

## Barnacles

### Inverted Invertebrates

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Thirty years ago while returning from Washington State with a cooler full of barnacles for a university project, two friends and I were stopped at Canadian customs. We declared that we were transporting marine animals, and the customs officer wanted to have a look at our cargo. Peering inside our cooler, the officer laughed and assured us that barnacles were not animals but “annoying things that grow on the bottom of your boat”.



Although public awareness of the marine environment has grown significantly since then, the customs officer’s attitude towards barnacles is still a common one. The barnacle’s habit of growing on almost anything in the ocean, from rocks to whales to boat hulls, can be not only annoying, but also expensive. In less than a year the number of barnacles growing on a large ship can cause enough drag to increase fuel consumption by 40 per cent. In less than two years, a large tanker can accumulate more than 10 tons of barnacles. Removing their hard calcareous shells is time-consuming and expensive.

Barnacles are crustaceans related to shrimps and crabs. Although the volcano-shaped shell of an adult barnacle does not resemble an adult crab or shrimp, the juveniles, or larvae of barnacles bear a strong resemblance to other crustacean larvae. Barnacles, like most crustaceans, spend at least the first few weeks of their lives as tiny planktonic larvae, swimming and feeding near the surface of the ocean. They pass through a series of moults until they reach a stage where they are ready to attach and assume the adult form. At this point they start looking for a place to settle, and anything is fair game for colonization – ships, pilings, rocks, crab shells, floating logs – anything. Some species are commensal (benign hitchhikers), attaching themselves to whales, sea turtles, jellyfish and sharks, and others are parasitic, invading the bodies of other crustaceans.

Once a barnacle larva finds a suitable surface to settle on, it secretes a strong adhesive from glands on its first antennae, glues its head to the surface, with legs extended above, and starts to create a hard outer shell. This head-down feet-up lifestyle inspired one scientist to describe a barnacle as “a small shrimplike animal standing on its head in a stone house kicking food into its mouth”. The glue used to attach barnacles is one of nature’s most incredible adhesives. It hardens quickly under water, and holds under extreme pressure. It cannot be dissolved by strong acids or alkalis, resists temperatures up to 225° C (440° F) and is resistant to bacteria. Even after the barnacle dies the shell stays firmly attached until it is worn away or removed by extreme force.

Once formed, the shell is a formidable fortress that protects the soft-bodied barnacle from predators, pounding surf and the effects of drying at low tide. The volcano-shaped shell of the Acorn Barnacle has an opening at the top that can be closed by movable shells at low tide or when a predator threatens. When open, the barnacle stretches out its feathery appendages to collect food from the water. The appendages trap small organisms and bits of organic material, and sweep them into the shell for the barnacle to eat.

On rocky beaches of British Columbia, you will find two types of barnacles: the volcano-shaped Acorn Barnacles; and, in wave-swept areas, Gooseneck Barnacles, with their shells on tough flexible stalks. Some species prefer to settle high on the shore beyond the reach of most marine predators such as sea stars and snails, and where competition for space and food is not so intense. These species must be able to live out of water for long periods of time while the tide is out. Other species cannot tolerate long dry periods and live closer to the low tide line or in deeper water where they are not exposed at low tide.

Gluing yourself to one spot for your entire adult life has its share of problems. Since you can't move around to collect food, you must be in a place where food comes to you regularly. And reproduction can be challenging – who knows what sex your nearest neighbour may be? To improve their chances of settling in an appropriate place, juvenile barnacles seek out adult barnacles of the same species; if these barnacles survived, conditions must be favourable. Adults give off chemicals to assist the larvae in their search for the perfect home. As for reproduction, settling beside a member of the opposite sex is guaranteed for most species, because they are hermaphrodites, possessing both male and female sex organs.

There are hundreds of different kinds of barnacles, from giant subtidal Acorn Barnacles to barnacles that live only on a specific species of whale. There are shell-less parasitic barnacles that fool female crabs into thinking they are a clutch of eggs to be cleaned and protected, and pelagic barnacles that grow only on floating objects far from shore. The lifestyles and appearance of barnacles are diverse and fascinating.

So the next time you're walking along a rocky shore, watch where you step. There are small shrimplike animals standing on their heads in those little stone houses.