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LIVING

Mad about mussels

Mussels a natural means of water purification and important food source for river otters, mink

Drew Monkman
OUR CHANGING SEASONS

The lakes, rivers and wetlands of the Kawarthas are home to a huge variety of fascinating aquatic organisms. Starting this week, I'd like to investigate some of these. I am going to begin by looking at freshwater mussels, a group of invertebrates I simply dismissed as "clams" as a kid, never giving them a second thought. What a shame this was. Not only are they fascinating - in fact, much more fascinating than you would ever imagine - but also increasingly at risk.

Wikimedia image

Freshwater mussels come in a great variety of sizes, shapes, colours, textures and patterns.

Mussels are organisms belonging to the phylum Mollusca. This makes them close cousins to snails, scallops, clams (usually used to refer to marine bi-valves) and even octopuses. A soft-bodied, non-segmented invertebrate, mollusks have a muscular "foot" for burrowing or crawling. The body is enveloped in a sheath of tissue known as the mantle that, in most species, secretes a calcareous shell. Freshwater mussels belong to a class of molluscs known as bivalves, which are characterized by having a hinged shell. 41 species of freshwater mussels occur in Ontario and all are members of the family Unionidae. The zebra mussel is a well-known freshwater bivalve that has invaded much of eastern North America, including the Kawarthas. It is native to the Caspian Sea. Zebra mussels were inadvertently transported across the Atlantic in the ballast water of a ship sometime in the mid-1980s and released into Lake St. Clair. As we shall see, they pose a significant threat to our native mussels.

Freshwater mussels live on the bottom of streams, rivers, lakes and ponds. However, they reach their great abundance and diversity in large rivers, thanks to the constant supply of oxygen and food. Mussels are essentially sedentary as adults, spending most of their lives partially buried in the mud or sand of the substrate.

They feed by drawing in water through the "inhalent siphon" and passing it across the gills to filter out small food particles such as algae, bacteria and deitrus. In this way, they are natural water purifiers. Filtered water and waste are expelled through the exhalent siphon. Their sedentary (and, presumably, fairly safe) lifestyle may help to explain one of the most amazing things about mussels, namely how long they live. In fact, many species have life spans covering several decades.

A rough estimate of age can be had by counting the number of growth rings on the shell.

Even more fascinating, however, is the mussel's reproductive cycle. It represents another example of how evolution often solves problems in nature in the most counter-intuitive and indirect ways. Here is how it works. During spawning, male mussels release sperm into the water. The sperm is taken in by females living downstream through their inhalent siphons. The female's eggs are actually fertilized in specialized portions of her gills. The embryos remain in the gills for several weeks or many months, depending on the species, until they reach the larval stage. When conditions are right, the female releases the larvae (now called "glochidia") into the water. Now, this is where things get even stranger. In order to survive, the glochidia must quickly attach to the gills or fins of the appropriate host fish. If they are lucky enough to do so, the glochidia become parasitic on the fish and derive nourishment from its body fluids. During this time, the glochidia transform into tiny juvenile mussels (less than 0.5 mm in size) and eventually fall to the lake or river bottom, leaving the fish completely unharmed. The tiny mussels not only burrow into the substrate but sometimes also produce mucous threads that become attached to pebbles or other hard objects. This helps to prevent them from being swept away by water currents.

PATRICK HUBERT Special to The Examiner

Slippershell mussels from the Ouse River.

You can well imagine that successful attachment to the body of the appropriate species of fish is best not left solely to chance. Some mussel species have therefore evolved specialized internal structures to attract their host fish. For example, the edge (flap) of the mantle sometimes takes the form of a minnow-shaped "fish lure." In the case of the female wavy-rayed lampmussel, the lure is complete with a fake eye spot and tail fin. All the while the mussel is luring in the fish, her body is almost completely buried with only the edge of the shell and the lure visible. Female rainbow mussels have an even more spectacular lure that looks like a crawling crayfish. The fish attacks the lure, causing the mussel to release the glochidia which attach to the fish's gills. To see a short video of a rainbow mussel lure in action, go to YouTube and search: Rainbow (Villosa Iris) Mussel Lure Display.

Not only are mussels extremely interesting and a natural means of water purification, they are an important food source for river otters, mink, raccoons and, especially, muskrats. Some fishes such as catfishes and suckers also eat them. Their empty shells play an important ecological role, too, as egg-laying and hiding sites for fishes and other animals. Freshwater mussels are also an indicator species of water quality, since they are sensitive to many kinds of pollution and habitat alteration. Mussels were also widely harvested by native North Americans for food, jewellery, and tools.

Sadly, as is so often the case these days, no less than 28 of Ontario's 41 native species are showing signs of decline. In Peterborough County, two species are now endangered (fawnsfoot and eastern pondmussel) and one species is threatened (rainbow mussel). Some of the main threats include habitat loss and degradation, climate change, and the introduction of aquatic invasive species such as zebra mussels. Zebra mussels can easily attach to the shells of native mussels by the hundreds, causing them to die from a lack of food or oxygen. Native mussels have already been nearly eliminated from much of the Trent-Severn Waterway and the Rideau and St. Lawrence rivers. However, some species are still quite common locally. These include the wonderfully-named creek heelsplitter (Lasmigona compressa) and the fatmucket (Lampsilis siliquoidea). The latter is often abundant in lakes.

Finding and identifying mussels can be a lot of fun, especially when you involve your kids. An easy way to tell if mussels are present is to walk along a lakeshore or riverbank during periods of low water and to look for shells. Muskrats often leave piles of shells called "middens" along the bank or in sheltered areas. Many mussels can be identified to the species level based simply on external and internal features of the shell itself. Empty shells are easier to identify than live animals because you can see the inside. You can also collect them and take them home with you for closer examination later. Shell shape and width are especially important characteristics. Seven basic shell shapes have been described for Ontario's mussels.

If you are examining live mussels, keep them in the water at all times to minimize stress. They should be returned to the substrate as soon as possible. Because mussel shells are often covered in algae or calcium carbonate deposits, a soft brush such as a nail brush can be useful for removing the materials. To aid in the identification of look-alike species, take photographs from several angles. The best available field guide for mussels is called the "Photo Field Guide to the Freshwater Mussels of Ontario " (ISBN 0-9733179-2-2) The "Mussels of Illinois" website is also very helpful.

Relatively little is known about the distribution and abundance of the mussels of Peterborough County and the Kawarthas. This is where information gathered by keen, amateur "musselers" can be useful. One local mussel enthusiast, who lives on the Ouse River near Norwood, found five species of mussels in only about one hour of searching. They included the creeper (Strophitus undulatus), the giant floater (Pyganodon grandis), the cylindrical papershell (Anadontoides ferussacianus), the creek heelsplitter (Lasmigona compressa) and the slippershell (Alasmidonta viridis). On another occasion he found what was most likely the threatened fawnsfoot mussel (Truncilla donaciformis). I encourage people to go out and see what species they can find and in what numbers. I will forward any reports I receive to the MNR.

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