Slipper Limpet

Crepidula fornicata

Class: Gastropoda
Order: Littorinimorpha
Family: Calyptraeidae
Genus: Crepidula

Easily seen along the shoreline.

Distribution

It is native to the eastern coast of North America. It occurs from the Gulf of St. Lawrence in the north all the way south to the Gulf of Mexico.

This species has been introduced to several other countries, especially in Europe. It is considered to be an invasive, nuisance species. The first known occurrence of *Crepidula fornicata* in Europe was in 1872. It was introduced accidently with imported American oysters. They have been repeatedly introduced ever since in ballast water and on ships' hulls.

Habitat

This species occupies a variety of seabed surfaces. They also occur in a wide range of environmental conditions.

They are most abundant in muddy or mixed muddy areas, reaching their highest densities in wave protected locations. These include bays, estuaries and sheltered sides of wave-exposed islands. In Nova Scotia they are common in intertidal and shallow subtidal regions. They attach themselves to almost any hard surface to be found (including each other and the shells of other living or dead hard-shelled invertebrates.

Food

They live off of plankton which they filter out of the seawater.

They are active suspension feeders, generating a water current through the mantle cavity by ciliary (hair-like) action and trapping food particles on a mucous sheet lying across the front surface of the gill filament.

Reproduction

The Slipper limpet is a. protandric hermaphrodite. This means it is born as a male with the potential to become female at a later date. Young males seek out older females for mating purposes. Once they convert to being female, they remain as females.

Being hermaphrodites they contain both male and female reproductive organs. Sperm producing ability advances quicker than ovum production which results in them being born male. They often stack on top of each other. Larger females are on the bottom, the smaller males are on the top. Stacks can be viewed as independent mating groups with copulation occurring between individuals occupying any position in a chain. Males at the top fertilize the bisexual individuals below and they in turn fertilize each other as well as the larger females at the bottom of the stack. These females control the sexual definition of the group by releasing pheromones into the surrounding water.

Development

Most females spawn twice in a year. Fertilized adult females create about 45 membrane sacs into which they place 250 eggs or so in each of these. They are kept nearby her, either under her foot or attached to the rock she is on. She broods these for about a month as they develop to the veliger stage.

Characteristics

The shell is oval, up to 5 cm in length. It is smooth with irregular growth lines. It can be white, cream, yellow or pinkish in colour with streaks or blotches of red or brown.

Adaptations

They form curved stacks of up to 12 individuals. Being stationary this facilitates reproduction. They have the ability to change from being male to female. A waterborne hormone regulates female traits. If the ratio of males to females becomes too high, the male reproductive organs will degenerate and the limpet will become a female.

Status/Threats

These are considered an invasive species. They occur in very large numbers in many areas of the Atlantic Ocean.

Sightings in Nova Scotia

These are very common in Nova Scotian waters.

Larvae are pelagic and are found in the water column. Growth of the larvae is temperature dependent and takes about 2 weeks longer at 18° C than at 24° C. After swimming around feeding on plankton for several weeks (2 to 4), the veliger larvae become capable of metamorphosis. The larvae are about 0.4 mm long when released and about 1 mm when they metamorphose. A newly formed juvenile limpet may settle on its own or on top of an established group. If the individual settles alone, it becomes male briefly, passing rapidly on to a female. If it settles on a stack it remains a male.

On the inside of the shell there is a white "deck", or septum which causes the shell to resemble a boat or a slipper, hence the common name. The septum protects the visceral mass of the limpet. It keeps the important digestive organs in place. There is variability in the shape of the shell: some shells are more arched than others.

The shell of a limpet settling on its own grows to fit the substratum. Another limpet may join it, thus initiating a stack formation. When settling on an existing group maturation from juvenile to male and the maintenance of the male state is promoted by pheromones released by the larger females at the bottom of the stack. If the females in the stack die, one of the larger males will become a female. Sex change occurs to the bottom-most male in a stack and takes approximately 60 days. During this time the penis regresses and the pouches and glands of the female duct develop. Adults live on the seabed on a variety of surfaces in a wide range of environmental conditions. They often attach to the shells of dead and living hard-shelled invertebrates including scallops, crabs, whelks and mussels.

Natural predators include birds, fish, crabs, starfish and other marine invertebrates. Considered to be a threat to marine biodiversity these limpets are subject to various eradication programs, including dredging. Studies are ongoing relating to their effect on the environment and control measurements are in place to limit further expansion. They are a great inconvenience to aquacultures, especially oyster and mussel beds.