

Binary fission in *Heteractis magnifica*: documentation in captivity

Sea anemones are brightly coloured marine invertebrates belonging to the order Actinaria of class Anthozoa and phylum Cnidaria. Globally, more than 1000 species of sea anemones have been reported. However, in India only 54 species belonging to 40 genera and 20 families have been documented¹. Sea anemones can reproduce either sexually or by parthenogenesis. In sexual reproduction, external fertilization occurs followed by the development of planktonic planula larvae, which become single polyps. In asexual reproduction, the sea anemones divide by budding or binary fission². The actinarian sea anemones attract traders's attention due to their potential as a source of drugs and being widely used in marine aquaria, besides being known for their ecological monitoring as a sentinel organism³. Many researchers worldwide have studied the reproductive methods of sea anemones. However, there is a lack of information pertaining to India, except for the asexual reproduction study of *Anthopleura nigrescens*⁴ and post-larval development of *Phytocoetes gangeticus*^{5,6}. A recent study on brooding and larval development of *Anthopleura handi* was carried out by Choudhury and Raghunathan⁷ under laboratory conditions in the Andaman and Nicobar Islands, India.

The present study was conducted at the ICAR-National Bureau of Fish Genetic Resources (NBFGR)-DST marine ornamental fish hatchery facility at Annamalai University, Tamil Nadu, India. Twenty numbers of sea anemone, *Heteractis magnifica* procured from a trader were acclimatized in 1000 litre FRP tank filled with UV-treated sea water along with biological filtration. Artificial lighting was provided for 24 h to mimic the natural light. After 15 h of acclimation, all the sea anemones started attaching to the tank bottom, walls and dead coral boulders, using their adhesive foot called pedal disc with a column-shaped body topped by an oral disc.

On the second day of stocking, it was noticed that a small portion on the disc of an individual anemone was slightly dented. Soon, the infested region of the anemone slowly started to divide into two portions by longitudinal fission (Figure 1 a). Notably, the damaged portion of the anemone got separated and two individuals were formed. At the time of separation, the thread-like filaments connecting the parent anemone had gradually elongated and the anemone was frequently exerted to pull out the elongated filaments to separate the new anemone (Figure 1 b). One of the peculiar characteristics observed was the ejaculation

of a brown-coloured fluid from the newly separated anemone (Figure 1 c). Slowly the two individuals separated from each other by breaking the filament-like structure (Figure 1 d and e). Finally, after 9 h, both the anemones were separated and settled in the tank (Figure 1 f).

Asexual reproduction in sea anemones has been reported through different forms like budding or binary fission, transverse, pedal laceration and autotomy of tentacles⁸. However, to our knowledge, there are no previous studies on separating sea anemones to rectify their damaged portions under captive conditions.

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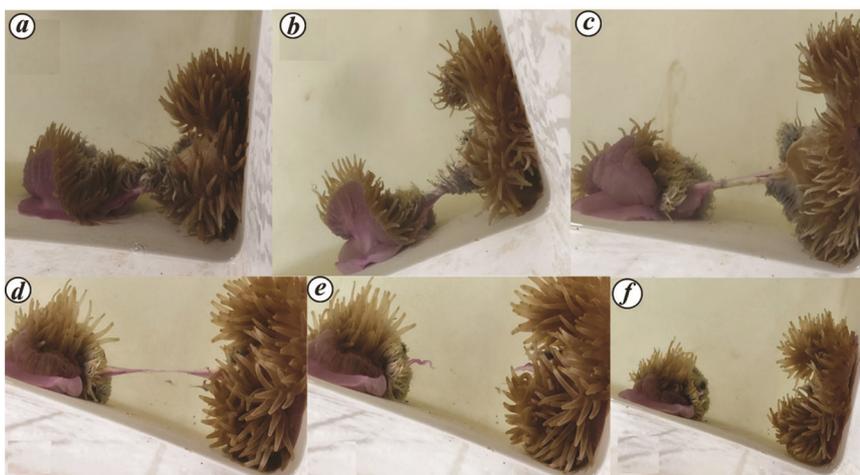


Figure 1. Process of separation in sea anemone, *Heteractis magnifica*. **a**, Damaged disc part. **b**, Initiation of longitudinal fission. **c**, Ejaculation of brown fluid. **d**, Separation of tissue filaments. **e**, Breakdown of tissue filaments. **f**, Separated anemone.