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**New primnoid genus and species (Alcyonacea: Primnoidae) from the
southwestern Atlantic**

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Abstract.—A new genus and species of primnoid octocoral, *Heptaprimnoa patagonica*, is described from deep water from the cold temperate/Subantarctic region off Argentina and Burdwood Bank. It is distinguished from other primnoid genera by having only seven rows of body wall scales.

Keywords: Alcyonacea, Argentina, new genus, new species, Octocorallia, Primnoidae, Subantarctic

As noted by Cairns & Bayer (2009), the Primnoidae is a large and diverse octocoral family, ranking fourth among the 44 octocoral families in number of species, and third in number of genera. Whereas the primnoids are cosmopolitan in distribution and occur over a depth range of 8–5850 m, they are found primarily in deep water, and there seems to be a disproportionate number of species and genera living in the Antarctic–Subantarctic region (see Appendix). Twenty-three of the 38 primnoid genera (60.5%) and 58 of the 247 species (23.5%) occur in this southern region. Among the 23 genera, 14 are found exclusively in the Antarctic–Subantarctic region; the species of four genera are found primarily in this region; and some species of another five genera occur there (see Appendix). The names of most of these species can be found in Cairns & Bayer (2009:Table 4), as updated in the papers listed below.

Over the last decade there has been a steady stream of publications, mostly taxonomic in nature, concerning Antarctic primnoids. Over the last ten years the following papers have concerned Antarctic primnoids: López-González et al. (2002), a new genus; Mellado et al. (2004), steroids from *Dasystenella*; Cairns & Bayer (2005),

a new species; Orejas et al. (2007), reproductive habits of two species; Zapata-Guardiola & López-González (2009), two new species; Cairns & Bayer (2009), three new genera and two new subgenera; Zapata-Guardiola & López-González (2010a), two new genera and species; Zapata-Guardiola & López-González (2010b), four new species; Zapata-Guardiola & López-González (2010c), a new genus; and Taylor et al. (2012), a new species and a revision of *Thouarella*. Based on unstudied museum collections, it would appear that many taxa remain to be described.

Materials and Methods

The specimens used in this study were originally collected by the R/V *Walther Herwig*, now housed at the Zoological Museum Hamburg (ZMH), and by the B/O *Miguel Oliver*, now housed at the Museo Nacional de Ciencias Naturales de Madrid (MNCN) and National Museum of Natural History, Smithsonian Institution, Washington, D.C. (USNM). The terminology used in the description can be found in Bayer et al. (1983). The SEM photomicrographs were taken by the author using a Zeiss EVO MA15 microscope. The polyps were prepared by



Fig. 1. Holotype of *Heptaprimnoa patagonica*, now in three pieces.

removing them from the branch and immersing them in 50% commercial bleach for 10 sec in order to remove the thin layer of tissue from the outer surfaces of the sclerites but not long enough to

start to disarticulate the polyp sclerites. This was followed by immediate and repeated rinsing with distilled water, and finally 95% ethanol. Polyps were attached to the SEM stub with Elmer's glue.

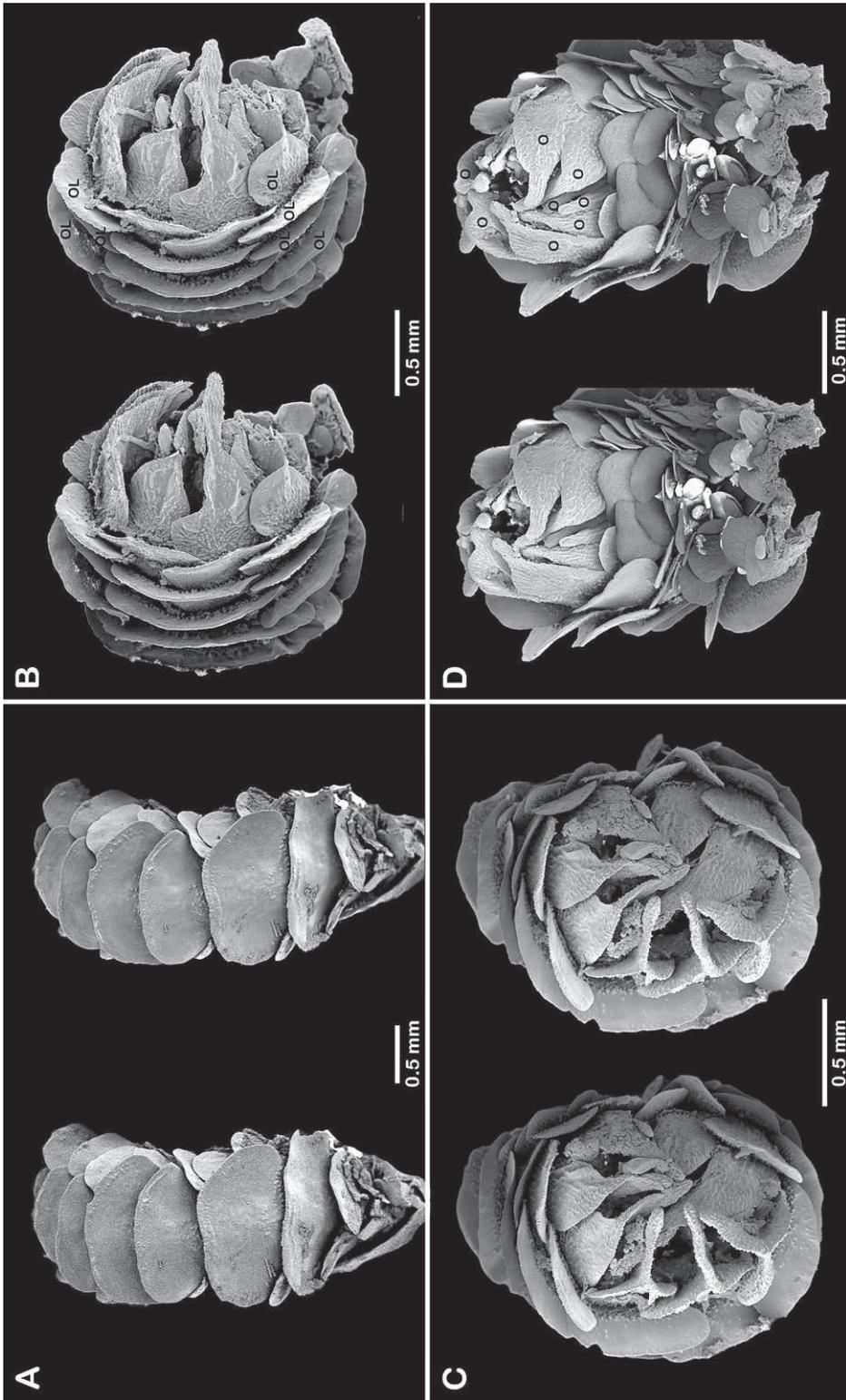


Fig. 2. Polyps from holotype of *Heptapinnia patagonica*. A, abaxial stereo view of polyp showing its broad abaxial body wall scales; B, oblique stereo opercular view of polyp showing seven outer lateral (OL) body wall scales and 2 small abaxial marginals between them; C, stereo opercular view of polyp; D, adaxial stereo view of polyp showing paired adaxial body wall scales, smaller irregularly arranged adaxial scales, and eight opercular scales (O).

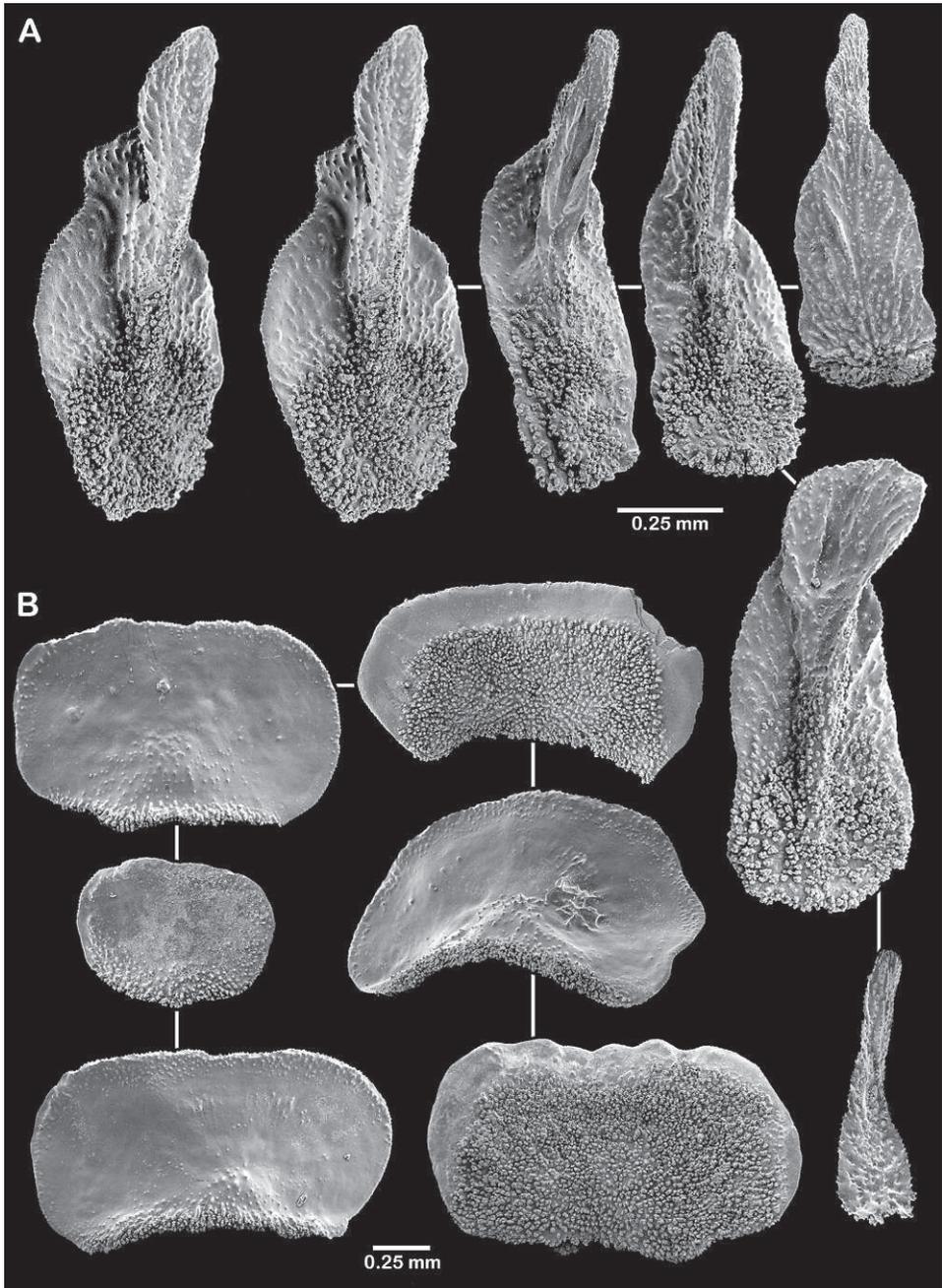


Fig. 3. Polyps from the holotype of *Heptaprimnoa patagonica*. A, seven opercular scales, pair in upper left stereo view illustrating prominent keel on inner surface, lower right scale from adaxial position; B, six abaxial body wall scales, small one being abaxial marginal.

Sclerites were rendered in full strength commercial bleach, followed by repeated rinsing in distilled water, 70% ethanol, and finally 95% ethanol. Sclerites were

individually transferred using a lightly dampened fine paint brush to a double-sided carbon adhesive tab onto the SEM stub.

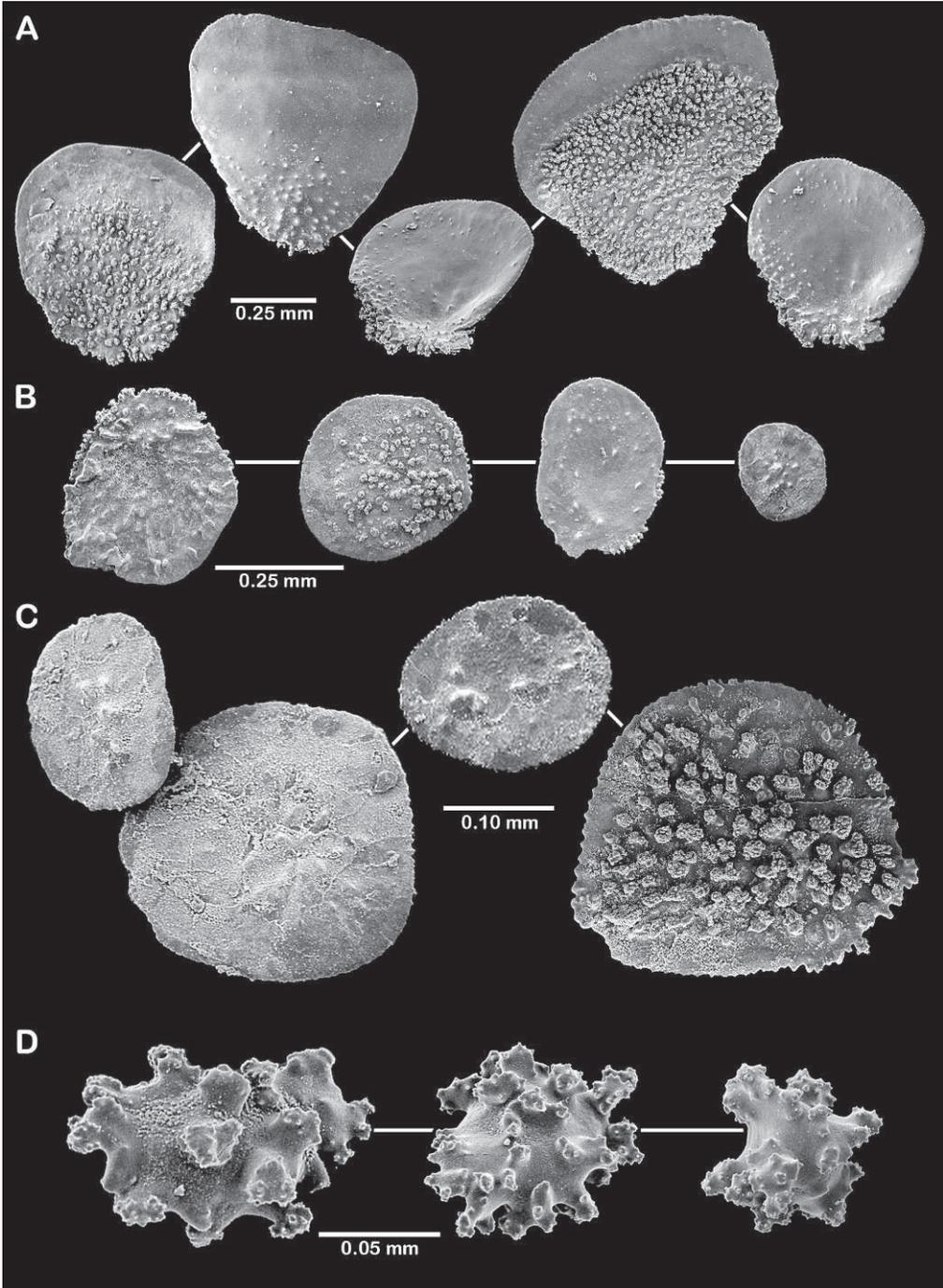


Fig. 4. Polyps from holotype of *Heptaprimnoa patagonica*. A, five inner and outer lateral body wall scales; B, four adaxial body wall scales; C, four scales from upper coenenchymal layer; D, three tuberculate spheroids from lower coenenchymal layer.

The following abbreviations are used in the text: L:W, ratio of length to width of a sclerite; MNCN, Museo Nacional de Ciencias Naturales de Madrid; NMNH, National Museum of Natural History, Smithsonian Institution, Washington, D.C.; O, opercular scale; OL, outer lateral body wall scale; SEM, scanning electron microscope; USNM, United States National Museum, Smithsonian Institution (now called the NMNH); *WH*, R/V *Walther Herwig*; ZMH, Zoological Museum Hamburg.

Systematics

Phylum Cnidaria

Class Anthozoa

Subclass Octocorallia

Order Alcyonacea

Family Primnoidae Milne Edwards, 1857

Heptaprimnoa, new genus

Diagnosis.—Colonies uniplanar, dichotomously branched. Polyps arranged in whorls, the polyps directed distally. Well-developed operculum present; operculars strongly keeled. Eight marginal scales present, but only seven longitudinal rows of body wall scales, the abaxial row being single (unpaired) and its scales being quite broad. Marginals not folding over operculum. Body wall and outer layer of coenenchymal scales with smooth outer surface. Inner coenenchymal layer composed of small tuberculate spheroids.

Discussion.—Using the key to the primnoid genera published by Cairns & Bayer (2009), *Heptaprimnoa* keys closest to the southwestern Pacific genus *Tokoprymno* Bayer, 1996. *Heptaprimnoa*, however, differs in having whorled (not biserially arranged) polyps, a uniplanar (not bushy) colony, smooth (not radially ridged) outer surface of its scales, two (not one) layers of dimorphic coenenchymal scales, and only seven (not eight) rows of longitudinal body wall scales.

Three other primnoid genera are similar to *Heptaprimnoa* in having a single row of adaxial body row scales: *Perissogorgia* Bayer & Stefani, 1989, *Dasystenella* Versluys, 1906, and *Pseudoplumarella* Kükenthal, 1915. *Perissogorgia* differs in having only five marginal scales (not eight) and only one row of body wall scales (i.e., the abaxial, not seven), resulting in a naked adaxial polyp face. It also differs in having only one layer and thus one type of coenenchymal scale. *Dasystenella* has only five marginal scales (not eight), which are spinose (not rounded), corresponding to only five (not seven) rows of body wall scales. Furthermore, *Dasystenella* has a bottlebrush arrangement of branches, and only one layer of coenenchymal scales. Finally, *Pseudoplumarella* has only 5–7 marginal scales (not eight) and only three (not seven) rows of body wall scales. Furthermore, *Pseudoplumarella* has adnately (not inclined) arranged polyps that are arranged in an alternate biserial manner (not in whorls). It should be noted that the number of coenenchymal layers found in primnoid genera received a very low consistency index in the phylogenetic analysis of Cairns & Bayer (2009), and, thus, should not be used exclusively to differentiate among genera.

Distribution.—Southwest Atlantic off Argentina and Burdwood Bank, 265–1248 m.

Etymology.—From the Greek *hepta* (= seven), an allusion to the seven rows of longitudinal body wall scales + *Primnoa*, type genus of the family, named for *Prymno*, one of the many deep-sea oceanic mythological Greek nymphs. Gender: feminine. Monotypic.

Type species.—*Heptaprimnoa patagonica*, herein designated.

Heptaprimnoa patagonica, new species

Figs. 1–4

Description.—Colonies uniplanar and dichotomously branched, with relatively

long terminal branches. Holotype (*WH* 267) now in three pieces: a sparsely branched segment 22 cm in length, a branched portion 17 cm in length terminating in four end branchlets, and a branched portion 19 cm in length terminating in six end branchlets (Fig. 1). Largest colony (USNM 1174977) 30 cm in height, containing distal branches up to 20 cm in length. Axis golden in color, up to 1.8 mm in diameter. Colonies light brown to off white.

Polyps occur in closely spaced whorls with little intervening coenenchyme, facing upward; 8–10 polyps occur in each whorl; 3 whorls occur per cm; whorl diameter up to 8 mm in most robust branch available. Polyps cylindrical to slightly rectangular in cross-section, up to 3.6 mm in length and 1.6 mm in distal diameter.

Each polyp covered with 7 longitudinal rows of body wall scales: 1 row of 7 or 8 broad abaxial scales, 2 rows of 5–7 outer lateral scales, 2 rows of 2–6 inner lateral scales, and 2 rows of 2 or 3 adaxial scales, as well as smaller, irregularly arranged discoidal scales on lower adaxial face. Abaxial body wall scales (Figs. 2A, 3B), which are quite broad (up to 1.6 mm wide, L:W = 0.43–0.60), gradually reduce in width toward polyp tip, and adjacent to opercular crown this row is expressed as two narrower (0.75–1.0 mm wide) scales (Fig. 2B), thus resulting in 8 marginal scales, but only 7 body wall rows. Abaxial body wall scales flat to slightly curved around circumference of polyp, roughly rectangular in shape, and have smooth, straight to gently rounded distal edges. Their outer surface is smooth; their inner surface is smooth for distal quarter, but tuberculate proximally (Fig. 3B). Outer lateral scales (Figs. 2B, 4A) roughly elliptical in shape, up to 0.7 mm in width, gradually increasing in size toward operculum, filling in space not covered by progressively smaller abaxial scales. Inner lateral scales (Figs. 2D, 4A) similar to outer lateral scales, but rarely more than

0.4 mm in width. Two or three pairs of adaxial scales (Fig. 2D) similar in size and shape to inner lateral scales, but proximal to these scales are a number of smaller (0.12–0.20 mm diameter), circular, irregularly arranged scales (Figs. 2D, 4B). As with abaxial scales, all body wall scales have a smooth outer surface and tuberculate inner surface. Marginal scales essentially not distinguishable from other body wall scales, but in some cases marginals bear a low medial keel on their inner surface.

Opercular scales (Figs. 2C, D, 3A) triangular in shape, 0.72–1.1 mm in length (L:W = 2.0–3.6). Longer opercular scales found on abaxial polyp side, these also having a lower L:W ratio due to their broad base. Abaxial and outer lateral opercular scales tend to have a widened base, the adaxial opercular scales being narrow-based triangles. Opercular scales prominently keeled (Fig. 3A), the keel curving into and over top of operculum.

Coenenchymal scales arranged in 2 layers, an outer layer of flat to concave scales (Fig. 4C) and an inner layer of tuberculate spheroids (Fig. 4D). Outer scales similar in shape and ornamentation to adaxial body wall scales, ranging from 0.17–0.30 mm in diameter. Tuberculate spheroids 77–125 μ m in diameter.

Remarks.—Many of the polyps of the holotype contain one yellow ovum, each 0.9–1.0 mm in diameter.

Types and type locality.—Holotype: 1 colony in 3 pieces (ZMH 12147), and 3 dry whorls and SEM stubs C1469–1473, 1476–1477 (USNM 1162059), *WH* 267, 40°00'S, 56°02'W (continental slope off Mar del Plata, Argentina), 520 m, 19 Jun 1966. Paratypes: 1 branch in alcohol (ZMH 12148), and 4 dry whorls (USNM 1162058), *WH* 244, 54°51'S, 56°40'W (southeastern slope of Burdwood Bank), 265 m, 4 Feb 1971; 1 colony in alcohol (ZMH 12149), *WH* 295, 48°54'S, 56°52'W (north of Falkland Islands), 780 m, 22 Feb 1971; 1 colony (MNCN 2.04/1097), and

branch fragment (USNM 1162060), B/O *Miguel Oliver* sta. 121W, 45.605°S, 59.773°W, 1232 m; 2 colonies (USNM 1162061), B/O *Miguel Oliver* sta. 159W, 2 Apr 2010, 45.068°S, 59.501°W, 776 m; 1 colony in 2 pieces (USNM 1174980), B/O *Miguel Oliver* sta. PAT0210, DR9, 42.069°S, 57.441°W, 1048 m; 1 colony (USNM 1174977), B/O *Miguel Oliver* sta. PAT1108, DR11, 44.872°S, 59.635°W, 1248 m.

Distribution.—Southwestern Atlantic off Argentina, from off Mar del Plata to Burdwood Bank, 265–1232 m

Etymology.—Named *patagonica* for the general region from which the type specimens were collected.

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Appendix

Primnoid genera (23) having all or some of their species living in the Antarctic–Subantarctic region.

Number of species (58 total) in that region in parentheses.

I. Genera occurring exclusively in the Antarctic-Subantarctic

Aglaoprimnoa (1)
Ainigmaptilon (5)
Amphilaphis (3)
Arntzia (1)
Dasystenella (1)
Digitogorgia (1)
Famnyella (4)
***Heptaprimnoa* (1)**
Mirostenella (2)
Onogorgia (1)
Ophidiogorgia (2)
Pyrogorgia (1)

Tauoprimnoa (1)
Tokoprimno (1)

II. Genera occurring primarily in the Antarctic-Subantarctic

Callozostron (3)
Convexella (4)
Metafannyella (3)
Thouarella (14)

III. Genera having some species in the Antarctic region

Narella (1)
Parastenella (1)
Plumarella (4)
Primnoa (1)
Primnoella (2)