

Modiolus rectus, the Mussel with a Mighty Byssus

By Bill Merillees



Straight Horsemussel (*Modiolus rectus*)
Actual size - 14.6 cm

Every shore prowling naturalist should know what a mussel is – and – further know that they attach themselves to rocks, pilings and virtually any solid object by strong threads. These threads are collectively known as a byssus. Not all mussels have them, partly because the term mussel is generic referring to a wide range of clams that are often not closely related. For example we have fresh water clams that are also known as mussels. For our marine species the term is generally applied to a specific family the Mytilidae, but even then not all members are given the common name of mussel.

The definition of a byssus is a “bundle of fibers secreted by glands in the foot and used to anchor bivalves to the substratum, or to construct ‘nests’ or brood pouches” (Coan, Scott and Bernard, 2000)

The very largest of our 16 mussel species is the giant California Mussel, *Mytilus californianus* Conrad, 1837, at 25 cm (10”) that frequents our outer West Coast. Here in the face of the most violent storms and pounding seas it manages to anchor itself to the substrate and each other by the means of many incredibly strong byssal threads. The tiniest of our mussels is the deep water, Arctic Glassy Mussel, *Dacrydium vitreum* (Möller, 1842), that barely reaches 6mm ($\frac{1}{4}$ ”). However our most common mussel and the one that naturalists are most familiar with is the ubiquitous ‘blue’ mussel of local beaches, rocks, wharfs and pilings. **Note:** What was thought for many years to be the Blue Mussel, *Mytilus edulis* Linnaeus 1758, turns out to be a different species altogether. Our ‘blue’ mussel is now correctly known to be the Foolish Mussel *Mytilus trossulus* A. A. Gould, 1850. (see Coan, Scott and Bernard, 2000).

Let us return to the subject of this article, the Straight Horsemussel, *Modiolus rectus* Conrad, 1837 and its mighty byssus. Second in size to the California mussel at 22 cm (9”) this gorgeous species (see Harbo, 1997) is found sub-tidally, vertically buried almost completely in sandy

sediments (see sketch). Without a firm substrate to attach to, it has developed a different strategy, its byssus has become an anchor. Instead of a number of sturdy tough threads the horse mussel’s byssus is composed of many thousands of long fine filaments, estimated to number in excess of 25,000 and possibly more than 50,000! For a small portion of one byssus I quit counting at 1,700 threads! These threads bifurcate into two groups, as they exit the shell, one roughly horizontal and one near vertical, both penetrating the local substrate. At their extremity they attach to the largest grains of sand available thereby forming a large bulbous mass, not unlike a ship’s anchor. These threads, the longest measuring just over 8 cm (3”), varied from about 1/10th to 1/5th the diameter of a human hair. They appeared to get wider and flatter as they got longer.

The anatomy of this byssus apparently is not well known (Gene Coan, pers. com.) so further, more detailed study is required. Whatever the outcome, the result of the present superficial study, certainly indicates that *Modiolus rectus* indeed has a mighty byssus.

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References:

Coan, C.V., P.V. Scott and F.R. Bernard, 2000: Bivalve Seashells of Western North America. Santa Barbara Museum of Natural History, Santa Barbara, CA.

Harbo, R.M., 1997: Shells and Shellfish of the Pacific Northwest. Harbour Publishing, Madeira Park, B.C.