

SPECIES SPOTLIGHT

SEA STARS

BY BILL RHODES | PHOTOS BY CHRISTOPHER PAPARO



No matter where you live or whether you are a child or an adult, chances are you are familiar with **starfish** (a.k.a. sea stars).

In fact, the sea star (*Asterias forbesi*) is one of the most recognized species found in New York's inshore marine waters. Many beach walkers have been delighted by the unmistakable sight of a spiny, five-armed critter lying on the beach or latched onto seaweed or debris along the ocean's edge.

Despite its common name, however, starfish aren't actually fish; they are **echinoderms**, closely related to sea urchins and sand dollars. As such, scientists now refer to starfish as sea stars. These familiar marine animals have lived in the Earth's seas for millions of years and, while we sometimes call them primitive, they are actually an evolutionary success story.

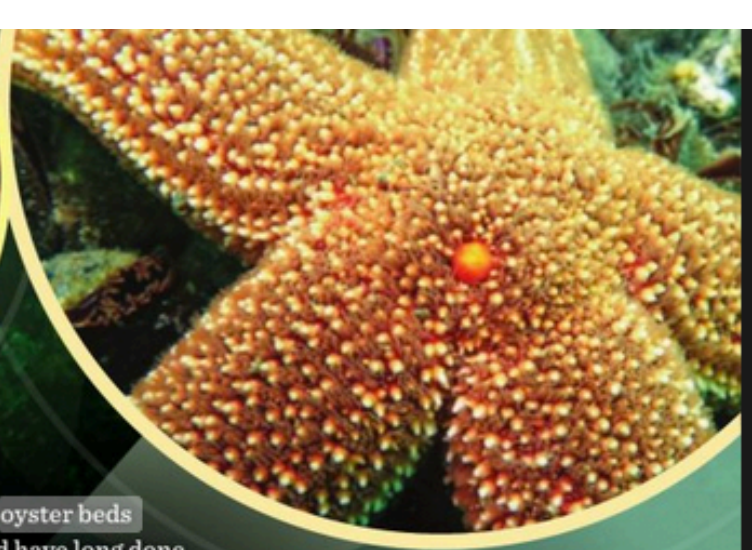
Description/Diet/Behavior

Sea stars are often found clinging to underwater rocks or boulders. They can grow to be six inches (15 cm) from arm tip to opposite arm tip and vary in color, being shades of red, pink, tan, or brown, with some of the most striking individuals displaying bright orange on their upper sides. They are radially symmetrical, meaning you can divide their bodies in half at any central point and have two mirror image sides.

On the underside of their arms are hundreds of small tubed feet equipped with "suckers" on their tips. These tubed feet help propel sea stars through the water, enable them to eat their food, and allow them to cling to underwater structures to avoid being washed away.

At the tip of each arm is a light-sensitive eyespot, which sea stars use to navigate along the sandy bottom. They also rely on **chemoreception**—their sense of smell—to identify chemicals in the water emanating from their prey. While they are carnivores and will eat small invertebrates and crustaceans, they are perfectly designed for finding and devouring bivalve **mollusks** (oysters, mussels, clams, and scallops).





When a hungry sea star finds a suitable-sized clam, it envelops the top and bottom shells in its arms and pushes its sticky feet up against them. Flexing its body, the sea star then pries open the shells just

enough for it to push its stomach out through its mouth and inside the clam, where it begins secreting digestive juices. These juices turn the clam's body into a liquid that is then guided into the sea star's mouth.

If you have ever tried to open a clam with your fingers, you know just how strong its muscles are, yet the sea star almost always wins this battle. It can exert constant muscle pressure for a very long time, generally outlasting the clam's resistance, and only requires a very thin opening to slide its stomach into its prey. When finished, the sea star pulls its stomach back inside itself, leaving behind an empty shell, still attached at the hinge.

Resilient creatures, sea stars can survive having their legs nipped off by a predator since the appendage will grow back, although usually not to the same size as before. Amazingly, some sea stars can grow their entire bodies back from a single leg, provided that about one-fifth of the central disk is still attached.

Life History

Most species of sea stars have separate male and female individuals. To reproduce, the female releases as many as 2.5 million eggs into the water, which stimulates nearby males to shed their sperm. The resulting fertilized eggs then hatch to become minute, free-swimming, bilaterally symmetrical larvae called *bipinnaria*. These larvae are covered with small hairs, which propel them in the water, where they become part of the ocean's zooplankton. After swimming and feeding for about three weeks, they settle to the ocean floor and change into the radially symmetrical, multiarmed, non-swimming adults we recognize as sea stars.

While a favorite of beachcombers, sea stars' proclivity for devouring clams and oysters has made them unpopular with many commercial clambers and shellfish harvesters, who see them as adversaries. Sea stars can wreak havoc

on oyster beds and have long done so in Long Island Sound.

The larger the clam or oyster, the less vulnerable it is to sea star predation, but sea stars can wipe out juvenile clams so that none are left to grow to harvestable size.

Sea stars are very effective at attacking vast underwater beds of shellfish. It has been documented that clams that are one-half inch or less in size (juveniles or small adults) are particularly vulnerable. These small clams can be consumed at a rapid pace—10 or more individual clams per day being eaten by a single sea star. Multiply that by the many thousands of sea stars that may be present in an abundant year, and it is easily understood how they can have a long-term, harmful impact on local commercial shellfish operations. But not all starfish compete with or interfere with commercial marine fishermen. There are more than 2,000 species of sea stars throughout the world—they live in every part of the ocean on Earth, at all depths.

Simply built, slow, and deliberate, sea stars may seem to be primitive animals, but they are in fact one of nature's success stories, and they are really fun to watch.

Bill Rhodes is a retired life sciences and healthcare industry executive. He is a freelance writer and avid naturalist.



Fun Facts

- Sea stars enjoy long lives, with some species living as many as 35 years.
- Sea stars live throughout the Earth's oceans, but cannot live in freshwater.
- Although a sea star can regenerate lost limbs, it will take about a year for one to grow back.
- Sea stars do not have a brain or blood, they use seawater to transport nutrients throughout their bodies.
- Not all sea stars have five arms; the sun star can have as many as 40 arms.

