

# *Entacmaea quadricolor* (Leuckart in Rüppell & Leuckart, 1828)

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## IDENTIFICATION

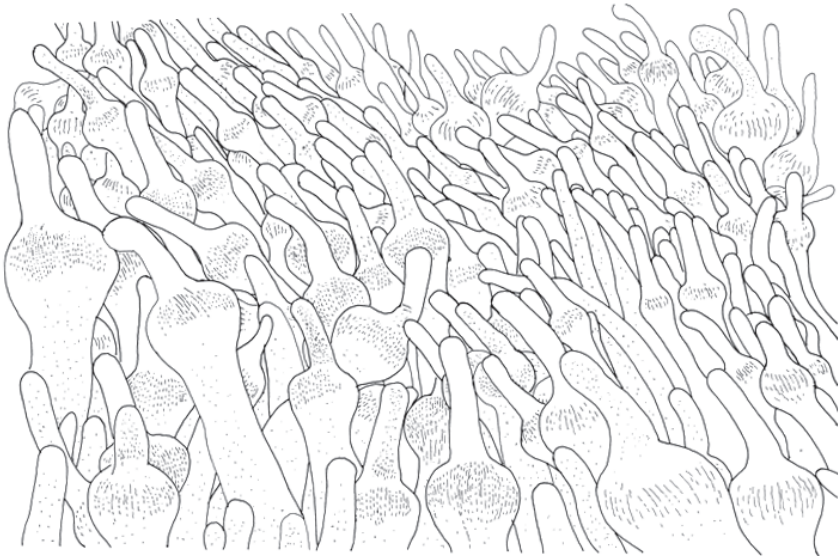
Order	: <b>Actinaria</b>
Family	: <b>Actiniidae</b>
Common/FAO Name (English)	: <b>Bubble tip anemone</b>



**Local names:** Not available

## MORPHOLOGICAL DESCRIPTION

The bubble tip anemone is usually attached deeply in crevices or hidden in holes in reef, such that only the emergent tentacles are visible. Each tentacle is brown in colour and inflated near the end, with a white band near terminus, commonly with a red tip. Column is brownish to pinkish in colour and is smooth; oral disc broader than pedal disc. Column is without verrucae; gradually flared from the small pedal disc. Oral disc is brown in colour, same as tentacles. Tentacles collapse when disturbed.



## PROFILE

### GEOGRAPHICAL DISTRIBUTION

The bubble tip anemone is widespread throughout the tropical waters of the Indo-Pacific area, Micronesia and Melanesia to east Africa and the Red Sea and from Australia to Japan. In India, it has also been reported from Andaman and Nicobar Islands.

### HABITAT AND BIOLOGY

Large adults are found in dimly lit, deep waters where they are often solitary. Smaller young specimens are found in shallow, well-lit areas in groups. Bulbous tips on tentacles are seen in juveniles whereas adults have more stringy tips. The tips of the anemones are not bulbous, as long as it does not host the fish. It is semi-aggressive as it is mobile, although a contented bubble tip anemone will stay put once it has found a place to settle.

It reproduces asexually using longitudinal fission, when it splits in half from the foot or mouth to form a clone. Fission is brought about by stretching in opposite directions, thinning of tissue and final tearing perpendicular to the axis of stretching. It is also reported to mouth brood, wherein it broods the embryos for a few days in the oral cavity before releasing them back into the water. This activity supplies the

embryos with their first zooxanthellae. When released, the embryos (planula) float and then connect and become a fully formed anemone.

The newly spawned eggs average 794  $\mu\text{m}$  in diameter, and are covered by microvillus distributed over the egg surface, except for a single bare patch. Eggs contain abundant zooxanthellae. Fertilization is external and after cleavage and several steps forms the ciliated planula larva. Larval movement is first observed 36 h after spawning. Larval survival remains high during the first 4 days after spawning, and then decreases rapidly.

## PRODUCTION SYSTEMS

### BREEDING IN CAPTIVE CONDITIONS

*Entacmaea quadricolor* has been bred in captivity. Anemones collected from subtropical reefs in the solitary Islands Marine Park, eastern Australia, were monitored in outdoor flow-through seawater tanks from 2003 to 2005. Sexually reproductive anemones were either male or female. The adults released their gametes synchronously into the water where the eggs were fertilized and further development occurred. Males generally began spawning prior to females. The synchronous nature of gamete release indicates similar responses in males and females to external factors like seawater temperature, photoperiod and lunar cycles.

Asexual propagation using fragmentation is widespread for its culture. It is propagated by cutting into halves or quarters. Anemones that are cut in half are larger in size, heal and grow quicker than those cut in quarters. Survival rate is higher (ranging from 89.3 % to 93.8 %) when the individuals are cut in halves. Even though, survival is lower (ranging from 62.5 % to 80.4 %) when the individuals are cut in quarters, it produces the greatest number of anemones. Feeding increased the oral disc growth and reduced wet weight loss, but did not significantly influence the growth of pedal disc.

### LARVAL REARING

The embryos develop into early planulae about 14 h after spawning. Early larval stages are round to pear-shaped with a greenish-brown colour due to the presence of zooxanthellae. As the larvae develop, they elongate along the oral-aboral axis. Considerable variation in shape of larvae can be seen. Colour also changes to orange-brown. Larvae occasionally release mucus-like material from their oral pore. Survival of planulae is initially as high as 91.3 % at 4 days of age. However survival rate falls to as low as 21.9 % by the time of metamorphosis.

### FOOD AND FEEDING

The bubble tip anemone is carnivorous in nature. In the wild, it derives its daily nutrition from its symbiotic algae, zooxanthellae, that dwells within its tissues. Nutrients are also obtained by filter feeding,

using its sweeping tentacles to absorb nutrients from the water, or through wastes and debris cleaned from the surface of its resident partner clownfish. It also uses its venomous cells or nematocysts found in its tentacles to sting and capture prey. In captivity, it can be fed with chopped silversides, shrimp, krill, mussels and fresh fish as well as with frozen carnivore preparations, 2 to 4 times a week.

## GROWTH RATE

*I*nformation not available

## DISEASES AND CONTROL MEASURES

*I*t is difficult to diagnose symptoms and corresponding diseases in anemones. Insufficient light and insufficient feeding are detrimental for it.

## PRODUCTION, MARKET AND TRADE

### PRODUCTION

*I*nformation not available

### MARKET AND TRADE

*A*nemone fishes and their host, sea anemones, form the most recognized symbiotic association in reef environments, and hence are highly sought after in the marine aquarium trade. The beautiful sea anemone, costing about US \$ 29 depending on size and colour, is collected for the live aquarium trade. These host anemones represent high-value species for collectors and are often preferentially harvested.

## CHALLENGES TO MARICULTURE

*A*lthough spawning and hatching have been achieved in captivity, the major obstacle to successful mariculture of the species is rapid decrease in survival of planula larvae after 4 days of spawning.

## FUTURE PROSPECTS

*S*ea anemones that host symbiotic anemone fishes are very much in demand in the aquarium trade. The development of reliable and cost-effective methods for culturing anemones would ensure a steady and sustainable supply to the industry without damaging natural coral ecosystems.

## SUGGESTED READING

Anna, S. and Peter, L. H. 2007a. Embryonic and Larval Development of the Host Sea Anemones *Entacmaea quadricolor* and *Heteractis crispa*. Biol. Bull., 213: 110-121.

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[www.marinespecies.org](http://www.marinespecies.org). Accessed on 17.10.2017.