

The specific characters of the coral *Stylaster roseus*

By H. BOSCHMA

Rijksmuseum van Natuurlijke Historie, Leiden

IN THE collections brought together by Dr. P. WAGENAAR HUMMELINCK in the Leeward Islands and other parts of the West Indian region there are a few small colonies of a stylasterine coral with the following data: Curaçao, Plaja Djerimi, North corner, December 11, 1948 (rock, sand; tidal and lower zone). Examination of these corals showed that in all their salient characters they prove to correspond with *Stylaster roseus* (Pallas) as far as the eighteenth-century data on the species are concerned, while differing from the specimens identified with this name in recent literature.

The corals from Curaçao are four or five colonies of a more or less fan-shaped growth, occurring together on a fragment of dead coral rock. The colonies are up to 3 cm high and not over 3 cm broad. Each colony consists of a few stems of a breadth of about 5 mm, rapidly tapering upwards while giving off side branchlets which in their topmost parts have a thickness of about 1 mm. The stems and the thicker branches are slightly compressed in the flabellar plane of the colony. On the upper parts of the branchlets the cyclosystems occur alternately on the two lateral surfaces, whilst on the thicker branches the cyclosystems are distributed without apparent order; they are more numerous on the anterior than on the posterior surface. The number of dactylopores in the cyclosystems varies from 7 to 12; this number was counted in 100 cyclosystems with the following result: 5 cyclosystems with 7 dactylopores; 12 with 8; 28 with 9; 37 with 10; 14 with 11; 4 with 12; yielding an average of 9.55.

Except on the tops of the smaller branchlets the cyclosystems extend very little above the surface of the coral; their diameter varies from 0.5 to 0.7 mm. The gastropores have a depth of about 1 mm, and the gastrostyles have a length of 0.4 mm and a thickness of 0.15 mm, so that they are rather slender, occupying about one-third to one-half of the lower part of the gastropore (Fig. 1b). The gastrostyles are covered with small spines on the whole of their surface (Fig. 1a). Feebly developed dactylostyles (not drawn in Fig. 1b) are present in the dactylopores.

The colonies bear numerous ampullae of a hemispherical shape, scattered among the cyclosystems on the larger branches, or occurring in clusters densely covering large parts of the surface; as a rule the ampullae are numerous, especially on the posterior surface of the colonies. The ampullae have a smooth surface, without warts or spines, and their diameter varies from 0.6 to 0.8 mm, the size indicating that probably they are female ampullae.

The colour of the corals from Curaçao is yellowish with an irregular admixture of pink, occasionally turning to a light purplish tint in the topmost parts of some branchlets or on and around some cyclosystems on the larger branches.

PALLAS (1766) gave a description of the coral named by him *Madrepora rosea*, mentioning some characters which at present still may be regarded as typical of the

species: this description was based on an examination of specimens in Dutch collections. In HOUTTUYN'S (1772) account of the coral, the salient data are mentioned as noted by PALLAS; HOUTTUYN'S work is here cited because it contains the first figure of the species (1772, Pl. 129, Fig. 4, copied in Fig. 2 of the present paper). This figure

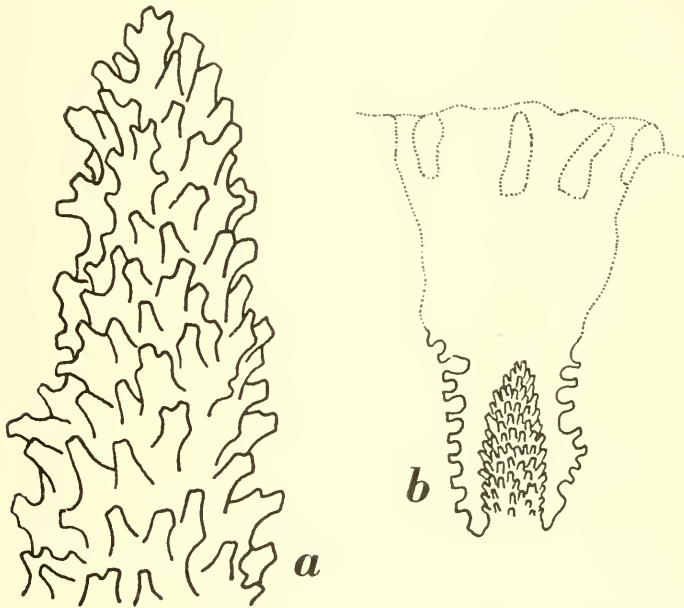


Fig. 1. *Stylaster roseus* (Pallas) from Curaçao. (a) gastrostyle, $\times 250$; (b) longitudinal section of a cyclosystem, $\times 60$



Fig. 2. Copy of the figure of *Madrepora rosea* Pallas in HOUTTUYN (1772, Pl. 129, Fig. 4). Original size

again appeared in a treatise by MÜLLER (1775, Pl. 23, Fig. 4), which practically is a translation of HOUTTUYN'S work with a few additional remarks. ESPER (1794) gave an elaborate description of the species, based on a specimen from a German collection, his figures (1794, Madrep., Pl. 36) represent a coral of a shape similar to that of

HOUTTUYN. The data noted here contain the original contributions towards a knowledge of the species; remarks in other eighteenth-century publications were copied from the cited works.

According to PALLAS, the colonies of his *Madrepora rosea* are "semi-palmares" (half a hand high, about 5 cm); ESPER records the height of large specimens as "zwey bis drey Zollen" (about 5 to 7½ cm). The two authors further state that the basal parts of the stems are comparatively thick, and that they gradually taper to very thin terminal branchlets while giving off numerous side branchlets. At that time the only known locality of occurrence of the species was "Mare circa Insulam St. Domingo" (PALLAS), "an den Küsten der Insel Domingo" (ESPER), the quoted passages referring to the eighteenth-century name of the island Haiti in the West Indies. It stands to reason that the corals which were collected nearly two hundred years ago came from shallow water.

It is interesting to note that the corals from Curaçao, on account of their small size and of their gradually tapering branches, closely correspond with the specimens described and figured by PALLAS, HOUTTUYN, and ESPER, thereby differing from the other species of *Stylaster* known to occur in the West Indian region, which attain a larger size and have branches of a much slenderer growth.

LAMARCK (1816) placed the species *Madrepora roseus* in the genus *Oculina*; GRAY (1831) erected the genus *Stylaster*, in which he placed the two species *Oculina rosea* and *O. flabelliformis*; in 1850 MILNE EDWARDS and HAIME (1850–1854) selected *Stylaster roseus* as the type of the genus *Stylaster*. In another paper (MILNE EDWARDS and HAIME, 1850) there is a rather elaborate description of *Stylaster roseus*, in which the authors state that they have never seen colonies of a larger size than a few centimetres, the thicker branches of which have a thickness at the base of 5 to 6 millimetres. These data correspond with those of the corals from Curaçao; in other details, however, there are slight differences: MILNE EDWARDS and HAIME remark that the number of dactylopores in the cyclo systems is from 10 to 14, most commonly 12, while the diameter of the cyclo systems is nearly 1 mm, these figures being somewhat higher than in the specimens from Curaçao. The measurements of the ampullae in the specimens of MILNE EDWARDS and HAIME (not over ½ millimetre) perhaps indicate that these were male ampullae.

POURTALES (1871, p. 83) remarks that *Stylaster roseus* is "abundant on the under surface of blocks of coral rock, on the reef at Cruz del Padre, north coast of Cuba, a couple of feet below low-water mark". MOSELEY (1880, p. 79) refers to this occurrence of the species in almost the same words, and on another page (*loc. cit.*, p. 77) remarks that "ampullae are especially well developed in the shallow water *Stylaster roseus*; those in the female stocks being very large and prominent".

A coral of rather common occurrence in depths of 120 to 324 fathoms (220 to 592 metres) off the Florida Reef was described by POURTALES (1868) as *Stylaster erubescens*; with some slight changes this description again appeared in a later paper (POURTALES, 1871); the following details are taken from the latter, the terminology partly being altered to a more modern wording: younger branchlets slender, with rather close-set alternate cyclo systems, these slightly prominent, 1.2 to 1.5 mm in diameter, deep; nine to twelve, most frequently eleven dactylopores in a cyclo system; gastrostyle deeply sunk, rounded and hirsute; dimensions, height and breadth of flabellum, 10 cm. On Plate 4 of the cited work is figured a colony of *Stylaster erubescens* in

natural size (Fig. 10), and the terminal part of a branch, 4 times enlarged (Fig. 11). The figures show that the tendency for a lateral arrangement of the cyclosystems on the branches is much more obvious than in the specimens from Curaçao, that the branches are much less pronouncedly tapering, and that the cyclosystems definitely extend over the surface of the branchlets, the smaller branchlets thereby becoming distinctly zigzag-shaped, in contradistinction to the corresponding parts of the specimens from Curaçao. The cyclosystems of *Stylaster erubescens* (diameter 1.2–1.5 mm) are about twice as wide as those of the specimens from Curaçao (diameter 0.5–0.7 mm), and distinctly wider than in the specimens of *Stylaster roseus* examined by MILNE EDWARDS and HAIME (diameter nearly 1 mm). The most important difference of the two forms is that of the entirely different shape of the gastrostyle, which in *Stylaster erubescens* is rounded (almost spherical), in the specimens from Curaçao conical, more than twice as high as broad (Fig. 1).

The Stylasteridae of the North Atlantic region remained imperfectly known till 1914, when BROCH's important paper appeared dealing with the specific characters of *Pliobothrus symmetricus* Pourtales, *Allopora norvegica* (Gunnerus), *Stylaster gemmascens* (Esper), and a species named by BROCH *Stylaster roseus* (Pallas). The material of the last named came from depths between 263 and 1,400 metres; BROCH notes that the colonies display a marked difference between small branches, main branches, and stem, that the cyclosystems are placed laterally and alternately on the small branches, that the cyclosystems show from 8 to 17, generally 9 to 11 dactylopores, and that the gastrostyle is almost spherical, with equal height and breadth. The characters here cited from BROCH's description are almost exactly those of the species *Stylaster erubescens* as described and figured by POURTALES (1871). BROCH's figures of colonies in natural size (1914, Pl. 1, Figs. 8 and 9, Pl. 2, Figs. 10 and 11) represent corals with an entirely similar form of growth as the specimen of *Stylaster erubescens* of POURTALES (1871, Pl. 4, Fig. 10); moreover, the figures of enlarged terminal branches (POURTALES, 1871, Pl. 4, Fig. 11; BROCH, 1914, Pl. 2, Fig. 17) are strikingly similar.

Unfortunately BROCH gave the name *Stylaster roseus* to the corals here dealt with, while placing the name *Stylaster erubescens* in the synonymy of the species. In BROCH's paper there is an instructive figure of a longitudinal section (1914, Pl. 3, Fig. 22) showing in two of the cyclosystems the spherical gastrostyles, which, judging by this figure, have a height and a breadth of about 0.3 mm. This figure has been copied in other publications (BROCH, 1924; KÜHN, 1939) as a longitudinal section of a branchlet of *Stylaster roseus* (Pallas).

BROCH (1914, p. 15) remarks "As the species is the commonest Stylasterid in the Atlantic north of the equator, it is probably the same form that served as a basis for Pallas' description of *Madrepora rosea*"; this is right as far as the specific identity of the North Atlantic corals with *Stylaster erubescens* is concerned, but it was an error to identify this species with *Stylaster roseus*. POURTALES (1868, p. 136, footnote: 1871, p. 83) examined the two forms and referred to them as separate species, the one from shallow water, the other from deeper water only; it is to be regretted that he did not give a description of the specific characters of *Stylaster roseus*.

The conclusion of the data dealt with above is that *Stylaster roseus* (Pallas), the type species of its genus, has a rather complicated history. The descriptions and figures of the various eighteenth-century authors contain some characters which may be considered typical of the species. In later years these older data were overlooked

and the name *S. roseus* was given to corals which in reality belong to the species *Stylaster erubescens* Pourtalès. An examination of specimens from shallow water of the island Curaçao could lead to additional characters, especially those of the gastrostyle, proving that the species *Stylaster roseus* is distinct from all the later described species of the genus.

REFERENCES

- BROCH, HJ. (1914), Stylasteridae. *Danish Ingolf Exped.*, Copenhagen, 5 (5), 1-25.
- BROCH, HJ. (1924), Hydroida. In: *Handbuch der Zoologie* (Kükenthal-Krumbach), Berlin & Leipzig, 1, 422-458.
- ESPER, E. J. C. (1794-1797), Fortsetzungen der Pflanzenthiere in Abbildungen nach der Natur mit Farben erleuchtet nebst Beschreibungen. Nürnberg, 1, 1-230.
- GRAY, J. E. (1831), Description of a new genus of star-bearing corals. *The Zoological Miscellany*, London, 1-80.
- HOUTTUYN, M. (1772), *De Zee-Gewassen. Natuurlyke Historie . . . volgens het Samenstel van den Heer Linnaeus*. Amsterdam, 1 (17), 1-613.
- KÜHN, O. (1939), Hydrozoa. In: *Handbuch der Paläozoologie* (Schindewolf). Berlin, 2A, 3-68.
- LAMARCK, J. B. P. A. DE (1816), *Histoire naturelle des animaux sans Vertèbres*. Paris, 2, 1-568.
- MILNE EDWARDS, H. and HAIME, J. (1850), *Recherches sur les Polypiers; 5me mém. Monographie des Oculinides*. *Ann. Sci. Nat.*, (3), *Zool.*, 13, 63-110.
- MILNE EDWARDS, H. (1850-1854), *A monograph of the British fossil corals*. London, i-lxxxv, 1-322.
- MOSELEY, H. N. (1880), Report on certain Hydroid, Alcyonarian, and Madreporarian Corals procured during the voyage of H.M.S. *Challenger*, in the years 1873-1876. *Rept. Sci. Res., Challenger, Zool.*, 2 (1), 1-248.
- MÜLLER, P. L. S. (1775), Von den Corallen. Des Ritters Carl von Linné . . . vollständiges Natursystem. Nürnberg, 6 (2), 641-960.
- PALLAS, P. S. (1766), *Elenchus Zoophytorum*. Hagae-Comitum, i-xxviii, 1-451.
- POURTALÈS, L. F. DE (1868), Contributions to the fauna of the Gulf Stream at great depths (2nd series). *Bull. Mus. Comp. Zoöl., Harvard Coll.*, 1 (7), 121-141.
- POURTALÈS, L. F. DE (1871), *Illustrated catalogue of the Museum of Comparative Zoölogy at Harvard College, No. 4. Deep-sea Corals*. Cambridge, 1-93.