IDENTIFICATION

Freshwater mussels can be identified to species by the characteristics of their shells. It is easier to identify empty shells since characters on the inside are visible. Figures 10–12 illustrate some common characters used to identify unionid mussels.

Identification of freshwater mussels takes lots of practice. Although there are some distinct characters that can be used for identification, many of the characters have a high amount of variation within species. The best way to improve your identification skills is to spend time looking at many individuals of each species. This will enable you to learn how each character varies within the species and help you to develop a memory for the overall three-dimensional shape of the shell. Shells of the same species are like pieces of art created by the same artist. Each one is different, yet there is a consistent theme of shape, color, and texture that holds true.

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http://animaldiversity.ummz.umich.edu

Freshwater Mollusk Conservation Society
http://www.mollusks.org

Brooks Natural History Survey, Molusk Collection
http://www.mbs.unc.edu/mollusk/index.html

Ohio State University, Division of Molluscs
http://www.bios馿.colostate.edu/molusk/OU/Molluscs.html


http://www.inhs.uiuc.edu/cbd/collections/mollusk/fieldguide.html


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Freshwater Mussels of Michigan

Figure 10: Fatmucket (Lampsilis siliquoidea)

Rays

Figure 11: Shell and Lampsilis implexa

Flutes

Figure 12: Giant floater (Pyganodon grandis)

Figure 13: Purple wartyback (Cyclonaias tuberculata)
Figure 1: Pea clams (Unionidae), fingernail or pea clams (Sphaeriidae), the streams and lakes of Michigan: freshwater mussels are a total of four families of bivalves that live in the quagga mussel (Dreissena bugensis) (Figure 4).

Dreissena polymorpha introduced to North America in 1938 as a nontarget species. The Asian clam (Corbicula fluminea) introduced to the United States in particular has more species of mussels, crayfish, snails, mayflies, dragonflies, and other aquatic invertebrates. The mussel family Unionidae, or freshwater mussels (Unioydidae) in eastern North America, with 45 species occurring in Michigan.

Figure 2: Asian clam (Corbicula fluminea), one of the most abundant of the exotic mussels. (Figure 3) Zebra mussels (Dreissena polymorpha) are native to most of Europe and Asia, and Asian and zebra mussels are native to North America, while Asian and zebra mussels are exotic to the continental United States. Asian and zebra mussels are exotic to the continental United States.

Zebra mussels were first detected in the Great Lakes in 1986, then in the Mississippi River in 1990, and in the Ohio River in 1992. Zebra mussels are highly successful invaders because they can attach to almost any hard surface, including boats, docks, bridges, and pipelines. Zebra mussels are a threat to aquatic ecosystems, as they can outcompete native mussels and disrupt the ecosystem by attaching to the underwater structures.

Figure 3: Zebra mussels (Dreissena polymorpha) in eastern North America, with 45 species occurring in Michigan. Zebra mussels are highly successful invaders because they can attach to almost any hard surface, including boats, docks, bridges, and pipelines. Zebra mussels are a threat to aquatic ecosystems, as they can outcompete native mussels and disrupt the ecosystem by attaching to the underwater structures.

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Figure 4: Unionid mussels are present in nearly all of Michigan’s rivers and many lakes. However, the highest abundance and species richness are found in the Lower Peninsula, with a mixture of public, private, and federal lands. Federal and state incentive programs are available to make sure they do not transport water—which can contain zebra mussels. Zebra mussels are a threat to aquatic ecosystems, as they can outcompete native mussels and disrupt the ecosystem by attaching to the underwater structures.

The best way to find freshwater mussels is to wash a small gravel-pit sample in a sink and check it for unionids. Unionid mussels are smaller than the zebra mussels, have a more complex life cycle, and are found in streams and rivers. Unionid mussels are highly successful invaders because they can attach to almost any hard surface, including boats, docks, bridges, and pipelines. Zebra mussels are a threat to aquatic ecosystems, as they can outcompete native mussels and disrupt the ecosystem by attaching to the underwater structures.

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Figure 5: One of the most important differences between the unionid mussels and the other freshwater bivalves is their unique life cycle. Figure 5: One of the most important differences between the unionid mussels and the other freshwater bivalves is their unique life cycle. Figure 5: One of the most important differences between the unionid mussels and the other freshwater bivalves is their unique life cycle. Figure 5: One of the most important differences between the unionid mussels and the other freshwater bivalves is their unique life cycle. Figure 5: One of the most important differences between the unionid mussels and the other freshwater bivalves is their unique life cycle. Unionid mussels are present in nearly all of Michigan’s rivers and many lakes. However, the highest abundance and species richness are found in the Lower Peninsula, with a mixture of public, private, and federal lands. Federal and state incentive programs are available to make sure they do not transport water—which can contain zebra mussels. Zebra mussels are a threat to aquatic ecosystems, as they can outcompete native mussels and disrupt the ecosystem by attaching to the underwater structures.

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Figure 6: Unionid mussels are present in nearly all of Michigan’s rivers and many lakes. However, the highest abundance and species richness are found in the Lower Peninsula, with a mixture of public, private, and federal lands. Federal and state incentive programs are available to make sure they do not transport water—which can contain zebra mussels. Zebra mussels are a threat to aquatic ecosystems, as they can outcompete native mussels and disrupt the ecosystem by attaching to the underwater structures.

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While the tropics are known for their diverse insect and plant communities, eastern North America is home to some of the richest freshwater animal communities in the world. The United States in particular has more species of mussels, crayfish, snails, stoneflies, mayflies, and other aquatic invertebrates than any other freshwater mussels (Unionidae) in eastern North America, with 46 species occurring in Michigan.

This brochure focuses on unionid mussels, however there are a total of four families of bivalves that live in the streams and lakes of the United States: Unionidae (Unionidae), Corbiculidae, Dreissenidae, and Zygidae (Zygodontidae). Unionidae and Corbiculidae are common in freshwater habitats, while the Dreissenidae and Zygidae are both highly invasive species. The Corbiculidae include the Asian clam (Corbicula fluminea), introduced to North America in 1938 as a controllable pest, and the Zygidae include the zebra mussel (Dreissena polymorpha), accidentally introduced to North America in the 1980s by the waterway and shipping industries. Both of these invasive species have had a significant impact on the native freshwater mussel ecosystems in Michigan.

Unionid mussels are of particular interest to ecologists due to their unique life history, importance to aquatic ecosystems, and use as indicators of change in water quality and habitat. They have also undergone significant declines in range and status due to introduction of invasive species, loss of freshwater habitat, and widespread pollution. The Asian clam, for example, is a significant invasive species, outcompeting native mussels for resources and changing the water chemistry of impacted areas. The zebra mussel has also significantly altered the ecosystem by forming large populations on lake bottoms, creating a physical barrier to fish migration, and removing large amounts of plankton and nutrient-rich water from the water column. These processes can have cascading effects on other benthic stream animals, such as native unionid mussels.

Unionid mussel species have developed fascinating ways to reproduce and survive in a variety of environments. Some species are parasitic, attaching to fish and living off the nutrients provided by their host. Others are free-living, using a variety of life cycle stages to move from one habitat to another. Still others are partially parasitic, requiring a fish host for part of their life cycle but able to survive on their own once they reach adulthood. Unionid mussels have developed unique ways to migrate, reproduce, and survive in a variety of environments. Some species have developed parasites that help them move between habitats, while others have developed unique reproductive strategies to ensure their survival.

CONSERVATION
Michigan’s 45 unionids – more than a third – are listed by the U.S. Fish and Wildlife Service as endangered or are candidates for federal listing. Currently 19 of these species are federally listed as endangered. Similar to many other freshwater animals, unionid mussels are considered a general indicator species, meaning that their presence or absence can provide valuable information about the health of a given waterbody. Unionid mussels are considered one of the most important indicators of water quality, and their presence or absence can indicate whether a waterbody is suitable for human use or whether it is contaminated with pollution.

One of the most important differences between the unionid mussels and the other freshwater bivalves in their unique life cycle. Unionid mussels require a fish host to complete their life cycle, whereas most other bivalves can reproduce and develop into the adult form without a fish host. Eggs are fertilized and develop into larval mussels within the gills of the female unionid mussel. These larvae, called glochidia, are released into the water and must attach to a suitable fish host to complete their development. Once the larval mussels have attached to a fish host, they remain in the gills of the host for a period of time ranging from a few weeks to several months. During this time, the larval mussels develop into the adult form of the mussel. The adult mussel then releases glochidia into the water, which can develop into the adult form of the mussel. This life cycle illustration demonstrates the interconnected nature of species in an ecosystem.

Unionid mussels are an important component of Michigan’s aquatic ecosystems. They play a significant role in the aquatic ecosystem by serving as a food source for many fish, invertebrates, and wildlife. Unionid mussels are also considered a bioindicator species, meaning that their presence or absence can provide valuable information about the health of a given waterbody. Unionid mussels are considered one of the most important indicators of water quality, and their presence or absence can indicate whether a waterbody is suitable for human use or whether it is contaminated with pollution.

In Michigan, Unionid communities in southern Michigan once had more than 20 species, but today only three species remain. Unionid mussels were harvested from large lakes and rivers in the 1930s for use in the button industry. A rapid decline in the mussel population was caused by the introduction of heavy metals, organic pollution, and dredging. In response, the Michigan Department of Natural Resources, then known as the Michigan Conservation Commission, closed the harvest for a period of five years beginning in 1944 to allow the mussel population to recover. By the end of the 1950s, the Michigan mussel population had recovered to a point where use of plastics to manufacture buttons was no longer possible. Michigan’s unionid communities are not considered stable enough for use in the button industry and are in decline or at risk of becoming extinct or endangered.
the dominant freshwater mussel family is represented by two species, the unionid mussel family is represented by 45 species occurring in Michigan.

Figure 1: Pea clams (Margaritifera species). They are common in eastern North America, with 45 species occurring in Michigan. These mussels have a hard, dark, elongated shell that is often mistaken for a bivalve. They are known for their unique life cycle, which involves a pelagic larval stage.

Figure 2: Zebra mussels (Dreissena polymorpha), introduced to North America in the 1980s by shipping vessels. Zebra mussels are a threat to the Great Lakes ecosystem because they can form dense populations that can outcompete native species. They are also a threat to waterfowl and other wildlife because their shell is highly visible in the water column. A more complete description of these mussels can be found in the text.
IDENTIFICATION

Freshwater mussels can be identified to species by the characteristics of their shells. It is easier to identify empty shells since characters on the inside are visible. Figures 10–13 illustrate some common characters used to identify unionid species. Identification of freshwater mussels takes lots of practice. Although there are some distinct characters that can be used for identification, many of the characters have a high amount of variation within species. The best way to improve your identification skills is to spend time looking at many individuals of each species. This will enable you to learn how each character varies within the species and help you to develop a memory for the overall three-dimensional shape of the shell. Shells of the same species are like pieces of art created by the same artist. Each one is different, yet there is a consistent theme of shape, color, and texture that holds true.

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Freshwater Mollusc Conservation Society
http://www3.info.michigan.edu/musc

BioScience Natural History Survey, Mollusk Collection
http://www3.info.michigan.edu/musc/biosciences_mollusks.html

Ohio State University, Division of Wildlife
http://www.biosci.ohio-state.edu/~molluscs/OSUM2/index.htm

BOOKS:


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Figure 10: Fatmucket (Lampsilis siliquoidea)
- Iridescent nacre
- Lateral teeth
- Cardinal teeth
- Beak
- Annular rings
- Rays
- Anterior
- Posterior
- Flutes

Figure 11: Fluted-shell (Lasmigona costata)
- Reduced lateral teeth
- Reduced cardinal teeth
- Thin, fragile shell

Figure 12: Giant floater (Pyganodon grandis)
- Lateral teeth absent
- Cardinal teeth absent

Figure 13: Purple wartyback (Cyclonaias tuberculata)
- Bumps
- Purple nacre
- Heavy lateral teeth
- Heavy cardinal teeth
- Thick, heavy shell

Figure 14: Purple Lilliput (Pilumnula nigricans)

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