

**Mollusc Notes : Neoteny in the Carinate Dove Shell, *Alia carinata*  
by Bill Merilees**

**Neoteny** – the retention of juvenile features in adult animals - Oxford Concise Dictionary

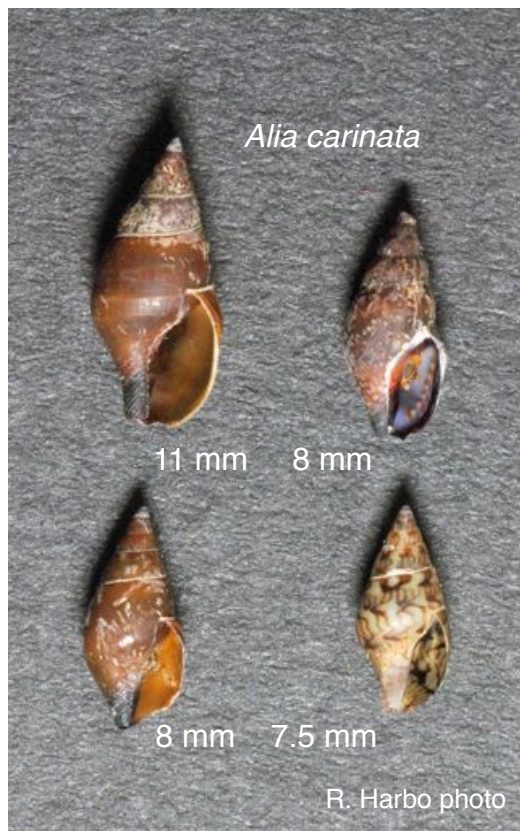
The Carinate Dove Shell, *Alia carinata* Hinds, 1844, found along British Columbia's west coast is possibly our most ubiquitous small intertidal snail? Both its common and scientific names are derived from the presence, in adult shells, of a strong carinate ridge or 'shoulder' on the body whorl. This imparts a diamond or squarish appearance to the aperture (see photos). At maturity this snail's lip thickens and a number of stubby denticles appear along its inside margin. This is the form most frequently illustrated. (Johnson and Snook, 1927; Morris, 1966; Abbott, 1974; Kozloff, 1973 & 1987; Lamb and Hanby, 2005 and McLean's, 2013, unpublished manuscript, to cite only a few.) Identification keys, (Light et al, 1957, and Kozloff, 1987) also focus on this feature.

Juvenile *Alia carinata* are quite different. They are more delicate, the body whorl is evenly rounded with the aperture lip quite thin. This imparts a distinct spindle shape to the shells which are often exquisitely patterned. Published illustrations of juvenile are few and far between.

The range of *Alia carinata* stretches from the Gulf of Alaska to Baja California (McLean, 2013). Here in British Columbia it is a very common intertidal species that can reach densities of many thousand per square metre. As might be expected, considering this range, there is considerable variability in shell colour and shape.

During a low tide sequence, in June 2014 at Ucluelet, B.C., Rick Harbo and I came across a giant form that was the largest *Alia carinata* we have ever seen. At 11 mm, it was co-habiting with 'typical' adults only 8 mm in length (**Fig. 1**). Further, though longer in length these giants did not possess the carinate body whorl, nor was there any indication of lip denticles typical of *A. carinata*. In size and shape this giant form possessed all the features of a juvenile – in essence a neotenuous form. When compared side by side the difference between these two forms is quite striking.

During a 2016 collecting trip, again with Rick Harbo, to Cygnet Cove, also in Ucluelet, I 'scraped up' additional samples of *Alia carinata* that exhibited considerable variability. In



**Fig. 1** - Intertidal scraping, Ucluelet, B.C.  
14-105-3 Merilees collection

addition to the large thin-lipped forms, these samples also contained a near complete spectrum of sizes, shapes and colour patterns! (**Fig. 2**).

The above observations are partially explained by the research of Turpen, (1999), in central California. He carefully studied the variability of shell form and colour of *Alia carinata* taken from four habitats: rocky subtidal; intertidal; eelgrass beds; and from the fronds of the giant kelp, (*Macrocystis pyrifera*).

Turpen's intertidal sample, the one most comparable to the Ucluelet collections, showed significant differences from those in the other habitats he sampled. The intertidal sample he states, "were generally tall and narrow, and often lacked the shoulder carina". He further cited a study by Bergman et al, (1983), where only 9% of *Alia carinata* from exposed environments were strongly keeled. No mention is made by Turpen, regarding the thickness of the aperture lip, nor the presence of denticles. He also noted that for some gastropods, "wave exposure is correlated with the presence of large apertures". Though speculative, he postulated that individuals



**Fig. 2** - Intertidal scraping, 16-119 Cygnet Cove, Ucluelet, B.C.,  
July 22, 2016. Varieties, forms, shapes and colour patterns.

living in high energy habitats required a stronger attachment to their substrate, hence a larger foot.

This author remains puzzled by the observation at Ucluelet, in particular why only some of the individuals collected in 7"x7" sample area were the large thin lipped form, while some slightly smaller ones were quite carinate? In mollusc taxonomic circles this focuses attention on the lumper vs splitter philosophies and the role that habitat can play in shell morphology and colour. As for the Ucluelet thin lipped giants they have the appearance of being a neotenous form, an expression of local environmental conditions.

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