

New records for the distribution and a description of the egg capsules of the Japanese nassa, *Hima fratercula* (Dunker, 1860) Family Nassariidae in Ladysmith Harbour, B.C.

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SUMMARY

The intertidal Japanese snail, *Hima fratercula* (Dunker, 1860), was most likely introduced to Washington and B.C. from Japan along with Pacific oyster seed, *Crassostrea gigas*, over the period from the 1920's to 1960's. Previously, it has only been reported from isolated sites in Washington and at Boundary Bay, B.C.

Both the native Western lean nassa, *H. mendica* and the non-native Japanese nassa, *H. fratercula* were found at numerous sites at the head of Ladysmith Harbour, B.C. over the period April to October, 2014. Bubble-shaped or bulliform egg capsules of *H. fratercula*, with 4 to 7 eggs per capsule, were found in May and June, 2014 at Ladysmith. *H. fratercula* were common and abundant in the mud under rocks, shells and wood debris. The limited distribution of the non-native species, *H. fratercula* at isolated sites may be attributed to a limited dispersal of crawl-away larvae. In contrast, the widely distributed native species, *H. mendica* has 28 to 33 embryos per capsule and planktonic larvae.

It was a clear, sunny spring day in April, 2014. We slowly grounded the boat on the mud bottom at Page Point in Ladysmith Harbour, B.C. George Holm, Bill Merilees, and Rick Harbo waded to the shore. This was a site where Dan Quayle had reported populations of Japanese oyster drills, *Ocenebra inornata* (Quayle 1964) and we were investigating their current status. We did not find any drills at this site, but George quickly found the Japanese nassa, *Hima fratercula* (Dunker, 1860). Over the period, April to October, 2014, we found *H. fratercula* at several other locations at the head of Ladysmith Harbour, along with oyster drills and many other non-native mollusks.

The native and non-native *Hima* species are described below. These snails were known as *Nassarius* until McLean (2007) elevated the subgenus *Hima* to the genus level. McLean (2007) also considered the Giant Western nassa, with a broad orange callus, as *Caesia fossatus* (Gould, 1850).

Western lean nassa *Hima mendica* (Gould, 1849
Synonyms: *Nassarius mendicus*; Basket-whelk.

This native snail is recorded from Kodiak Island, Alaska, south to Baja California, Mexico, from the intertidal zone to depths of 180 m. It is moderately common on the surface of sand, mud and on the underside of rocks. It is seen more often than other Nassas, which typically burrow in the seabed.

The shell has a distinct twisting furrow at the base. The tall (to 18 mm) **elongated** shell has a sharp apex, spiral ridges and **about seven to 12 pronounced axial ridges**, forming numerous small beads with the spiral ridges. About seven rounded whorls with a sharp apex. It is gray-brown, occasionally white, and sometimes has one or more darker spiral bands of brown. There may be small rounded teeth inside the outer lip. The live animal has a cream-coloured body with brown streaks and patches.

Griffith (1967) reported dredged samples of *H. mendica* from Ladysmith Harbour and the authors found intertidal specimens at Page Point, Ladysmith Harbour, April to October, 2014.



Hima mendica, Page Point, Ladysmith Harbour, B.C.

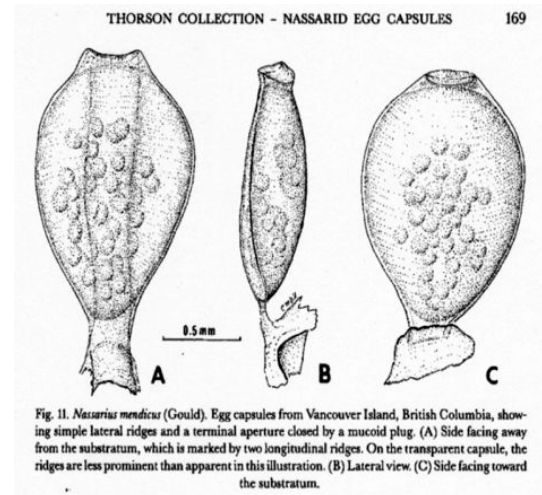


Live, *H. mendica* (L. Schroeder)

Egg capsules of *Hima mendica*

Egg capsules of *H. mendica* from Barkley Sound, Vancouver Island, B.C. had a short stalk, were ovate with a slightly flaring apex, surrounded by a very low ridge (D'Asaro 1993). Both sides of the capsule were convex, but one side had a seam, marked by two low, longitudinal ridges extending from the stalk to the apex. Five capsules examined had from 28 to 33 eggs. From the developing larvae, it was concluded that hatching occurs at the veliger stage (planktonic larvae).

The figure of the egg capsules is from D'Asaro 1993.



Japanese nassa (non-native species; NW Pacific) *Hima fratercula* (Dunker, 1860)

Synonym: *Nassarius fraterculus*.

The intertidal Japanese snail, *H. fratercula*, was most likely introduced to Washington and B.C. from Japan along with Pacific oyster seed, *Crassostrea gigas*, over the period from the 1920's to 1960's. It has only been reported from isolated sites in Washington and Boundary Bay, B.C.

The shell has a distinct revolving furrow at the base. The elongated shell (more ovoid or squat than *H. mendica*) has broad, robust spiral ridges prominent on most whorls and up to 16 pronounced, axial ridges angled slightly and having a wide spiral sculpture. It is gray-brown, with cream-coloured spiral bands, very distinct on the body whorl. Shell height to 17 mm (Ladysmith Harbour specimen 17.3 mm). The interior of the shell shows the light colored spiral band. The live animal has a light gray body with white spots and streaks and dark patches.



Hima fratercula Ladysmith Harbour, B.C. (2014)



Live *Hima fratercula* (Boundary Bay, B.C.), the shell covered with sand particles and debris.

Distribution of *H. fratercula* in B.C. and Washington

H. fratercula most likely went undetected for many years before it was recognized and reported as being different from the native mudsnail *H. mendica*. Many biological surveys were focused on detecting drills (Atlantic *Urosalpinx cinerea* and Japanese *Ocenebra inornata*) that may have impacted commercial oyster aquaculture. Other abundant non-native species such as *Batillaria attramentaria* (NW Pacific) and the Eastern mudsnail, *Ilypnassa obsoleta* (Atlantic) were noted in surveys (Quayle, 1964).

The first report of *H. fratercula* in Washington State was by Eleanor Duggan, who collected this species in 1960. She found the snail to be abundant in Padilla Bay at Bayview State Park, Skagit County, Washington. The shells were under stones which had a mud substrate and in pools of water left by the receding tide. James McLean was first to identify the species (Duggan, 1963).

Although *H. fratercula* was not recognized in Boundary Bay, B.C. until June, 1977 (Carlton, 1979), it had likely been well established for some years. Boxes of Pacific oyster seed, *C. gigas*, were transported from Japan to Washington and then on to B.C., over the period from the 1920's to 1960's. The Pacific oyster, *C. gigas*, was well established in Boundary Bay by 1933 (Eisey, 1933), being cultured by the Crescent Bay Oyster Company.

In April, 2014, George Holm, along with Bill Merilees and Rick Harbo, discovered an intertidal population of the Japanese nassa, *H. fratercula*, at the head of Ladysmith Harbour, B.C. This is only the second location in B.C. where this snail has been found. *H. fratercula* was found at several sites in Ladysmith Harbour, April to October, 2014, where Japanese oysters, *C. gigas*, had been seeded in the past. The native *H. mendica* at Page Point, was also found at Ladysmith Harbour in 2014 by R. Harbo and B. Merilees.

Egg capsules of *H. fratercula*

Small, rounded egg capsules, bubble-shaped or “bulliform”, were found immediately adjacent to the *H. fratercula* at several locations at the head of Ladysmith Harbour, May 27, May 29 and June 29, 2014. The egg capsules were laid on stable objects projecting from the mud, primarily on the underside of rocks and some wood debris. There are reports of “bulliform” egg cases laid by *Nassarius (Hima)* (D’Asaro 1993). Dr. Seiji Goshima forwarded photographs of similar egg capsules of *H. fratercula* in Japan, but they had fewer eggs, two to four eggs, evident in the capsules. Considering the limited, isolated populations of *H. fratercula* in B.C. and Washington, and the low number of eggs, *H. fratercula* are likely direct developers with crawl away snails. The more widespread, native snail, *H. mendica*, with greater numbers of eggs, is considered to have pelagic larvae (D’Asaro 1993).



Hima fratercula and bubble-shaped egg capsules, 4 to 7 eggs in each capsule, on the underside of wood debris, Bush Creek, Ladysmith Harbour, May 29, 2014



Hima fratercula (lower right) and bubble-shaped egg capsules, 2 to 4 eggs, Japan. Image courtesy of Seiji Goshima (Hokkaido University).

The egg capsules of *H. mendica* are much different, being stalked and ridged (described in the earlier section).

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