

Horse Mussel

Modiolus modiolus

Class: Bivalvia
Order: Mytiloida
Family: Mytilidae
Genus: Modiolus

Distribution

This species is widely distributed in the northern hemisphere. It is found along the Atlantic coast of North America, from the Arctic Ocean to Florida, and along the Pacific coast, from the Arctic Ocean to California.

Habitat

The horse mussel is found partly buried in soft sediments or coarse grounds or attached to hard substrata, forming clumps or extensive beds or reefs.

Food

They are suspension filter feeders. Particles of varying size are extracted from water as it is drawn into the body cavity.

Reproduction

Mussels have separate sexes. Sperm and eggs are released into the water column for fertilization. Spawning peaks in spring and summer.



Shells are all along the nearby shoreline.

Its global range includes the coasts of Japan, Iceland, Europe, north-western Africa and the Mediterranean Sea. It occurs on the European seaboard of the Atlantic Ocean from the United Kingdom northwards. It occupies all of the North Sea and extends south to the Bay of Biscay. There are large beds of these mussels along the coast of Scotland.

They occur on both the west and east coasts of Canada but are far greater in number all along the eastern seaboard. They extend from Nova Scotia up into the Arctic Ocean.

It can be seen singly usually in rough ground but also in huge beds. It can be found on the lower shore in rock pools or in laminarian (seaweed) holdfasts but more common subtidally to depths approaching 300m. It is found from low tide mark to depths of 50 metres in British waters and 80 metres off the coast of Nova Scotia. Individuals have been found at depths of up to 280 m. Water movement appears to be an important factor in the build up of many of the denser reef areas, the majority being found in areas of moderate to strong tidal currents.

Food availability for suspension feeders is linked to seasonal production. Adult *M. modiolus* in Nova Scotia occur commonly in areas with moderate to high water exchange. They ingest phytoplankton, detritus, bacteria, and non-living organic matter. Feeding material is sorted by size and rejected particles fall off gill edges as pseudo-feces.

The timing and duration of gametogenesis and spawning varies a great deal globally. Fertilization is in response to environmental conditions. Depth and latitude (water temperature) are contributing factors. In this species mussels are long lived and slow to reproduce. They do not become sexually mature and capable of reproduction for several years.



Development

Fertilized eggs become larvae. Larval development is planktotrophic, with a short trochophore stage prior to the veliger stages. They are free swimming for three to four weeks. During this time they develop several structures, including a pair of ocelli and a foot, retained through life.

Characteristics.

This is a large, robust mussel with the potential to grow to 22 cm or more. 10 cm, however, is typical. Size relates to age and at this (10cm) size the mussel is likely to be between 12 to 18 years old. Growth rates vary regionally. The shape is an irregular oval, or rhomboid. It is bluish-white to slate blue, darkening in older specimens with a very glossy periostracum (chitinous layer), a light horn colour to mahogany or dark brown in old shells, usually with a lighter yellow-brown strip along the umbonal ridges.

Adaptations

Rapid growth is an adaptation to avoid predation. Once a large size is reached growth slows down. Individuals reaching 45-60 mm in length are less vulnerable to predation.

Status/Threats

Larvae and juveniles are heavily predated.

Sightings in Nova Scotia

These are quite common in coastal areas.

Settling larvae metamorphose into young juveniles and proceed to find a primary settlement location. They prefer the byssus threads and aggregations or clumps of adults which provide a refuge from predators. Juveniles growing on byssus threads are more likely to survive than free living individuals. These newly-settled young mussels exhibit rapid growth in the first four to six years prior to reaching maturity. They invest energy in growth rather than reproduction.



Young shells have numerous long, smooth, spines which wear away in the adult. The interior of the shell is white, with a faint bluish tinge. It has a wide pallial line, a large anterior adductor muscle scar and small posterior adductor muscle scar. The two valves are roughly triangular or bluntly oblong with rounded umbones near the anterior end.

The colour of the mussel (animal) itself is a dark orange; the foot is red, whitish towards the thick and wrinkled base.

Both margins of the mantle are covered with delicate cilia

The shell bears clear growth lines, and a sculpture of fine concentric lines and ridges. Numbers of growth bands can establish the growth rate, especially of

younger individuals. These rates vary a great deal with environmental circumstances. For example, ongoing studies of both wild and enclosed mussels indicate lower growth rates for mussels from deeper populations.



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The strong, thread-like anchor (byssal thread), allows the mussel to attach itself securely to almost any substrate, including each other. These tough threads are secreted as a liquid by a gland near the foot. This hardens upon contact with water. In attaching to each other they form protective clumps. These can grow to be large banks.

Trawling and dredging destroy beds.

Horse mussels have formed wave-like mounds in the Bay of Fundy up to 3 m high and 20 m wide and from 10 to 100 metres long.

