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Astropectinidae (Asteroidea) diversity in the Mar del Plata Submarine Canyon: A deep-water exploration

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Abstract: The family Astropectinidae is one of the most diverse and numerous families of sea stars found in deep waters, particularly well-represented in the Atlantic Ocean. This family comprises 26 genera, with species inhabiting environments ranging from shallow coastal zones to abyssal depths. In this study, the Mar del Plata Submarine Canyon, located off the coast of Argentina, was explored at depths ranging from 200 to 3500 meters. A total of 153 specimens of Astropectinidae were collected, representing six species from five different genera. All species recorded are new occurrences for this region, including three new species described herein: *Dytaster stellamarisae*, *Plutonaster neninae* and *Psilaster pearsei*. Additionally, we report new regional observations of *Bathybiaster loripes*, *Dytaster grandis*, and *Leptychaster kerguelenensis*. These findings substantially expand the known distribution and diversity of Astropectinidae in the deep waters of the southwestern Atlantic.

Key words: Asteroidea, Argentina, Deep-sea diversity, South Atlantic, new species

Resumen: "Diversidad de Astropectinidae (Asteroidea) en el Cañón Submarino de Mar del Plata: una exploración en aguas profundas". La familia Astropectinidae es una de las más diversas y numerosas entre las estrellas de mar presentes en aguas profundas, con una destacada representatividad en el océano Atlántico. Esta familia comprende 26 géneros, con especies que habitan desde zonas costeras someras hasta profundidades abisales. En este estudio, se exploró el Cañón Submarino de Mar del Plata, frente a la costa de Argentina, a profundidades entre los 200 y 3500 metros. Se recolectaron un total de 153 ejemplares de Astropectinidae, representando seis especies de cinco géneros diferentes. Todas las especies registradas constituyen nuevos reportes para la región, e incluyen tres nuevas especies aquí descriptas: *Dytaster stellamarisae*, *Plutonaster neninae* y *Psilaster pearsei*. Además, se reportan nuevos registros regionales de *Bathybiaster loripes*, *Dytaster grandis* y *Leptychaster kerguelenensis*. Estos hallazgos amplían significativamente el conocimiento sobre la distribución y diversidad de Astropectinidae en las aguas profundas del Atlántico suroccidental.

Palabras clave: Asteroidea, Argentina, diversidad en aguas profundas, Atlántico Sur, especies nuevas

INTRODUCTION

Sea stars (Asteroidea) are a diverse group of marine organisms, with over 1,900 species distributed across global oceans (Mah & Blake, 2012). In cold-water environments, particularly those at high latitudes and in deep-sea habitats, the diversity of sea stars is especially rich, with nineteen families recorded from these regions (Mah & Blake, 2012). The Caribbean and Atlantic regions host 228 species (Alvarado & Solís-Marín, 2013), while the Southern Ocean alone is home to 176 species (Moreau *et al.*, 2021).

Among these families, Astropectinidae stands out as one of the most ecologically and taxonomically significant in the deep sea. Comprising 26 genera and more than 243 species, members of this family are distributed from shallow waters to abyssal depths, showing remarkable adaptability across diverse marine environments (Mah & Blake, 2012). Astropectinidae are often found in cold, deep-sea ecosystems, where their diversity is not yet fully understood, making them a focal point for deep-sea biodiversity studies.

The South-West Atlantic, particularly its deep-water ecosystems, has been explored

since the HMS Challenger expedition (1872-1876), whose findings were pivotal in shaping our understanding of marine biodiversity in the region (Sladen, 1889). Recent deep-sea sampling including many discoveries of echinoderms, including new species, further enriching the knowledge of this area's biodiversity (e.g., Martinez & Penchaszadeh, 2017; Rivadeneira *et al.*, 2020; Moreau *et al.*, 2021; Pertossi *et al.*, 2021; Hurtado-García & Manjón Cabeza, 2022). However, significant gaps remain in our understanding of deep-sea fauna, particularly within submarine canyons, which are critical hotspots of marine life.

The Mar del Plata Submarine Canyon, located at the continental slope off Argentina, represents an unexplored frontier for biodiversity studies. Situated at approximately 38°S, 54°W, this canyon marks the terminus of the Río de la Plata and is characterized by sandy muds, pebble deposits, and rocky outcrops along its V-shaped walls (Violante *et al.*, 2010). The canyon's unique geomorphology and deep-sea habitat provide a pristine environment for studying Astropectinidae diversity.

The objective of this study is to assess the diversity of the Astropectinidae family in the deep waters of the Mar del Plata Submarine Canyon, contributing to the understanding of the region's previously undocumented biodiversity.

MATERIAL AND METHODS

Sampling

Samples were collected from the Argentine continental slope in the Mar del Plata Submarine Canyon area onboard the B/O *Puerto Deseado* during August 2012 and May/September 2013. Out of a total of 64 sampling hauls, sea stars were collected in 22, at depths ranging from 200 to 3,500 m. A trawl net was used in 16 of these hauls (L5, L8, L10, L14, L21, L24, L26, L33, L34; L41, L44, L45, L52, L53, L59 and L62), while a dredge was employed in 6 (L15, L25, L55, L60, L61 and L64).

Systematics

Specimens were sorted and fixed in 96% ethanol before being studied in the laboratory under a stereoscopic microscope, covering as wide a size range as possible. Identification was based on morphological characters following original descriptions, classifications and distributions according to Bernasconi (1972), Clark (1970), Clark and Downey (1992), Clark & McKnight (2000), Fell (1958), Koehler (1906, 1907), Müller & Troschel (1842), Perrier (1881, 1884), Sibuet (1975), Sladen (1889), Verrill (1880, 1884), and Wyville Thomson (1873). Taxon names, statuses and distributions were verified in the World Register of Marine Species (WoRMS). Specimens were compared with samples from various collections, including those from the Museo Argentino de Ciencias Naturales "Bernardino Rivadavia", Buenos Aires (MACN), National Museum of Natural History, Smithsonian Institution, Washington D. C. (USNM), Universidad Nacional Autónoma de México (UNAM), México D. F., Museu Nacional (MNRJ), Rio de Janeiro, and Zoologisches Museum Hamburg.

For scanning electron microscope (SEM) imaging, plates and pedicellariae were macerated in sodium hypochlorite solution, washed several times in distilled water, then in 96% ethanol, air-dried, and finally transferred to aluminum stubs. The specimens were metal sputter-coated and observed under a SEM (Philips XL 30) at the MACN. Digital photos of specimens were taken with a Nikon D-800 and Leica IC 80 HD.

Type material and additional specimens were deposited in the Invertebrate Collection of the Museo Argentino de Ciencias Naturales (MACN-In), the collection of the Instituto de Biología de Organismos Marinos (CNP-Inv), Puerto Madryn, Argentina, and the Invertebrate Zoology Collection of the Museo Nacional de Historia Natural (MNHNM), Montevideo, Uruguay.

RESULTS

A total of 153 specimens of the family Astropectinidae were collected: 26 belonged to the genus *Bathybiaster*, 21 to *Dytaster*, 48 to *Leptychaster*, 58 to *Plutonaster*, and one to *Psilaster*.

SYSTEMATICS

Order Paxillosida Perrier, 1884
Family Astropectinidae Gray, 1840
Genus *Bathybiaster* Danielssen & Koren, 1882
Bathybiaster loripes Sladen, 1889 (Fig. 1)

Material examined. Mar del Plata Submarine Canyon: 37°54'S, 54°43'W, 780 m, "R/V Puerto Deseado" L44, 26 May 2013, MACN-In 44702 (4 wet specimens: R= 15 mm, r= 3 mm; R= 9 mm, r= 3 mm; R= 10 mm, r= 3 mm; R= 5 mm, r= 2 mm), CNP-Inv 4108 (3 wet specimens: R=

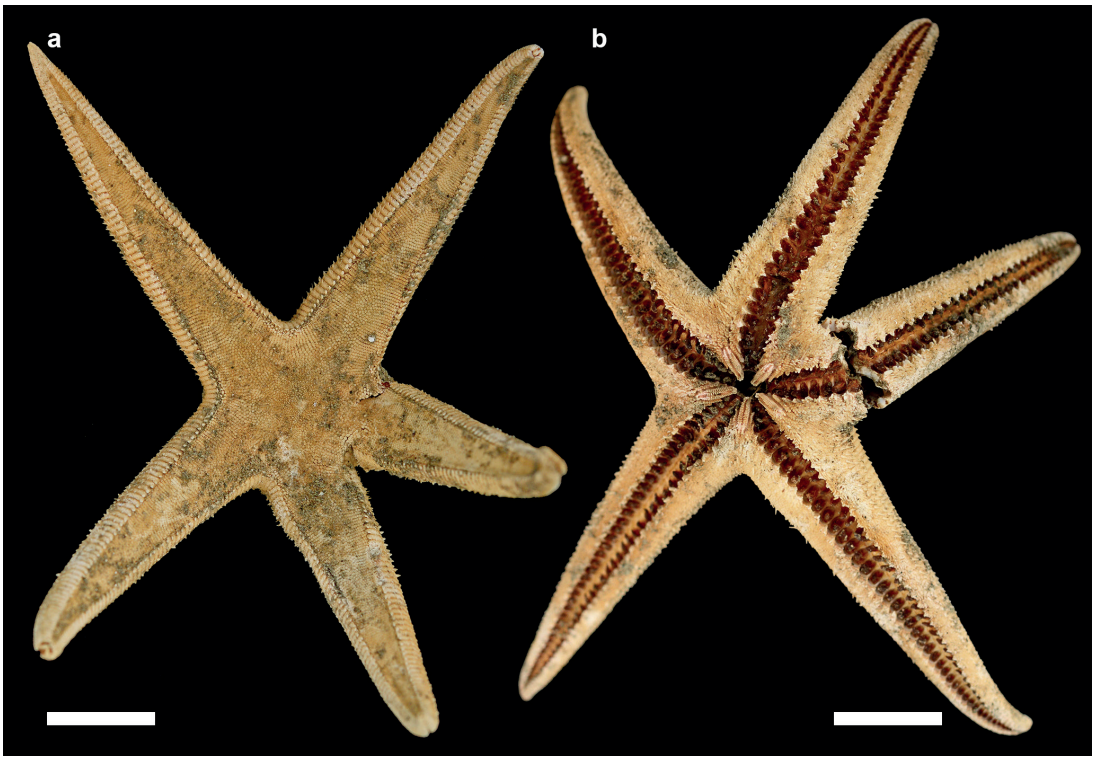

Fig. 1 *Bathybiaster loripes*. Abactinal (a) and actinal surfaces (b). Scale bars = 2 cm.

135 mm, r= 30 mm; R= 90 mm, r= 17 mm; R= 63 mm, r= 12 mm). Mar del Plata Submarine Canyon: 37°59'S, 55°09'W, 528 m, "R/V Puerto Deseado" L5, 10 Aug 2012, MACN-In 44704 (1 wet specimen: R= 111 mm, r= 25 mm), CNP-Inv 4109 (1 wet specimen: R= 82 mm, r= 20 mm). Mar del Plata Submarine Canyon: 37°58'S, 54°57'W, 647 m, "R/V Puerto Deseado" L8, 10 Aug 2012, MACN-In 44705 (2 wet specimens: R= 107 mm, r= 23 mm; R= 105 mm, r= 20 mm). Mar del Plata Submarine Canyon: 37°54'S, 54°03'W, 2420 m, "R/V Puerto Deseado" L24, 14 Aug 2012, MACN-In 44706 (6 wet specimens: R= 105 mm, r= 20 mm; R= 140 mm, r= 25 mm; R= 21 mm, r= 5 mm; R= 20 mm, r= 5 mm; R= 7 mm, r= 4 mm; R= 110 mm, r= 23 mm and 2 dry specimens: R= 21 mm, r= 7 mm; R= 14 mm, r= 5 mm), CNP-Inv 4110 (4 wet specimens: R= 110 mm, r= 20 mm; R= 110 mm, r= 19 mm; R= 117 mm, r= 21 mm; R= 95 mm, r= 17 mm). Mar del Plata Submarine Canyon: 37°59'S, 55°12'W, 308 m, "R/V Puerto Deseado" L33, 17 Aug 2012, MACN-In 44707 (2 wet specimens: R= 75 mm, r= 17 mm; R= 75 mm, r= 17 mm), CNP-Inv 4111 (1 wet specimen: R= 76 mm, r= 15 mm).

Diagnosis: Flexible skeleton. Abactinal plates round with large paxillae bearing 5 to 10 thick spinelets. Madreporic plate smooth and exposed. Epiproctal plate visible. Marginal plates elongated, each with 6 spines. Actinal surface narrow, with scale-shaped spinelets. Five adambulacral furrow spines, the central spine the largest and curved. Oral plates elongated, laterally flattened, with four thick apical spines.

Body brown, with a small disc and long arms.

Distribution: South Atlantic Ocean, South Pacific Ocean and Indian Ocean.

Bathymetric range. 80 –4842 m.

Present study: 250 –2934.

Remarks: Danis *et al.* (2012) reported this species at 4842 m, and also recorded it from the Scotia Arc, Antarctic Peninsula, sub-Antarctic islands, Weddell, Ross, and Bellingshausen seas. Moreau *et al.* (2021) concluded that *B. loripes* is restricted to the Antarctic shelf, while *B. vexillifer* is found in deep waters. However, our new records provide evidence that *B. loripes* also inhabits the deep waters of the Southern Ocean.

Genus *Dytaster* Sladen, 1885

Dytaster grandis Verrill, 1894 (Fig. 2)

Material examined. Mar del Plata Submarine Canyon: 38°02'S, 53°39'W, 2935 m, "R/V Puerto

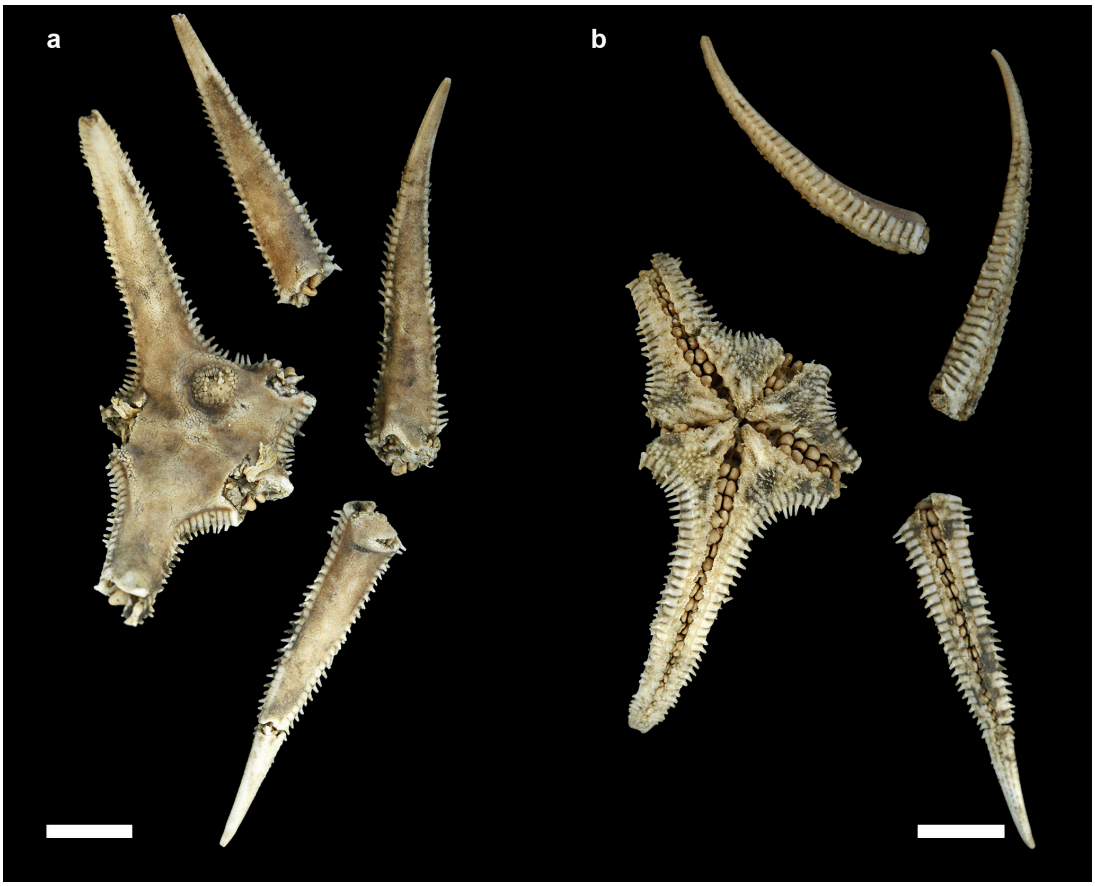

Fig. 2 *Dytaster grandis*. Abactinal (a) and actinal surfaces (b). Scale bars = 2 cm.

Deseado" L45, 5 Sep 2013, MACN-In 44708 (1 dry specimen: R= 95 mm, r= 21 mm).

Diagnosis: Abactinal plates rounded, with short, mattress-shaped spinelets. Madreporite approximately one-third the diameter of the disc. Marginal plates rectangular, equal in size, and aligned, each bearing a prominent superomarginal spine. Inferomarginal plates with 1 –2 spines, and short, broad spinelets. Actinal plates round, with small, square paxillae, each bearing an enlarged central spinelet. Adambulacral plates short and rectangular, with 11 furrow spines. Oral plates enlarged, with two larger, central, laterally flattened spines followed by 2–3 additional spines.

Body light brown, tending towards yellow.

Distribution: Caribbean Sea, Gulf of Mexico, Bay of Biscay, Azores, SW Africa, North Atlantic Ocean and South Atlantic Ocean.

Bathymetric range. 1000 –4846 m.

Present study. 2935 m.

Remarks: Two subspecies have been described for this species, differing only in number and shape of the adambulacral spines, and its distribution (Clark & Downey, 1992). *Dytaster grandis grandis* has 6 –12 truncate adambulacral furrow spines and is found along the east coast of the USA, Gulf of Mexico, Bay of Biscay, Azores, and SW Africa. In contrast, *Dytaster grandis nobilis* has 5 –7 acuminate furrow spines and is recorded off Buenos Aires (Argentina) at depths of approximately 4800 m and at 3305m in Uruguay. The specimen in this study has 11 adambulacral furrow spines, yet its distribution closely matches that of *Dytaster grandis nobilis*. There is little doubt that these specimens belong to *Dytaster grandis*, with a higher likelihood of correspondence to *D. grandis nobilis*. However, the sole differentiating character between the two subspecies is highly variable and based on limited samples (two specimens in the case of *D. grandis nobilis*). Notably, the original description of *D. grandis* lists a range of 8–10 furrow spines. An exhaustive study, involving sampling from

the Gulf of Mexico to Argentina, is necessary to determine whether these represent two separate subspecies or a single, wide-ranging species with plastic characters, such as furrow spine count.

Dytaster stellamarisae sp. nov. (Fig. 3)

HOLOTYPE: Mar del Plata Submarine Canyon: 37°52'S, 53°52'W, 1712 m, "R/V Puerto Deseado" L55, 8 Sep 2013, MACN-In 44709 (1 dry specimen: R= 140 mm, r= 30 mm).
PARATYPES: Mar del Plata Submarine Canyon: 38°08'S, 53°51'W, 2082 m, "R/V Puerto Deseado" L21, 13 Aug 2012, MACN-In 44712 (1 wet specimen: R= 145 mm, r= 30 mm). Mar del Plata Submarine Canyon: 37°52'S, 54°11'W, 1950 m, "R/V Puerto Deseado" L25, 15 Aug 2012, MACN-In 44711 (2 dry specimens: R= 165 mm, r= 40 mm; R= 110 mm, r= 28 mm). Mar del Plata Submarine Canyon: 38°02'S, 53°39'W, 2934 m, "R/V Puerto Deseado" L45, 5 Sep 2013, MACN-In 44703 (5 wet specimens: R= 10 mm, r= 2 mm; R= 85 mm, r= 22 mm; R= 102 mm, r= 23 mm; R= 76 mm, r= 21 mm; R= 80 mm, r= 18 mm). Mar del Plata Submarine Canyon: 37°53'S, 53°54'W, 1763 m, "R/V Puerto Deseado" L53, 8 Sep 2013, MACN-In 44710 (4 wet specimens: R= 145 mm, r= 35 mm; R= 125 mm, r= 25 mm; R= 140 mm, r= 30 mm; R= 150 mm, r= 22 mm and 2 dry specimens: R= 125 mm, r= 30 mm; R= 135 mm, r= 28 mm), CNP-Inv 4183 (3 wet specimens: R= 140 mm, r= 35 mm; R= 155 mm, r= 26 mm; R= 132 mm, r= 27 mm), CNP-Inv 4184 (1 dry specimen: R= 156 mm, r= 35 mm), MNHNM-4328 (1 dry specimen: R= 156 mm, r= 35 mm).
Etymology: This species name is dedicated to a wonderful woman. The name is used as a noun in apposition.
Diagnosis: Madreporite occupying half of the disc radius. Up to 33 spiniform spinelets, with the largest positioned centrally. 1–6 superomarginal and inferomarginal spines. 6–7 flattened, compressed furrow spines. Actinal spinelets large and thin, with an enlarged central spinelet. Simple, bivalve pedicellariae on abactinal and actinal surfaces.
Description: Long arms with a thick disc.

Abactinal plates covered with round paxillae, some larger than others, each bearing numerous large, spiniform spinelets (7–33) arranged around a central, largest spinelet. Simple bivalve pedicellariae are located between the paxillae or occupying the position of the largest spinelet, though these are not evident in adult forms. Papulae are visible on the disc. A large madreporite, up to 23 mm in diameter in larger specimens, is readily distinguishable, sometimes in contact with marginal plates. It is covered with paxillae whose spinelets are more widely spaced than those on the disc, occupying half of the disc radius (or a quarter of the disc diameter).

Marginal plates are large and visible from both actinal and abactinal surfaces, extending to the arm tips. The number of superomarginal plates ranges from 14 to 42 from the mid-interradial line to the arm tip. These plates are square, bearing 1 to 6 clustered spines. The longest spines range from 0.3 to 2.8 mm in length. Inferomarginal plates align with the superior series and also bear 1 to 6 spines, though the number does not necessarily correspond between the two series. Inferomarginal spines may be aligned.

The actinal surface is reduced, with rectangular plates with rounded tips that are clearly distinguishable. Paxillae follow the same pattern as on the abactinal surface but have thinner, longer spinelets. Simple bivalve pedicellariae are present on the disc and arms, more numerous than on the abactinal surface, and are distinguishable in adult specimens.

Adambulacral plates are square, with 5–7 flattened furrow spines aligned in parallel, compressed and aligned to the furrow. These spines are similar in length to those on the superomarginal plates. Oral plates are elongated, each with two laterally flattened spines with broad bases.

The body is pale orange, with a pronounced stellate shape (R/r up to 7.7).
Distribution: South Atlantic, Argentina, Mar del Plata Submarine Canyon.
Bathymetric range. 1700–3400 m.
Remarks: *Dytaster stellamarisae* sp. nov. differs from other species (Table 1) in the shape and maximum number of paxillar spinelets, which are more numerous and morphologically distinct. In *D. stellamarisae* sp. nov., the pedicellariae are simple and bivalve, contrasting with the granuliform, multi-valved pedicellariae of *D. grandis* (3–4 obtuse valves) and *D. cherbonnieri* (2–5 blunt, rounded valves). Additionally, the maximum R/r ratio is higher in *D. stellamarisae* specimens. The madreporite size also differs, occupying a quarter of the disc diameter (or half of the disc radius), distinguishing it from other species.

The number of marginal spines overlaps only with *D. grandis nobilis*, the only other species reported from the Southwestern Atlantic. However, all other characteristics of *D. grandis* differ

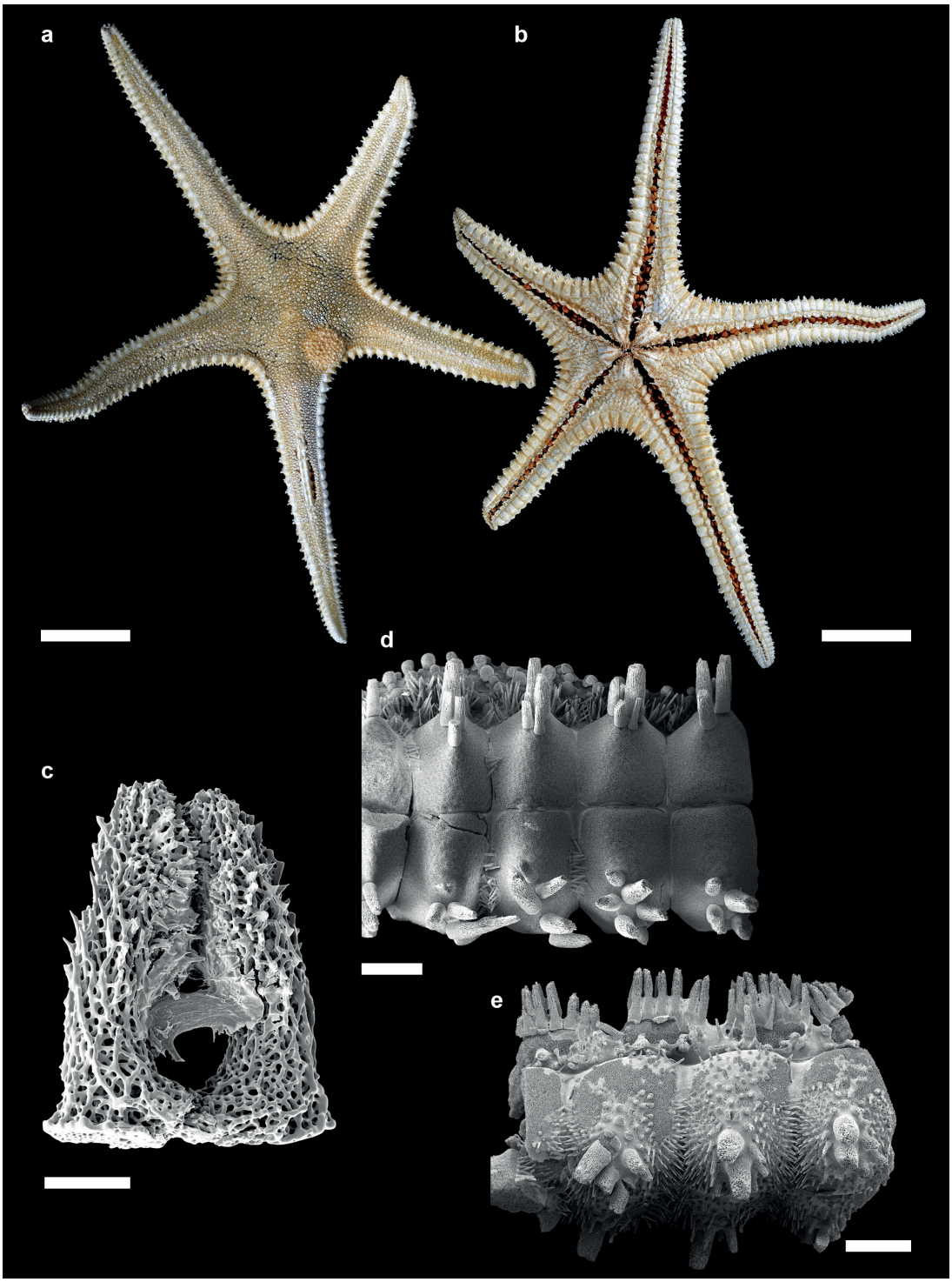

Fig. 3 *Dytaster stellamarisae* sp. nov. Holotype. Abactinal (a) and actinal surfaces (b). Detail of pedicellariae (c), marginal plates and spines (d) and ambulacral plates and spines (e). Scale bars a-b = 3 cm; d-e = 2 mm; c = 200 μm.

significantly from those of *D. stellamarisae*.

The specimen description generally conforms to the genus *Dytaster*, with one notable exception. The genus is typically characterized by a single prominent marginal spine, absent in juveniles. The new specimens, however, show 1–3 spines in juveniles and 4–6 spines in adults on both superomarginal and inferomarginal plates. This discrepancy suggests a need to revise the genus diagnosis to account for these observations.

Therefore, the diagnosis of the genus *Dytaster* (modified from Clark and Downey, 1992) stands: An abyssal genus of Astropectinidae with a moderately small disc, long and narrow carinate arms, and rounded interbrachial arcs. Abactinal membrane thin, flexible, and inflated. Abactinal paxillae very small and irregular. Marginal plates thin, rectangular, opposite, bearing 1–6 prominent, acute spines. Actinal interradial areas moderately small, with imbricate plates. Adambulacral plates relatively long, with furrow spines arranged in straight, subequal series. Madreporite large, conspicuous, covered with paxillae. Simple pedicellariae frequently present.

Genus *Leptychaster* E.A.Smith, 1876
Leptychaster kerguelenensis Smith, 1876
(Fig. 4)

Material examined: Mar del Plata Submarine Canyon: 37°60'S, 54°42'W, 852 m, "R/V Puerto Deseado" L10, 11 Aug 2012, MACN-In 44713 (2 dry specimens: R= 11 mm, r= 3 mm; R= 8 mm, r= 3 mm and 32 wet specimens: R= 22 mm, r= 6 mm; R= 12 mm, r= 4 mm; R= 12 mm, r= 4 mm; R= 10 mm, r= 3 mm; R= 7 mm, r= 3 mm; R= 8 mm, r= 3 mm; R= 7 mm, r= 3 mm; R= 7 mm, r= 3 mm; R= 13 mm, r= 3 mm; R= 29 mm, r= 7 mm; R= 14 mm, r= 5 mm; R= 13 mm, r= 4 mm; R= 13 mm, r= 3 mm; R= 10 mm, r= 3 mm; R= 12 mm, r= 4 mm; R= 15 mm, r= 5 mm; R= 13 mm, r= 4 mm; R= 8 mm, r= 3 mm; R= 12 mm, r= 4 mm; R= 8 mm, r= 3 mm; R= 12 mm, r= 4 mm; R= 10 mm, r= 4 mm; R= 8 mm, r= 3 mm; R= 10 mm, r= 3 mm; R= 9 mm, r= 3 mm; R= 9 mm, r= 4 mm; R= 10 mm, r= 4 mm; R= 12 mm, r= 3 mm; R= 6 mm, r= 2 mm; R= 7 mm, r= 3 mm; R= 11 mm, r= 4 mm; 1 disc), CNP-Inv 4112 (10 wet specimens: R= 8 mm, r= 3 mm; R= 12 mm, r= 3 mm; R= 11 mm, r= 4 mm; R= 13 mm, r= 4 mm; R= 13 mm, r= 4 mm; R= 11 mm, r= 4 mm; R= 6 mm, r= 2 mm; R= 13 mm, r= 5 mm; R= 16 mm, r= 5 mm; R= 14 mm, r= 4 mm). Mar del Plata Submarine Canyon: 38°01'S, 54°30'W, 1006 m, "R/V Puerto Deseado" L14, 11 Aug 2012, MACN-In 44714 (1 wet specimen: R= 22 mm, r= 6 mm and1 dry specimen: R= 22 mm, r= 5 mm). Mar del Plata Submarine Canyon: 38°02'S, 54°30'W, 997 m, "R/V Puerto Deseado" L41, 26 May 2013, MACN-In 44715 (4 wet specimens: R= 24 mm, r= 7 mm; R= 18 mm, r= 4 mm; R= 13 mm, r= 4 mm; 1 disc).

Diagnosis: Compressed disc with five rays ending in rounded tips. Abactinal paxillae bearing 15–20 rounded spinelets. Madreporite not visible. Superomarginal plates small and rounded; inferomarginal plates rectangular. Actinal area small and triangular, with few plates. Subambulacral spines grouped in bundles of 7–9, with 2 furrow spines curved upward in an "L" shape. Oral plates elongated.

Coloration light, nearly white, with an R/r ratio ranging from 4.3 to 2.3.

Distribution: Southern Indian Ocean shelf (Subantarctic convergence) surrounding Kerguelen and Marion islands. Continental Argentine shelf and slope.

Bathymetric range: 17–1900 m.

Present study: 852–1006 m.

Remarks: *L. kerguelenensis* is a sub-Antarctic species wich extends along the Argentine continental shelf (Romanelli & Tablado, 2011), and whose depth range has recently been extended below 1000 m (Hurtado-García & Majón-Cabeza, 2022). In this study, we provide specimens that extend its latitudinal range further north.

Genus *Plutonaster* Sladen, 1885
Plutonaster neninae sp. nov. (Fig. 5)

HOLOTYPE: Mar del Plata Submarine Canyon: 37°53'S, 54°15'W, 1451 m, "R/V Puerto Deseado" L34, MACN-In 44716 (1 dry specimen: R= 72 mm, r= 33 mm).

PARATYPES: Mar del Plata Submarine Canyon: 37°53'S, 54°15'W, 1451 m, "R/V Puerto Deseado" L34, 25 May 2013, MNHNM-4327 (1 dry specimen: R= 70 mm, r= 28 mm). Mar del Plata Submarine Canyon: 38°01'S, 54°25'W, 1200 m, "R/V Puerto Deseado" L15, 12 Aug 2012, MACN-In 44717 (1 dry specimen: R= 53 mm, r= 23 mm and 2 wet specimens: R= 55 mm, r= 23 mm; R= 51 mm, r= 20 mm). Mar del Plata Submarine Canyon: 37°52'S, 53°57'W, 1738 m, "R/V Puerto Deseado" L26, 15 Aug 2012, MACN-In 44718 (1 dry specimen: R= 52 mm, r= 19 mm), CNP-Inv 4185 (1 dry specimen: R= 52 mm, r= 20 mm). Mar del Plata Submarine Canyon: 37°53'S, 53°53'S, 1970 m, "R/V Puerto Deseado" L52, 7 Sep 2013, MACN-In 44719 (1 dry specimen: R= 70 mm,

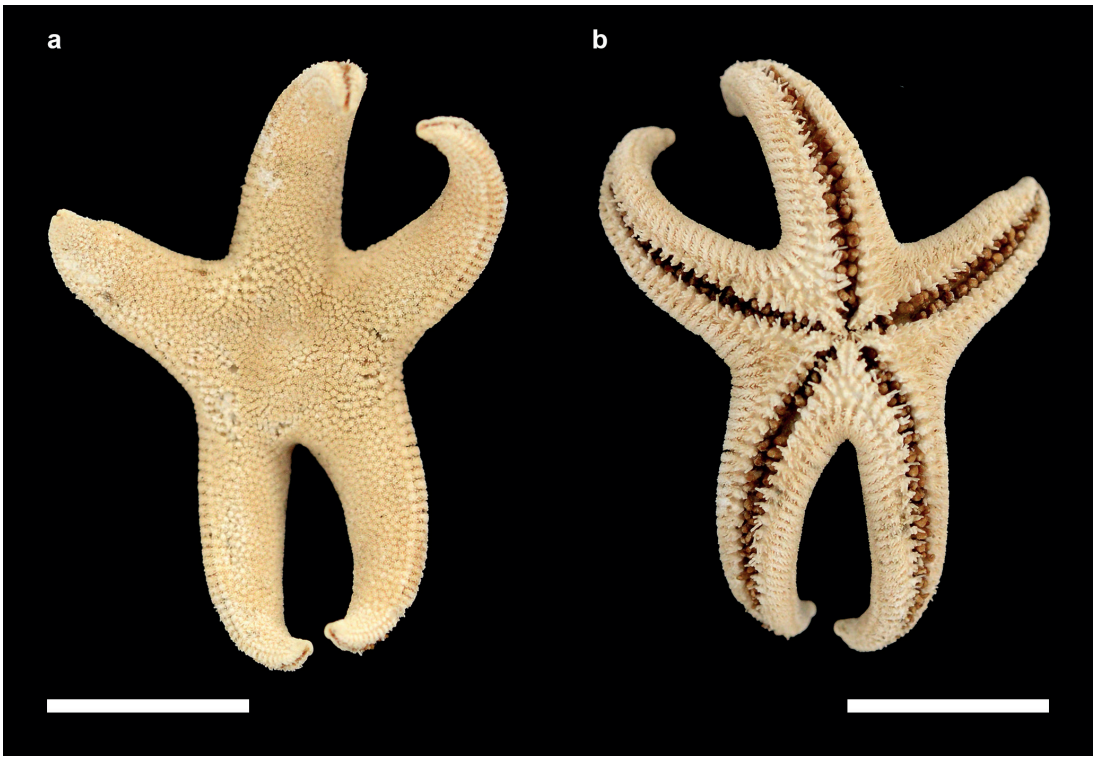

Fig. 4 *Leptychaster kerguelenensis*. Abactinal (a) and actinal surfaces (b). Scale bars = 1 cm.

r= 21 mm). Mar del Plata Submarine Canyon: 37°52'S, 53°52'S, 1712 m, "R/V Puerto Deseado" L55, 8 Sep 2013, MACN-In 44720 (3 dry specimens: R= 51 mm, r= 18 mm; R= 24 mm, r= 9 mm; R= 11 mm, r= 5 mm). Mar del Plata Submarine Canyon: 37°59'S, 54°10'W, 1444 m, "R/V Puerto Deseado" L58, 9 Sep 2013, CNP-Inv 4186 (4 wet specimens: R= 57 mm, r= 23 mm; R= 73 mm, r= 28 mm; R= 76 mm, r= 29 mm; R= 80 mm, r= 28 mm). Mar del Plata Submarine Canyon: 37°50'S, 54°05'W, 1398 m, "R/V Puerto Deseado" L59, 10 Sep 2013, MACN-In 44721 (6 wet specimens: R= 44 mm, r= 17 mm; R= 70 mm, r= 22 mm; R= 70 mm, r= 25 mm; R= 21 mm, r= 9 mm; R= 15 mm, r= 7 mm; R= 20 mm, r= 7 mm), CNP-Inv 4187 (3 dry specimens: R= 38 mm, r= 14 mm; R= 10 mm, r= 5 mm; R= 10 mm, r= 4 mm). Mar del Plata Submarine Canyon: 37°52'S, 54°05'W, 1584 m, "R/V Puerto Deseado" L60, 10 Sep 2013, MACN-In 44722 (2 wet specimens: R= 73 mm, r= 28 mm; R= 59 mm, r= 22 mm). Mar del Plata Submarine Canyon: 37°55'S, 54°07'W, 2161 m, "R/V Puerto Deseado" L61, 10 Sep 2013, MACN-In 44723 (1 wet specimen: R= 66 mm, r= 20 mm). Mar del Plata Submarine Canyon: 37°55'S, 54°14'W, 1404 m, "R/V Puerto Deseado" L62, 11 Sep 2013, MACN-In 44724 (10 wet specimens: R= 76 mm, r= 33 mm; R= 66 mm, r= 28 mm; R= 57 mm, r= 22 mm; R= 80 mm, r= 30 mm; R= 76 mm, r= 30 mm; R= 86 mm, r= 30 mm; R= 80 mm, r= 27 mm; R= 75 mm, r= 20 mm; R= 74 mm, r= 29 mm; R= 70 mm, r= 28 mm and 1 dry specimen: R= 76 mm, r= 25 mm), CNP-Inv 4188 (2 wet specimens: R= 75 mm, r= 22 mm; R= 70 mm, r= 24 mm). Mar del Plata Submarine Canyon: 37°50'S, 54°08'W, 1395 m, "R/V Puerto Deseado" L64, 11 Sep 2013, MACN-In 44725 (12 wet specimens: R= 67 mm, r= 27 mm; R= 51 mm, r= 21 mm; R= 63 mm, r= 23 mm; R= 67 mm, r= 27 mm; R= 70 mm, r= 23 mm; R= 65 mm, r= 23 mm; R= 77 mm, r= 26 mm; R= 42 mm, r= 15 mm; R= 74 mm, r= 25 mm; R= 76 mm, r= 25 mm; R= 66 mm, r= 26 mm; R= 75 mm, r= 26 mm), CNP-Inv 4189 (6 wet specimens: R= 64 mm, r= 21 mm; R= 67 mm, r= 27 mm; R= 40 mm, r= 15 mm; R= 71 mm, r= 24 mm; R= 61 mm, r= 20 mm; R= 54 mm, r= 20 mm).

Etymology: This species is named in honor of Alicia "Nenina" Carranza, in recognition of her unwavering support for Argentine science. The name is treated as a noun in apposition.

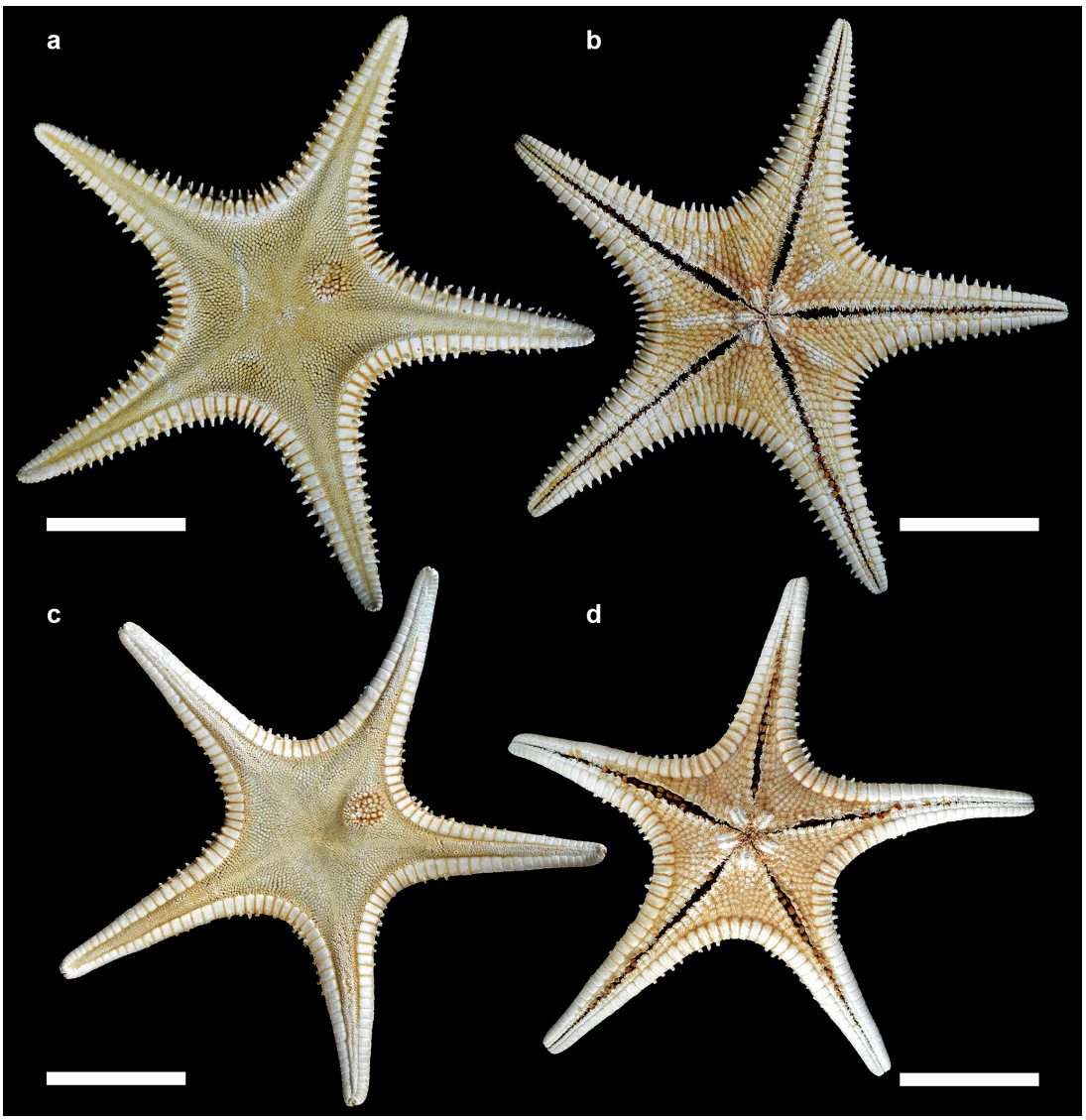

Fig. 5 *Plutonaster neninae* sp. nov. Abactinal (a) and actinal surfaces (b) of short-armed morpho. Holotype. Abactinal (c) and actinal surfaces (d) of long-armed morpho. Paratype. Scale bars = 3 cm.

Diagnosis: Angular abactinal paxillae and oval actinal plates. Superomarginal plates large and rectangular, each bearing one or two inferomarginal spines. Furrow spines number between 5 and 9, and are large, flat, and arranged in parallel.

Description: In the abactinal region, individual plates are not clearly distinguishable; only the angular paxillae are visible. Each paxilla bears an average of 32 short, rounded spinelets. The madreporite is prominent, measuring 6.4 mm in diameter (Fig. 6a).

Marginal plates are square and extend across both the abactinal and actinal surfaces. Superomarginal and inferomarginal plates are aligned, each bearing a large spine with a broad base (Fig. 6c). In the interradial regions, inferomarginal plates possess two spines.

The actinal surface comprises 29–31 series of plates between the arms, arranged in columns from a single plate near the rays to up to eight stacked plates toward the center. These are well-defined, angular plates. Each paxilla bears an average of 29 granulated spinelets.

Adambulacral furrow spines number between 5 and 9, depending on specimen size (Fig.

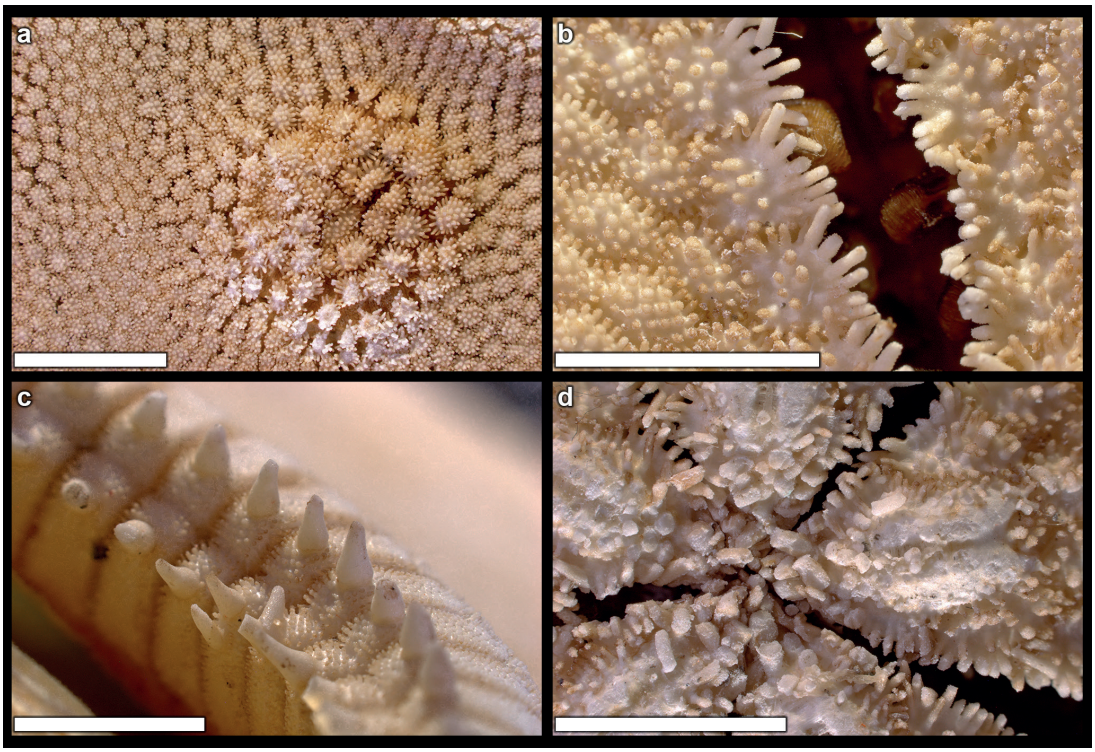

Fig. 6 *Plutonaster neninae* sp. nov. Holotype. (a). Abactinal surface. (b), ambulacral plates and spines. (c), marginal plates and spines. (d), ambulacral plates and spines. Scale bars = 5 mm.

6b). These are large, thin, and flat, arranged in parallel rows, and are accompanied by 4 or 5 similarly shaped secondary spines. Oral plates are equipped with two large, broad spines and 4–6 smaller lateral spines (Fig. 6d).

The body is orange and flattened, with five rays and a R/r ratio ranging from 2.1 to 3.8.

Distribution: South Atlantic, Argentina, Mar del Plata Submarine Canyon.

Bathymetric range: 1200–3447 m.

Remarks: Differences between these specimens and previously reported species from the South Atlantic (Table 2) are most evident in the spination of the inferomarginal plates. The new species bears two spines, a condition shared only with *P. fragilis*. However, it differs from *P. fragilis* in several characters, including the shape and arrangement of plates, the form of paxillae, and the presence or absence of pedicellariae.

The number of furrow spines is similar across species, but in *P. neninae*, they are large, slender, and aligned parallel to one another, supported by 4–5 large, similarly shaped secondary spines. In contrast, *P. bifrons* exhibits shorter secondary spines, often accompanied by a large distal spine.

Abactinal plates also differ. The new species has a greater number of plates (approximately 24), compared to *P. agassizi*, which has up to 7. The paxillae are angular in *P. neninae*, while in *P. bifrons*, they are more oval in shape. Notably, *P. neninae* completely lacks pedicellariae.

Among the examined specimens, two distinct morphotypes were observed. Both share the general diagnostic features of the species, but one group (represented by 50 specimens) has shorter arms and a more rounded body compared to the other group (8 specimens). In the former, marginal plates extend further toward the actinal surface and become reduced in size along the arms. Spines are present on both the superomarginal and inferomarginal plates, although they are smaller than those in the second morphotype. Similar variation within the genus has been previously reported by Clark and Downey (1992), who noted that such intraspecific differences are common in this group.

Genus *Psilaster* Sladen, 1885

Psilaster pearsei sp. nov. (Fig. 7)

HOLOTYPE: Mar del Plata Submarine Canyon: 37°52'S, 53°51'W, 1712 m, "R/V Puerto Deseado"

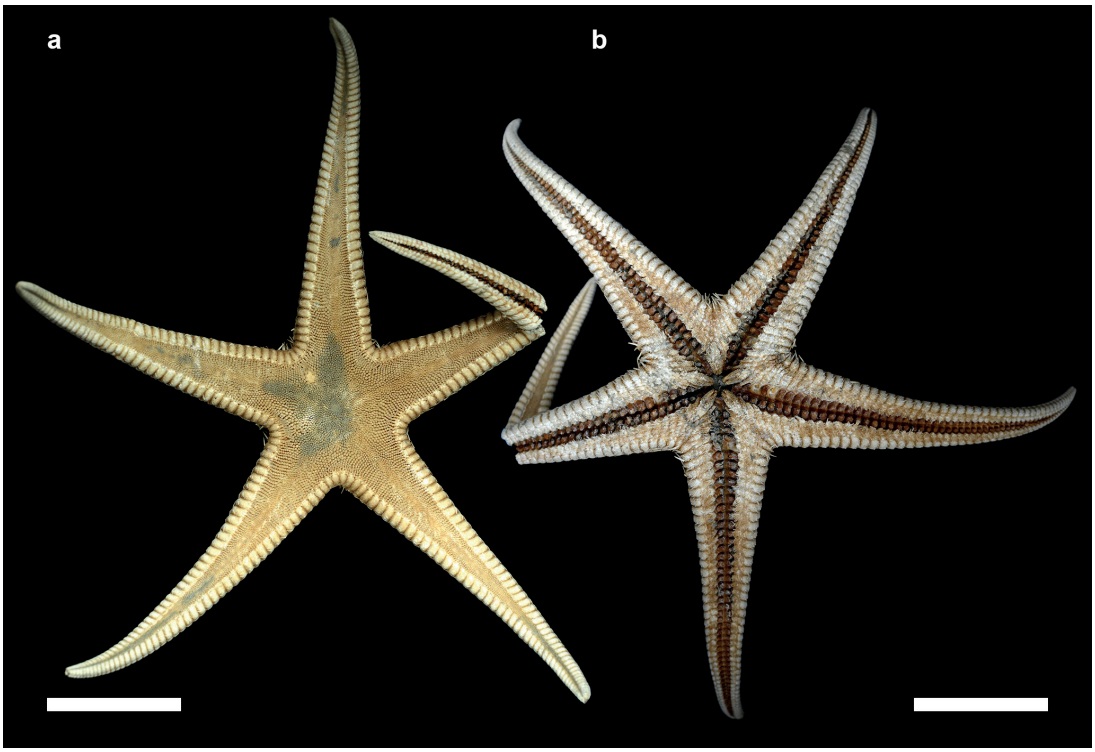

Fig. 7 *Psilaster pearsei* sp. nov. Holotype. Abactinal (a) and actinal surfaces (b). Scale bars = 5 cm.

L55, 8 Sep 2013, MACN-In 44726 (1 dry specimen; R/r = 5.4.).

Etymology: This species is named in honor of John Pearse, in recognition of his extensive work on Asteroidea and his valued friendship. The name is used as a noun in apposition.

Diagnosis: 3–4 inferomarginal spines; 1–2 superomarginal spines; marginal squamiform spinelets; 8 furrow spines.

Description: The disc is relatively small. The abactinal area (Fig.8a) contains a high density of rounded plates arranged in six rows, with 6–7 plates per row. Paxillae are rounded, each bearing an average of nine long spinelets with rounded tips. The madreporite is small, lacking paxillae, and has a diameter of up to 3.5 mm.

Marginal plates are rectangular with squamiform spinelets that become longer and thinner toward the edges. Superomarginal plates (Fig.8d) carry a prominent, acute spine (with two spines in some specimens), while the inferomarginal plates (Fig.8c) bear 3–4 spines of uniform size.

The actinal plates are square and covered with paxillae, each bearing an average of 23 spinelets similar in shape to those on the abactinal surface. The arrangement of paxillae on this surface appears more orderly.

Adambulacral plates (Fig.8b) are rectangular, each bearing 8–9 furrow spines arranged at an angle, followed by five rows of 7–8 secondary spines, similar in number and shape to the furrow spines. Oral plates (Fig.8 e) are well-defined and elongated, each carrying two large, broad, spatulate spines.

The body is light brown with darker tube feet. R/r = 5.4.

Distribution: South Atlantic, Argentina, Mar del Plata Submarine Canyon.

Bathymetric range. 1712 m.

Remarks: The specimen was compared with descriptions of all species cited for the Atlantic Ocean, as well as with other specimens in the MACN collection, including *Psilaster charcoti* and *Psilaster andromeda*. Specimens of *Psilaster casiope* and *Psilaster acuminatus* from the UNAM were also examined.

The specimen differs from other species in the genus by several diagnostic characters (Table 3), particularly the armament of the superomarginal plates, which is more prominent and present on all plates, unlike in other species. The oral plates also differ, as species without flattened jaws typically have four spines. For *P. herwigi*, although the number is unspecified, two series of rectan-

Fig. 8 *Psilaster pearsei* sp. nov. Holotype. (a), Abactinal surface. (b), ambulacral plates and spines. (c), inferomarginal plates and spines. (d), superomarginal plates and spines. (e), oral plate. Scale bars = 5 mm.

gular suboral spines are described, differing from those in *P. pearsei*. The spinelets in *P. pearsei* are distinctive, being spiniform, large, and scale-like on the marginal plates, while other species have rounded, thin, short, or sparse spinelets. Additionally, this specimen has 8–9 furrow spines, while some others species have a maximum of 8. The R/r ratio is also larger in *P. pearsei*.

DISCUSSION

Our examination of 153 specimens from the Astropectinidae family led to the classification of six species across five genera, all representing new records or range extensions for the Southwestern Atlantic Ocean. Notably, we observed range expansions for *Leptychaster kerguelenensis*, *Bathybiaster loripes*, and *Dytaster grandis*, while the other three genera yielded newly described species.

The close geographic distributions of *Dytaster grandis* and *Dytaster stellamarisae* sp. nov. raised questions of differentiation. However, morphological analysis revealed distinct differences, justifying their classification as separate species. For *D. grandis*, establishing clear subspecies boundaries remains challenging due to limited distributional data and subtle morphological variations.

Among the new species, *Plutonaster neninae* sp. nov. extends the northern distribution of *Plutonaster* in the Southwestern Atlantic compared to *P. bifrons*. Additionally, *Psilaster pearsei* sp. nov., discovered at 37° 52'S, represents an interesting range extension from the nearest known occurrence of *Psilaster herwigi* at 35°48'S, and the second species of *Psilaster* in Southwestern Atlantic Ocean.

Table 1: Morphological characteristics and distribution of *Dytaster* species compared. ND= no data.

AREA		*Dytaster nobilis* Sladen, 1889	*Dytaster grandis* (Verrill, 1884)	*Dytaster exilis* Sladen, 1889	*Dytaster felix* Koehler, 1907	*Dytaster cherbonnieri* Sibuet, 1975	*Dytaster insignis* (Perrier, 1884)	*Dytaster pedicellaris* H.E.S Clark & D.G. McKnight, 2000	*Dytaster stellamarisae* sp. nov.
Abactinal	Area and plates	Large paxillae.	Small paxillae with minute spinules.	Area on the disk more or less inflated. Small crowded paxillae.	Small and rounded paxillae.	Enlarged plates.	Small paxillae.	With a small round swelling centrally, occupying most of plate. Paxillae do not seem to form very regular rows.	Rounded paxillae, some larger than others.
	Paxilar spinelets	Few, with a central grunuliform spinelet.	Up to 15 tiny, obtuse spinelets.	Short cylindrical, papilliform, obtusely tipped.	Granular spinelets arranged in circles enclosing 2–6 larger central spinelets	15–20 short, acute spinelets.	Up to 25 tiny granules, granuliform in shape.	5-8 distinct slender, tapering, sharp-tipped spinelets.	Up to 33 spiniform spinelets arranged around a central, largest one.
	Madreporite	1/4 of disc radius.	1/3 of disc diameter with paxillae and pedicellaria.	6 mm.	Large and oval.	2/3 of disc radius with enlarged paxillae.	1/5 of disc diameter covered with enlarged paxillae.	Interradial, more or less oval.	1/2 of disc radius with paxillae.
	Pedicellariae	ND	Scattered and granuliform, with 3–4 obtuse valves.	Absent.	ND	Numerous, with 2–5 blunt, rounded valves.	Absent.	Pedicellariae formed by 2-4 very enlarged, thick rather flattened spines.	Simple bivalve.
Marginal	Superomarginal plates	Length and heigh subequal, confined entirely to the lateral wall of the ray.	Squarish.	Confined to the lateral wall. Length slightly greater than the height.	Narrow, a little longer than wide. Covered with series granules, rounded.	Vertical, except at the tip of the arms.	Large and broad, mostly confined to the abactinal surface.	Forming a distinct and slightly raised edge to disc and arms.	Large and square.
	Superomarginal spines	ND	Moderately large spine, 5–12 in number.	Single, short, conical sharply pointed spine.	Absent.	One large spine.	Large acuminate spine with no smaller secondary spines.	1–3 rather short, tapering, thorny, round tipped enlarged spines.	1–6 prominent, large spines.
	Inferomarginal plates	ND	Similar to superomarginal.	Correspond to the superior series.	Correspond exactly to superomarginals.	Similar to superomarginal.	Similar to superomarginal.	Corresponding with superomarginals.	Big and square, extending to the actinal surface.
	Inferomarginal spines	ND	Similar to superomarginal.	Single, short, conical spine.	Short, conical, tight spines.	One large spine with 1–2 smaller spines near the lower edge.	Similar to superomarginal.	1-2 enlarged conspicuous spines similar to, but slightly larger than, that of superomarginals.	1–6 prominent spines.
	Pedicellariae	ND	Minute.	ND	Three acute valves, thick, elongated and sometimes arche.	ND	ND	Short, squat round-headed.	Absent.
Actinal	Area and plates	Row of papilliform granules along the outer margin.	Triangular area with an enlarged central spine.	Numerous plates in regular series.	ND	Few plates.	Moderately large areas with small plates arranged in regular rows.	Area well defined. Conspicuous regular row of large square or rectangular plates bordering oral and adambulacral plates. With a few spines.	Rounded plates.
	Paxilar spinelets	Small papilliform, rather widely spaced.	Small and divergent, with a larger central spine.	Small and papilliform, in groups, with a centrally conspicuous pedicellaria.	ND	Scattered.	Granules and granuliform, with a few occasionally bearing a central obtuse spine or, rarely, a pedicellaria.	ND	Large and thin, 12–20 in number, with an enlarged central spine.

Table 1: Morphological characteristics and distribution of *Dytaster* species compared. ND= no data.

AREA		*Dytaster nobilis* Sladen, 1889	*Dytaster grandis* (Verrill, 1884)	*Dytaster exilis* Sladen, 1889	*Dytaster felix* Koehler, 1907	*Dytaster cherbonnieri* Sibuet, 1975	*Dytaster insignis* (Perrier, 1884)	*Dytaster pedicellaris* H.E.S Clark & D.G. McKnight, 2000	*Dytaster stellamarisae* sp. nov.
Actinal	Adambulacral plates	ND	ND	Long and very narrow.	ND	Slightly longer than broad.	ND	Distinct, more or less rectangular with narrow edge to furrow and actinal plates.	Rectangular and short.
	Adambulacral furrow spines	6–7, one very small. Compressed laterally and slightly curved. Secondary series behind.	5–8 flattened, compressed, and truncate.	12 short cylindrical and papilliform spinelets, no spines.	8–10 elongated spines, arranged in comb shape, the medians a little longer than the others. Outside, two irregular rows of 3-6 larger, lanceolate and pointed spines.	7–12 flattened and truncate.	7–9 straight, nearly equal, blunt, slightly compressed; subambulacral spines shorter, blunt, scattered or arranged in irregular rows.	5 proximally, narrow and rounded basally. 6-7 out along arms, curving back over adambulacral plates. 2–3 sturdier, longer, upright subambulacral spines.	6–7 flattened and parallel to each other.
	Pedicellariae	Absent.	Granuliform, with 3–4 obtuse valves.	One centrally and conspicuous formed by 4 thickened and enlarged spinelets.	Present.	ND	ND	Occasionally an incipient straight. Broad-headed 2-4 valved obvious and frequent pedicellaria per plate.	Simple and bivalve.
R/r		4.55	4.5–6.8	6.5	4–5.14	4.5–6.8	4.2–5.9	3.58–3.66	Up to 7.7
Distribution		36°44°S, 46°16°W Off the coast of Buenos Aires Depth: 4846 m.	East coast of USA, Gulf of Mexico, Bay of Biscay, Azores, SW Africa, Western South Atlantic. Depth range: 1000-4846 m.	Between Juan Fernandez island and Valparaiso. West of Tristan da Cunha. Depth range: 2514–3475 m.	Antarctic Peninsula, Scotia Sea and Weddell Sea. Depth range: 750 m.	Off Angola and SW Africa. Depth range: 2864–3431 m.	Known from the Gulf of Mexico, the West Indies, and Tristan da Cunha. Depth range: 2515–3530 m.	South of Cape Campbell in the Hikurangi. north of the Three Kings Islands. Depth range: 1 137–2677 m.	37°52°S, 53°52°W, South Atlantic, Argentina, Mar del Plata Submarine Canyon. Depth: 1712 m.

Table 2: morphological characteristics and distribution of *Plutonaster* species compared. Nd= no data.

AREA		*Plutonaster agassizi* (Verrill, 1880)	*Plutonaster bifrons* (Wyville Thomson, 1873)	*Plutonaster ambiguus* Sladen, 1889	*Plutonaster complexus* H.E.S Clark & D.G. McKnight, 2000	*Plutonaster hikurangi* H.E.S Clark & D.G. McKnight, 2000	*Plutonaster jonathani* H.E.S Clark & D.G. McKnight, 2000	*Plutonaster fragilis* H.E.S. Clark, 1970	*Plutonaster intermedius* (Perrier, 1881)	*Plutonaster knoxi* Fell, 1958	*Plutonaster neninae* sp. nov.
Abactinal	Area and plates	Plates in a series, up to 7, covered with large paxillae.	Paxillae with oval columns of moderate height.	Paxillae very minute and crowded.	A clearly marked very narrow naked area present between abactinal and superomarginal plates. Papulae 4–6 around each plate, along disc and arm edges.	Plates narrow, 8–9 plates in a row, out plates broaden and 5–7 in a row. Gently lobed, forming a close cover.	Plates oval.	Plates oval or faintly lobed. Paxillae small, crowded.	Paxillae similar to *Astropecten*.	Crowded paxillae, coarser on the disc than on the arms.	Plates in a series, up to 24, covered with angular paxillae.
	Paxilar spinelets	Numerous, short, blunt, and granule-like spinelets.	15–25 short spinelets, with median ones shorter and blunter than the fine peripheral spinelets.	Each paxillae with crown of 5–6 small, equal papilliform spinelets.	Slightly larger-headed central spinelets.	Short sturdy trunk that ends in a round or oval convex head, crowned by slender, generally untapering flat-tipped spinelets.	12–25 slender, well-separated, finely thorny, blunt-tipped marginal spinelets; enclosing a number of slightly shorter, very round headed, finely thorny well-spaced spinelets.	10–25 fine rugose spinelets.	ND	20–30 slender, thorny spinules of more or less uniform size, the central spinules not differing obviously from the outer ones.	Short, round spinelets, with a mean of 32.

Table 2: morphological characteristics and distribution of *Plutonaster* species compared. Nd= no data.

AREA		*Plutonaster agassizi* (Verrill, 1880)	*Plutonaster bifrons* (Wyville Thomson, 1873)	*Plutonaster ambiguus* Sladen, 1889	*Plutonaster complexus* H.E.S Clark & D.G. McKnight, 2000	*Plutonaster hikurangi* H.E.S Clark & D.G. McKnight, 2000	*Plutonaster jonathani* H.E.S Clark & D.G. McKnight, 2000	*Plutonaster fragilis* H.E.S. Clark, 1970	*Plutonaster intermedius* (Perrier, 1881)	*Plutonaster knoxi* Fell, 1958	*Plutonaster neninae* sp. nov.
Abactinal	Madreporite	Large.	ND	ND	Large, almost circular.	Large, interradial. 6. 7 mm wide.	Quite large	Large about 10 mm. Almost circular.	ND	ND	Visible, with a diameter of 6.4 mm.
	Pedicellariae	ND	Rare.	ND	Simple, present along arm and disc edges.	Quite conspicuous centrally on many abactinal paxillae.	ND	Inconspicuous.	ND	ND	Absent.
Marginal	Superomarginal plates	Smaller than the abactinals and crowded, with small rounded spinelets.	As long as broad, covered with miliary grains.	28–30 plates, very small and slightly tumid. Covered with small papilliform granules and one small tubercle like granule.	Plates narrow, with distinct, sturdy, generally well spaced round granules.	With round or slightly angular granules that form almost regular rows.	18–21 rectangular plates well-defined, conspicuous. Covered by round or slightly angular well-spaced granules.	35 or 36 plates, tumid and rectangular. covered with small spinelets.	44 marginal plates, granular.	About 70 plates. The proximal few are broader than long. Densely crowded by slender, spiniform granules.	Large and rectangular, extending to both the abactinal and actinal surfaces.
	Superomarginal spines	One short, stout, and blunt spine (not always present).	One prominent, rigid central spine.	ND	1–3 enlarged fast-tapering short spines.	1–3 prominent, large, very sturdy spine stands upright.	1 round-tipped, short, sturdy tapering enlarged spine with a rounded tip.	1–2 enlarged, sturdy, tapering, broad-based spines.	Spines, smaller than inferomarginal.	1 erect, prominent, pointed primary spine.	1 large spine with a broad base.
	Inferomarginal plates	Smaller than the abactinals and crowded, with small rounded spinelets.	Square, covered with miliary grains.	Correspond with superomarginal. Breath twice as their length. One short, tapering, pointed spinelet.	Correspond with superomarginals but wider than long.	Correspond with superomarginals, raised, narrowly rectangular.	Correspond with superomarginal. Small, rounded, generally well separated granules similar to those of superomarginal plates.	Correspond with superomarginals. Plates separated by deep fascioles.	44–54 marginal plates, wider than long, granular.	About twice as broad as they are long in the proximal part of the ray; beyond, they gradually become squarer in outline.	Large and rectangular, extending to both the abactinal and actinal surfaces.
	Inferomarginal spines	One short, stout, and blunt spine (not always present).	One prominent, rigid central spine.	Minute conical thornlets	Enlarged spines short, almost conical; a single spine may be present, or interradially 2–4 small spines may form a vertical row.	1 enlarged spine, this similar to, but considerably longer than enlarged superomarginal spines. Occasionally, a second much smaller spine is also present.	1 enlarged conspicuous spine, similar to, but larger than enlarged spines of superomarginal plates. A second very small enlarged spine is present behind and on actinal side of larger spines.	1–2 enlarged, broad-based tapering spines.	1 isolated obtuse spine.	A coating of fine spinules, and one erect primary spine, resembling thus the superomarginals.	1–2 large spines with a broad base.
	Pedicellariae	ND	Present.	ND	ND	Enlarged tips of 3 or 4 spines that bend over and meet. 2 on a plate.	ND	Incipient, formed by enlarged and clavate heads of 3 or 4 spines, near superomarginals.	ND	ND	Absent.

Table 2: morphological characteristics and distribution of *Plutonaster* species compared. Nd= no data.

	AREA	*Plutonaster agassizi* (Verrill, 1880)	*Plutonaster bifrons* (Wyville Thomson, 1873)	*Plutonaster ambiguus* Sladen, 1889	*Plutonaster complexus* H.E.S Clark & D.G. McKnight, 2000	*Plutonaster hikurangi* H.E.S Clark & D.G. McKnight, 2000	*Plutonaster jonathani* H.E.S Clark & D.G. McKnight, 2000	*Plutonaster fragilis* H.E.S. Clark, 1970	*Plutonaster intermedius* (Perrier, 1881)	*Plutonaster knoxi* Fell, 1958	*Plutonaster neninae* sp. nov.
Actinal	Area and plates	Triangular areas with angular paxillae.	Actinal areas of moderate size with up to seven series of plates, arranged mostly in regular columns.	ND	Large area, well-defined with very regular rows of plates. Rectangular, narrow, each with slender, well-spaced spines.	Large area, well-defined with very regular rows of plates. Rectangular, narrow, each with slender, well-spaced spines.	Well-defined area. Plates forming regular rows.	Plates in regular longitudinal rows, one plate corresponding to each adambulacral. Each plate with numerous short spines. Interradially.	ND	Intermediate large areas.	Oval paxillae.
	Paxilar spinelets	Short and rounded.	Coarse granules or short spinelets.	ND	Short, finely thorny-headed spinelets.	ND	Rows of well-spaced thorny headed granules; these similar to but slightly longer than those of inferomarginal.	ND	ND	ND	Granulated, with a mean of 29 spinelets.
	Adambulacral plates	Bear.	ND	Longer than broad.	Conspicuous.	Straight margin, in the last quarter of the arms the margin often gently rounded.	Rectangular, conspicuous, separated laterally by grooves that continue out between actinal plates	ND	ND	ND	Square.
	Adambulacral furrow spines	7–8 slender spines.	7–10 furrow spines, backed by shorter subambulacral spines and often a large distal spine.	6–7 delicate, tapering, sharply-pointed spinelets.	7–11 slender, well-spaced, slightly tapering, round tipped and generally of similar size apart from distalmost and proximal spines which are shorter; these spines finely thorny.	9–10 spaced, round tipped, finely thorny, the most proximal and distal spines often distinctly shorter. 1 enlarged, conspicuous subambulacral spine.	8–9 slender, well-spaced, very finely thorny, round-tipped spines. 1 enlarged, sturdy conspicuous subambulacral spine.	7 spines.	Furrow-comb of about 8 uniform spines, outside of which lies a single, large and very conspicuous subambulacral spine.	5 to 9 large, thin, and flat, disposed in parallel and carrying 4 or 5 secondary spines.	5–9 large, thin, and flat spines, arranged in parallel and carrying 4 or 5 secondary spines.
	Pedicellariae	ND	Present.	ND	Simple pedicellaria, formed by 2 or 3 enlarged spinelets.	1–2 conspicuous	Incipient.	Formed by enlarged and clavate heads of 3–5 spines.	ND	ND	Absent.
R/r		2.4–3.8	3.4–5.0	3.85	1.5–5.5	1.8–6.3	1.6–5.8	3–3.3	2.8	3.2	2.1–3.8
Distribution		South of Islas Malvinas to the Florida Strait and Gulf of Mexico; also found at Ascension Island, the Cape Verde Islands, and off South Africa, west and south of Cape Town. Depth range: 335–3110 m.	Mediterranean Sea; northeast Atlantic Ocean (from Faroe Islands to Gulf of Guinea, including Canary Islands); northwest Atlantic Ocean (from New Jersey, USA, to Venezuela); and Argentina. Depth range: 100–3587 m.	Tasman Sea. Depth: 1737 m.	New Zealand Exclusive Economic Zone and Campbell Plateau. Depth range: 1700–2460 m.	New Zealand Exclusive Economic Zone and Campbell Plateau. Depth: 1920 m.	New Zealand Exclusive Economic Zone and Campbell Plateau. Depth range: 934–990 m.	New Zealand Exclusive Economic Zone and Campbell Plateau. Depth range: 1647–1693 m.	West Indian Ocean	New Zealand Exclusive Economic Zone and Campbell Plateau. Depth range: 112–985 m.	37°52°S, 53°52°W, South Atlantic, Argentina, Mar del Plata Submarine Canyon. Depth range: 1200–3447 m.

Table 3: Morphological characteristics and distribution of *Psilaster* species compared. ND= no data.

AREA		*Psilaster acuminatus* Sladen, 1889	*Psilaster andromeda* (Müller and Troschel, 1842)	*Psilaster cassiope* Sladen, 1889	*Psilaster herwigi* (Bernasconi, 1972)	*Psilaster charcoti* (Koehler, 1906)	*Psilaster pearsei* sp. nov.
Abactinal	Area and plates	Relatively broad.	Paxilar area highly variable.	Paxillae small and closely crowded.	Paxillae with oval or polygonal bases.	Covered with small, fine and very tight paxillae, a little larger on the disc than on the arms and becoming excessively small towards the end of the arms.	Paxillae round, with slightly angular edges.
	Paxilar spinelets	7–15 short, blunt.	9–15 short, blunt.	8–16 short, thick, papilliform spinelets, with a superficially granuliform appearing.	10–20 short, clavate, papilliform spinelets with rugose tips.	ND	Average of 9, elongated with rounded tips.
	Madreporite	Small.	ND	Small, with a surface grooved by coarse, deep striation furrows.	ND	Small, close to the edge.	Small and naked, with a diameter of 3.5 mm.
	Pedicellariae	ND	ND	ND	ND	ND	Absent.
Marginal	Superomarginal plates	Plates higher than broad, with discrete squamiform and densely crowded spinelets.	Variable in breadth, proportionate to overall size.	More or less massive, encroaching on the upper surface to form a broad border. The superficial face is armed with spaced squamiform granules that transition at the edges to papilliform fasciolar spinules. Occasionally, some plates, particularly distally, bear an enlarged laterodistal granule or tubercle.	Sloping inward on the upper side, with polygonal squamiform granules arranged medially.	As a thin border.	Rectangular, with squamiform spinelets.
	Superomarginal spines	Often with an enlarged distal spine, except on the first four or five plates.	The first five or six plates are sometimes armed with a spine.	Absent.	No enlarged spines present.	A row of 5-6 small flattened and lying spines.	1–2 prominent, acute spines.
	Inferomarginal plates	Plates are higher than broad, forming a gentle, well-rounded curve.	ND	Similar in contour and armament.	ND	Correspond exactly to the superomarginals.	Rectangular, with spinelets shaped like scales.
	Inferomarginal spines	3–4 spaced, upwardly appressed spines.	1–4 inconspicuous, spaced spines.	1–4 spaced, tapering, slightly flattened spines.	Some proximal spines with 1–3 flattened, inconspicuous spines.	4–5	3–4 prominent, acute spines.
	Pedicellariae	ND	ND	Absent.	ND	ND	Absent.
Actinal	Area and plates	Small to moderate in size.	Area small to moderate in size.	ND	Area relatively large.	Plates poorly developed, only form a single row. Each carry a small tuft of very short and erect spines.	Square plates.
	Paxilar spinelets	In at least one very large specimen, some spinelets are enlarged into small spines, but the armament remains uniform in smaller specimens.	Uniform.	Almost uniform and flattened.	Groups of short, clavate spinelets. Similar in appearance.	ND	Mean of 23, elongated with rounded tips.
	Adambulacral plates	ND	ND	Large.	Moderately long.	ND	Rectangular.
	Adambulacral furrow spines	8.	7 to 8.	7–8 slender, compressed spines, backed by several much shorter subambulacral spines.	6–7 somewhat prismatic spines.	5 spines in a single row, large, and flattened and form a small erect comb.	8–9 spines arranged in angle.
	Pedicellariae	ND	ND	ND	ND	ND	Absent.
R/r	Cm	3.7–5.0	3.5–5.1	3.3–4.5	2.5–3.5	3.6–5	5.4
Distribution		West and southwest of South Africa, also in temperate Australasia. Depth range: 155–547 m.	From the Norwegian coast and western Sweden to the Faeroe Channel and south to the Bay of Biscay; also in the Arctic, extending north to the Murman coast. Depth range: 70–1500 m.	Gulf of Mexico and Caribbean, east to the Guyana Trench; in the eastern Atlantic from just north of Cap Blanc to the Cameroons and Gulf of Guinea. Depth range: 550–1460 m.	35°48'S, 52°48'W, Uruguay. Depth: 800 m.	Southern Ocean.	37°52'S, 53°52'W, South Atlantic, Argentina, Mar del Plata Submarine Canyon. Depth: 1712 m.

Astropectinidae emerged as one of the most abundant families within the Asteroidea in the Mar del Plata Submarine Canyon, suggesting a strong affinity for the canyon's muddy substrates, similar to those favored by other Paxillosida families. The canyon's location at the mouth of the Río de la Plata likely enhances this habitat's productivity through high organic matter input from river discharge, which may contribute to the high organism abundance observed.

Our findings highlight the connectivity of Argentinian deep-sea ecosystems with sub-Antarctic and Antarctic regions, revealing shared biodiversity patterns and emphasizing the potential for further new records in these depths. This study not only expands our understanding of Astropectinidae distributions but also underscores the importance of continued exploration in these under-sampled deep-water environments.

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