

Following is a write-up from Rick Johnson from the 2006 season:

Gray Whale Barnacles

Bev Lindquist kicked off a discussion on whale lice and barnacles based on her recent trip to Baja. Barnacles reproduce in the same warm lagoons where gray whales give birth to their young. The larval barnacles are planktonic; they glide and swim to a new host whale where they attach and become adults. Lice on the other hand are Isopods which hold their eggs under their bodies. They disperse by crawling from mother whale to calf.

This discussion precipitated a rambling discourse on barnacles which Bev asked me to write up. Here is a cleaned up version.

What is a barnacle? If you guess a clam or mollusk you are a good observer, and in good company with the illustrious naturalist, Georges Cuvier. But unfortunately he was wrong. Barnacles have calcareous shells and until 1830 were classified as mollusks. At that point their larval forms were discovered to be like other Crustacea (e.g. crabs, shrimps, lobsters). Inside the barnacle's shells, is an upside down body - head permanently attached to the bottom and jointed legs which can extend to comb minute food out of the water, and kick it in towards the mouth. When a barnacle is out of water and exposed to air, two shell plates, like the portal of an astronomical observatory, close at the top to protect the body inside. The barnacles' scientific class name is Cirripedia, which means "curls of hair" "feet", a description of the shape of the feeding appendages. (Here is a reference with a beautiful picture of a feeding barnacle http://www.calacademy.org/research/izg/SFBay2K/Balanus_crenatus64349E.htm)

Adult barnacles are sessile; they stay put. When the larva settles, glands near its first antenna secrete glue that forms an extremely strong bond, "among the most powerful natural glues known -with a tensile strength of 5,000 lbs per square inch and an adhesive strength that has been measured at 22 - 60 lbs per square inch". (ref: <http://www.onr.navy.mil/media/article.asp?ID=36>) Barnacles have a low conical shape that deflects the force of waves and water currents which also helps them stay in place.

The skin of the whale is a trickier substrate than rock since skin is continually sloughed off and regenerated. One source describes it this way: "A barnacle on a whale pulls the skin into the cavity of its shell, making an attachment that penetrates beyond the layer of sloughing skin". (ref: <http://www.learner.org/jnorth/tm/Barnacle.html>). When a whale barnacle is torn off the skin, it leaves a scar.

Reproduction: Most barnacles are hermaphrodites. They have both ovaries and testes, but an individual usually functions as male or female, not both at the same time. They cross-fertilize with an extensible penis that reaches over to an adjacent barnacle. The eggs mature for about four months and then larva are released as nauplius larva. This form looks like a little water bug and feeds on plankton and molts through six stages.

Then it metamorphoses into a cypris, a non-feeding stage that does the settling and attachment. Cyprids settle gregariously in response to a settlement factor which is probably a chemical from the adults' bodies (see http://www.marlin.ac.uk/species/larval_gen_Semibalanusbalanoides.htm). As Bev described it, these larval stages are timed to occur in the warm water lagoons where there is an abundance of slow moving, whale hosts for attachment.

How fast do they grow? In a rocky shore barnacle, the newly attached, young barnacle is about 3mm after one month of growth. Whale barnacles may grow faster. From pictures, the whales migrating north have quarter inch size young barnacles interspersed among the adults (see ref: <http://www.humboldt.edu/~cmc43/ectoparasites.html> which also has pictures of lice, and look at <http://www.biosbcc.net/ocean/marinesci/05nekton/GWsouth.htm> which shows an adult barnacle next to a ruler for scale, and also a microphotograph of the cyprius stage.)

How old do they get? Rocky shore barnacles live to 7 to 10 years of age. Bev learned that whale barnacles live to over twenty years.