
Nucella ostrina

The rock-dwelling emarginated dogwinkle

Phylum: Mollusca
Class: Gastropoda, Prosobranchia
Order: Neogastropoda
Family: Thaisidae

Taxonomy: *Nucella* was previously called *Thais*. *Thais* is now reserved for subtropical and tropical species. For a more detailed review of gastropod taxonomy, see Keen and Coan (1974) and McLean (2007). *Nucella ostrina* has mistakenly been called *N. emarginata* though it has now been found that the two species diverged in the late Pleistocene epoch (Marko et al. 2003)

Description

Size: Rarely over 30 mm (Kozloff 1974), usually up to 20 mm (Puget Sound); up to 40 mm, but rarely over 30 mm (California) (Abbott and Haderlie 1980); illustrated specimen (Coos Bay) 20 mm. Females slightly larger than males (average 18.9 and 17.8) (Houston 1971).

Color: Exterior brown and dingy white, dirty gray, yellow or almost black (if diet of mussels); yellow, black or gray periostracum in grooves between ridges; ridges sometimes white (black in this specimen). Interior: aperture and columella chestnut brown or purple.

Shell Shape: Fusiform; short spire, expanded whorl. Shell thin, not heavy. 3-4 whorls; nuclear whorl inconspicuous.

Sculpture: Spire relatively high, partial nub of aperture lacking (McLean 2007); alternating large and small spiral ridges over most of shell, can be nodulose; sometimes ridges are obscure and surface is fairly smooth. Axial sculpture wrinkled, not prominent.

Outer Lip: Thin, crenulate, not thick and layered (Oldroyd 1924). No denticles or anal notch on posterior (upper) end, no single strong tooth near anterior canal. No row(s) or denticles within lip.

Columella: Sunken and concave, arched and flattened below: species *ostrina*; no folds, (Fig. 1).

Sutures: Not deep (Fig. 1).

Anterior (Siphonal) Canal: Short: less than 1/4 aperture length: species *ostrina* (Kozloff 1974) (Fig. 1); canal narrow, slot-like, not spout-like; not separated from large whorl by revolving groove.

Aperture: Wide; length more than 1/2 shell length (Oldroyd 1924). Ovate in outline, with a short anterior canal but no posterior notch (Fig. 1).

Umbilicus: Closed (McLean 2007).

Operculum: Dark brown with nucleus on one side (Fig. 2).

Eggs: Pale yellow, vase-shaped, about 6 mm high, in clusters of up to 300 capsules (Abbott and Haderlie 1980) (Fig. 4). Each capsule with 500-600 eggs. Each capsule with a longitudinal suture and a hard clear escape aperture.

Veliger: Four distinct stages: advanced shell measures 775 μ long (LeBoeuf 1971) (Fig. 5).

Possible Misidentifications

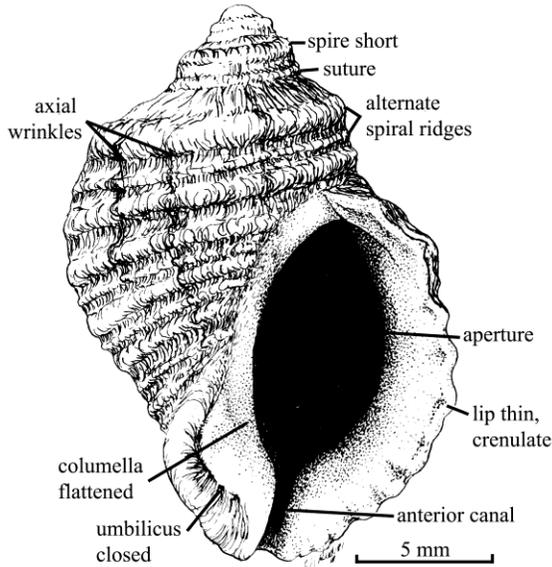
Snails of the genus *Nucella* can be distinguished from other carnivorous estuarine gastropods by their sculpture (the same on both spire and whorls), by the large body whorl and by the large ovate aperture. Other genera with a siphonal notch, and generally fusiform shape include:

Olivella and *Buccinum*, which have columellar folds;

Ocenebra and *Ceratostoma* which have a spout-like siphonal canal, not a narrow-slot-like one as in *Nucella*;

Tritia reticulata and *Lirabuccinum dirum* which have a distinct revolving furrow or fossa setting off the anterior canal from the body whorl; (*Lirabuccinum* has spiral sculpture only on the body whorl; the spire has both spiral and axial ribs);

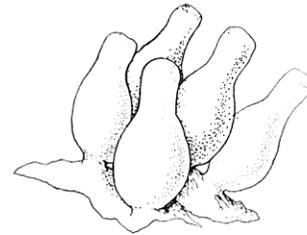
Nucella ostrina



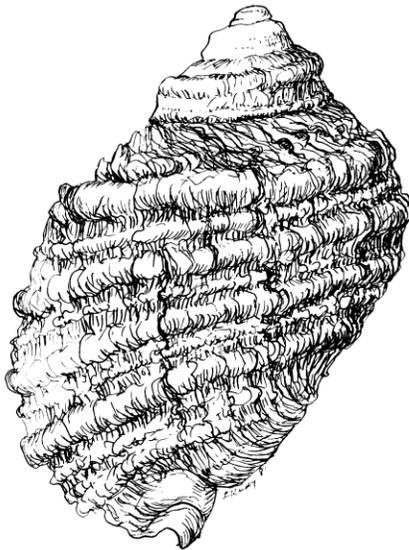
1. *Nucella ostrina* (ventral view, H: 21mm) x4:
Shell ovate, body whorl expanded, spire short;
aperture ovate, wide; sculpture: alternating large and small
nodulose spiral ridges, wrinkled axial folds; columella
flattened, unfolded; umbilicus closed; outer lip crenulate,
thin, no denticles, short anterior canal.



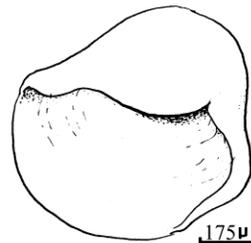
2. Operculum.



4. Egg capsules x4.



3. *Nucella ostrina* (dorsal view) x4.



5a. Advanced veliger shell (Le Boeuf 1971).



5b. Advanced veliger larva - fourth stage (Le Boeuf 1971).

Acanthina (also from the family Thaisidae), which has a strong tooth on the anterior end of the outer lip.

There are three other species of *Nucella* in our area. Two are not typically found in estuarine conditions, but they do look quite a bit like *N. ostrina*:

Nucella lima, the file dogwinkle, is subtidal, short-spined, and fairly rare. It is whitish to brown, with about 15 alternating large and small file-like spiral ridges on the large whorl. It can be up to 43 mm, somewhat larger than *N. ostrina*.

Nucella canaliculata, the channeled dogwhelk, has a high spire and a prominent shoulder below the deep suture. It is light (white to orange), and sometimes banded. Its 14-16 spiral ridges are very evenly shaped and spaced. It is an inhabitant of outer shore mussel beds. Larger than *N. ostrina*, it averages 26.5 mm (male) and 24.8 mm (female) (California) (Houston 1971).

The third species, *Nucella lamellosa* (see description in this guide), is the most common dogwinkle in the northwest, quite common in bays and estuaries, and one of its many variations is very like *N. ostrina*. *N. lamellosa* can have strong axial ruffles, be quite smooth, or have strong horizontal ribs. In this last case, it is difficult to distinguish from *N. ostrina*. *N. lamellosa* has a higher spire (usually 5-7 whorls, including the tiny nuclear whorl); it is heavy, with a thick-layered lip, not a thin crenulated one. There is usually at least one row of denticles inside the lip in *N. lamellosa*; its anterior canal is longer than that of *N. ostrina* (more than 1/4 aperture length). While *N. lamellosa* can have strong spiral ridges, the body whorl in this species is then often flattened and angled, not expanded as in *N. ostrina*, and the horizontal ridges themselves are not alternating large and small (compare Fig. 2, *N. lamellosa* in this guide). *Nucella lamellosa* inhabits much quieter waters, as a rule, and a lower tidal range than does *N. ostrina*. Its color is usually lighter; it is rarely blackish.

A fourth species of *Nucella*, *Nucella emarginata* though not found in our area can easily be confused with *N. ostrina* because

they are morphologically cryptic. See Marko et al. (2003) for a more detailed discussion.

Ecological Information

Range: Bering Sea south to northern Baja California, but rare below Pt. Conception (Abbott and Haderlie 1980).

Local Distribution: Coos Bay: marine portions, i.e. near bay mouth up to Fossil Point.

Habitat: Almost entirely on rocky shores; in fairly heavy surf (Ricketts and Calvin 1971); also in semi-protected areas (Houston 1971). Outer shores in mussel beds, on jetties.

Salinity: Full seawater; collected at 30.

Temperature: Cold to temperate waters: small animals high in tidal range show great thermal resistance, active at range of 0-30°C (Bertness and Schneider 1976).

Tidal Level: Ubiquitous intertidal predators, found from mid to high intertidal zones (Moran and Emler 2001).

Associates: Primary prey is barnacles, especially *Balanus*; mussel *Mytilus*; *Pisaster ochraceus*. Commensal flatworm *Nexilis epichitonius* found in specimens on Coos Bay entrance jetty (Holliman and Hand 1962).

Weight: 1.5 gm (wet).

Abundance: Common to abundant (McLean 2007); much less common in inner bay than *N. lamellosa* (Coos Bay).

Life History Information

Reproduction: Found to spawn year-round in Bodega Bay, Calif. and throughout Oregon, but most activity is in November-February. Little hermaphroditism (Houston 1971). Spawning is not salinity, photoperiod or temperature-related (Houston 1971). Females gregarious (groups to 20), deposit egg capsules in clusters. Each female lays 8-9 capsules; stalked capsules have about 200-300 eggs each (ibid), many of which may be sterile nurse eggs which are consumed by developing larvae. Veligers swim in capsule fluid and metamorphose into snails about 1.1 mm long, emerging from plug at top of capsule (ibid). Pacific Northwest hatchlings number about 10-20 per capsule average; Bodega Bay about 5% hatch (10-15) (ibid).

Growth Rate: Pacific Northwest: 2.5-3 months from egg deposition to hatching; possibly more rapid development farther south (Abbott and Haderlie 1980).

Longevity: 5-10 years (Dawson et al. 2014).

Food: Prefers mussels *Mytilus edulis* and *M. californianus*; also barnacles *Balanus*, *Pollicipes*, *Chthamalus*; limpet *Lottia*, as well as herbivorous gastropods *Tegula funebris* and *Littorina*. Feeding is by drilling with the radula, inserting the proboscis, and feeding on the soft body within. Species *N. ostrina* shows a wide food preference, but individuals seem to be consistent in diet (Abbott and Haderlie 1980).

Predators: *Cancer oregonensis*. Adult snails prey on eggs.

Behavior: Presence of *N. ostrina* elicits several escape responses from prey *Mytilus edulis*: gaping, spontaneous valve closure, foot activity, byssal fixing (Wayne 1980). Increase in air temperature reduces predation rate of *Nucella ostrina* on *Balanus glandula* while an increase in submerged body temperature results in an increase in predation rate (Yamane and Gilman 2009).

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