Evolutionary Ecology of the coral genus Madracis - an illustration of the nature of species in scleractinian corals

Vermeij, M.J.A.

Citation for published version (APA):

General rights
It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

Disclaimer/Complaints regulations
If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please Ask the Library: http://uba.uva.nl/en/contact, or a letter to: Library of the University of Amsterdam, Secretariat, Singel 425, 1012 WP Amsterdam, The Netherlands. You will be contacted as soon as possible.
Chapter 10

Corals on the move: rambling of *Madracis pharensis* polyps early after settlement

Vermeij, M.J.A. and R.P.M. Bak
Throughout their life corals are sedentary organisms. The majority of species only moves through space as planulae, or in case of fragmentation and displacement due to environmental disturbance. Only as planulae can corals actively choose favored locations on the reef, to enhance future chances for successful growth and survival. After settlement calcification starts and there is no further active movement over the reef bottom.

On Curaçao (12\degree N, 69\degree W) we noticed a new mode of behavior that allowed recently settled planulae of *Madracis pharensis* (volume 0.023 mm\(^3\); sd= 0.035; Vermeij, et al. submitted) to move over their substratum after settlement (April 12\textsuperscript{th}, 1998). On the reef (depth 15m) two day old free-swimming planulae (n\approx 80) settled in test tubes (placed over colonies to quantify planulae release patterns in five *Madracis* species, (Vermeij, et al. submitted). The behavior of these planulae was subsequently followed. We attached the open test tubes with the planulae to a plastic rod, in the original orientation and at the same height (10 cm) over the reef bottom. Some planulae died and others metamorphosed and started calcification (Fig. 1). However, the majority (>70\%) of the planulae attached to the tube-walls. They metamorphosed into polyps, but without starting calcification. These polyps started moving the following days, crawling and tumbling over the substratum. From the moment this was noticed the planulae were photographed daily (H 09.00) to follow their movement. Holding on to the substrate with their tentacles, polyps moved

![Figure 1. Detail of test tube with settled Madracis pharensis planulae. Metamorphosed planulae are visible on glass surface. Polyps that started calcification after settlement (a), i.e. deposition of basal plate is visible between tumbling polyps. Outside diameter of test tube 15 mm.](image)
Figure 2. Movement of polyps over three consecutive days. Pictures traced from photographs.
their basal part in a direction away from the majority of planulae that settled at the same time (Fig. 2). This type of movement has previously been described for anemones (Shick 1991). Most planulae moved at a speed of millimeters per day, but some were exceptionally rapid. At a speed of up to one centimeter per day they moved away from the flock shown in Fig. 2. Our observations were interrupted at day five, when a tourist boat anchor destroyed our experimental setting.

The polyp movement we observed allows corals after settlement, i.e. after the first decision regarding habitat selection is made, to explore the substratum at a small scale. We hypothesize that being a polyp allows for more adhesion to the substratum of initial choice than being a planula and this emphasizes the importance of the first decision. It appears that the polyps consequently search for micro habitats at a scale of mm and cm, possibly for small pits or crevices, within the patch of substratum that they initially choose as suitable settlement substratum. It remains to be seen how such behavior relates to the presence/absence of known stimuli for coral settlement such as calcareous red algae (Morse, 1994; Morse, et al. 1996; Morse and Morse, 1996) or microorganisms (Negri et al. 2001).
CITED LITERATURE
Chapter 10 Corals on the move