

Notes

Rolling stones: first report of a free living *Acropora anthocercis* (Brook) from the Red Sea

B. Riegl, W. E. Piller, M. Rasser

Institut für Paläontologie der Universität Wien, Geozentrum Althofenstrasse 14, A-1090 Wien, Austria

Accepted: 20 July 1995

Unattached spheroidal “rolling stones” are formed by a variety of organisms, including corals. If entirely covered by living tissues, they are termed coralloliths; if partly dead, they are called “free living” (Scoffin et al. 1985). A sharp delineation between these two forms can be difficult. They are usually formed by massive species (*Porites*, *Gardineroseris*, *Siderastrea*; e.g. Scoffin et al. 1985; Lewis 1989). However, in this note we report an example of a branching species, *Acro. Acropora anthocercis*, from northern Safaga Bay, Red Sea, Egypt which forms “rolling stones”. It is also the first record of *Acropora anthocercis* (Brook 1893) from the north-western Red Sea. Sections of the specimen revealed that it was made up entirely of coral, with only a thin coralline algal crust on the lower surface (Figs. 1, 2 and 3).

The life-history of one specimen was reconstructed by means of longitudinal and transverse sections. In Fig. 3 we reconstructed the following sequence of events: a fragment consisting of two thick horizontal branches (H) with three obliquely ascending branchlets (B) broke off a presumably tabular colony. The proximal part of the fragment died and was overgrown by a red algae crust (growth discontinuity D1). The branchlets re-orientated their growth direction, first filling free space with coenosteum (C), then radial corallites proliferated and turned into axials which resulted in a growth direction perpendicular to the original (arrows indicating growth direction of re-orientated branchlets). In the course of regeneration and the formation of new branchlets, the vertical axis rotated by 55° (A1 to A2). The specimen remained stable for long periods as shown by the polar growth direction and numerous growth discontinuities (D2, D3) on the bottom surface, where coral tissues, which were too long in contact with the substratum died and were replaced by algal crusts and polychaete (serpulid) tubes. When the resting position changed, coral tissue overgrew these crusts and deposited new coenosteal material without the formation of branches. Repeated

rolling is inferred by the stunted aspect of the branch tips, which is atypical for this species.

A. anthocercis generally forms thick tables or stout corymbose to sub-corymbose colonies. The ability of branches to anastomose and form thick “super-branches” helps to avoid total fragmentation. The fact that the present specimen was able to develop branches coupled with a polar growth form which was maintained during the entire life-span (see section), and the incrustation by a coralline alga on the lower surface, are indicative of relatively long phases of orientational stability. Nevertheless, the symmetrically spherical growth of the colony and stunted as well as dead branch tips are signs of repeated rolling. The presence of short branches may have ensured survival, as they allow high water flux through the colony when lying upside-down. Evidence for repeated rolling are:

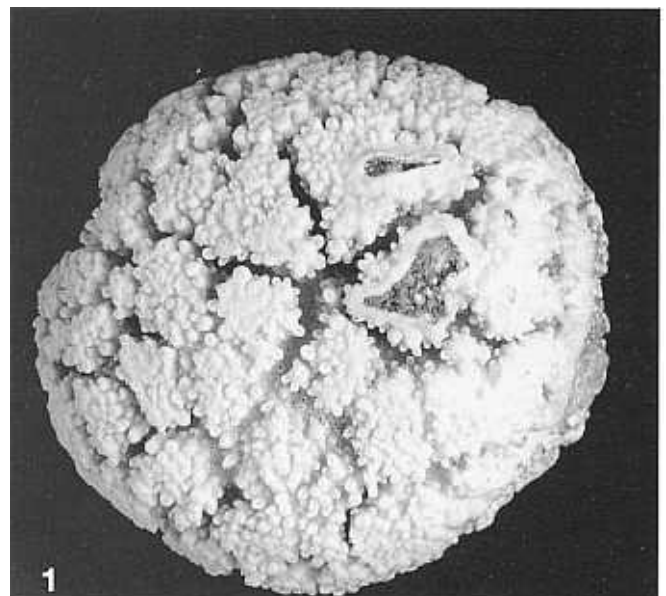


Fig. 1. External view of spheroidal *Acropora anthocercis*

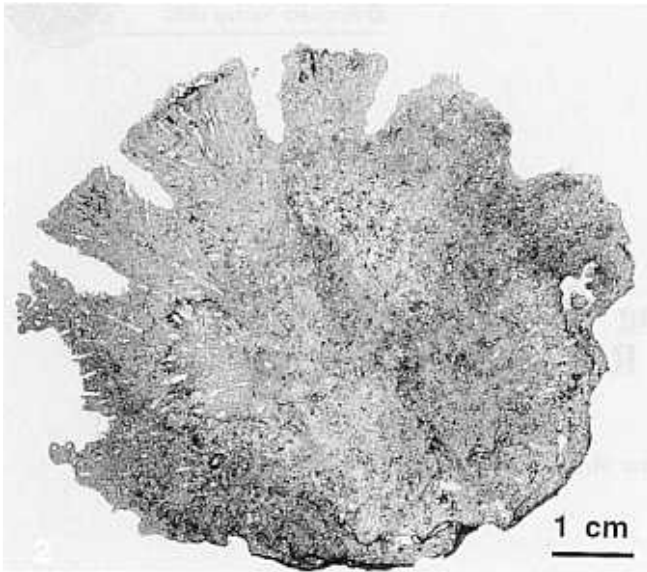


Fig. 2. Transverse thin section, through specimen of Fig. 1

(1) the almost perfectly round outline (2) axial corallites do not protrude above the height of the first rosette of radials. This only happens when growth of axials is suppressed. (3) Partly regenerated necrotic areas at numerous branch tips. This indicates resting on branch tips for some time, leading to necroses of their apices. (4) Only one short branchlet, which is shorter than the others, retained the typical morphology. In conclusion, all of the branch tips are flattened and this is presumably an adaptation to repeated contact (rolling) over the substratum.

Acknowledgements. This study was financed by the Austrian Science Foundation Project P 8090-GEO.

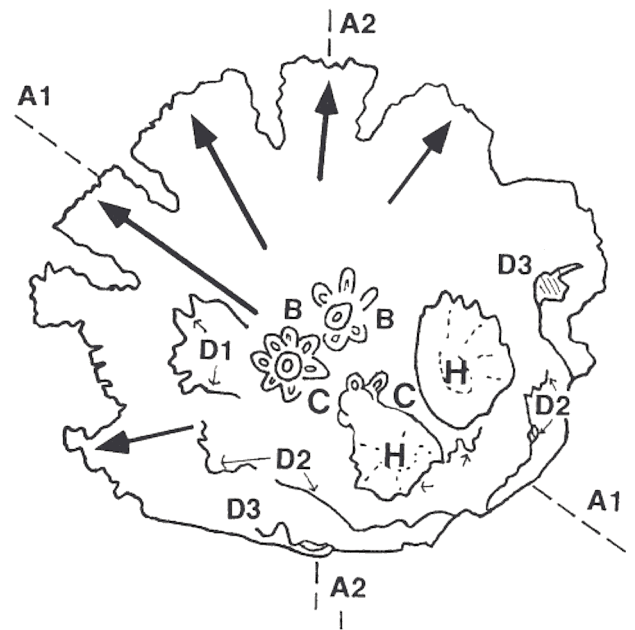


Fig. 3. Explanatory sketch of Fig. 2

References

- Lewis JB (1989) Spherical growth in the Caribbean coral *Siderastrea radians* (Pallas) and its survival in disturbed habitats. *Coral Reefs* 7:161–167
- Scoffin TP, Stoddart DR, Tudhope AW, Woodroffe C (1985) Rhodoliths and coralliths of Muri Lagoon, Rarotonga, Cook Islands. *Coral Reefs* 4:71–80