

Nuttallia Notes: Intertidal Distribution & the Presence of the Commensal Pea Crab, *Pinnixa faba*.

by Bill Merilees

The presence of the Purple Mahogany Clam, *Nuttallia obscurata* (AKA Varnish Clam and/or Savory Clam) first came to notice in 1991 when Robert Forsyth (1993) discovered this species on White Rock Beach, British Columbia. Shortly thereafter they were found at a number of locations in the Salish Sea, as well as Toquart Bay in Barkley Sound on the west coast of Vancouver Island. Today it is considered an introduced species with a distribution north at least to the north end of Vancouver Island and south along our coastline well into Oregon.

The presence of this large (to 9+ cm.), relatively, shallow burrowing, mid intertidal clam (**Photo 1**) has had an influence on the local marine intertidal ecology in at least two ways. With population numbers often exceeding a thousand per square meter this clam has become an important food item for gulls, scoters, oystercatchers, crows and raccoons, (not to mention supporting a local commercial 'Savory' clam fishery). Secondly, *Nuttallia obscurata* also became a frequent host to juvenile *Pinnixa faba*, a commensal, pinnotherid crab.

This article is based on a series of 9 samples (100+ clams in each) of *Nuttallia* taken at Departure Bay in Nanaimo, B.C., between March, 2010 and May, 2011, and a single transect made at Manson's Landing, Cortes Island, B.C., in 2000. At this latter location, an evenly sloping beach with a similar sandy gravel substrate, offered an ideal situation to determine this species' intertidal distribution.

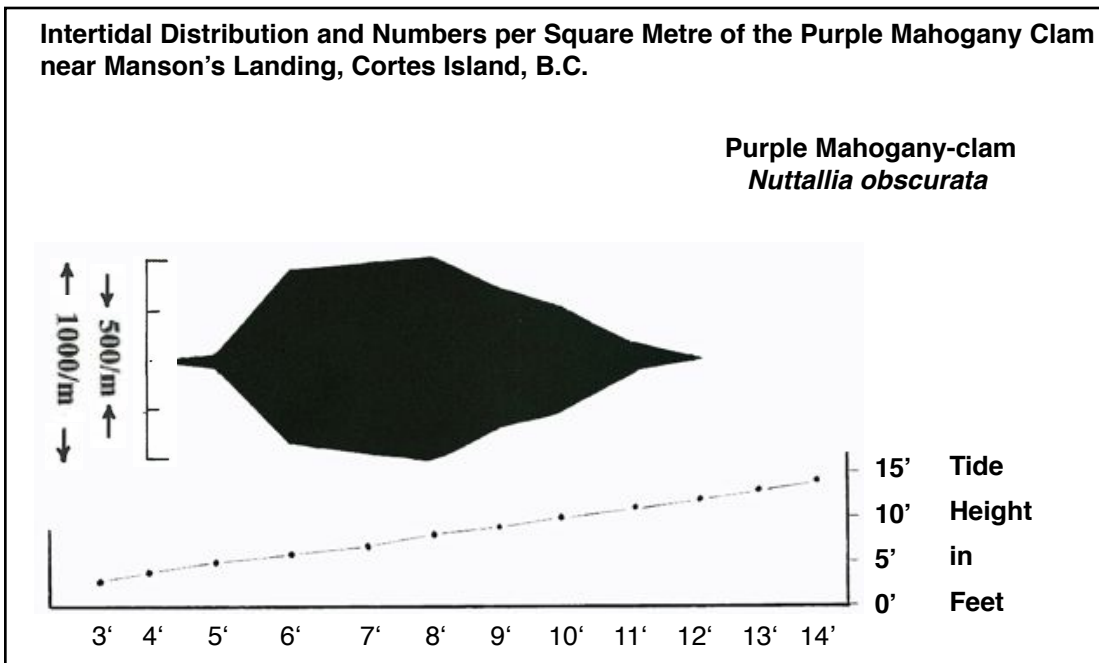


Variation in colour morphs of Varnish Clams in Departure Bay, Nanaimo, B.C. Note: patterned juvenile (lower right center)

Intertidal Distribution:

At Manson's Landing, 25x25 cm (10"x10") plots were dug at 30 cm (1 ft.) elevation intervals, between the 90 and 390 cm (3 -13 ft.) tide levels, and the number of clams found in each counted. These numbers were then extrapolated to provide the number of *Nuttallia* per square metre (Fig.1). At Departure Bay, a similar transect (not illustrated) was examined. This study area was much less uniform, not only in its topography, but also the substrate was less uniform supporting a 'patchy' distribution of clams.

This mid intertidal distribution of *Nuttallia* provides an ideal and easily accessible food source for beach bivalve predators. This has been suggested as one possible reason why the Black Oystercatcher population has dramatically increased, in the Salish Sea in recent years. (Merilees, 2007).



Commensal Crab frequencies:

On close examination it came as a big surprise when a considerable number of *Nuttallia* were found to contain immature pinnotherid clams, identified as *Pinnixa faba*, (Hart,1982). This is the Mantle Pea Crab of Lamb and Hanby, (2005). Post planktonic pea crabs (1-2 mm in length) began to appear in June. At this time, using their telson they were very mobile! This cohort appears to remain in their host for approximately 18-20 months at which time they had obtained a

carapace size of 8 to 10 mm. The percentage of *Nuttallia* hosting pea crabs ranged from 49.0% (March, 2011) to 78.3% (December, 2010) mean being 60.8%, N=9.

Hart, (1982) recorded immature pea crabs in twelve different clam species (*Macoma* (3 sp.), *Mya*, *Saxidomus*, *Clinocardium*, *Serripes*, *Venerupis*, *Entodesma*, *Gari*, *Solen* and *Siliqua*) as well as a sea cucumber (*Cucumaria*) and one limpet (*Lottia scutum*). From long standing personal observation of these bivalve species the author has never seen a percentage of pea crabs in such high numbers as reported here for *Nuttallia obscurata*.

Upon leaving its first host the pre-adult pea crabs seek out a second host, the adult Horse Clams (*Tresus capax* and *T. nuttallii*). Here they will hopefully locate a mate and continue this species life cycle. With often more than a thousand *Nuttallia* per square meter, and with a pea crab occupancy rate averaging over 60%, it is fascinating to imagine this crab army scuttling down the beach all seeking out what must be a very limited number of un-taken horse clams in which to breed!

Although pea crabs are more commensal (meaning they eat at another species' table) than parasitic the crab's residence does not leave the clam unscathed. The presence of pea crab 'habitation' can often be observed in the form of a rusty stain on its host's inner shell. **(Photo 2)** The author speculates that the sharp 'nail' at the tip of the crab's walking legs in some way is responsible for this blemish.



Acknowledgements: Thanks to Fred Zwickle and his family at Cortes Island for their interest, assistance and hospitality and to Rick Harbo, George Holm and Linda Schroeder for their review of this article.

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