

Generic Reassignment and Affinities of  
*Sympodium salomonense* Thomson & Mackinnon  
(Coelenterata: Octocorallia)  
(Plates 10-17)

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Abstract

*Sympodium salomonense* Thomson & Mackinnon, 1910, from Chagos Archipelago is found to be a species of *Corallium* morphologically similar to *Corallium tortuosum* Bayer, 1956, from the Hawaiian Islands. Sclerites of both nominal species have been compared and illustrated by scanning electron microscopy and demonstrated to represent a single species. Owing to minor differences in sclerites and wide geographical separation of type localities, the Hawaiian population is here treated as a subspecies of the senior nominal species.

Introduction

During the course of an inventory of octocoral type specimens in the Department of Zoology of the Natural History Museum, London (then known as the British Museum [ Natural History ]) undertaken by F. M. Bayer and G. L. J. Paterson in 1984, it was discovered that the specimens described by Thomson & Mackinnon (1910) as *Sympodium salomonense* actually are members of the gorgonacean genus *Corallium*.

As the original description and illustrations are not adequate to demonstrate the relationship of the species to other members of the genus *Corallium*, three of the four original syntypes have now been examined in order to refine the definition of the species.

*Corallium salomonense* (Thomson & Mackinnon)  
Plates 10-13

*Sympodium salomonense* Thomson & Mackinnon, 1910: 168, pl. 12, figs. 11, 12; pl. 13, figs. 15a, 15b.

*Material examined*: Chagos Archipelago, Salomon Islands, 120 -150 fath. (= 220-275 m), 2 colonies BMNH 1912.2.24.28 (syntypes), one of them illustrated by Thomson & Mackinnon (1910: pl. 12, fig. 12). 1 colony, syntype, Zoological Museum of Cambridge University; illustrated by Thomson & Mackinnon (1910: pl. 12, fig. 11).

*Description*: All specimens are so small that the mature growth form has not been achieved. They are short, basically digitiform colonies each with several polyps situated in high-rimmed, pit-like impressions in the calcareous axial substance (Plate 10). The illustrations of two sclerites given by Thomson & Mackinnon (1910: pl. 13, figs. 15a, 15b) do not adequately represent the array of sclerites characteristic of the species. Insofar as it goes, the original description is correct in reporting "double spindles and 'quadruplets'" (i.e., 8-radiate capstans and crosses). The description of the "double spindle" is essentially accu-

rate, but the illustration seems to be a free-hand sketch rather than a camera-lucida drawing and does not agree precisely with the sclerites as seen under the light microscope. The tubercles are, in fact, much sharper than illustrated, so the sclerites have a distinctly thorny aspect (Plates 11–13). The “double spindles” of the unillustrated syntype in the Natural History Museum (London) reach slightly more than 0.09 mm in length by 0.058 mm in width (Plate 11), larger than the greatest size reported by Thomson & Mackinnon ( $0.07 \times 0.05$  mm), but those of the illustrated syntype reach 0.11 mm in length and 0.06 mm in width (Plate 12), hence larger than originally reported. The longest sclerites of Thomson & Mackinnon’s illustrated specimen preserved in the Zoological Museum of Cambridge University are  $0.1 \times 0.06$  mm, hence almost as large as those of the illustrated syntype in the collection of the Natural History Museum (London).

The “quadruplets” are essentially as described by Thomson & Mackinnon, but similarly not very well represented by their figure 15a. The size as reported agrees rather well with that of the illustrated syntype preserved in the Natural History Museum (London), but is correspondingly smaller than observed in the other 2 colonies.

In some parts of the illustrated colony, the sclerites are opaque white and obviously have been affected by acidity of the preservative at some time. The normal crystalline translucence of *Corallium* sclerites has been lost, and the sharp ornamentation of the tubercles has been blunted. If the original preservative was unbuffered formalin, damage could have occurred early and may account for the appearance of the original drawings.

The basic types of sclerites of *Corallium salomonense* (Figs. 2–4) are identical with those of *Corallium tortuosum* Bayer (Plate 14–15): 8-radiate capstans and crosses. The 8-radiates of one colony from the type series of *C. tortuosum* are 0.063 mm long and 0.04 mm wide, slightly smaller than those reported from *C. salomonense* by Thomson & Mackinnon, and the tubercles are not so thorny. The 8-radiates of a specimen from Brooks Bank are  $0.075 \times 0.05$  mm, corresponding closely in both size and acuteness of sculpture with those of the illustrated syntype of *salomonense* in the Natural History Museum (London). There is no significant discontinuity either in size or in shape between the smallest and simplest coenenchymal sclerites of Hawaiian *C. tortuosum* and the largest and thorniest of *C. salomonense* from Chagos. They form a virtually uninterrupted series.

Even though the fully developed colonial form of *C. salomonense* is still unknown, all other skeletal characters agree so closely with those of *Corallium tortuosum* that they can only be considered representatives of one species, the senior synonym for which is *Corallium salomonense* (Thomson & Mackinnon, 1910), new combination. However, in view of the wide geographic separation of the type localities of *C. tortuosum* and *C. salomonense*, it is considered prudent for the time being to treat the two populations as subspecies:

1. From Chagos:

*Corallium salomonense salomonense* (Thomson & Mackinnon, 1910)

Plates 10–13

*Diagnosis:* *Corallium* with autozooids seated in distinct pits in the calcareous axis, the apical ones bordered by a distinctly raised, horse-shoe shaped rim; verrucae flat or only slightly raised in contracted state, apertures closed by tentacle bases in the form of an 8-rayed star; siphonozooids scattered, obscure; coenenchyme thin; sclerites in the form of 8-radiates and crosses, not markedly asymmetrical, the largest reaching 0.11 mm in length, tubercular ornamentation complex, sharp.

*Remarks:* Although the sclerites of *C. salomonense* are in general somewhat larger than

those of *C. tortuosum*, and the largest 8-radiates of the syntype illustrated in Thomson & Mackinnon's plate 12, fig. 12, are larger than the largest observed in *C. tortuosum*, the sclerites of the unillustrated syntype in the Natural History Museum (London) are very similar in overall aspect to those of some Hawaiian specimens of *C. tortuosum* (e.g., USNM 56801 from Nihoa, and 54732 from Brooks Bank). The variation in ornamentation present among the three syntypes of *Sympodium salomonense* examined is somewhat greater than that observed among specimens of *Corallium tortuosum* from Hawaiian waters.

Distribution: Indian Ocean: Salomon Island, Chagos Archipelago; 220-275 m.

## 2. From Hawaii:

*Corallium salomonense tortuosum* Bayer, nom transl.

Plates 10, 14-16

*Corallium tortuosum* Bayer, 1956: 82, figs. 5b, 6c, 8e-g.

*Material examined:* Hawaii: west coast of Hawaii off Kawaihae Light N. 82° 30' E, 4.1 miles, 147-198 fath. (= 268-360 m), bottom temp. 48° F, USFC str. Albatross sta. 4045, 11 July 1902. One colony, USNM 49332, paratype. Hawaii: south coast of Molokai, off Lae-o Ka Laau Light N. 74° 30' W, 8.1 miles, 92-212 fath. (= 167-386 m), bottom temp. 46.3° F, USFC str. Albatross sta. 3838, 4 April 1902. One colony and fragments, USNM 49333, paratype. Hawaii: Pailolo Channel between Molokai and Maui, off Mokuhooniki Islet N. 31° W, 2.7 miles, 127-154 fath. (= 231-280 m); bottom temp. 60°-61° F, USFC str. Albatross sta. 3863, 10 April 1902. 25+ fragments, USNM 49334, paratypes. Hawaii: Pailolo Channel between Molokai and Maui, off Mokuhooniki Islet N. 27° W, 3.3 miles, 136-148 fath. (= 248-269 m), USFC str. Albatross sta. 3885, 17 April 1902. 4 colonies, USNM 49469, paratypes. Hawaii: Pailolo Channel between Molokai and Maui, off Mokuhooniki Islet N. 47° W, 3.4 miles, 148 fath. (= 269 m), bottom temp. 65° F. USFC str. Albatross sta. 3886, 17 April 1902. One branch, USNM 77137. Hawaii: Pailolo Channel between Molokai and Maui, off Mokuhooniki Islet N. 35° W, 3.1 miles, 130-151 fath. (= 237-275 m), bottom temp. 61° F, USFC str. Albatross sta. 4100, 23 July 1902. One colony and branches, USNM 49331, holotype (SEM 1352); 25+ fragments, USNM 52202, paratypes (SEM 1356, 1357). Hawaii: off Kaula Islet, SW of Nihoa, 21° 43.8' N, 160° 36.5' W, 386-500 m, SANGO xiii haul 5, 30 August 1971, coll. R. Grigg. 2 incomplete colonies, USNM 54734. Hawaii: Off Kaula Islet, location not specified, SANGO xiii, haul 1, 29 August 1971, coll. R. Grigg. 2 fragments, USNM 54733. Hawaii: north of Nihoa I., 23° 12' N, 161° 52' W, 210 fath. (= 382 m), coll. M. Palmgren. 1 branch, USNM 56801 (SEM 1353). Hawaii: French Frigate Shoals, 23° 56.1' N, 165° 22.1' W, 353-381 m, SANGO xiii, haul 1, 21 August 1971. One incomplete colony, USNM 54729. Hawaii: French Frigate Shoals, 23° 56' N, 165° 42' W, 183-186 fath. (= 333-339 m), 28 October 1977, coll. M. Palmgren. 2 incomplete colonies, USNM 56797. Hawaii: Brooks Bank, 24° 00.8' N, 166° 41.8' W, 271-346 m, SANGO xiii, haul 4, 26 August 1971, coll. R. Grigg. One colony, USNM 54730. Hawaii: Brooks Bank, 23° 57' N, 166° 41' W, 244-322 m, SANGO xiii, haul 13, 26 August 1971, coll. R. Grigg. One colony, USNM 54735 (SEM 1358). Hawaii: Brooks Bank, 24° 00' N, 166° 40.2' W, 216-330 m, SANGO xiii, haul 15, 26 August 1971, coll. R. Grigg. 4 incomplete colonies and fragments, USNM 54732 (SEM 1355).

The collections of the U. S. National Museum of Natural History contain, in addition to the type series collected by the U. S. F. C. steamer Albatross between Maui and Molokai, one lot from station 3886 and 2 lots questionably from stations 3827 and 4128. Operations by the University of Hawaii during project SANGO obtained 6 lots from localities in the Hawaiian Islands as far west as Brooks Bank (166° W). This new material, together with

improved methods of microscopy, now permits an evaluation of intraspecific variation and modification of the specific (now subspecific) diagnosis.

The original diagnosis read: "colonies irregularly branched in one plane. Autozooids on all sides, seated in calycular pits in the solid axis. Rind thin. Siphonozooids scattered. Spicules: crosses and 8-radiates only, in both rind and verrucae; small crosses and irregular rodlets in pharyngeal region."

The original diagnostic characters of *Corallium tortuosum* remain basically unchanged, but require modification in some details: colonies abundantly branched, often but not always in one plane (Plate 10); polyps situated in distinct pits in the calcareous axis, those on the smaller branches and terminal twigs bordered by a distinctly raised, beaded, horse-shoe shaped or circular rim (Plate 16); axis marked by longitudinal beaded ribs; verrucae flat or only slightly raised in contraction, with the aperture closed by the tentacle bases in the form of an 8-rayed star; siphonozooids located near the autozoid verrucae as well as widely scattered in the coenenchyme, very inconspicuous and difficult to see; coenenchyme extremely thin, papillate on the main trunk and large branches, but chiefly so where protected from abrasion during collection; sclerites 8-radiates and crosses, not markedly asymmetrical (Plate 14).

Remarks: The location of small crosses and rods in the pharyngeal region probably is erroneous. As far as can be determined by dissection as well as by clearing, these small sclerites are located in the backs of the tentacles as a continuation of the spiculation of the body of the polyp, rather than in the pharyngeal wall.

The growth form and sclerites of *Corallium stylasteroides* as described by Ridley (1882) are not unlike those of *C. tortuosum*. Although the type specimen from Mauritius is at present not accessible for study, examination of an original slide preparation of its sclerites (Plate 17) shows that the two species are distinct. Ridley (1882: 225) stated that the sclerites of *stylasteroides* are "of one kind only, viz. small, cylindrical, with one terminal tubercle at each end, and a whorl of 3 tubercles surrounding each end, leaving a slight median space bare of tubercles." In his key on page 231, Ridley correctly calls them "octoradiate," and so illustrates them (1882: pl. 9, fig. 4). He evidently failed to notice that virtually all of the octoradiates are sculptured asymmetrically, many of them being irregular but obvious examples of the "double club" or "opera glass" type of sclerite present in several other species of *Corallium*, but definitely not in *C. tortuosum* and *salomonense*. Ridley also overlooked the presence of sexradiates (which are scarce on the slide and probably uncommon in the specimen) as well as of crosses (which are present in greater or lesser number in all species). The sclerites agree well in size with the measurements given by Ridley ( $0.058 \times 0.035$  mm), and are much smaller than those of *salomonense* (up to  $0.11 \times 0.06$  mm).

*Symbiotic associations:* As noted in the original description of *C. s. tortuosum* (Bayer, 1956: 82), most, if not all, colonies are infested with an unidentified species of zoanthid, clearly visible on the colonies illustrated on Plate 10. The axis of many specimens has tunnels and cavities induced by an unidentified polynoid polychaete worm.

*Distribution:* Hawaiian Islands, westward to Brooks Bank; 167-386 m, possibly as deep as 500 m.

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#### Explanation of Plates

Plate 10. Above: *Corallium salomonense* (Thomson & Mackinnon). Left, syntype, BMNH 1912.2.24.28. Center, Illustrated syntype (Thomson & Mackinnon 1910: pl. 12, fig. 12). Right, Illustrated syntype (Thomson & Mackinnon 1910: pl. 12, fig. 12). Right, Illustrated syntype (Thomson & Mackinnon 1910: pl. 12, fig. 11), Zoological Museum of Cambridge University. Divisions of scale are mm.

Below: *Corallium tortuosum* Bayer. Colonies, USNM 49334.

Plate 11. Sclerites of *C. salomonense*, illustrated syntype, BMNH.

Plate 12. Sclerites of *C. salomonense*, unillustrated syntype, BMNH.

Plate 13. Sclerites of *C. salomonense*, illustrated syntype, Zoological Museum of Cambridge University.

Plate 14. Sclerites of *Corallium tortuosum* Bayer, USNM 54735.

Plate 15. Sclerites of *Corallium tortuosum* Bayer. 1353, USNM 56801 from Nihoa; 1352, USNM 49331, type; 1355, USNM 54732 from Brooks Bank; 1356, USNM 52202, para-type.

Plate 16. *Corallium tortuosum* Bayer, USNM 52202. Tip of axis, stereoscopic views.

Plate 17. *Corallium stylasteroides* Ridley. Sclerites drawn from slide prepared by Ridley (BMNH).

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