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Some Didemnid Ascidians from the Northern Mariana Islands, Micronesia

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Abstract The collection during the biological expedition to the northern Mariana Islands conducted by the Natural History Museum and Institute, Chiba in 1992 contained only three species of the Didemnidae (Urochordata, Ascidiacea), *Didemnum cuculliferum* (Sluiter), *Didemnum edmondsoni* Eldredge and *Polysyncraton poro* Monniot et Monniot. Detailed descriptions were given to them.

Key words: Taxonomy, Ascidiacea, Didemnidae, *Didemnum*, *Polysyncraton*, Marianas.

Three species of the Didemnidae, described in the present report, were the only ascidians collected by the biological expedition to the northern Mariana Islands in 1992, conducted by the Natural History Museum and Institute, Chiba, Japan in cooperation with the Department of Natural Resource (Commonwealth of the Northern Mariana Islands) and University of Guam Marine Laboratory.

Scarcity of ascidian species in the collection, and the complete lack of simple ascidians and of didemnid-algal symbioses is surprising. This probably is attributable to collecting methods rather than being indicative of a poor ascidian fauna. Previous records from this region are of 13 species in a small collection from Saipan Island (Tokioka, 1967). About 30 species are known from the Ogasawara (=Bonin) Islands (Nishikawa, unpublished), situated to the north of this region, and 53 species from the Caroline Islands (Tokioka, 1967), to the south of the region. It is more likely that the northern Mariana ascidian fauna has not been adequately sampled than that there is a remarkable difference in the fauna among these 3 locations.

1. *Didemnum cuculliferum* (Sluiter, 1909) (Fig. 1 A–B)

Didemnum cuculliferum Sluiter, 1909, pp. 90–91, pl. 4, fig. 15, pl. 7, fig. 14; Kott, 1981, pp. 164 and 166, figs. 16d and 22a–b (synonymy); Monniot and Monniot, 1987, pp. 28–29, pl. 5B, text-fig. 7D–E.

Specimens examined. 12 colonies attached to a coral fragment, MAUG EAST, subtidal, 5 June '92, coll. T. Kurozumi (CBM-ZV-1).

Description. Colony small, roundish in outline, very thin; the maximal ca. 4 mm in diameter and less than 1 mm in thickness. Colony snowy white in the preservative (70% ethanol); no pigment granules detected. Colony surface furnished wholly with projections composed of spicules, conical, or flattened with 2–3 summits, situated each close to a branchial aperture of zooid, and sometimes also on marginal area without zooids. A single common cloacal aperture with smooth margin in a colony. Cloacal cavity very spacious in the thoracic zone, and often down to the abdominal. Hypozooidal test very thin. Superficial spicule-free layer almost invisible. Spicules crowded and evenly distributed through colony, absent from thin marginal zone of common cloacal aperture. Spicules usually 15 to 50 μm in diameter, consisting of 5–6 rays with blunt tips on equatorial plane (Fig. 1A); very rarely up to 75 μm, of 3–4 rays (Fig. 1B). Thorax up to 450 μm long, with ca. 6–8 stigmata in each half of 4 rows; atrial aperture very widely open, with a minute lateral organ around postero-ventral corner of the aperture on each side. Retractor muscle thin and elongated, roughly as long as thorax. Abdomen ca. 375 μm long. Neither gonads or larvae present.

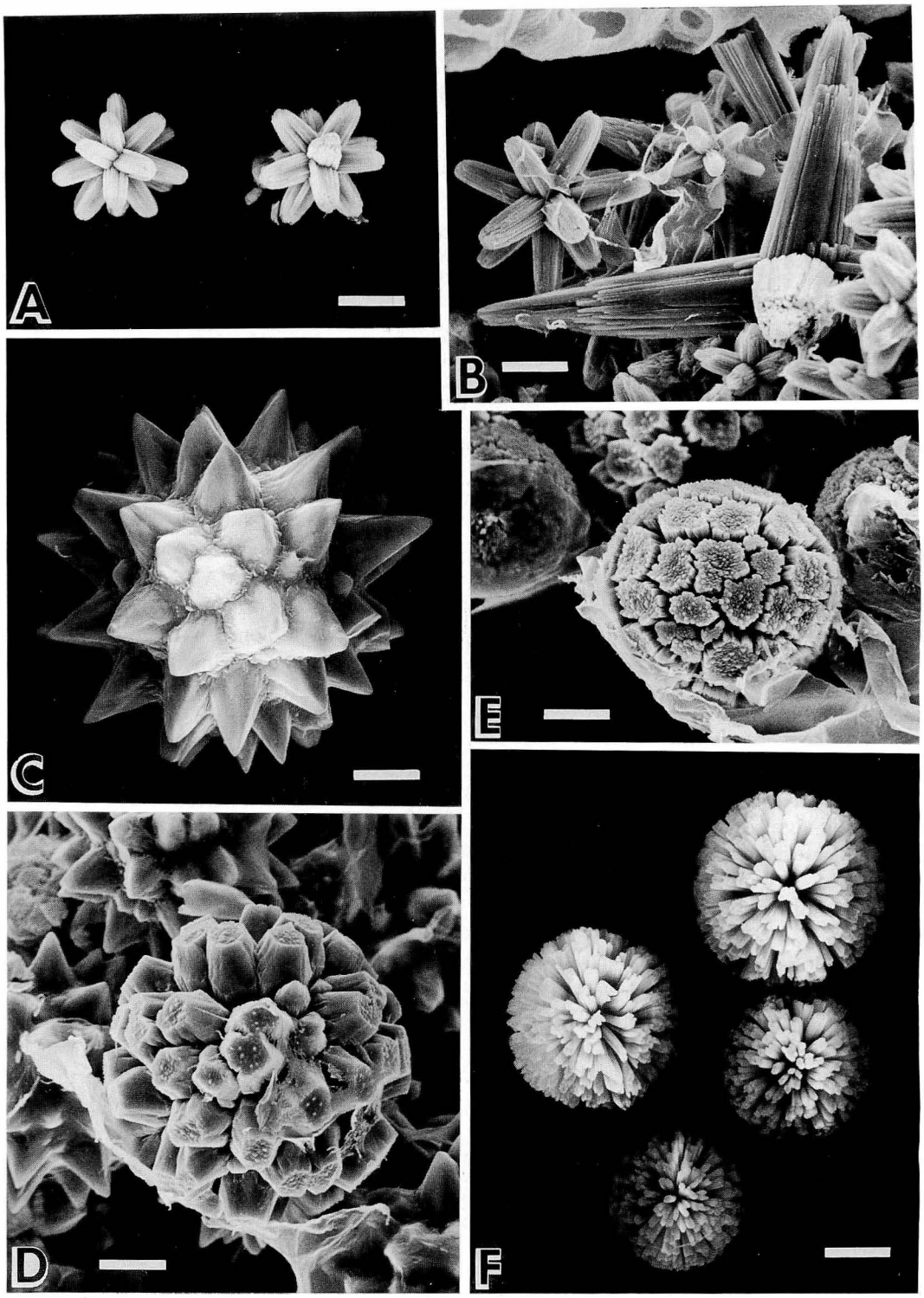

Fig. 1. SEM images of spicules. A–B. *Didemnum cuculliferum* (Sluiter) from Maug East (CBM-ZV-1). C–E. *Didemnum edmondsoni* Eldredge from Anatahan (CBM-ZV-2). F. *Polysyncraton poro* Monniot et Monniot from Anatahan (CBM-ZV- 3). Scale bars indicate 10μm. For details see the text. (By courtesy of Y. Iwaikawa).

Remarks. Although the present immature colonies lack vas deferens and testis, they are identified with *Didemnum cuculliferum* hitherto reported widely from West Pacific waters. Features of the colonies that are characteristic of this species, are the shape and position of the spicule-filled projections over the colony surface, the shape and size of spicules, the size and position of the cloacal cavity and the shape of branchial aperture (see e.g. *D. nekozita* Tokioka, 1967, a junior synonym of *D. cuculliferum*).

2. *Didemnum edmondsoni* Eldredge, 1967
(Fig. 1C–E)

Didemnum edmondsoni Eldredge, 1967, pp. 208–210, fig. 14.

Specimens examined. 2 colonies attached to a large coral fragment, with the colonies of *Polysyncraton poro*, ANATAHAN, subtidal, 12 May '92, coll. P. Schupp and T. J. Donaldson (CBM-ZV-2).

Description. Colony roughly roundish, with undulating margin, flat investing; the larger 20 mm×11.5 mm in extent, the smaller 12 mm×11 mm, and up to 1.5 mm thick. Colony pale brownish, due to dark brown granules, 5–7.5 μm in diameter, densely distributed in the surface layer of colony and in body wall of zooids, but absent around branchial apertures of zooids and common cloacal apertures, and in peripheral zone of colony. Colony surface quite smooth; superficial spicule-free layer indiscernible. Three (in the smaller colony) or 4 (in the larger) common cloacal apertures, with margins distinctly divided into several lobules with blunt tips. Cloacal cavity moderately spacious in thoracic zone only. Hypozooidal layer thin. Spicules densely and evenly distributed throughout, 20–65 μm in diameter; usually composed of 12–14 conical rays with pointed (or occasionally flat-ended) tips on equatorial plane (Fig. 1 C–D), but sometimes almost or completely spherical with very slight indication of rays (Fig. 1E). Thorax and abdomen each ca. 750 μm long. Atrial aperture widely open; an extensive ear-shaped lateral organ situated along its ventral margin on each side; the organ containing many smaller spherical spicules. Fine short atrial languet sometimes discernible. Four stigmatal rows; number of stigmata hard to count precisely. Retractor muscle very short. A white mass in first intestinal loop. Testis undivided; proximal end of vas deferens coiling 7–8 times. Neither eggs nor larvae observed.

Remarks. Pigmentation, the shape of spicules, the distribution of cloacal cavity and the vas deferens coils all resemble those recorded for *Didemnum edmondsoni* previously known only from Oahu, Hawaii. The Oahu specimens seem to differ from the present colonies only in the size of spicules (18–31 μm, instead of 20–65 μm in the latter). This difference may be of taxonomic significance and the present identification must be tentative. Larvae are not available for comparion. The pigmentation, and the position of cloacal cavity in the present colonies are reminiscent of *Didemnum albopunctatum* Sluiter, so far recorded from Indonesia and Fiji (see Kott, 1981). However, this species lacks the stellate spicules with many pointed rays found in the present colonies.

In the existence of both stellate and spherical spicules, *D. edmondsoni* resembles *D. chartaceum* Sluiter from West Pacific (see Kott, 1981), although in the latter species the spicules are much less crowded.

3. *Polysyncraton poro* Monniot et Monniot, 1987
(Fig. 1F)

Polysyncraton poro Monniot and Monniot, 1987, pp. 47–49, pl. 3, H, text-fig. 16A–C.

Specimens examined. 10 colonies attached to a large coral fragment, with the colonies of *Didemnum edmondsoni*, ANATAHAN, subtidal, 12 May '92, coll. P. Schupp and T. J. Donaldson (CBM-ZV-3).

Description. Colony elongated oval in outline, snowy white, and flat investing; 20 mm×7 mm in maximal extent, up to 1 mm thick. Colony surface quite smooth; superficial spicule-free layer indiscernible. Cloacal cavity spacious, only at thoracic level. Hypozooidal test very thin. No pigment granules detectable. Spicules very densely and evenly distributed throughout colony, including around common cloacal apertures, whose margin having several lobules with blunt tips. Spicules 10–40 μm in diameter; spherical, consisting of numerous

fine needles with blunt or flat-ended tips (Fig. 1F). Thorax much depressed antero-posteriorly; up to 1 mm in dorso-ventral diameter; atrial languet usually present, very thin and more or less extensive with expanded tip. Atrial aperture very widely open; thoracic lateral organ obscure. About 8 stigmata in each half of 4 rows; stigmata of only the first row much elongated. Retractor muscle indiscernible. Abdomen ca.500μm long, sometimes with a small egg. Three –5 (usually 4) testicular follicles; proximal end of vas deferens coiling 2 (rarely 1) times. No larvae.

Remarks. The present specimens are similar to the original and only previous description of *Polysyncraton poro* from Tahiti in the shape, size and distribution of spicules, the atrial languet, the number of testicular follicles (3–7 in *P. poro*) and vas deferens coils (2–3 in *P. poro*). Although the colony is thicker (2.5 mm vs. 1 mm) and more extensive (8 cm vs. 2 cm) in the Tahitian specimens, this probably is the result of age or infraspecific variation.

The size, shape and distribution of spicules, and the number of testicular follicles in the present specimens resembles those in *Polysyncraton recurvatum* (Sluiter) from Indo-West Pacific waters (see Kott, 1981). However, this species may be distinguished by the occurrence of dark pigment granules even in preservative and the more numerous coils of the vas deferens (4.5 times).

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