

New and additional records of deep-water blind lobsters from Brazil (Decapoda, Polychelidae)

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Abstract

Four species of deep-sea blind lobsters (Polychelidae) are recorded herein from Brazil: *Pentacheles laevis* Bate, 1878, *Pentacheles validus* A. Milne-Edwards, 1880, *Polycheles sculptus* Smith, 1880, and *Polycheles typhlops* Heller, 1862. *P. validus* was hitherto unknown from the Southeastern Atlantic. *P. laevis*, *P. sculptus*, and *P. typhlops* are recorded herein from several additional localities in Brazil. The differences between the closely related species *P. typhlops* and *P. perarmatus* are discussed. A key for the Brazilian species is given.

Key words: Benthos, deep-sea fauna, lobsters, *Pentacheles*, *Polycheles*, Polychelidae, Brazil

Introduction

Much of what we know about the Brazilian deep-water fauna is largely the outcomes of only a few expeditions conducted occasionally in the late nineteenth century (Tavares, 1999a). Although Brazil's deep-sea floor remains poorly known, progress has been made as a result of a series of reports based upon the collections obtained by the RV "Marion Dufresne" in Southeastern Brazil in 1987 (Tavares, 1999b). In the present report four species of deep-sea blind lobsters are recorded from Brazil: *Pentacheles laevis* Bate, 1878, *Pentacheles validus* A. Milne-Edwards, 1880, *Polycheles sculptus* Smith, 1880, and *Polycheles typhlops* Heller, 1862. *P. validus* was hitherto unknown from the Southeastern Atlantic. *P. laevis*, *P. sculptus*, and *P. typhlops*, known from only a few localities in Brazil (Galil, 2000; Ramos-Porto *et al.*, 2000; Melo and Xavier Filho, 2002; Silva-Ferreira *et al.*, 2002), are recorded herein from several additional localities. Opportunity is taken here to elaborate on the taxonomy of these species. The specimens have been deposited in the collections of the Museu de Zoologia da Universidade de São Paulo (MZUSP) and National Museum of Natural History, Smithsonian Institution, Washington D.C. (USNM). Terminology used below is that discussed in Galil (2000). Abbreviations used includes: cl, carapace length from tip of rostrum to the middle of the posterior border of the carapace; CP, beam trawl; mm, millimeters; P1, cheliped; P5, last pereopod; stn, sampling station.

Pentacheles laevis Bate, 1878
(Figure 1A)

Restricted synonymy.- *Pentacheles laevis* Bate, 1878: 278; Galil, 2000: 301.
Polycheles laevis Firth and Pequegnat, 1971: 49.

Material examined.- Brazil, TAAF MD55, "Marion Dufresne", stn 4 CP07, 21°31'S, 40°07'W, 750-789 m, 10.v.1987: male cl. 24.5 mm (MZUSP 16096) and female cl. 45 mm (MZUSP 16099). Santa Catarina, "Nuevo Apenino", trawling 70: male cl. 53 mm and female cl. 60 mm (MZUSP 15704).

Comparative material.- Hawaii, vicinity of Kauai, "Albatross", stn 4028, 799-860 m: female cl. 38 mm (USNM 30317).

Description.- Griffin and Stoddart (1995), as *Pentacheles granulatus* Faxon: description of color; photographs of dorsal view of the carapace. Galil (2000): description of carapace, abdominal tergites, and P1; photographs of dorsal view of the carapace and lateral view of abdomen.

Remarks.- In addition to the specimens of *P. laevis* reported herein, two males are known from South Brazil (Rio Grande Ridge), collected by the Russian vessel "Mesyatsev" in 1974 (Galil, 2000), and one individual from Rio de Janeiro (Silva-Ferreira *et al.*, 2002). The males and females examined in the present report agree very well with the Hawaiian female (USNM 30317), identified as *Pentacheles granulatus* Faxon, 1863, a species considered by Galil (2000: 301) as a junior synonym of *P. laevis* Bate.

Distribution.- Western Atlantic: United States, Mid Atlantic Bight, Bahamas Is, and Brazil (Espírito Santo, Rio de Janeiro, Santa Catarina, and Rio Grande Ridge). Eastern Atlantic: Southwestern Ireland, Ibero-Moroccan Gulf, Azores, Canary Is. Indo-Pacific: Japan, Hawaii, Philippines, Sri Lanka, Molluca Sea, Indonesia, Marquesas Is, Vanuatu, Nasca Ridge, Fiji, Wallis and Futuna Is, New Caledonia, Madagascar, Australia, New Zealand, Tasmania. Eastern Pacific: Gulf of Panama, Colombia, Galapagos Is. Depth range: between 350 and 2505 meters.

Pentacheles validus A. Milne-Edwards, 1880
(Figure 1B)

Restricted synonymy.- *Pentacheles validus* A. Milne-Edwards, 1880: 65; Galil, 2000: 308.
Polycheles validus; Bouvier, 1925: 434; Firth and Pequegnat, 1971: 61.

Material examined.- Brazil, TAAF MD55, "Marion Dufresne", stn 2 CP02, 22°55'S, 40°18'W, 1900-1950 m, 8.v.1987: male cl. 33 mm (MZUSP 16098). Stn 2 CP01, 23°06'S, 40°20'W, 2370-2380 m, 9.v.1987: male cl. 21 mm (MZUSP 16104).

Comparative material.- Bahamas, Exuma Sound, "Isalin", stn 334, 24°15'18"N, 76°06'18"W, 13.iv.1975: female cl. 56.5 mm (USMN 154400).

Description.- A. Milne-Edwards (1880): description of carapace, antennules, ocular peduncles, and chelipeds. Bouvier, 1925: description of carapace, ocular peduncles, maxillipeds, pereopods, abdomen, and uropods; drawings of ventral view of left anterior portion of carapace and habitus in dorsal and lateral views. Firth and Pequegnat (1971): description of carapace, antennules, third maxillipeds, abdomen, P1, P5; drawing of habitus in dorsal view. Galil (2000): description of carapace, abdominal tergites, and P1; photographs of dorsal view of the carapace and lateral view of abdomen.

Remarks.- The Brazilian and the Bahamas specimens agree well with each other in spite of their very different sizes. The spinulation of the internal and external angles of orbital sinus, an unstable character which sometimes shows divergence between left and right side, is more developed in the Bahamas specimen.

Distribution.- Western Atlantic: United States, Mid Atlantic Bight, Bahama Is, Gulf of

Mexico, Caribbean Sea, Brazil (Rio de Janeiro), S. Georgia Island. Eastern Atlantic: Biscay Bay, Azores, Canary Is, West Africa, South Africa. Indo-Pacific: East Indian Ridge, Vanuatu, Wallis and Futuna islands, New Caledonia, Australian Bight, New Zealand, Tasmania. Eastern Pacific: Chile. Depth range: between 914 and 3365 meters.

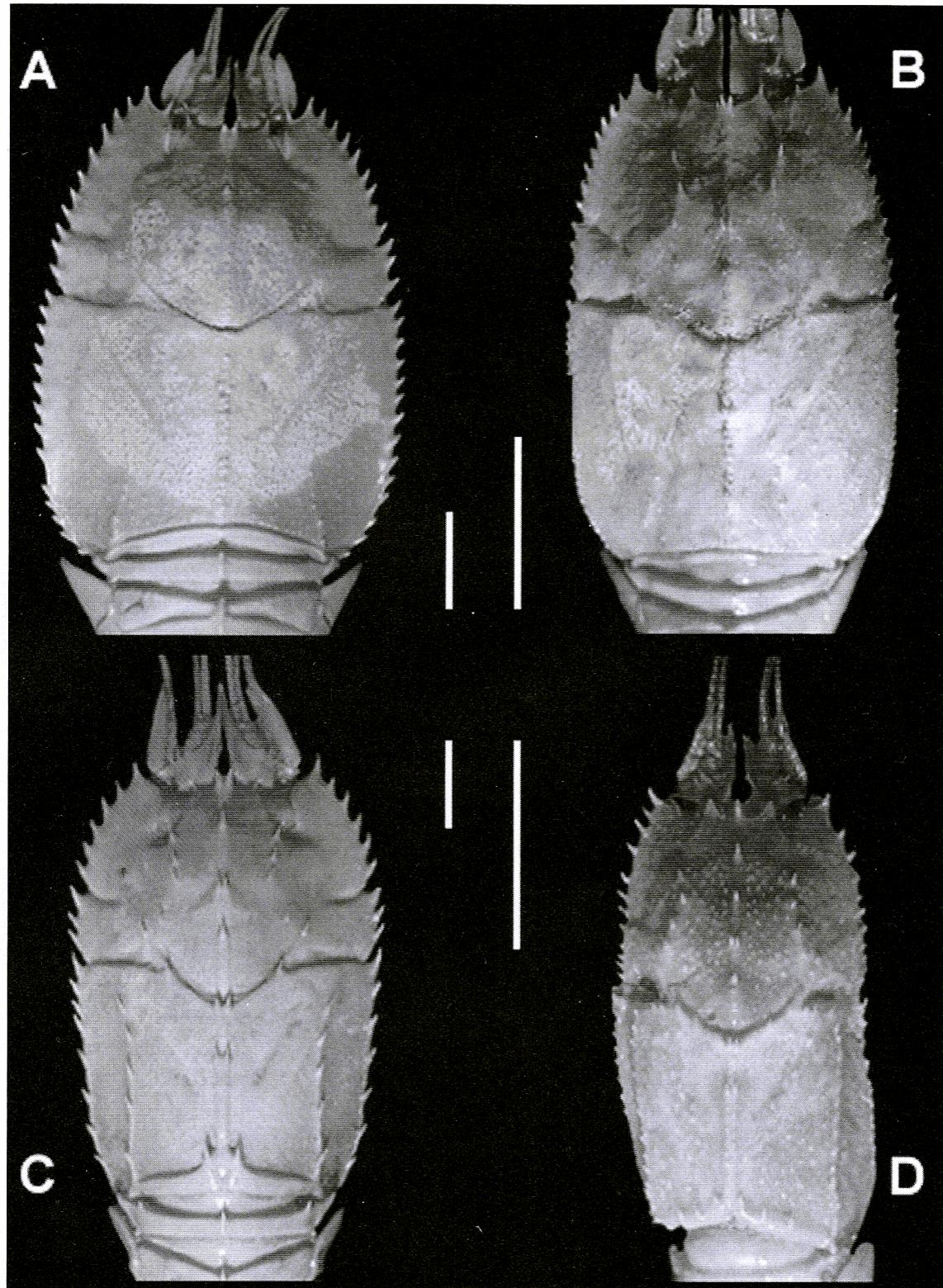


Figure 1: Dorsal view of the carapace. A, *Pentacheles laevis* Bate, 1878, female (MZUSP 16099). B, *Pentacheles validus* A. Milne-Edwards, 1880, male (MZUSP 16098). C, *Polycheles sculptus* Smith, 1880, male (MZUSP 16097). D, *Polycheles typhlops* Heller, 1862, male (MZUSP 16103). Scale bar: 10 mm.

Polycheles sculptus Smith, 1880
(Figure 1C)

Restricted synonymy.- *Polycheles sculptus* Smith, 1880: 346; Bouvier, 1925: 438; Galil, 2000: 340.

Stereomastis sculpta; Firth and Pequegnat, 1971: 69; Griffin and Stoddart, 1995: 248.

Material examined.- Brazil, TAAF MD55, "Marion Dufresne", stn 55 CB95, 19°38'S, 38°43'W, 960 m, 30.v.1987: male cl. 19 mm (MZUSP 16107). Stn 4 CP07, 21°31'S, 40°07'W, 750-785 m, 10.v.1987: male cl. 47 mm (MZUSP 16097) and male cl. 33 mm (MZUSP 16105). Stn 65 CP107, 24°03'S, 42°14'W, 1020 m, 2.vi.1987: male cl. 21.5 mm (MZUSP 16106). REVIZEE, stn 1126, 25°44'S, 45°11'W, 408 m: ovigerous female cl. 59 mm (MZUSP 15243). Stn 1128, 25°46'S, 45°10'W, 619 m: ovigerous female cl. 55 mm (MZUSP 15242). Santa Catarina, "Mar Salada", trawling 69, 920 m: ovigerous female cl. 58 mm (MZUSP 15696).

Comparative material.- Bahamas, "Isalin", stn 322, 23°40'30"N, 77°03'30"W, 1362 m, 8.iv.1975: female cl. 51 mm (USNM 154389).

Description.- Smith, 1880: description of carapace, thoracic sternum, antennules, antenna, epistome, endostome, mandibles, maxillula, maxilla, maxillipeds, pereopods, abdomen, pleopods, and telson; drawings of habitus in dorsal view, antennal scale, proximal segment of antennula, right side of the carapace in ventral view, second and fifth pereopods, and lateral view of abdomen. Bouvier, 1925: description of carapace, ocular peduncles, maxillipeds, pereopods, abdomen, uropods, and color; drawings of ventral view of left anterior portion of carapace and basal part of the antenna, habitus in dorsal view. Firth and Pequegnat (1971): description of carapace, antennules, abdomen, P1, P5. Galil (2000): description of carapace, eyestalks, antennules, abdominal tergites, P1, and color; photographs of dorsal view of the carapace and lateral view of abdomen.

Remarks.- Besides the material reported herein, *P. sculptus* is also known from Brazil from two specimens from Pará (Ramos-Porto *et al.*, 2000) and three specimens from Rio de Janeiro (Silva-Ferreira *et al.*, 2002).

Distribution.- Western Atlantic: Canada (Nova Scotia), Ireland, United States, Gulf of Mexico, Caribbean Sea, Guyana, Brazil (Pará, Espírito Santo, Rio de Janeiro, São Paulo, Paraná, and Santa Catarina). Eastern Atlantic: Ibero-Moroccan Gulf, Mauritania, Canary Is, Cape Verde Is, South Africa. Mediterranean Sea. Indo-Pacific: Japan, Arabian Sea, Gulf of Aden, Ceylon, China Sea, Philippines, Indonesia, West Africa, Comoro Is, Madagascar, Australia, New Zealand (Tasman Sea). Eastern Pacific: Canada, United States, Chile. Depth range: between 77 and 2370 meters.

Polycheles typhlops Heller, 1862
(Figures 1D, 2A)

Restricted synonymy.- *Polycheles typhlops* Heller, 1862: 392; Bouvier, 1917: 36; 1925: 433; Galil, 2000: 354.

Polycheles typhlops typhlops; Firth and Pequegnat, 1971: 51; Griffin and Stoddart, 1995: 242.

Material examined.- Brazil, TAAF MD55, "Marion Dufresne", stn 57 CP97, 21°43'S,

40°20'W, 600 m, 31.v.1987: male cl. 21 mm (MZUSP 16103). São Paulo, PADCT, stn 6628, 24°30'S, 44°13'W, 455 m, xii.1977: male 54 mm (MZUSP 12831). Paraná, REVIZEE, 25°46'S, 45°10,23'W, 619 m: 2 males, both 43 mm (MZUSP 15241). Paranaguá, REVIZEE, stn 1126, 25°44'S, 45°11'W, 408 m: male 44.5 mm and female 32.5 mm (MZUSP 15244). Paraná, REVIZEE, stn 1016, 26°13'S, 45°53'W, 489 m: female (MZUSP 15245). Stn 1015, 26°22'S, 45°53'W, 584 m: male 21 mm and 3 females 43 mm, 49 mm, one ovigerous 47.5 mm (MZUSP 15247). Santa Catarina, REVIZEE, stn 1001, 27°22'S, 47°01'W, 600 m: male 46.5 mm (MZUSP 15248). Stn 1020, 28°00'S, 46°22'W, 152 m: 2 ovigerous females 56 mm and 58 mm (MZUSP 15246). Santa Catarina, PADCT, stn 6633, 26°14'S, 45°44'W, 576 m: 2 males both 38 mm, and 2 females 31.5 mm and 41 mm (MZUSP 12826). Santa Catarina, Costa Grande, trawling 28, 18.iv.2002: female 57 mm (MZUSP 15697). Trawling 37, v.2002: female 63 mm (MZUSP 15706). Trawling 04: ovigerous female 55 mm (MZUSP 15705). Santa Catarina, PADCT II, PM 1, v. 2001: male 39 mm (MZUSP 15625). Rio Grande do Sul, REVIZEE, stn 21/66791, 12.i.1998: male 37 mm (MZUSP 14596). Stn 0420: male 38 mm and ovigerous female 47.5 mm (MZUSP 14599). Stn 0415: 2 ovigerous females 54 mm and 58 mm (MZUSP 14598). Stn 0416, 32°45'S, 52°20'W: 2 ovigerous females 54 mm and 60 mm (MZUSP 14581). Locality unknown: 2 females 39 mm and 40 mm (MZUSP 14597) and 1 ovigerous female 30 mm (MZUSP 16102).

Comparative material.- *Polycheles perarmatus* Holthuis, 1952. Golfo do México, off Mississippi Delta, "Oregon", stn 1562, 29°13'N, 87°56'W, 1562 m: female cl. 46 mm (USNM 211231).

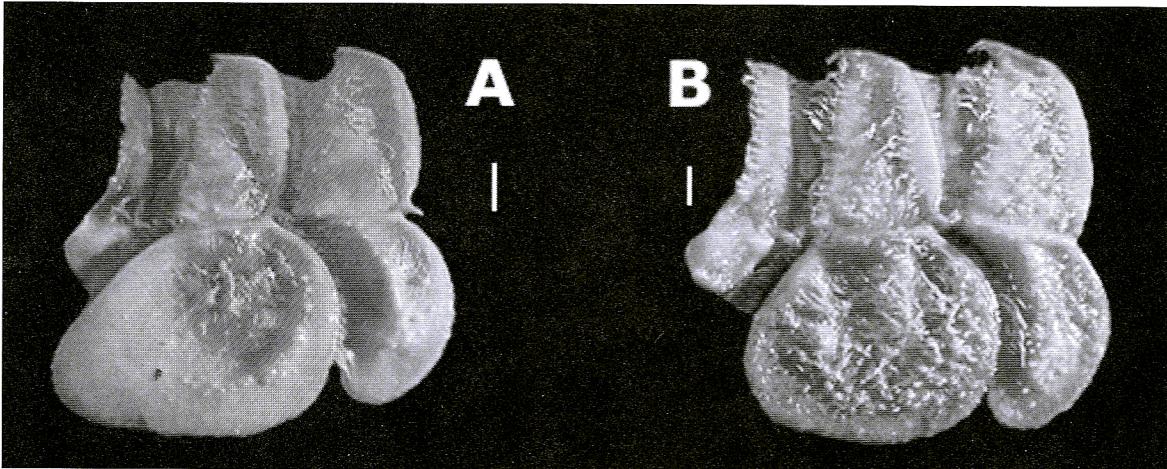


Figure 2: View of the left side of the first three abdominal segments. A, *Polycheles typhlops* Heller, 1862, female (MZUSP 15247). B, *Polycheles perarmatus* Holthuis, 1952, female (USNM 211231). Notice the second abdominal pleura ovate in *P. typhlops* and rounded in *P. perarmatus*. Scale bar: A, 3 mm; B, 4 mm.

Description.- Bouvier, 1917: description of rostrum, carapace, eyestalks, antennules, antennas, mandibles, maxillas, third maxillipedes, P1-2, P5, branchial formula, abdomen, pleopods, telson, and color. Bouvier, 1925: morphological variations; drawings of dorsal view of left anterior portion of carapace. Firth and Pequegnat (1971): description of carapace, antennules, third maxillipedes; abdomen, P1, P5; drawings of habitus in dorsal view. Griffin and Stoddart (1995): description of carapace; photograph of habitus in dorsal view. Galil (2000): description of carapace, eyestalks, antennules, abdominal tergites, P1, and color; photographs of dorsal view of the carapace and lateral view of abdomen.

Remarks.- *P. typhlops* Heller, 1862 is closely related to *P. perarmatus*. Actually the latter species was long considered as a subspecies of the former (e.g., Holthuis, 1952; Firth and

Pequegnat, 1971; Griffin and Stoddart, 1995). Firth and Pequegnat (1971: 56, 57) considered unstable most of the defining characters given by Holthuis (1952) for *P. perarmatus*. Nevertheless, Galil (2000) maintained that *P. perarmatus* can be distinguished from *P. typhlops* as follows: (i) by the rounded second pleuron; (ii) the three carinae ventrally on the uropodal exopod; (iii) the prominently granulate sixth tergite; (iv) the seven pairs of spines on the posterior margin of the carapace; (v) the evenly denticulate anterior margin of the first abdominal tergite. Based upon the examination of the Brazilian material of *P. typhlops* and the material of *P. perarmatus* from the Gulf of Mexico (USNM 211231) we found, however, that the shape of second abdominal pleura is the most reliable character to distinguish between *P. typhlops* and *P. perarmatus* (ovate in the former and rounded in the latter, figure 2A-B). Additionally, in *P. perarmatus* the posterior margin of the carapace is usually ornamented with 6-7 pairs of spines (instead of three pairs as in *P. typhlops*). We consider the ornamentation of the anterior margin of the first abdominal tergite and the granulation on the sixth abdominal tergite too variable to be used to distinguish between the two species. In *P. typhlops* and *P. perarmatus* the ventral surface of exopod of the uropod is provided with three well recognizable carinae, although the intermediate carina seems stronger in *P. perarmatus*. While *P. typhlops* is known from several oceanographic basins, *P. perarmatus* seems so far restricted to the Atlantic Ocean.

Distribution.- Western Atlantic: Bermuda, Gulf of Mexico, Caribbean Sea, Suriname, French Guyana, Brazil (Pará, Rio de Janeiro, São Paulo, Paraná, Santa Catarina, and Rio Grande do Sul). Eastern Atlantic: North Sea, North Africa, Cape Vert Islands, South Africa. Mediterranean Sea. Indo-Pacific: Japan, North sea, East China Sea, Philippines, New Caledonia, Maldives Is, Comoro Is, Indonesia, Madagascar, Australia. Eastern Pacific: United States. Depth range: between 200 and 4020 meters.

Key to the Brazilian genera and species of the family Polychelidae (adapted from Galil, 2000)

1. Epipod of third maxilliped longer than schium; basal antennular segment proximally quadrate, lamellar *Pentacheles* (3)
2. Epipod of the third maxilliped rudimentary; basal antennular segment proximally rounded *Polycheles* (5)
3. Lateral margins of carapace posterior to postcervical incision with 14-15 spines *Pentacheles laevis*
4. Lateral margins of carapace posterior to postcervical incision with more than 25 spines *Pentacheles validus*
5. One rostral spine; posterior margin of carapace armed with three or more pairs of spines *Polycheles typhlops*
6. Two rostral spines; posterior margin of carapace armed with one pair of submedian spines only *Polycheles sculptus*

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