The Anemone FAQ

(For tropical, clown-hosting anemones)

by Greg Peterson (BonsaiNut) with help from Marina Peters (MarinaP)

Special thanks to Cquarium for use of anemone photos.

If you are considering keeping anemones, please make an educated and responsible decision about purchasing them. They are not easy to keep, and are considered moderately to extremely difficult invertebrates to maintain in captive systems for long periods of time. All hosting anemones require established and stable tanks. Some require larger systems. Start by reading as much as possible about the care and requirements of anemones (this FAQ is a good start). Best of all, try to find someone (in person or online) who is successfully keeping the same anemone species you want to try. Learn from that person's experiences and mistakes.

TABLE OF CONTENTS

I INTRODUCTION

What are clown anemones?

Without getting into a long detailed biology discussion, clown anemones belong to the following systematic classification:

Phylum *Cnidaria*
Class *Anthozoa*
Subclass *Hexacorallia*
Order *Actinaria*

In a nutshell, this describes anemones as tubular creatures closely related to corals, possessing penetrating stinging cells as well as "holding" or adhesive stinging cells. Additionally, they all have a flat pedal disk, a distinct column, and an oral disk with tentacles. Though some species can get quite large, they are biologically very simple creatures. They are all photosynthetic via the presence of zooxanthellae, or simple algae in their body tissues. This zooxanthellae provides much/most of the energy necessary for these anemones to thrive, and is a driver of their need for bright light (and an indication of why clown anemones are only found in shallow water). They are opportunistic feeders, capturing or ensnaring live, dead, or decaying food objects that are brought within physical contact of their tentacles. They reproduce via cloning or sexual activity, and are either male or female individuals. They are long-lived and may live over a hundred years in the wild. In some areas they are very prevalent and live in colonies of hundreds of individuals.

What is the life cycle of anemones?

Very little research has been done on tropical clown anemones in the wild. In fact, the only current biology manual covering anemones is out of print and copies are difficult to locate. Because of this, detailed information on anemone reproduction and life cycle is hard to come by. In general, clown anemones reproduce asexually (via cloning by splitting, budding or pedal laceration) or sexually. Only some clown anemones have been observed reproducing asexually, though it is believed that all *may* have this ability. All clown anemones can reproduce sexually.

Splitting occurs when an anemone splits itself in half, creating two identical individuals, while budding occurs when a small piece of the parent anemone breaks off and becomes a separate individual. At least two species of clown anemone (*E. quadricolor* and *H. magnifica*) have been known to split in captivity. *S. gigantea* has been seen to split once – so it does occur. Budding is less common and has only been observed once or twice in *S. gigantea* and *S. mertensii*. Pedal laceration has never been observed with clown anemones (this form of reproduction is common in some other anemones such as *Aptasia*) though it may occur with large *E. quadricolors.*

Anemones are sexual creatures, in that there are male and female individuals. They reproduce sexually by releasing eggs and sperm into the water column, where larval anemones mature and settle out to become juvenile anemones. The free-floating larval

stage is apparently short (one week or less) and the juvenile anemones that settle out on to the substrate are already fully formed individuals with a host population of zooxanthellae. If one were able to induce spawning in captive anemone pairs, it might be possible to aquaculture large quantities of anemones in captivity. Unfortunately, there is little information on how/why anemones spawn in captivity, and though it does occur, it seems to happen infrequently (perhaps only annually).

Anemones are long-lived in the wild, and their populations are kept in check by predation and low survivability of young. In captive systems absent of predators, some anemone colonies can spread out of control. There have been cases of *E. quadricolor* cloning from a single individual to a colony of dozens of individuals over several years. Additionally, some species of non-clown anemones are known as "pest" anemones because they reproduce so quickly that they can take over entire aquariums. In the wild, this does not occur.

What kinds of anemones host clownfish?
There are ten species of anemones that host clownfish in the wild. They are:

Cryptodendrum adhaesivum (adhesive or pizza)
Entacmaea quadricolor (bulb-tentacle, BTA, or corn)
Heteractis aurora (beaded or sand)
Heteractis crispa (long tentacle, LTA, leathery, or milk)
Heteractis magnifica (magnificent, ritteri, or skunk)
Heteractis malu (sebae, delicate, or sand)
Macrodactyla doreensis (long tentacle, LTA, or corkscrew tentacle)
Stichodactyla gigantea (gigantic or carpet)
Stichodactyla haddoni (haddon's, saddleback, carpet, or sand carpet)
Stichodactyla mertensii (merten's, or spotted-base carpet)

What anemones host what clowns in the wild?
The following list includes anemones and the clowns that they host in the wild. It should be noted that this is not an exact or exclusive list; some clowns will easily accept other anemones as hosts, while other clowns (particularly captive-raised clowns) will be hesitant to host in an anemone, even if they are listed as a compatible species.

Cryptodendrum adhaesivum (adhesive or pizza)
- *A. clarkii*

Entacmaea quadricolor (bulb-tentacle, BTA, or corn)
- *A. akindynos*
- *A. allardi*
- *A. bicinctus*
- *A. chrysopterus*

A. clarkii
A. ephippium
A. frenatus
A. latezonatus
A. mccullochi
A. melanopus
A. omanensis
A. rubrocinctus
A. tricinctus
P. biaculeatus

Heteractis aurora (beaded or sand)
A. akindynos
A. allardi
A. bicinctus
A. chrysogaster
A. chrysopterus
A. clarkii
A. tricinctus

Heteractis crispa (long tentacle, LTA, leathery, or milk)
A. akindynos
A. bicinctus
A. chrysopterus
A. clarkii
A. ephippium
A. latezonatus
A. leucokranos
A. melanopus
A. omanensis
A. perideraion
A. polymnus
A. sandaracinos
A. tricinctus

Heteractis magnifica (magnificent, ritteri, or skunk)
A. akallopisos
A. bicinctus
A. chagosensis
A. chrysopterus
A. clarkii
A. leucokranos
A. melanopus
A. nigripes
A. ocellaris
A. percula

A. perideraion

Heteractis malu (sebae, delicate, or sand)
A. clarkii

Macrodactyla doreensis (long tentacle, LTA, or corkscrew tentacle)
A. chrysogaster
A. clarkii
A. perideraion

Stichodactyla gigantea (gigantic or carpet)
A. akindynos
A. bicinctus
A. clarkii
A. ocellaris
A. percula
A. perideraion
A. rubrocinctus

Stichodactyla haddoni (haddon's, saddleback, carpet, or sand carpet)
A. akindynos
A. chrysogaster
A. chrysopterus
A. clarkii
A. polymnus
A. sebae

Stichodactyla mertensii (merten's, or spotted-base carpet)
A. akallopisos
A. akindynos
A. allardi
A. chrysogaster
A. chrysopterus
A. clarkii
A. fuscocaudatus
A. latifasciatus
A. leucokranos
A. ocellaris
A. sandaracinos
A. tricinctus

What water conditions do anemones need?
Anemones are shallow water tropical inverts. They require clear, clean water absent of pollutants and high in dissolved oxygen. In general, anemones can be even more demanding in this respect than small-polyped stony corals. Additionally, anemones require moderate indirect water flow. They “breathe” by absorbing oxygen from the

water around them, and water flow is required to bring them food and carry away wastes. If anemones are unhappy with their local environment, they will move to find one more suitable. An indication of an unhappy environment is one in which anemones continue to move about the tank – if happy, an anemone will settle down and remain in one place for a long period of time (years).

What light conditions do anemones need?

Anemones are shallow water, photosynthetic tropical inverts. They all require bright lighting in order to thrive. A few species (*E. quadricolor* and *S. haddoni*) will thrive under bright VHO fluorescent lighting, but for the most part all other species require very bright lighting that includes metal halides.

II SELECTION AT THE LOCAL FISH STORE

Many successful anemone keepers attribute their success to obtaining a healthy anemone at the store in the first place. Anemones are often poor shippers, and they are especially prone to bacterial infection or stress-related damage. A reputable, experienced retailer often takes this into consideration, and has special tanks set up specifically to handle anemones.

What does a healthy anemone look like?

General Appearance

Healthy anemones are full, firm and out in the open. They are not shrunken, soft, or hiding in the rocks. If the anemone doesn't look "right" to you, trust your instincts and come back to look at the anemone another day to see if it has perked up. Do not buy a sickly-looking anemone in the hopes that it will do better in your system at home.

Color

You should know the natural coloration of the species of anemone you are interested in. Look for an anemone that is vibrantly colored, not faded or pale. Make sure it is not dyed or "bleached"; both conditions are often deadly for the anemone and will require specialized care to fix.

Healthy clown anemones are all photosynthetic creatures, and zooxanthellae is brown in color, so there is no such thing as a healthy white anemone. The absence of zooxanthellae is called bleaching, and can be caused by stress to the anemone, or lack of suitable lighting. Bleached anemones exhibit whitish translucent tentacles and often hide from light. A bleached anemone will require specialized care until it can grow its zooxanthellae back – a process which will take 3 months or longer even in the best conditions.

Sometimes bland-colored anemones are dyed at the exporter to give them a brighter color (and justify higher prices). Dyed anemones exhibit a universal bright color over their entire bodies, and the tentacles are the same bright color as their columns. Bright yellow or pink anemones have almost certainly been dyed and should not be purchased. Dyeing an anemone does not necessarily kill it, though it does stress it unnecessarily. A dyed anemone that is kept in a healthy system will eventually lose the dyed coloration and will return to its native coloration (over the course of a year or so).

Mouth

The mouth of the anemone should be tightly closed. It should not be gaping open (wide open and loose), which is usually the sign of stress, illness, or both. For the most part, nothing should be oozing or leaking out of the mouth, and the mouth should not look like it is inside out.

Foot

The pedal base (or "foot") of the anemone should be whole and undamaged, and should be attached to a rock, the substrate, or the side of the aquarium. It should not be ripped or infected. Foot lacerations can be deadly to an anemone, especially one that is not well

acclimated in a system. If an anemone is attached to a piece of live rock, buy the rock with the anemone, rather than risk damage to the foot by attempting to remove it.

Feeding Response
Ask the retailer to feed the anemone while you watch. Appropriate food items will stick to the tentacles of the anemone – this stickiness is a sign of health, and its absence is often a warning sign. The anemone should rigorously grab the food item and move it to its mouth. The mouth should expand and engulf the food. If an anemone will not eat in the store, there is a good chance that it will not eat in your tank at home.

What type of anemone should I buy?
Your anemone selection should probably be based on three things; first, your general expertise and comfort keeping challenging reef invertebrates (anemone difficulty); second, the tank environment and suitability for the anemone; and third, placement and "role" of the anemone within the reef system. The first two points are covered elsewhere in this FAQ. The third point is a subjective one. Looking at your system as a whole, try to envision what it is you want from your anemone. Do you want an anemone that lies open in the sand in the front of your tank, or an anemone that stands up on top of your highest rock pile? Do you want a large anemone or a small one? Do you want an anemone with a reputation for moving around, or an anemone that stays in one place? Do you have a specific species of clownfish that you are purchasing a host anemone for? Answering these questions will often lead you in one direction in terms of selecting an optimal species.

What is the easiest clown-hosting anemone to care for?
Some anemones are much more difficult to keep than others, though it is also true that all species of Pacific clown anemones have been kept successfully in captivity. Generally, it is best to start with an "easier" anemone first before you try to tackle a more difficult species. As a rough guideline, consider the following difficulty list of anemone species:

DIFFICULT
E. quadricolor (bulb-tentacle anemone, BTA, or corn anemone)
S. haddoni (haddon's sea anemone, saddleback anemone, carpet anemone, or sand carpet)

MORE DIFFICULT
M. doreensis (long tentacle anemone, LTA, or corkscrew tentacle sea anemone)
C. adhaesivum (adhesive sea anemone or pizza anemone)
H. aurora (beaded sea anemone or sand anemone)
H. crispa (long tentacle anemone, LTA, leathery sea anemone, or milk anemone)
H. malu (sebae anemone, delicate sea anemone, or sand anemone)

MOST DIFFICULT
H. magnifica (magnificent sea anemone, ritteri, or skunk anemone)
S. gigantea (gigantic sea anemone or carpet anemone)

S. mertensii (merten's sea anemone, or spotted-base carpet)

As you can see, there are wide ranges of common names that can be used to describe each anemone species. Additionally, anemones are often misidentified at the retail store. It is best if you become familiar with your targeted species prior to going to stores to look for it – you might find it under a different (or unique) name altogether. (See the species guide later in the FAQ).

What anemones should I stay away from?

At a minimum, it is best to stay away from the most difficult anemones in the list above until you are very experienced. These anemones have specialized care requirements, or get very large, or are generally "fickle" in their acceptance of captive environments. Additionally, you should stay away from anemones that are sick, injured or just "don't look good" in your retail store.

Can you keep different species of anemones in the same tank?

The jury is still out on this subject. A fair number of hobbyists have reported problems with keeping different species of anemone in a small tank. There appears to be a chance for chemical competition between anemone species. At the least, different species will physically combat each other, stinging and/or consuming one another if they move in close contact. Only keep different species in the same system if you are prepared to remove one species or the other upon signs of stress. It should be noted that having multiple individuals of the same species in a tank is not a problem – even if the individuals are different color morphs and come from different parts of the ocean.

III INTRODUCTION TO YOUR TANK, AND ACCLIMATION

Anemones are soft-bodied animals that maintain a lot of water in their tissues. Rapid changes in chemistry between the anemone's internal fluids and the water in their external environment will have a dramatic negative impact on the health of an anemone. This includes rapid changes in pH, salinity, and temperature. A suitable captive environment for an anemone MUST be chemically stable, and introduction of an anemone must be done carefully and slowly to allow the creature to acclimate.

Is my system adequate for keeping anemones?

Appropriate System Size

Do not buy an anemone that will potentially outgrow your tank. Anemones, when healthy, can grow very quickly. They are best described as medium to large-sized invertebrates. Additionally, larger systems are more environmentally stable than smaller ones, and this increases your odds of maintaining anemones successfully. A smaller anemone CAN be kept in a nano reef tank, if it is the primary focus of the tank. Larger anemones require tanks that 20 gallons or larger, with the caveat that a large carpet anemone can easily take up half of a 20 gallon tank. It is not recommended to try to keep different anemone species at the same time in a tank that is smaller than 100 gallons.

Water Parameters

Water chemistry MUST be stable in order to keep anemones successfully. This means that tanks must be fully cycled before you even THINK of adding an anemone. As a rule of thumb, you should wait until a least a month after your tank is done cycling just to ensure that your system is adequately balanced and healthy. Test your water before introducing a new anemone. Aim for zero ammonia, nitrite, and nitrate, specific gravity (salinity) of 1.024 – 1.026, pH of 8.2 – 8.4, temperature of 76 - 80F.

Tank Stability

If there is one way to guarantee that you will fail with anemones, it is to have an unstable tank with wild temperature swings, pH spikes, and frequent changes in salinity. Larger tanks help in this respect, but a careful aquarist can still maintain a stable system in a small setup. The golden rules are to be patient, and make changes to your system SLOWLY. It is better to do multiple small water changes than one giant one. It is better to feed small amounts over extended periods than to feed a large amount all at once. Any time you make a change to your system, try to minimize the initial impact, and spread it out over time.

Lighting

All Pacific clown anemones are shallow water tropical invertebrates. They all require bright lighting in order to thrive. A few species (most notably *E. quadricolor*) will do well even under bright fluorescent lighting, but they are the exception. All species will thrive under bright metal halide lighting, and some require the highest light intensity you can provide. If you are at all concerned about the intensity and quality of the lighting in your tank, consult the species tables at the end of this FAQ and make sure that you buy

anemones that are more forgiving of lower light intensities.

Water Flow

Anemones like moderate to strong water flow. They "breathe" by absorbing oxygen from the water around them, and they use water to bring food and carry away wastes. If they are not in a location with adequate flow, they will try to move to find a better location. Some species (like *H. magnifica*) are notorious for needing strong, diffuse water flow, and are very active in seeking it out.

Tank Hardware & Equipment

Because anemones are drawn to strong water flow, they have a tendency to gravitate towards power heads. If you have power heads in the tank, make sure the intakes are covered so that an anemone will not get sucked in and chopped up. For this reason, cover overflows, too.

Other Tank Inhabitants

There are two groups of critters to be conscious of when planning to add an anemone to a reef tank – potential anemone predators, and potential anemone prey. Anemone predators include certain types of nudibranchs, bristle worms, butterfly fish, large angelfish and large puffers. Even if a clownfish pair is present and hosting in the anemone, predators can nip at the anemone until the anemone eventually perishes from their attacks. Anemone prey include small bottom-dwelling or slow-moving fish like dragonets, blennies, gobies and seahorses. *S. haddoni* anemones are especially notorious for eating anything and everything that comes in contact with their oral disk – including crabs, snails, sea urchins and shrimp. Generally, if an anemone *can* eat something, it probably will.

How do I acclimate my new anemone?

Acclimation procedures for anemones are similar to acclimation procedures for other sensitive invertebrates. When you first bring an anemone home, you will want to float the anemone bag in your reef tank in order to equalize temperature. After 15 minutes or so, you will want to open the bag and start to slowly dilute the bag's water with water from your system. There are many ways to do this, the easiest of which is referred to as "drip acclimating". Drip acclimation consists of setting up a small line of tubing that has a very tiny amount reef water running through it from your system's pump, and allowing a small amount to "drip" into the anemone bag, so that over the course of an hour or so, the water in the anemone bag is completely replaced with water from your system. When you remove the anemone from the bag, gently place it somewhere in the tank where the environment is best suited for the anemone species. Be cautious about providing too much light too soon for an anemone that may have been out of bright light for a while.

My anemone grabbed my hand and won't let go – what should I do?

Sometimes, with a healthy anemone (or certain "sticky" anemone species), the anemone will grab hold of your hand or other object. Don't panic! You are not about to be eaten

☺ Do not try to pull your hand away because you may damage the anemone. Instead, wait patiently, and the anemone will release your hand after a minute or two.

Where should I locate my anemone in the aquarium?
Before buying an anemone, research the species so that you have an understanding of the environment it prefers in the wild. Many anemones are strictly "sand" anemones, while other anemones like to stay up in the reef rock. Before adding the anemone to your tank, try to visualize where you want your anemone to live, and arrange the environment accordingly. Very often, if your tank conditions are good and you chose a good location, an anemone will stay right where you place it when you first introduce it to your tank. However, anemones often have a will of their own, and will sometimes "wander" the tank until they find a location that they are happy with. When they wander, they will damage any creature, coral or invertebrate they brush up against. If your tank is full of prized corals, you will probably want to stay away from the anemones that like to be up in the rocks, since they will damage your corals if they start wandering.

How do I remove an anemone, or physically move it?
Anemones are difficult to move because their pedal disk (foot) will strongly attach to the substrate, rocks, reef rubble, etc. Additionally, many anemones will seek out cracks or crevices to hunker down in. It is often impossible to try to move an anemone without causing serious damage to it by damaging or tearing the foot or column. In some cases, you can move or rotate a rock that an anemone is attached to in order to reposition the anemone (similar to moving a coral that is growing on a piece of reef rock). If the pedal disk is out in the open (for example, attached to one of the sides of the aquarium), you can gently and carefully slip a fingernail (or other thin object) under one edge and carefully 'peel' the anemone away from the glass. If an anemone is in an area that cannot be accessed, you can sometimes get an anemone to move on its own accord by changing its environment; for example, increasing or reducing the water flow, increasing or decreasing the light, etc. Some people report that aiming the flow of a powerhead at an anemone's foot will sometimes cause it to move.

Do I need a clownfish for my anemone to be healthy?
In the wild, clownfish are never found without an anemone. However, in captivity anemones are not necessary for the survival of clowns and vice versa. An anemone without clownfish will do just fine.

IV DIET

What should I feed my anemone?
Anemones will thrive on a varied diet, especially if they have healthy zooxanthellae and are under bright lighting. Though anemones can consume large chunks of food, it is better (for the anemone and your system) to feed it smaller items more frequently. A good diet includes fresh or frozen seafood (krill, shrimp, mysis shrimp, scallops) enriched with reef vitamins (Selcon or Zoe). Additionally, prepared frozen aquarium foods work well - the gel-bind variety of Formula I/II, etc. Anemones will even eat flake food if they can grab it – some anemones will eat a lot of flake if they are located at the right spot in the aquarium where water flows directly into their tentacles. Try different foods to see which one your anemone accepts best – as individuals their tastes seem to vary. Monitor feeding based on the health of the anemone and understand that your anemone will grow based on how much you feed it. If you want it to grow quickly, feed once per day. If you want it to grow slowly, feeding once per week (or less frequently) is fine.

How should I feed my anemone?
A healthy anemone will have an aggressive feeding response. This means that anything that comes into contact with its tentacles will be seized and consumed. For most anemones, feeding is as simple as placing the food object into contact with the anemone's tentacles (a feeding stick or small wooden dowel facilitates getting the food to the anemone). A healthy anemone will ingest even large pieces of food in less than a minute. Some anemones that are weakened or recovering from stress will take longer to eat. In these cases, you may have to protect the food item from being stolen by fish or other inverts (crabs or shrimp). Placing an inverted strawberry basket (or other mesh item) over the anemone during feeding helps give it unmolested time to ingest food.

My fish or shrimp steal the food from my anemone. What should I do?
Make sure to feed your fish prior to feeding the anemone. Fish will be less aggressive if they have full bellies. Additionally, you might want to give some of your most curious inverts (cleaner shrimp, etc) a piece of the anemone food prior to feeding the anemone. If all else fails, you can use a strawberry basket, breeding cage, or other mesh item to place over the anemone while it is eating so that it is not being molested by tank mates.

Will my anemone eat my reef tank fish?
Maybe. All anemones are opportunistic feeders. If they can catch something (anything) they probably will try to eat it. For the most part, fish know to stay away from anemones, though rarely they can be chased and/or blunder into one and be consumed. This is more of a risk with sand anemones and bottom-dwelling fish than with rock anemones and free-swimming fish. Carpet anemones (*S. haddoni, S. gigantea,* and *S. mertensii)* are notorious fish eaters, probably due to their bottom-fitting form and their incredible stickiness. To minimize the risk of fish death, you might consider keeping a clownfish

with your anemone (since clowns tend to keep other fish away). Additionally, any tank with anemones should probably have night lighting to allow fish to avoid anemones at night.

V REPRODUCTION

How do clown anemones reproduce?

Anemones reproduce both asexually and sexually. Asexually, anemones produce clones of themselves via splitting, budding, or (perhaps) pedal laceration. Both *E. quadricolor* and *H. magnifica* are known to split frequently in home aquariums; asexual reproduction in other species is very rare at this time. Sexually, anemones are either male or female individuals, and they release eggs or sperm into the water column to fertilize and settle out as juvenile anemones. Anemones have been observed spawning in home aquariums, but no juvenile anemones have ever been raised except in research environments.

How do I get my BTA to split?

There are a lot of different opinions about getting *E. quadricolor*s (BTAs) to split. On one hand, people argue that if you provide a healthy environment and plenty of food, BTAs will split naturally. BTAs are also known to split when stressed, and the most successful way to get a BTA to split via stress is to feed it heavily for several weeks, then do a large water change in your tank (50% or so). Finally, there are people who proscribe to manual splitting, which involves cutting the anemone in half with a sharp knife, and letting the two halves heal into two individuals. Only attempt this last feat if you have done extra research and talked to people who have been successful doing it before.

VI BEHAVIOR

How should I expect my anemones to behave in my tank?

Anemones are for the most part sessile invertebrates in that they typically don't move unless they have a reason to. Movement is the single best indicator of whether your anemone is healthy and happy – if located properly in a healthy reef system, most anemones won't move for years. If your anemone moves around, there is something wrong. In most cases, researching an anemone species beforehand will give you a good indication of where in your system an anemone will be most happy, and you can prepare a site for the anemone ahead of time. Additionally, anemones will go through cycles of expansion and contraction, where they will puff up very large, and then shrink down to almost nothing. This is their way of balancing internal water chemistry and flushing wastes out of their system. Some anemones will expand and contract as often as once a day, but anything more than this is a sign that something is annoying the anemone. For the most part, the anemone should remain fully inflated almost all of the time, and definitely during the daylight hours when the light is brightest. If an anemone spends too much time contracted, there is something bothering it.

How do I get my anemone to move?

Sometimes your anemone will move to a place in the tank where it is difficult to care for, or where it might be in danger (near overflows, etc) or where it might be damaging other tank inhabitants. You can physically move the anemone (or move the rock it is attached to) but this may only provide a temporary solution. The best approach is to understand why the anemone relocated, and change the environment in your tank so that the anemone no longer feels the best location is where it is currently located. In many cases you can rearrange your rockscape so that water currents are changed and the anemone will move to a better water flow area. Additionally, some people have gotten anemones to move by redirecting water flow in the tank, including placing a powerhead to shoot water directly at the anemone's foot. Your best bet is to try to provide a perfect environment and location for the anemone ahead of time, so that once located in your tank it doesn't feel the need to go wandering.

How do I get my anemone to stay put?

Anemones only move because they are unhappy with their environment. Any environmental factor can have an impact, but the most common are:

1) Water quality (not good enough)
2) Lighting (wrong kind or too little)
3) Water flow (too much or too little, but often too little)
4) Security (not deep enough sand, or not a good safe rock location)

You need to go back to the basics and make sure you are providing the best possible environment for your anemone based on researching the species need. Once you get your tank "dialed in", your anemone should stay in one spot.

Will anemones eat my fish?
Anemones are opportunistic feeders that will eat anything if given the chance. Some anemones are more dangerous to fish than others – most specifically *S. haddoni* and *C. adhesivum* are both sand anemones and extremely sticky, so that they can easily snare bottom-dwelling fish like gobies, mandarins, and the like. Additionally, anemones can cause damage to fish that get stung but escape before being eaten. Some simple ways to reduce the risk is to keep clown fish in your anemones (clowns are territorial and try to scare fish away) and make sure that you have night lighting on your tank so that fish can always see where the anemones are located.

How come my BTA doesn't have 'bubble tentacles'?
The short answer is that no one knows. There have been lots of theories about why BTAs have bulbs or lack them, but no one has been able to prove one theory or the other. The factors that do not appear to have any impact include: presence or absence of clownfish, frequency of feeding, or brightness or quality of lighting. To confuse matters further, there have been instances of some BTAs that have had tentacles with bubbles and tentacles without bubbles at the same time. The presence or absence of bubble tips does not appear to affect (or indicate) anemone health.

My anemone shrinks and expands a lot – should I be worried?
Keep an eye on this behavior – it could be a sign of impending problems. Anemones shrink and expand as a way of regulating their internal water chemistry and flushing wastes from their bodies. This shrinking and expanding is most severe when an anemone is first added to a system. If your tank is stable and water parameters are good, you should not worry about this shrinking behavior too much. However, if an anemone starts to shrink and expand more frequently, or if it remains shrunk for long periods of time each day, there is something wrong.

My anemone's tentacles are 'writhing' or twisting – should I be worried?
Healthy anemones can sometimes have writhing tentacles – most commonly *S. gigantea* or *S. haddoni*. This is not usually a sign of concern, but is often a sign that the anemone is doing extremely well and the environment is well-suited to it. On occasion writhing tentacles can be accompanied by contraction and/or other signs that the anemone is unhappy. This occurs most frequently when adding an anemone to a new environment or making a change to the water chemistry in a reef system (via water change, etc). If this is the case, keep an eye on the anemone to ensure that signs of stress disappear.

My anemone just disappeared in my rock pile – should I be worried?
Rock anemones (most commonly *E. quadricolor*) will sometimes pull back into rock piles so that they become hidden from sight. In most cases this is because the anemone feels like relocating, or may be because the anemone is splitting. In most cases this

behavior is fine and the anemone will reappear when it is hungry or looking for light. There is no cause to rip apart your rockwork to try to find him. On rare occasions when a tank's environment is not adequate for keeping anemones, they may pull back into a rock pile from stress, in which case they may need rescuing, if only to completely remove it from the system. You need to be the judge to determine the quality of your environment, as well as prior behavior on the part of the anemone.

VII HEALTH ISSUES

Why are anemones so hard to keep?

Anemones are biologically very simple creatures. They have a very simple internal structure, and they depend almost entirely upon their environment for basic needs. They have limited ability to recover from stress, damage, or disease. In the proper home aquarium environments anemones can be quite hardy, and can grow aggressively and reproduce frequently. However, anemones do not tolerate shipping well, and can often arrive in a local fish store in poor condition. Combine the potential for poor initial health with the general intolerance for poor tank conditions, and anemones can be very frustrating invertebrates to try to keep for beginning aquarists.

What is anemone 'bleaching'?

All healthy clown anemones have a population of zooxanthellae in their body tissues that helps provide nutrients to the host anemone. This algae population is brown in color, and all healthy clown anemones will have an underlying color tone of light to dark brown depending upon the intensity of lighting under which they are kept, and the size of their zooxanthellae population. In cases of stress or poor water conditions, the zooxanthellae population in an anemone can die or be expelled. This condition is called "bleaching" since a healthy, dark colored anemone can become light and pale overnight. Bleached anemones are white or translucent in color, and lack the noticeable brown undercoloring of healthy anemones. The lack of zooxanthellae puts an anemone at significant health risk, since it no longer has a substantial source of nutrients. However, even badly stressed and bleached anemones can recover if placed in a stable, healthy environment. Daily feedings and appropriate light conditions will help the animal to rebuild its zooxanthellae population and reacquire its normal tan/brownish color over time. This process may take a while – three months is not unusual.

There is something coming out of my anemone's mouth – what is it?

Anemones only have one opening into their digestive system – their mouth. Once they digest a meal, anything that is indigestible (fish bones, etc) will come back out of the mouth when the anemone is done eating. Additionally, anemones will sometimes "deflate" in order to flush wastes out of their system or to balance internal water chemistry. This water will flow in and out of the mouth, and sometimes contains some body slime, etc. Stringy dark brown substance coming out of the anemone's mouth is usually a bad sign – it is most often an indication that the anemone is expelling its zooxanthellae due to stress or injury. Finally, when spawning anemones release their eggs or sperm from their mouths. In the case of females, the eggs are colored spheres about the size of poppy or small sesame seeds; in the case of males, the sperm is a light-colored cloud that looks a lot like smoke.

My anemone doesn't look too good – what should I do?
There are many things that can cause stress to an anemone. Your best bet is to read through this entire FAQ and follow a checklist to try to determine the cause of stress (and remove it). Ask yourself these questions:

1) Was the anemone healthy to begin with?
2) Is my system adequate in all areas for keeping anemones?
3) Has there been recent changes in water conditions / environment?
4) Has there been any recent physical stresses (predation or injury?

My anemone deflates and 'smoke' comes out of its mouth – what should I do?
Most likely your anemone is a male anemone that is spawning ☺ However, if this behavior continues frequently (several times a week) and is accompanied by general poor appearance of the anemone, there is a good likelihood that your anemone has an internal infection and is trying to flush bacteria and/or dead tissue out of its system. Unfortunately in this later case, the prognosis is not good. There is little history of anti-bacterial use with anemones, and most anti-bacterials will cause more harm to the anemone than good. Maintain your anemone in a stable environment and hope for the best, but keep a close eye on it and remove it from your system the moment it dies and/or starts to decay.

My anemone looks inverted – its mouth is inside out. What should I do?
This behavior is normally a sign of extreme stress and/or near death for the anemone ☹ Assuming that your tank environment is perfect, the only thing you can do is wait to see if your anemone can recover from whatever caused the stress in the first place. Occasionally this behavior is caused when an anemone is first added to a new system and when the anemone is not carefully and slowly acclimated. Hopefully the anemone will recover from its shock and live on to thrive in your system.

My anemone won't attach, and is rolling around the aquarium – what should I do?
Failure to attach is often a sign that water conditions are not suitable for the anemone. Check all water parameters again and address anything that is out of line. Some sand anemones may have a difficult time initially attaching when first placed in an aquarium (especially if they are also slightly stressed from shipment or acclimation) – *M. doreensis* is a good example of one species noted for this behavior. If you have a sand anemone that is rolling around, but otherwise looks healthy, try to 'plant' it in the substrate. Dig a hole and bury the anemone so deep that its entire column is buried with only its tentacles sticking out at the top.

How do I know my anemone is dead?
Dead anemones start to decompose quickly and smell HORRIBLE. If your anemone starts to show breaks in the body skin, holes, or tears, especially if they were not caused by anything physical, it is likely that your anemone is decomposing. Sometimes an

anemone can start to decompose even when it is still living. The best test is to smell it – if it smells BAD it is time to toss it. (Trust me, you will know what I mean when I say it smells BAD).

Why does my anemone shrink up during the day?
All anemones shrink down periodically to flush wastes and balance water chemistry. However if your anemone does this frequently (more than a couple times per week) or stays shrunk for more than an hour or two at a time, you need to look for other factors that are stressing the anemone. In most cases the anemone is not happy with the water conditions (chemically) or it is not receiving proper lighting (too bright or wrong spectrum). If the anemone shrinks only when the lights come on, this is almost always a sign of light shock where the anemone either isn't fully acclimated to the lighting in your tank, or the lighting is too intense or too yellow. This behavior is often seen with bright metal halide lighting, especially (for whatever reason) if the bulb is a 10K or lower (white to yellow) bulb. Try replacing your bulb with a bluer bulb or moving the anemone to a darker section of the tank.

Are there any medicines for sick anemones?
None at this time. There has been very little work in this area.

If my anemone dies, will it release toxins and kill my entire reef tank?
The anemone itself will not release toxins, however the ammonia spike from the decay of a large anemone will certainly have a negative impact on your tank (just as the decay of any other large creature would). If an anemone dies you need to remove and dispose of the carcass as soon as possible.

VIII PHYSICAL HAZARDS

My anemone just got sucked into my powerhead – what should I do?
In a stable, healthy environment, anemones can recover from tremendous damage – including being torn in half. However just as often they can get secondary infections which spell the end of the anemone. It is best to move the anemone to a safe location in the tank and keep a close eye on it to see whether it is recovering or getting worse.

A rock that my anemone was attached to just moved and my anemone ripped – what should I do?
Leave the anemone alone and try not to stress it further. Keep a close eye on it to see whether it is recovering or getting worse. Many healthy anemones can recover from minor tears and physical damage – however if they get an infection and start to break down, you will need to remove them from your tank.

Will my BIG clown hurt my LITTLE anemone?
Clownfish are often rough on small or newly introduced anemones. Make sure to obtain large enough anemone if you have clownfish in the tank. General rule of thumb is that your anemone diameter should be at least twice the length of the clown, and even larger if you have two clownfish. If you have a small anemone and a big clown, there is a good chance the clown could stress it until it dies.

My clown appears to be biting tentacles off my anemone – what should I do?
This behavior has been noted from many aquarists and has not been explained. Some clowns tug and pull on tentacles, and on occasion will vigorously rip off tentacles or tentacle tips. Larger anemones can recover from this abuse more easily than small anemones. You may try feeding your clown more frequently to see if this reduces the incidence of biting. However if the clown continues to bite and the anemone is stressed, you may have to remove one or the other from the tank.

Tentacles on my anemone are disappearing. What's going on?
If *all* the tentacles on your anemone are shrinking, it is normally a sign of starvation. If only some of the tentacles are missing, shrinking, or deflated, it is a sign of physical damage.
Anemones will grow quickly if they are in a healthy environment and have bright lighting and a secondary food source. However if the lighting is dim and they don't have a lot of secondary food, the anemone will start to wither away as it consumes its own body tissues to stay alive. One of the most striking signs of this condition is when the tentacles become shorter and shorter – appearing like nubs or bumps on the oral disk. Anemones can recover from this condition, but only if they are placed in a healthy environment with

good water and proper lighting. Secondary targeted feeding can help, but it is normally a short term solution if other factors are not in line.
Anemones can be physically damaged (and lose tentacles or have shrunken tentacles) by many sources. Frequently it can be predation by another fish – either a clown or small angel or other reef fish. Anemones can also be stung by large LPS colonies like frogspawn or bubble corals. Finally, anemones can be preyed upon by large worms (especially if the damage only occurs at night). There are other (less common) predators as well. The sign of predation is always localized damage on the anemone.

Are there reef critters that will eat my anemone?
Yes. The normal predators of anemones on the reef are certain fish, like large angels, parrot fish, and some wrasses (though these fish are rarely found in reef tanks). In addition, some nudibranches feed specifically on anemones. Finally, some of the larger reef worms will eat anemones. For the most part, in reef tanks, it is very rare to find anything that will actively prey on your anemones (the most common is probably pygmy angels and worms). Keeping clownfish in your anemone reduces the risk of predation, since the clowns will tend to keep other critters away.

IX OTHER

What other things do clowns host in?
Clownfish have strong hosting instincts. In the absence of a suitable anemone host, they will often host in LPS corals (especially gonipora, frogspawn, or other LPS that resemble anemones). Additionally, they will host leather corals, large mushrooms, xenia, or even caulerpa beds! The presence of an anemone is not required to have a healthy clown, or to even having spawning clownfish.
A quick comment upon large elephant ear mushrooms (*Amplexidiscus fenestrafer*). These mushrooms WILL eat your clowns if the clowns try to host in them, regardless of whether the clown is immune to their stings.

Are there any artificial hosts for clown fish?
If a living host is not available, clowns will accept a suitable "lair" as their territory. Many breeders are successful with overturned or inverted terracotta flowerpots or sections of PVC piping.

Why are some anemones so colorful while others are so bland?
All healthy clown anemones have two types of coloration – the brown coloration given to them by their healthy zooxanthellae, and color 'pigments' whose purpose is not clearly understood, but may have something to do with protecting the anemone from bright lighting. Therefore, many anemones (of any clown species) will be brown in color, but some may have striking pigments that given them brighter secondary coloration. These colorful 'morphs' demand much higher prices in the ornamental aquarium trade. Probably the most common (and popular) or the colorful varieties is the so-called "Rose BTA" which is a beautiful orange or red *E. quadricolor*. However many colorful varieties exist for all species of clown anemone.

What other anemones are commonly found in my LFS?
Many non-clown anemones can be found in your LFS. The most common of these include the Atlantic carpet or Sun anemone (*Stichodactyla helianthus*) and Atlantic anemone or Condylactis (*Condylactis gigantea).* These anemones have similar care requirements to Pacific clown anemones. They may or may not host clowns – generally speaking the chance of getting a clown to accept one of these anemones is much lower than the chance to get them to accept a Pacific anemone.

Is my anemone dangerous to humans? Can I get stung by my anemone?
Though you can generally not feel anemone stings through the thick skin of your hands or fingers, almost all anemones can sting you on the back of your arms or where your skin is thin. Have aquarium gloves handy. Some people are allergic to anemone stings. Protect your hands, especially if you are handling carpet anemones whose sting can be

quite potent. If you get stung and you are in pain, apply white vinegar to a cloth and keep the cloth on the affected area for 15 minutes, then rinse.

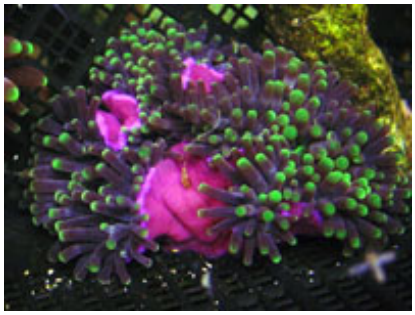
X SPECIES GUIDE

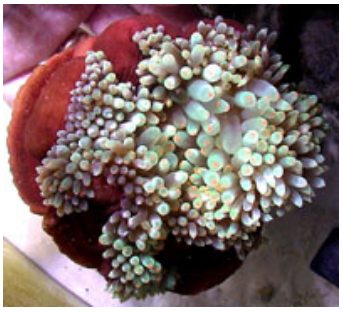
Cryptodendrum adhaesivum (Adhesive, or Pizza anemone)
Difficulty: More difficult.
Maximum size: 1 foot in diameter.
Recommended Minimum Tank Size: Medium (minimum 40 gallons).
Placement in Tank: In the sand only.
Light: Bright metal halide lighting, preferably above 175W.
Current: Low – moderate.
Natural clown fish symbionts:
A. clarkii
Split history in captivity: None.
Additional info: As named, this anemone is extremely "sticky". It is not often available because it is difficult to capture in the wild, and its stickiness causes problems in distribution. It is a very proficient opportunistic feeder (it will eat anything it touches). Sometimes available in brilliant greens, yellows and purples.

Entacmaea quadricolor (Bulb-tentacle, BTA, or corn anemone)
Difficulty: Difficult (however, considered the "easiest" of all clown anemones).
Maximum size: 1 foot in diameter.
Recommended Minimum Tank Size: Small-medium (minimum 10 gallons).
Placement in Tank: In rocks – preferably in cracks or crevices.
Light: Wide range of acceptable light – from VHO fluorescent to metal halide.
Current: Moderate.
Natural clown fish symbionts:

- *A. akindynos*
- *A. allardi*
- *A. bicinctus*
- *A. chrysopterus*
- *A. clarkii*
- *A. ephippium*
- *A. frenatus*
- *A. latezonatus*
- *A. mccullochi*
- *A. melanopus*
- *A. omanensis*
- *A. rubrocinctus*
- *A. tricinctus*
- *P. biaculeatus*

Split history in captivity: Common.
Additional info: Very common in the retail trade. Widely available captive-raised "clones". Prolific cloner – can split several times per year, and 50+ individuals from one parent colony is not unheard of. Numerous color morphs, including the much-sought "rose BTA" which is a morph with red or orange tentacles.



Heteractis aurora (Beaded, or Sand anemone)
Difficulty: More difficult.
Maximum size: 1 foot in diameter, though large sizes rarely seen in trade.
Recommended Minimum Tank Size: Small-medium (minimum 10 gallons).
Placement in Tank: In the sand only.
Light: Metal halide lighting.
Current: Low - moderate.
Natural clown fish symbionts:

- *A. akindynos*
- *A. allardi*
- *A. bicinctus*
- *A. chrysogaster*
- *A. chrysopterus*
- *A. clarkii*
- *A. tricinctus*

Split history in captivity: None.
Additional info: Unique "knobby" tentacles make this anemone easy to identify. Frequently available in a sandy brown color, but occasionally seen in bright purple or other bright colors. Like other sand anemones, prefers to bury its base deep in the sand, with its oral disk lying flat on the surface of the sand.

Heteractis crispa (Leathery, Long Tentacle Anemone, or LTA (also sebae anemone))
Difficulty: More difficult.
Maximum size: 1 1/2 feet in diameter, with 6"+ long tentacles.
Recommended Minimum Tank Size: Medium (minimum 40 gallons).
Placement in Tank: No strong preference. In sand if brightly lit, else on rocks.
Light: Metal halide lighting.
Current: Moderate.
Natural clown fish symbionts:

- *A. akindynos*
- *A. bicinctus*
- *A. chrysopterus*
- *A. clarkii*
- *A. ephippium*
- *A. latezonatus*
- *A. leucokranos*
- *A. melanopus*
- *A. omanensis*
- *A. perideraion*
- *A. polymnus*
- *A. sandaracinos*
- *A. tricinctus*

Split history in captivity: None.
Additional info: The longest and thinnest tentacles of any clown anemone. Less common in trade than the other "long tentacle" anemone, *M. doreensis*. Purple color morphs more common than in other species.

Heteractis magnifica (Ritteri, or Magnificent Anemone)
Difficulty: Most difficult
Maximum size: 3 feet in diameter or larger. The 2nd largest of all clown anemones.
Recommended Minimum Tank Size: Large (minimum 75 gallons)
Placement in Tank: On top of a rock structure in good flow, top third of the tank
Light: Bright metal halide lighting, preferably above 175W
Current: Strong.
Natural clown fish symbionts:

- *A. akallopisos*
- *A. bicinctus*
- *A. chagosensis*
- *A. chrysopterus*
- *A. clarkii*
- *A. leucokranos*
- *A. melanopus*
- *A. nigripes*
- *A. ocellaris*
- *A. percula*
- *A. perideraion*

Split history in captivity: Rare
Additional info: If unhappy, will move around a lot, climbing up the glass and bothering other sessile invertebrates. Often locates as high in the water column as possible to get bright lighting and high flow. If you don't have bright enough lighting, it will often climb the tank glass to the surface. Grows fast under good conditions, can triple in size in one year.

Heteractis malu (Delicate, Sebae, or Sand Anemone)
Difficulty: More difficult.
Maximum size: 1 foot in diameter. Short tentacles.
Recommended Minimum Tank Size: Small - medium (minimum 10 gallons).
Placement in Tank: In sand only.
Light: Metal halide lighting.
Current: Low-moderate.
Natural clown fish symbionts:
A. clarkii
Split history in captivity: None.
Additional info: Very common in trade, but more difficult to keep than numbers would tend to indicate. The most frequently dyed anemone species – often seen in an unnatural and garish yellow or pink color. A bright white specimen, while pretty, is not healthy – it is bleached and will turn a brownish color once it regains its zooxanthellae.

Macrodactyla doreensis (Corkscrew, Long Tentacle Anemone, or LTA)
Difficulty: More difficult.
Maximum size: 1 foot in diameter, though large sizes rare. Long tentacles.
Recommended Minimum Tank Size: Small - medium (minimum 10 gallons).
Placement in Tank: In sand only.
Light: Metal halide lighting.
Current: Moderate.
Natural clown fish symbionts:

A. chrysogaster
A. clarkii
A. perideraion

Split history in captivity: None.
Additional info: Common in trade, somewhat picky in care. Numerous color morphs – rarely bright green or purple. Tentacles sometimes (but not always) exhibit cork-screw twisting.

Stichodactyla gigantea (Giant Sea Anemone, or Carpet Anemone)
Difficulty: Most difficult.
Maximum size: 1 ½ feet in diameter. Short tentacles (though longer than those on S. haddoni).
Recommended Minimum Tank Size: Medium (minimum 40 gallons).
Placement in Tank: Sand or rock.
Light: Bright metal halide lighting, preferably above 175W.
Current: Strong.
Natural clown fish symbionts:

- *A. akindynos*
- *A. bicinctus*
- *A. clarkii*
- *A. ocellaris*
- *A. percula*
- *A. perideraion*
- *A. rubrocinctus*

Split history in captivity: None.
Additional info: Uncommon in trade, very difficult to care for (may be most difficult of the clown anemones). Demands the brightest light possible – found in the wild in 3' or less of water. Seems to do best with very high water flow. Rare color morphs include green, blue, purple, and pink.

Stichodactyla haddoni (Haddon's Anemone, Saddleback, or Carpet Anemone)
Difficulty: Difficult (one of the hardier clown anemones)
Maximum size: 2 feet in diameter. Short tentacles, closely packed together.
Recommended Minimum Tank Size: Medium (minimum 40 gallons).
Placement in Tank: In sand only.
Light: Wide range of acceptable light – from VHO fluorescent to metal halide.
Current: Low-moderate.
Natural clown fish symbionts:

- *A. akindynos*
- *A. chrysogaster*
- *A. chrysopterus*
- *A. clarkii*
- *A. polymnus*
- *A. sebae*

Split history in captivity: None.
Additional info: Commonly available, even in color morphs like green, blue and purple. Notorious fish eater – extremely "sticky" when healthy. Will eat anything that blunders into it, including shrimp, crabs and snails. Can get very large, very quickly.

Stichodactyla mertensii (Merten's Sea Anemone)
Difficulty: Most difficult
Maximum size: 3 feet in diameter or larger. The largest of all clown anemones. Short tentacles like S. gigantea, with a few twice as long as the rest.
Recommended Minimum Tank Size: Large (minimum 75 gallons).
Placement in Tank: On rocks.
Light: Metal halide lighting.
Current: Moderate.
Natural clown fish symbionts:

- *A. akallopisos*
- *A. akindynos*
- *A. allardi*
- *A. chrysogaster*
- *A. chrysopterus*
- *A. clarkii*
- *A. fuscocaudatus*
- *A. latifasciatus*
- *A. leucokranos*
- *A. ocellaris*
- *A. sandaracinos*
- *A. tricinctus*

Split history in captivity: None.
Additional info: Very rare in trade. Not much information available about captive care.

XI RESOURCES / RECOMMENDED READING

Anemone Fishes and their Host Sea Anemones by Fautin and Allen
This book can be found online here: *http://biodiversity.uno.edu/ebooks/intro.html*

The Reef Aquarium Volume II by Sprung and Delbeek

Host Sea Anemone Secrets by Ron Shimeck

The Modern Coral Reef Aquarium by Fossa and Nilsen

A Functional Biology of Sea Anemones by J. Malcolm Schick