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Asterinid seastars from the Mozambique Channel (Echinodermata: Asteroidea: Asterinidae)

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Abstract

A new fissiparous asterinid seastar *Aquilonastra chantalae* **sp. nov**. is described from Europa Island, one of the Scattered Islands (Les îles Éparses) in the Mozambique Channel. It is compared with the fissiparous asterinid *Aquilonastra conandae* O'Loughlin & Rowe from the Mascarene Islands. A table of distinguishing diagnostic characters is provided. The asterinid *Aquilonastra richmondi* O'Loughlin & Rowe is reported for Europa Island.

Key words: fissiparous, Asterinidae, *Aquilonastra*, new species, Scattered Islands, Europa

Introduction

Europa Island is the southernmost of the Scattered Islands (Les îles Éparses) in the southern Mozambique Channel, 550 km from the coast of Mozambique and 300 km from the coast of Madagascar at 22°21'S 40°23'E. Expeditioners from the research program BioReCIE (*Biodiversité, ressources et conservation des récifs coralliens des Iles Eparses*) recently visited the island. In November 2011 a multidisciplinary team explored the reef slopes and reef flats. Among other echinoderms (Conand *et al.* submitted) Chantal Conand received numbers of very small previously unknown seastar specimens from the reef flat, and these specimens are reported in this paper. A similar small fissiparous seastar, at first mistakenly thought to be *Asterina burtoni* Gray, 1840, occurs in the rocky shallows of the Mascarene Islands to the east of Madagascar and was previously studied by Chantal Conand and her colleagues (see Kojadinovic *et al.* 2004, Ooka *et al.* 2010). *Aquilonastra conandae* O'Loughlin & Rowe, 2006 was erected for this species. This work distinguishes these two similar small fissiparous asterinid species from opposite sides of Madagascar in the Indian Ocean. A single specimen of a second asterinid species, *Aquilonastra richmondi* O'Loughlin & Rowe, 2006, was also collected from Europa Island during the recent expedition.

Methods

The specimens were collected by Nicky Gravier-Bonnet (for Chantal Conand) at one reef flat site only (Station 10 Bio 90) at low tide under rocks on November 10th 2011. They were preserved in 95% ethanol and sent to Mark O'Loughlin at Museum Victoria for determination. Melanie Mackenzie took photos of preserved specimen in Museum Victoria, in collaboration with Mark O'Loughlin, using a Leica DC500 high-resolution digital camera system with Auto-Montage software. Terminology follows that referred to and defined and illustrated by O'Loughlin & Waters 2004. Our colleague Ben Boonen prepared the figures for publication, in collaboration with Mark O'Loughlin.

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Abbreviations

NMV Museum Victoria, Australia, used with registration number prefix F.
MNHN Muséum national d'Histoire naturelle, Paris, used with echinoderm registration prefix IE.

Numbers in brackets after registrations refer to numbers of specimens in lots.

Asterinidae Gray, 1840

Synonymy and diagnosis. See Clark and Downey, 1992.

Aquilonastra O'Loughlin, 2004 (in O'Loughlin & Waters, 2004)

Diagnosis. Rays 5, or 5–8 in fissiparous species; inter-radial margin deeply incurved, form stellate; rays discrete, broad at base, tapering, rounded distally; flat actinally, high convex abactinally; abactinal plates in longitudinal series, not perpendicular to margin; papulate areas extensive; papulae predominantly single, large, in longitudinal series along sides of rays; abactinal plates with glassy convexities; abactinal spinelets and actinal spines predominantly fine, glassy, conical or sacciform or splay-pointed sacciform, in bands or tufts, numerous (10–40 per plate); actinal plates in longitudinal, not oblique, series; superambulacral plates present for all of ray, sometimes for part of ray or absent in pedomorphic species; superactinal plates present.

Aquilonastra chantalae sp. nov.

Figures 1 & 2, table 1.

Material examined. Holotype (in alcohol). Indian Ocean, Scattered Is., Europa I., station 10 Bio 90, 22°20'35"S 40°22'55"E, under rock on reef flat, C. Conand, 10 Nov 2011, MNHN IE–2013–617 (in alcohol).
Paratypes. Type locality and date, MNHN IE–2013–618 (11, in alcohol); NMV F189860 (8, in alcohol).

Description. Fissiparous *Aquilonastra* species; rays 5–7, predominantly 6, rarely 7, largest specimens with 5; up to R = 4 mm, r = 2 mm (preserved in alcohol); rays discrete, wide basally tapering to rounded end distally; more than one inconspicuous madreporite; some abactinal contiguous spinelets over papulae possibly act as pedicellariae, spinelets not differentiated as valves; abactinal gonopores. At R = 4 mm, plates with proximal notch or indentation for papula, rarely doubly notched; single large papula per papular space; single longitudinal series of single papulae along each side of rays; abactinal spinelets glassy, rugose, predominantly digitiform, spinous distally and laterally, up to rarely 10 per plate; marginal plates in regular series, subequal; superomarginal spinelets up to about 5 per plate; inferomarginal spinelets up to about 8 per plate. Spines per actinal plate: oral 4–5, suboral 1, furrow 3 (4 rare), subambulacral 1 (2 rare), actinal inter-radial 1 (2 rare); inter-radial spines predominantly subsacciform, spinous distally.

Colour (live). Variably mottled, predominantly with green, never with red, madreporites orange (photo from C. Conand).

Distribution. Indian Ocean, Mozambique Channel, Scattered Is., Europa I., 0–1 m.

Etymology. Named *chantalae* for Dr Chantal Conand, Professor Emeritus, University of La Réunion, in appreciation of Chantal's considerable contribution to echinoderm research and provision of specimens for this study.

Remarks. The similar small fissiparous asterinid species *Aquilonastra conandae* O'Loughlin & Rowe, 2006 from the Mascarene Islands is distinguishing amongst western Indo-Pacific fissiparous species of *Aquilonastra* O'Loughlin, 2004 in O'Loughlin & Rowe 2006. Twenty nine paratypes (NMV F107412) in Museum Victoria were compared and contrasted directly with specimens of *Aquilonastra chantalae* **sp. nov.** Diagnostic characters that distinguish *Aquilonastra chantalae* **sp. nov.** from *Aquilonastra conandae* O'Loughlin & Rowe, 2006 are listed in the table.

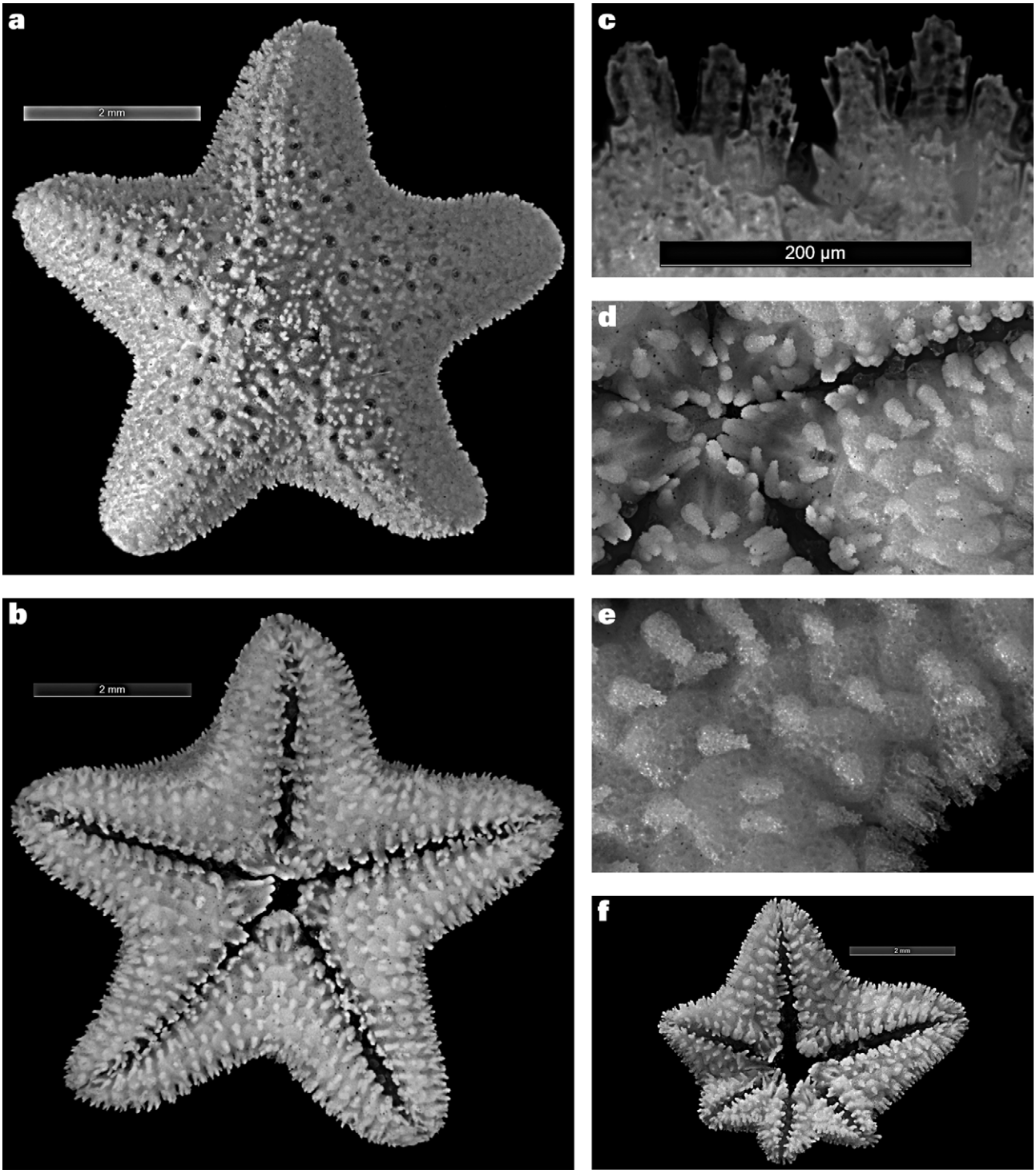

FIGURE 1. *Aquilonastra chantalae* **sp. nov.** a, abactinal view of holotype (MNHN IE–2013–617); b, actinal view of holotype (MNHN IE–2013–617); c, abactinal spinelets of paratype (NMV F189860); d, actinal view of oral region of paratype (NMV F189860); e, actinal view of distal inter-radius and margin of paratype (NMV F189860); f, actinal view of post-fissiparous paratype (MNHN IE–2013–618).

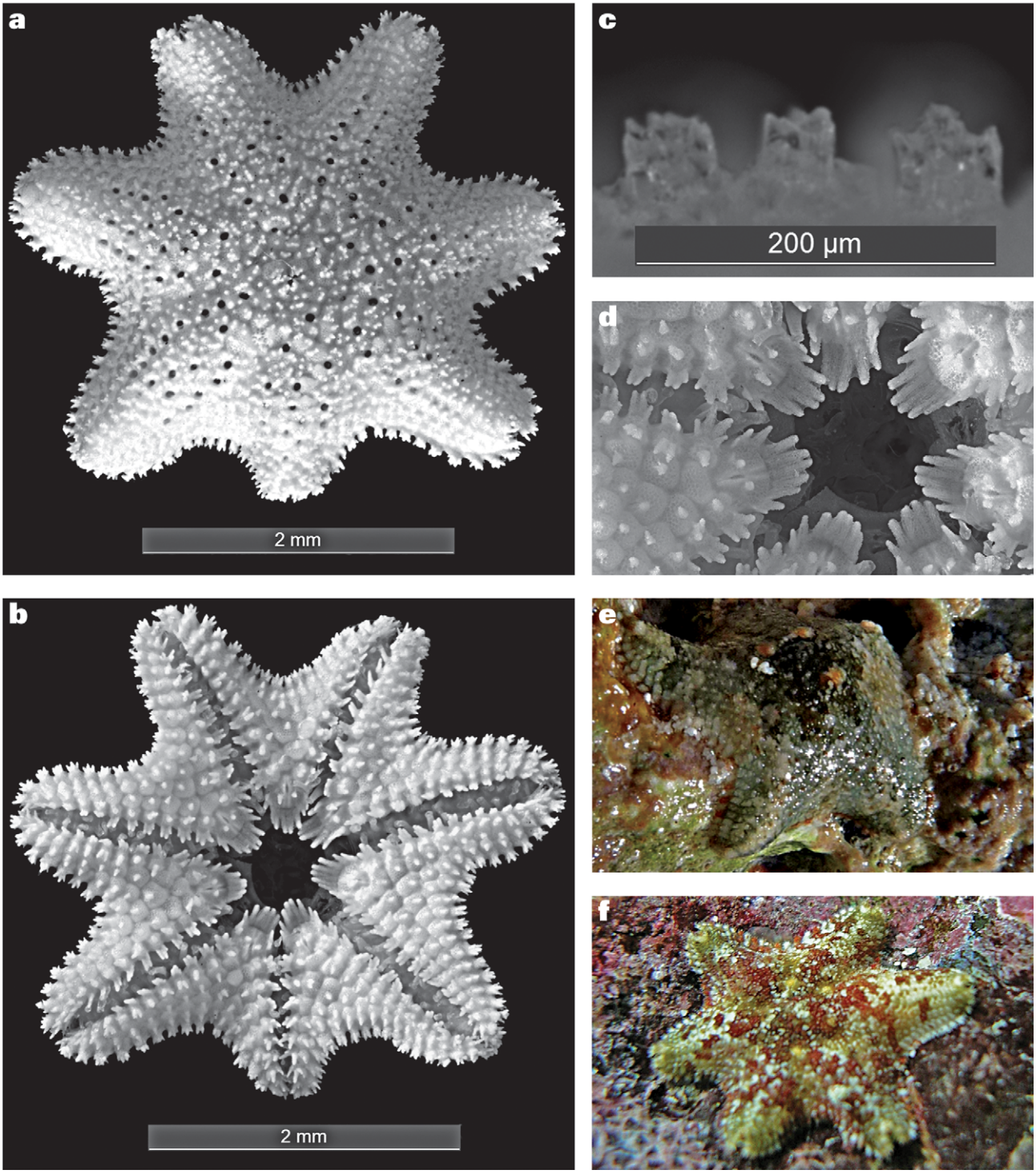

FIGURE 2. a–d, f., *Aquilonastra conandae* O'Loughlin & Rowe, 2006. a, abactinal view of paratype (NMV F107412); b, actinal view of paratype (NMV F107412); c, abactinal spinelets of paratype (NMV F107412); d, actinal view of oral region of paratype (NMV F107412) ; f, live colour photo of specimen in situ (photo provided by C. Conand). e, *Aquilonastra chantalae* **sp. nov.**, live colour photo of specimen in situ (photo provided by C. Conand).

TABLE 1. Morphological distinctions between *Aquilonastra chantalae* **sp. nov.** and *Aquilonastra conandae* O'Loughlin & Rowe, 2006 (comparisons for specimens of same size at R = 4 mm).

Morphological characters	*Aquilonastra chantalae*	*Aquilonastra conandae*
Specimen live colour Madreporite live colour	red never present orange	red always prominent yellow
Ray number (at R = 4 mm)	5	6–8
Maximum size	R up to 4 mm	R up to 10 mm
Abactinal spinelets	most digitiform, up to about 90 µm long	most squat, granular, up to about 60 µm long
Furrow spines per plate	usually 3 proximally	frequently 4 proximally
Subambulacral spines	usually 1 proximally	frequently 2 proximally
Marginal plates / spinelets	not paxilliform	sub-paxilliform

Aquilonastra richmondi O'Loughlin & Rowe, 2006

Aquilonastra richmondi O'Loughlin & Rowe, 2006: 279–281, figs 1, 4e, 6f, g, 10a.

Material examined. Indian Ocean, Scattered Is., Europa I., station 10 Bio 90, 22°21'S 40°23'E, under rock on reef flat, C. Conand, 10 Nov 2011, MNHN IE–2013–619 (in alcohol).

Distribution. Indian Ocean, Côtes d?Arabie, E Africa, Kenya, Tanzania, Comoros, Madagascar, Mauritius, E South Africa, Sodwana Bay; under boulders and in crevices in rocks and live coral; 0–20 m (O'Loughlin & Rowe 2006).

Remarks. O'Loughlin & Rowe 2006 reported *Aquilonastra richmondi* for the east Africa coast as far south as Sodwana Bay, and for the west Indian Ocean and Madagascar. The occurrence on Europa Island is within this distribution range. *Aquilonastra rowleyi* O'Loughlin & Rowe, 2006 and *Aquilonastra samyni* O'Loughlin & Rowe, 2006 were also reported for specimens collected from Sodwana Bay in KwaZulu Natal. These three species, together with *Aquilonastra chantalae* **sp. nov.**, are the only four species of *Aquilonastra* O'Loughlin, 2004 occurring in the south-west Indian Ocean

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