercles, traversing only central parts of tergum; lateral parts smooth. Pleura very small, ending in short triangular tooth. Abdominal somites 2–5 with distinct median carina. Tergum of abdominal somites 2–5 armed laterally with 3 large squamae. Posterior margin of fifth abdominal tergite armed with strong, acute spine. Pleura of somites 2–4 ending in very large sharp posteriorly directed spinelike point. Posterior margin of pleura 2–4 armed with small teeth. Pleura of somite 5 armed with 2 large triangular sharp teeth on posterior margin. Pleopods: abdominal sternites 2–5 furnished with pleopods. Exopods lamellate provided with short hairs along margins. Endopods much longer and narrower than exopods, and provided with only few long hairs.

*Etymology.*—This species is named for Jeanete Maron Ramos, Santa Úrsula University Chancellor, in recognition of her continuous support over several decades to the study of Brazilian biodiversity.

*Distribution.*—The species is known only from the type locality.

*Remarks.*—Among the western Atlantic species of the genus, *Scyllarus ramosae* (Fig. 4) clearly resembles *Scyllarus faxoni*, from which it can be readily distinguished by the following attributes: (1) end of abdominal pleura 2–5 forming large sharp tooth directed backward (Fig. 2A, C, E), while in *S. faxoni* pleura 2–5 end abruptly (Fig. 2B, D, F); (2) posterior margin of fifth abdominal pleura armed with 3 prominent acute teeth (Fig. 2E), whereas in *S. faxoni* they are short and blunt (Fig. 2F); (3) posterior margin of fifth abdominal tergite armed with strong acute spine (Fig. 1M), while in *S. faxoni* it is short and truncated (Fig. 1L); and (4) outer margin of fourth antennal segment with 2 strong teeth behind additional ridge (Fig. 1B), instead of only 1 tooth in *S. faxoni* (Fig. 1C). The form of the outer margin of the fourth antennal segment varies considerably in *S. faxoni* (Fig.

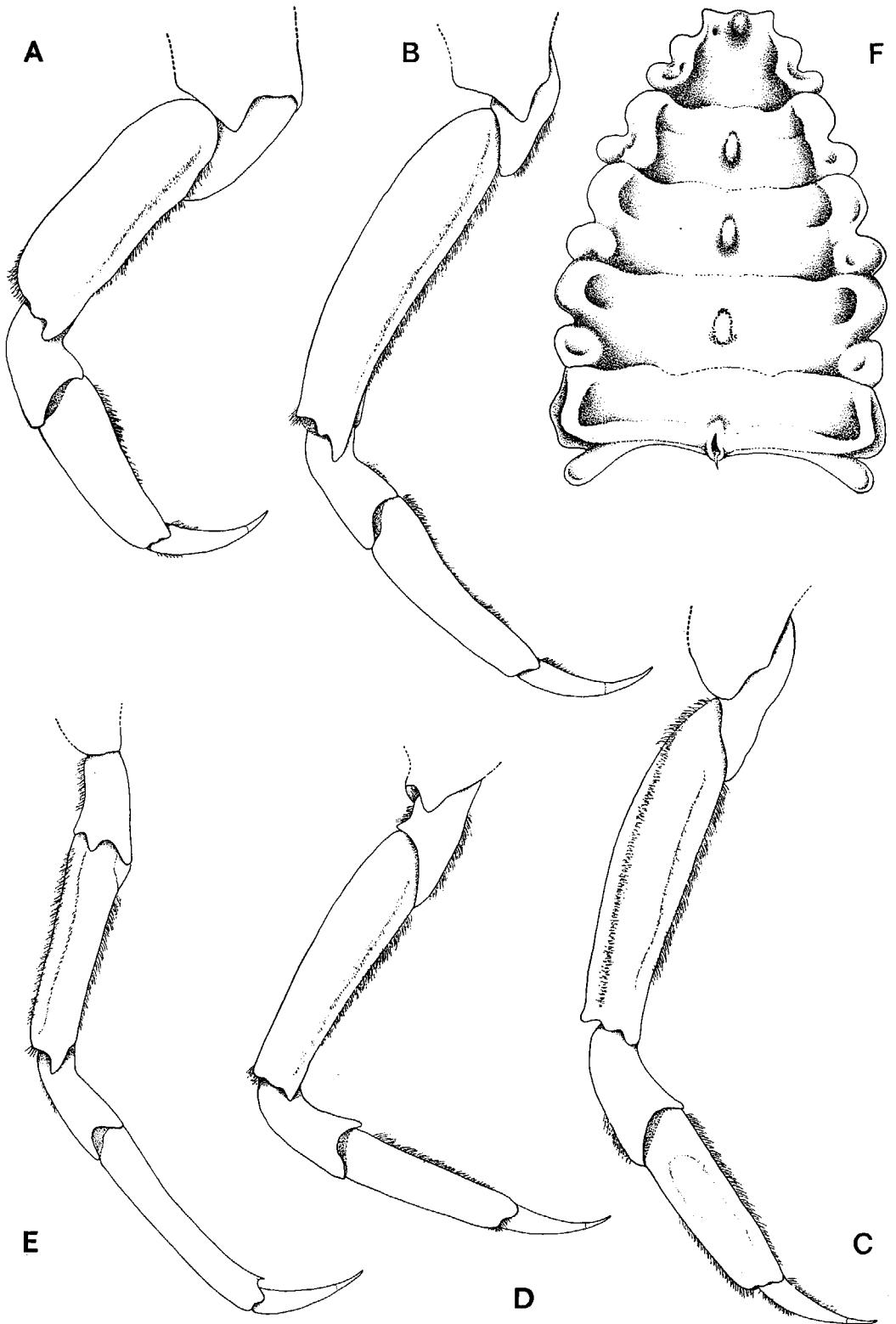


Fig. 3. A–F, *Scyllarus ramosae*, new species, Brazil, off coast of Espírito Santo (18°59'S, 37°49'W), 290–315 m. ♂ holotype tl. 44.9; cl. 15.9 (MNRJ 1584). A–E, pereopods 1–5, respectively. F, thoracic sternum.

1D–K), but, in this species, there is only one tooth behind the additional ridge. In the male holotype of *S. faxoni* (from Guadeloupe, tl. 42, cl. 16) figured in Bouvier (1925: pl. 7, fig. 2), the tooth of the additional ridge is followed by a shallow notch not found in the material herein examined nor in the specimen figured by Lyons (1970: fig. 14).

In addition to the previously mentioned characters in *Scyllarus ramosae*, the anterolateral, mediolateral, and posterolateral carapace teeth are much more developed and acute than in *S. faxoni*.

#### Other Species of *Scyllarus* Occurring in Brazilian Waters

Three additional species of *Scyllarus* have been recorded from Brazil. They are: *S. americanus*, *S. chacei*, and *S. depressus*.

*Scyllarus americanus* and *Scyllarus chacei*.—*Scyllarus chacei* was the first species of *Scyllarus* mentioned from Brazilian waters. Its presence was first established by Rathbun (1901: 97) based on the *Albatross* collections obtained on the northeastern coast of the country (off Cape São Roque, 37 m, st. 2758, USNM 23328, identified by her as *S. americanus*). Early subsequent mentions of *S. americanus* for the area, by Bouvier (1925), Schmitt (1935), and Holthuis (1959), were based on this same material and should be credited to *S. chacei* as well. It was Holthuis (1960: 152) who recognized that there were two species involved, and split *S. americanus* into *S. americanus* sensu stricto and *S. chacei* Holthuis, 1960. According to him, the true *S. americanus* "is known to inhabit the Atlantic coast of the U.S.A. from North Carolina to Florida, and the eastern Gulf of Mexico, including Cuba," while *S. chacei* was considered to have a much wider range extending "from North Carolina to northeastern Brazil throughout the Caribbean area." In Brazil, *S. chacei* is presently known from Pará, Ceará, Rio Grande do Norte, Pernambuco, Alagoas, Sergipe, Bahia, and Rio de Janeiro States.

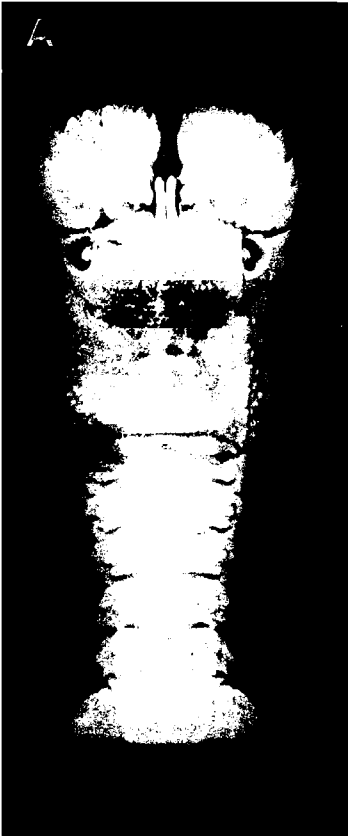
In the absence of additional collections from Brazil, Williams (1965) followed Holthuis (1960) in considering the north coast of South America as the southern limit of the range of *S. americanus*, and in attributing previous records from Brazil for that species to *S. chacei*. Lyons (1970), Coelho (1971), and Coelho and Ramos (1972) obtained additional

specimens from different localities in Brazil, but continued to assume that, of the two species involved, only *S. chacei* inhabited the Brazilian coast, an assumption followed by Rodriguez (1980). During the reexamination of the Brazilian material previously identified by Coelho (1971) and Coelho and Ramos (1972) with *S. chacei*, Coelho (1981) reidentified five specimens from northeastern Brazil with *S. americanus* (material from Paraíba and Pernambuco States, which I have not seen). Despite this, Williams (1984) continued to exclude the Brazilian coast from the known range of *S. americanus*. Unfortunately, none of Coelho's specimens, or any other Brazilian material, has been so far compared with Caribbean representatives of *S. americanus* or *S. chacei*. Comparison between Brazilian and Caribbean representatives of those two species has been necessary and is now possible. In the MNRJ and MZUSP collections, there are four specimens from different localities in Brazil (MNRJ 3576, MZUSP 9207, 10894, 7069), which I compared with Caribbean specimens of *S. americanus* (USNM 127989) and *S. chacei* (USNM 169887), and assigned to *S. americanus*. On the Brazilian coast, *S. americanus* has been recorded from Paraíba, Pernambuco, and São Paulo. The existing data of depth range of the Brazilian specimens of *S. americanus* and *S. chacei* are in agreement with the conclusion of Holthuis (1960) that *S. chacei* is found in depths greater than *S. americanus*.

*Material of S. chacei Examined*.—Oregon II, 21 June 1975, st. 59/17751, 28°39.8'N, 80°08'W, 59 m: 2 ♀♀ (USNM 169887), R. H. Gore det.—Antares, 28 February 1996, st. D32, 18°52'N, 39°35'W, 22–52 m: 1 ♂, 1 juvenile (MNRJ 1591).

*Material of S. americanus Examined*.—Florida, Alligator Point, J. Rudloe coll., 2 February 1969, 11.5 m: 1 ♀ (USNM 127989), W. G. Lyons det.—01°20'N, 28°00'W: 1 ♀ (MZUSP 9207), M. Tavares det.—Abrolhos, southeast of Santa Barbara Island, Décio F. de Moraes, Jr., coll., 19 January 1984, stomach contents of the red grouper *Epinephelus morio* Valenciennes: 1 ♂ (MNRJ 3576), M. Tavares det.—Santos, São Paulo State, E. Rodrigues coll., 5 December 1976: 1 juvenile (MZUSP 10894), G. Melo det.—Wladimir Besnard, 21 July 1966, st. 208, Angra dos Reis, Rio de Janeiro State, 13.5 m: 1 ♂ (MZUSP 7069).

*Scyllarus depressus*.—Not unexpectedly, the fact that the description of *Scyllarus depressus* was based on a postlarva (Smith, 1881: 429) caused some confusion. Although adults of *S. depressus* were available soon after the



description of *S. depressus*, for many years subsequent authors had difficulties in correlating them with Smith's species. As a result, adults of *S. depressus* were mistakenly ascribed to the eastern Atlantic species *S. arctus* (Linnaeus, 1758), or were considered to belong to a new species, namely *S. nearctus* Holthuis, 1960.

Several authors confounded *Scyllarus depressus* with *Scyllarus arctus*. Doflein (1900:131) examined one juvenile caught in Rio de Janeiro by the Austrian zoologist Emil Selenka and identified it as *S. arctus*. Moreira (1903, 1905) assigned to *S. arctus* a female taken by the *Annie*, 18 January 1903, 60–100 m, between 43° and 43.30°W, 27–37 km off the coast of Brazil. De Man (1916: 64, 67) accepted Doflein and Moreira's records and included Rio de Janeiro in the known range of *S. arctus*. Luederwaldt (1929: 52) mentioned one specimen caught in the vicinity of São Sebastião Island, São Paulo, identified by M. J. Rathbun as *S. arctus*. Vasconcellos (1938: 67) mentioned *S. arctus* from Brazil. Andrade Ramos (1951: 125) examined another specimen identified by M. J. Rathbun as *S. arctus*, caught in "Brazil" in 1897. Although he held that this specimen belonged to *S. arctus*, he found some resemblance in the ornamentation of the abdominal somites between his specimen and that figured by Verrill (1922: pl. VII; *Scyllarides sculptus bermudensis* Verrill, 1922, which, according to Holthuis (1991: 176), is a junior synonym of *Arctides guineensis* (Spengler, 1799)).

In the collections available, I found only the specimen (MZUSP 749) mentioned by Andrade Ramos (1951). A comparison of Andrade Ramos' material, six specimens from different localities in Brazil (MZUSP 749, 8811, 8812, 8365, 9318; MNRJ 5703), and the female (USNM 220967) from off North Carolina, shows that the Brazilian material belongs to *S. depressus*.

In 1960, Holthuis described *Scyllarus nearctus*. Although in the material listed he mentioned only the holotype female from Dry Tortugas, Florida (USNM 104502), he was fully aware that the old records of *S. arctus* from the western Atlantic actually belonged to *S. nearctus*, since he stated that *S. nearc-*

*tus* is found from North Carolina to São Paulo, Brazil. Holthuis (1960) specified that the record by Rathbun (1900: 309) of *S. arctus* from Mazatlán, Pacific coast of Mexico, constituted an exception and should not be interpreted as *S. nearctus*, since this specimen was a "typical" *S. arctus*, "probably labeled incorrectly as to the locality." Robertson (1968) showed that the postlarva described by Smith (1881) as *S. depressus*, and the adult female described by Holthuis (1960) as *S. nearctus*, are actually conspecific (Lyons, 1970: 34–35). Therefore, the name *S. depressus* replaces *S. nearctus*.

*Material of S. depressus Examined.*—Off North Carolina, 33°48'36"N, 76°34'06"W, 69 m: 1 ♀ (USNM 220967).—Brasil, 1897: 1 ♂ (MZUSP 749), M. J. Rathbun det.—*Wladimir Besnard*, 5 September 1970, st. MBT 159, 22°00'S, 40°06'W, 90 m: 1 ♀ ovigerous (MZUSP 9318).—*Wladimir Besnard*, 27 July 1986, st. 4949, 23°47'S, 44°58.2'W, 50 m: 1 ♀ (MZUSP 8811).—*Veliger II*, 19 April 1986, st. 22, 23°50.30'S, 45°10'W, 40 m: 1 ♂ (MZUSP 8812).—*Wladimir Besnard*, 27 July 1986, st. BT 5, 27°44'S, 48°23'W, 50 m: 1 ♂ (MNRJ 5703).—Locality unknown: 1 ♀ (MZUSP 8365), H. R. Costa det.

#### KEY TO WESTERN ATLANTIC SPECIES OF *SCYLLARUS* SOUTH OF VENEZUELA

1. Additional ridge on fourth antennal segment well developed ..... *S. ramosae*, new species
- Fourth antennal segment without additional ridge ..... 2
2. Deep notch in posterior margin of abdominal somites 1–4 ..... 3
- Very shallow notch in posterior margin of abdominal somites 1–4 ..... 4
3. Second article of antennular peduncle cylindrical ..... *S. depressus* S. I. Smith
- Second article of antennular peduncle flattened dorsally ..... *S. americanus* S. I. Smith
4. Gastric and cardiac teeth prominent and acute ..... *S. chacei* Holthuis
- Gastric and cardiac teeth low and inconspicuous ..... *S. planorbis* Holthuis

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Fig. 4. A, C, *Scyllarus ramosae*, new species, Brazil, off coast of Espírito Santo (18°59'S, 37°49'W), 290–315 m: ♂ holotype tl. 44.9; cl. 15.9 (MNRJ 1584). A, dorsal view; C, lateral view. B, D, *Scyllarus faxoni*, ♂ tl. 42.6; cl. 14.1 (RMNH 26039). B, dorsal view; D, lateral view.



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