



Feather star  
photographed with  
black background,  
Philippines

Text and photos  
by Steve Rosenberg

**Crinoids, or “feather stars” as they are commonly known to the scuba diving community, are echinoderms, members of the phylum Echinodermata, meaning “spiny skin,” which includes many well-known species like sea stars, sea urchins and brittle stars. Their highest concentrations are found around Indonesia, the Philippines, the Solomon Islands and Australia’s Great Barrier Reef. Most divers take a quick look at the shapes and varieties of feather stars, but usually pass on by, in search of other interesting subject matter. However, there is more to them than meets the eye!**

Many divers who have traveled to the Indo-Pacific are familiar with feather stars and admire them for their bright colors and interesting shapes. Feather stars are also well

known to divers because of their propensity to attach to the wetsuits of careless divers. The arms of feather stars are very sticky and will cling to almost any surface

much like “living velcro.”

Unfortunately, when they extend their arms they will often stick to almost anything that passes by, including hands, wetsuits,

fins, buoyancy compensators and camera gear. It is very easy to damage a feather star when you just brush against them. Their arms are fragile and often tear off

when they stick, so divers need to be very careful when they swim close to the reef surface that are populated by these interesting creatures.

# Fascinating Feather Stars

*& The Creatures Within*





### Characteristics and behavior

Most species hide under rocks, in crevices or under coral ledges during the day, coming out usually at night and slowly make their way across hard surfaces to find good places to feed. Feather stars walk on short legs and are actually free swimmers. Swimming may be a slight exaggeration, in that they are able to propel themselves through the water by alternating sweeps of their arms.

Each feather star has up to 200 arms per animal. They feed by extending their arms up and out into the water column to catch bits of plankton passing by in the current. Tiny fingerlike tube feet that line their arms pass the bits of plankton into special food gutters that run along the center of each arm. Tiny microscopic cilia (hair-like projections) carry the food along the gutters that run the length of the arms down to the mouth of the feather star. Crinoids are

distinguished from other echinoderms by the fact that their mouth is pointed upward, unlike their starfish cousins. They are often found perched atop rocks and coral heads in areas prone to current, in order to capture bits of plankton carried along by the water movement.

### Hosts to commensal critters

Few divers take the time to carefully look closely enough to see that crinoids are actually hosts to many tiny commensal animals. The underwater world can be a scary and dangerous environment for small and vulnerable critters; potential predators lurk around every corner. Many of these small marine animals have adapted to the constant threat from predators by finding ways to become less "desirable" or less accessible. For a number of these small animals, such as shrimp, clingfish and squat lobsters, crinoids provide the perfect

refuge.

Symbiosis is a relationship between two organisms that live together. Usually the larger partner, in this case the feather star, is referred to as the host. The smaller organism, in this case squat lobsters, shrimp or clingfish, is referred to as an associate. Within the marine biology community, this relationship is typically described as commensalism, which primarily ascribes a benefit to the associate, or mutualism where there is a benefit to the host and to the associate. The tiny residents of the feather stars receive two major benefits, protection from predators a ready source of food. The feather star itself receives a lesser benefit in that these tiny house guests serve as a cleaning crew, picking off scraps of plankton and detritus that get stuck in various parts of the host.

Many of these tiny animals have an incredible ability to disguise them-

Squat lobster inside host feather star, Philippines (above); A crinoid shrimp sits atop an arm of a feather star (top right); Feather stars extend their arms into the water column to gather plankton, Philippines (top left)



Feather Stars

A tiny shrimp hides within the folds of a feather star (above); Feather star perched on reef surface, Philippines (left)



Gold squat lobster blends in with a crinoid of the same color, Philippines

selves within the host by mimicking the colors, shapes and textures of the crinoid. Some underwater photographers simply look at the host feather stars as interesting and colorful animals and may take a couple of quick snapshots of the outside of the host with the water column in the background to create interesting images of the feather stars. However, most photographers rarely spend the time to focus on the tiny residents hiding within.

In some ways, this can be seen as more challenging because the tiny residents are pretty elusive and pose inherent difficulties because of their size and ability to hide in plain sight. They also have a frustrating ability to navigate easily within the sticky, retractable and writhing arms of the feather stars. We, as photographers, find it very rewarding when we are able to capture images of the interesting macro subjects we discover within the hosts. Again, though it should be

noted that much care needs to be taken not to injure the animals.

**Squat lobster.** One of the more spectacular companions or “associates” is the aptly named squat lobster, from the *Allogalathea* family, a small crab that lives among the arms of the crinoid. Working as a miniature house cleaner, these crustaceans quite often take on the colors of their host in order to camouflage themselves further from predators. During the day, they hide amongst the arms or feet of the crinoid, before boldly walking the surface of the arms at night, picking up tiny morsels of food that have become stuck to their host. A second species of crab, commonly known as “crinoid crabs,” are frequent inhabitants of crinoids but are less conspicuous than their larger relative, the squat lobster.

**Shrimp.** Not to be outdone by their crustacean cousins, various shrimp

have also created a commensal relationship with crinoids; several species can be found cohabiting within these spectacular echinoderms. Although different species seem to all be called “crinoid shrimp”, there are many differences in size and shape between the species of *Periclimenes*, *Laomenes*, *Brucecaris*, as well as several others that are associated with crinoids. Similar to the squat lobsters, these fragile shrimps live within the protective folds of the feather star as a form of shelter, while feeding on the microscopic food items that they can find within the arms of the host.

**Fish.** Crustaceans are not the only ones that have created a relationship with crinoids; several species of fish also use crinoids as protection. The beautiful ornate ghost pipefish is often found trying to blend itself among the arms of a crinoid, as a means of camouflage. There is even a small species

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of cuttlefish, known simply as the “crinoid cuttlefish” that hides in crinoids and adapts its color to match!

The most unique fish to call the crinoid home is the tiny, yet spectacular, crinoid clingfish. This fish—which looks like a cartoon character, with bulbous eyes, tapered tail and sometimes garish coloration—lives nestled within the disc of crinoids and feeds upon bits of plankton and small crustaceans trapped within the crinoids’ appendages. Trying to photograph these small fish is a lesson in frustration. They are constantly darting and dipping around their host, hiding amongst the arms.

For the photos in this article, standard macro equipment was used, including a Nikon D7100 camera, 60mm macro lens, Subal housing, and Sea & Sea strobes; the images were captured using the fol-

lowing specs: ISO 200, F/29, 1/200th of a second.

### Final thoughts

With so much traffic happening within a crinoid, it is always a great idea to stop and observe whenever you see one on a dive. For photographers, it is a definite must to peer inside these colorful and exotic-looking reef inhabitants, due to the multitude of potential macro photographic opportunities they can provide. ■

*A professional underwater photographer and photojournalist since 1980, Steve Rosenberg has produced over 20 destination guide books in print for international publishers including Lonely Planet, Cruising Guides and Aqua Quest Publications; as well as hundreds of articles for US and international publications. With*

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Crinoid clingfish in feather star (above); *Periclimenes* sp. crinoid shrimp camouflaged against the host feather star (top right); Harlequin ghost pipefish against feather star (top left)

#### SOURCES:

ALLEN, G. (2000). *MARINE LIFE OF THE PACIFIC AND INDIAN OCEANS*. TUTTLE PUBLISHING.

HANSSON, H. (2012). “CRINOIDEA.” *WORLD REGISTRY OF MARINE SPECIES*. WIKIPEDIA.ORG

