

Atlantic Atlantic Mud Mud Piddock Piddock

Barnea truncata

Class: Bivalvia
Order: Myoida
Family: Pholadidae
Genus: Barnea

Distribution

This global Family of *Pholadidae* is commonly known as piddocks or angelwings. It is split into several genera, one of which is *Barnea*. This genus contains several species and *B. truncata*, the Atlantic mud-piddock, is one of them. It occurs from Nova Scotia, Canada sporadically south along the Atlantic coast into South America.

Habitat

These marine bivalves are intertidal burrowers. They bore into substrates of variable hardness, building tubular burrows. Sites selected vary regionally and include marine peats, firm muds, mudstone, and on occasion wood.

Food

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

Reproduction

The sexes are separate. Eggs and sperm produced are fertilized externally.



Mud piddock siphons can be clearly seen in this photo and on the nearby shoreline. Empty burrows can also be easily found and, on occasion, shell fragments.

Barnea species are distributed mainly along the Atlantic and Pacific coasts of the American continent, or in the Indo-West Pacific region. These two groups have distinct features and structures. *Barnea truncata* occurs from eastern Canada to Florida, the Gulf of Mexico, South America, and also West Africa. Its previous southern range (21°Lat S, Brazil) has now extended to the intertidal zone of Bahia Blanca Estuary Argentina (38°S). Larval transport by shipping is the probable entry route. In Canada there is a very unique and disjunct population in the Minas Basin of the Bay of Fundy. They populate three separate areas of this basin, the most accessible being at Burntcoat Head. Nova Scotian mud piddocks are isolated from those further to the south (350 km) in Maine, which is also a disjunct population. These are the only mud piddocks in all of Canada.

They are highly specialized in burrowing into inorganic and organic substrates of variable hardness by using their shell to mechanically erode the substratum.

In Canada the species is restricted to settling on and burrowing in a single geological formation, red-mudstone associated with Jurassic-age sandstones in the Minas Basin. Adults are immobile and are dependant on this specific substrate in the intertidal zone. This habitat type is very limited in size and is unlikely to ever expand. It is more than likely to diminish.

The Minas Basin has a large tidal range, resulting in highly oxygenated waters with considerable particulate food resources. The incoming particulates such as phytoplankton and other organic matter enter through the adult piddock's incurrent siphon. Waste is carried away via the excurrent siphon.

Eggs and sperm are discharged during spawning in a steady stream through the siphon. They usually spawn in late spring and summer when water temperatures rise. Fertilized eggs become free drifting larvae. They are widely dispersed.



Development

Larval development has distinct stages, going from trocophore to veliger larvae. In the first stage a hinge is very clear and defined. The second stage veliger larvae develop a ciliated velum used for swimming and also for trapping minute particles of food. At this second stage the rate of development relates to food availability.

Characteristics

In the Canadian population, the adult has a greyish-white shell, typically 3-5 cm in length. The small, very attractive shell is thin and delicate. It is elongated and gapes at both the anterior and posterior ends. They are also known as Fallen or True Angelwings.

Adaptations

This intriguing animal has the ability to tunnel down into the red-mudstone of the local shoreline. The adult becomes a stationary, boring, suspension feeder. It remains all of its adult life in the protective burrow it creates for itself.

Status/Threats

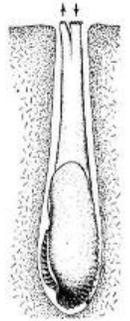
The primary threats to the Minas Basin population are habitat degradation and exposure to sediment.

Sightings in Nova Scotia

Limited to a few areas in the Minas Basin.

The first drifting larval stage lasts up to a little over a month. They have two major features, a hinge and colouring. The hinge has four interlocking teeth, one being more prominent than the others. Colouring includes two distinguishable rings, one dark, and one light, around the peripheral edge. A pinkish hue is obvious when many larvae are grouped together.

The veliger larvae go through several major changes, both external and internal. A functioning foot is developed. This is used when they are ready to settle on suitable substrates. Once settled they begin to burrow. Metamorphosis now takes place from veliger larvae into juvenile piddocks. These burrowing juveniles continue to grow and develop into the adult form.



The species has distinct male and female specimens but is not externally sexually dimorphic, the male and female look the same. They have laterally compressed bodies, enclosed by a shell in 2 parts called valves. These have interlocking teeth. The shell is composed of calcium carbonate. It serves its purpose but is quite fragile and does not usually survive being dug up. Sculpturing is strong at the more pointed anterior end but diminishes in strength on the truncate posterior end. They reach sexual maturity at about 2 years and can live to almost 9 years of age entombed in their individual burrows with only their siphons showing at the surface. The two siphons are sheathed together.



Each piddock creates and expands its own burrow. This is accomplished at the pointed end of the shell with tiny interlocking teeth or ridges. Using longitudinal movements, adductor muscles and the foot wedge the shell back and forth, propelling it forward into the substrate. Dirt from the excavation is cleared by water expelled from the mantle cavity. Because the species grows in size as it continues to burrow, the top of the bore hole is narrower than the piddock, creating a tomb. Their life-supporting siphons extend from the burrow to the surface.



Any changes in sedimentation deposits can result in smothering of individuals, if not sites. Human induced climate change will impact many species globally. COSEWIC designation is Threatened. Mud piddocks and their habitat are protected under the federal Fisheries Act.

