Habitat use by juvenile mollusc species: *Nucella ostrina, Littorina scutulata* and *Mytilus trossulus*.

by Hilary Hamilton, M. Sc. candidate Thompson Rivers University, Kamloops, BC.
hjhamilton4@gmail.com
with Dr. Louis Gosselin, Primary Investigator at Thompson Rivers University

Along the coast of Barkley Sound, British Columbia, it's easy to spot adults of several intertidal snail species without looking too far. Common mollusc species found on these exposed shores include predatory snails such as *Nucella ostrina,* a number of littorine snails such as *L. scutulata,* and an abundance of bivalves in the *Mytilus* genus. It is much less common, however, to encounter the juveniles of these species, unless you know where to look.

Nucella ostrina, *Mytilus trossulus* and *Littorina scutulata* all live in the harsh environment of the intertidal zone, where survival requires overcoming intense biological and environmental pressures. For these three species living in the mid to high intertidal zone, the stress of low tide conditions can shape populations and potentially act as selective pressures on a species' life history (Lowell 1984; Raffaelli and Hawkins 1996). These pressures are greatest during the juvenile life stage, where the large surface area to volume ratio of these small individuals may make it difficult for individuals to buffer heat gain or water loss. Our current research at Thompson Rivers University seeks to understand the survival of juvenile invertebrates through this vulnerable stage, and there have been some interesting findings thus far.

Previous research shows that the mortality rate of juvenile invertebrates is very high (Gosselin and Qian 1997). What we're beginning to see now is that juveniles of the three mollusc species mentioned above are far more vulnerable to stress encountered at low tide than adults (Hamilton and Gosselin, unpub. data). In fact, it appears this is also true for intertidal Arthropods, such as crabs.

Based on field observations it appears, at least with these three mollusc species, that juveniles are partly overcoming this vulnerability by utilizing different habitats at different stages of their life. For example, *Mytilus trossulus* adults are generally found in large beds on exposed shores, but juveniles smaller than three millimeters aren't often found here. Instead, juvenile *M. trossulus* (**Fig. 1a**) use microhabitats such as filamentous algae as shelter until they reach a size large enough to tolerate the more stressful exposed habitat (**Fig. 1b**). *Nucella ostrina* also make a habitat shift early in life (Gosselin 1997). Juvenile *N. ostrina* are exceedingly hard to find in the field but after much exploration, it appears they tend to move upwards in elevation upon hatching from egg capsules and can be found in pebble and shell substrate underneath *Mytilus trossulus* beds (F**ig. 2**). As adults, *N. ostrina* spend more time in exposed habitats searching for food and mates and therefore are much more commonly observed.

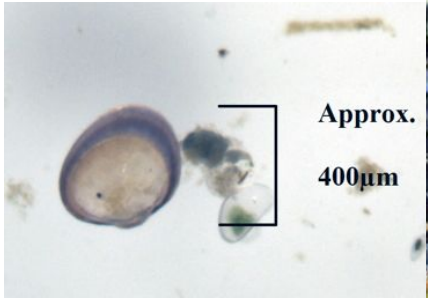

Figure 1. a: A juvenile *Mytilus trossulus* **b**: *Mytilus trossulus* juveniles can often be found in filamentous algae growing near adults pictured above.

We are now working to answer the following question: what is the relationship between an invertebrate's ability to move and its physiological tolerance of low tide stress? With these three molluscs, their vulnerability early in life can be overcome by moving to a more tolerable habitat, one that is usually hidden and protected. But species that can't move, such as barnacles, tube worms and wormsnails (vermetids), don't have this option. We hope to answer the research question by investigating the changes in tolerance to low tide stress throughout an animal's life and comparing motile and non-motile (sessile) invertebrates. Our research will determine if temperature and drying stress are important pressures that have shaped the life history strategy of intertidal invertebrates, which would explain why spotting a juvenile snail or mussel out in the open along the intertidal is a rare occurrence.

Figure 2. *Nucella ostrina* egg capsules.

References

Gosselin LA. 1997. "An ecological transition during juvenile life in a marine snail". *Mar. Ecol. Prog. Ser.* 157:185–194.

Gosselin LA, Qian PY. 1997. “Juvenile mortality in benthic marine invertebrates”. *Mar. Ecol. Prog. Ser.* 146:265–282.
Lowell RB. 1984. “Desiccation of intertidal limpets. Effects of shell size, fit to substratum, and shape”. *J. Exp. Mar. Bio. Ecol.* 77:197–207.
Raffaelli D, Hawkins SJ. 1996. *Intertidal Ecology.* Springer Science & Business Media.