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First record of the bryozoan genus *Stylopoma* from the Mediterranean Sea

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The first record of the genus *Stylopoma* (Bryozoa: Cheilostomatida) is reported from the Mediterranean Sea with the description of *Stylopoma inchoans* sp. nov. from a single specimen collected in the 19th Century. Its affinities to recently described Indo-Pacific species are discussed.

The genus *Stylopoma* Levinsen, 1909 has not been previously recorded from the Mediterranean Sea, although the generic identity of an undescribed species in the George Busk collection (Natural History Museum, London) has been discussed by several authors (Tilbrook, in press). Specimens of *Schizoporella spiculifera* (Busk's unpublished name), from an unknown Mediterranean locality, were never formally described. Waters (1909) considered Busk's name to be synonymous with *Stylopoma viride* (Thornely, 1905), but Hastings (1932) noted differences between Busk's and Thornely's species and later (Hastings, 1968) referred the former to *Schizoporella longirostris* Hincks, 1886 (=*Schizoporella dunkeri* (Reuss, 1848)).

Examination of Busk's specimens, as part of a study into Indo-west Pacific species of *Stylopoma* (Tilbrook, in press), showed that they belonged to a species of *Stylopoma*, very close to *S. viride* but differing from it in several key features. Although no ovicells have been observed in the material, the combination of setiform vicarious avicularia and certain attributes of the primary orifice, the characteristics of which were used as diagnostic features by Tilbrook (in press), are distinct enough to characterize it as a new species.

Stylopoma inchoans sp. nov.
(Figure 1A,B)

Holotype (here selected): 1899.7.1.2366, Mediterranean (two slides: one dry mount and one Canada balsam mount of opercula and avicularian mandibles from the dry mount).

Paratypes: 1899.7.1.2367, Mediterranean (Alder) (dry mount); 1899.7.1.2368, Mediterranean (Canada balsam mount of opercula and avicularian mandibles from the Holotype).

Colony encrusting, multilaminar. Autozooids large, rounded to globular in shape, randomly orientated in frontally budded layers. Frontal shield with a thick brownish cuticle, evenly perforated by small round pores (40–60), each set in a large depression, a raised central umbo may be present; marginal pores and lateral walls distinct. Primary orifice rounded, wider than long, the distal border raised, the short straight proximal border with a narrow slit-like median sinus, the distal end of which may be narrowed, the sides almost touching; very large, deep, ribbed condyles, occupying the width of the proximal border. Adventitious avicularia single or paired, proximo-lateral to orifice, disto-laterally directed; large acute mandible; complete crossbar and small columella. Vicarious avicularia also commonly present, as large as autozooids, with a globular cystid, a narrow setiform mandible curved basally, triangular opesia, entire rostral palate; complete crossbar with stout wide columella; randomly orientated. Despite the large size of the specimen ($\sim 2.5\,cm^2$) no ovicells are present.

Holotype: means and standard deviations:
autozooid (N=30), length=0.68 ±0.06 mm; width=0.51 ±0.06 mm;
orifice (N=20), length=0.10 ±0.01 mm; width=0.15 ±0.01 mm;
sinus length (N=20), 0.04 ±0.00 mm;
avicularium (N=20), length=0.19 ±0.02 mm.

Stylopoma inchoans sp. nov. is an easily recognizable species of *Stylopoma* with its rounded orifice, with a slit-like sinus and deep, ribbed condyles, and setiform vicarious avicularia.

Vicarious avicularia with a setiform mandible were previously thought unique to *S. viride* within the genus (Tilbrook, in press), but *S. inchoans* sp. nov. differs from *S. viride* (to which it has previously been assigned) in having a less rounded primary orifice, a slit-like as opposed to a U-shaped sinus, and large, deep articulatory condyles which are ribbed.

Tilbrook (in press) used the structure of both the large, perforate ovicell and ancestrular complex to differentiate species of *Stylopoma* from superficially similar species of *Schizoporella* which have a smaller, imperforate ovicell, a generally broader, shallower, orificial sinus and a single schizoporellid ancestrula. Although neither the structure of the ovicell nor that of the ancestrular complex are known in *S. inchoans* sp. nov. it differs from *Schizoporella dunkeri* (to which it has also been previously assigned, as *S. longirostris*) and from other species of *Schizoporella* Hincks, 1877 in the possession of vicarious avicularia and the presence of ribbing on the articulatory condyles, neither ever having been noted in species of *Schizoporella sensu stricto*.

This species is the first record of *Stylopoma*, a warm-temperate to tropical genus, in the Mediterranean Sea, despite *S. viride* and *S. duboisii* (Audouin, 1826) both occurring in the Red Sea and along the eastern African coast, and *S. spongites* (Pallas, 1766) and several other species of *Stylopoma* (personal observation) occurring along the western African coast. *Stylopoma inchoans* sp. nov. differs from *S. duboisii* in having a narrower sinus which narrows distally, deeper articulatory condyles, and larger, more acute adventitious avicularia. *Stylopoma duboisii* produces spatulate vicarious avicularia. Although the orifice of *Stylopoma inchoans* sp. nov. is superficially similar to that of *S. spongites* it differs in being more D-shaped, in having wider, ribbed condyles, no denticulations around the distal rim of the orifice, and larger, more acute adventitious avicularia. *Stylopoma spongites* also produces spatulate vicarious avicularia.

Two recent papers have described 29 new species of *Stylopoma*; Jackson & Cheetham (1994) identified 15 new species from the Caribbean Sea and Gulf of Mexico while Tilbrook (in press) described 14 new species from the Indo-west Pacific. The Indo-west Pacific has a greater diversity of *Stylopoma* species than central America, centred in the Indo-Malaysian region.

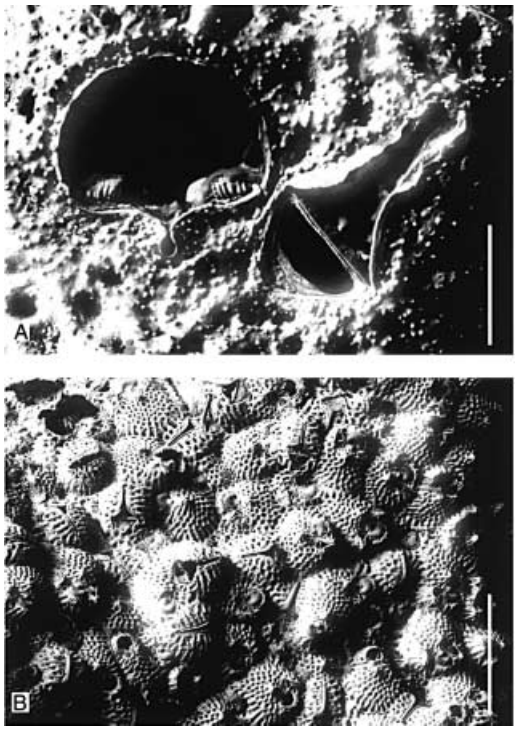

Figure 1. *Stylopoma inchoans* sp. nov., SEM micrographs of paratype 1899.7.1.2367: (A) primary orifice and suboral avicularium; (B) colony surface, note the setiform vicarious avicularia at the centre. Scale bars: A, 0.1 mm; B, 1.0 mm.

The species found in these two foci differ in several morphological characteristics: the ancestrular complex (where it is known) in Indo-west Pacific species comprises five zooids, whereas the Caribbean *S. spongites* has only three zooids; the primary orifice in Indo-west Pacific species is D-shaped, but more rounded in the Caribbean species; the majority of Indo-west Pacific species have a V-shaped orificial sinus, while all are slit-like in Caribbean species; no rostral palates have been observed in vicarious avicularia from the Indo-west Pacific species, the complete opposite to the Caribbean species; and adventitious avicularia have not been observed covering the ovicell in any Indo-west Pacific species, a condition commonly observed in Caribbean species. *Stylopoma inchoans* sp. nov. seems to fit between the two groups as outlined above sharing similar attributes to those species nearest to it geographically, *S. duboisii* and *S. spongites*, i.e. in having a D-shaped orifice, with a wide proximal border but a slit-like sinus.

The new species of *Stylopoma* recorded by Jackson & Cheetham (1994) from the Caribbean and Gulf of Mexico were distinguished using both morphological and molecular characters, the two procedures correlating closely. Thus the use of morphospecies is well justified in the taxonomy of the genus *Stylopoma* and might prove to be valid for other genera of the cheilostomate Bryozoa. Other *Stylopoma* species are yet to be described from the Indo-west Pacific, in particular Indonesia and the Solomon Islands, from the Atlantic Ocean and eastern Pacific (Tilbrook, unpublished data).

Of the four slides of *Stylopoma inchoans* sp. nov. all but one, according to Hastings (1968), come from the same original specimen. The fourth slide (1899.7.1.2367) contains a specimen attributed to the collection of Joshua Alder. Examination of the two dry specimens (the others are Canada balsam mounted slides) shows that the Alder specimen had been broken off of the larger colony (1899.7.1.2366—Holotype). The provenance of the specimen is unknown, although it may have originated from the Mediterranean cruise of HMS 'Porcupine' (July–October 1870).

Hastings (1968) speculated that Busk's choice of name alluded to the observation that the species was encrusting a sponge. The sponge oscules penetrate the surface of the multilaminar bryozoan colony showing that the two were living contemporaneously. Commensal relationships between a bryozoan and another invertebrate have been noted previously, once with a sponge (Harmelin et al., 1994), with hydroids (e.g. Ristedt & Schumacher, 1985) and with corals (e.g. Tilbrook, 1997).

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REFERENCES

Audouin, J.V., 1826. Éxplication sommaire des planches de polypes de l'Egypte, et de la Syrie. *Description de l'Egypte, Histoire Naturelle*, **1**, 225–244. [Planches 1–14 par J.C. Savigny.]

Harmelin, J.G., Boury-Esnault, N. & Vacelet, J., 1994. A bryozoan–sponge symbiosis: the association between *Smittina cervicornis* and *Halisarca* cf. *dujardini* in the Mediterranean. In *Biology and palaeobiology of bryozoans. Proceedings of the Ninth IBA Conference*, University of Wales, Swansea, UK, 25 July–1 August 1992 (ed. P.J. Hayward et al.), pp. 69–74. Fredensborg: Olsen & Olsen.

Hastings, A.B., 1932. The Polyzoa, with a note on an associated hydroid. *Scientific Reports of the Great Barrier Reef Expedition*, **4**, 399–458.

Hastings, A.B., 1968. Some type and other specimens involved in the problem of *Stylopoma* Levinsen (Polyzoa). *Bulletin of the British Museum (Natural History), Zoology*, **16**, 355–364.

Hincks, T., 1877. On British Polyzoa. Part II. Classification. *Annals and Magazine of Natural History, Series 4*, **20**, 520–532.

Hincks, T., 1886. The Polyzoa of the Adriatic. *Annals and Magazine of Natural History, Series 5*, **17**, 254–271.

Jackson, J.B.C. & Cheetham A.H., 1994. Phylogeny reconstruction and the tempo of speciation in cheilostome Bryozoa. *Paleobiology*, **20**, 407–423.

Levinsen, G.M.R., 1909. *Morphological and Systematic Studies on the Cheilostomatous Bryozoa*. Copenhagen: Carlsberg Fund & Fr. Bagge.

Pallas, P.S., 1766. *Elenchus Zoophytorum*. Hagae-Comitum: Petrum Van Cleef.

Reuss, A.E., 1848. Die fossilen Polyparien des Wiener Tertiäbeckens. *Haidingers Naturwissenschaftlichen Abhandlungen*, **2**, 1–109.

Ristedt, H. & Schumacher, H., 1985. The bryozoan *Rhynchozoon larreyi* (Audouin, 1826)—a successful competitor in coral reef communities of the Red Sea. *Marine Ecology*, **6**, 167–179.

Thornely, L.R., 1905. Report on the Polyzoa. In *Report of the pearl oyster fisheries, Gulf of Manaar (4). Supplementary Report. Vol. 26* (ed. W.A. Herdman), pp. 279–429. London: The Royal Society.

Tilbrook, K.J., 1997. Barnacle and bivalve associates of a bryozoan–coral symbiosis from the Coralline Crag (Pliocene) of England. *Tertiary Research*, **18**, 7–22.

Tilbrook, K.J., in press. Indo-west Pacific species of the genus *Stylopoma* Levinsen, 1909 (Bryozoa: Cheilostomatida). *Zoological Journal of the Linnean Society, London*.

Waters, A.W., 1909. Reports on the marine biology of the Sudanese Red Sea, from collections made by Cyril Crossland, M.A., B.Sc., F.Z.S.; together with collections made in the Red Sea by Dr. R. Hartmeyer. XII. The Bryozoa. Part 1. Cheilostomata. *Journal of the Linnean Society (Zoology)*, **31**, 123–181.

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