Invasive Zebra and Quagga Mussels

Life Cycle of Dreissenid Mussels

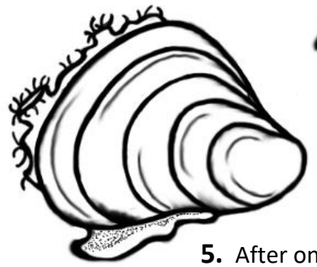
Zebra and quagga mussels are an **aquatic invasive species** that can be found growing in freshwater lakes, ponds, rivers, streams, and wetlands. As adults, these fast growing **bivalves** filter their food out of the surrounding water. One adult zebra mussel can filter up to 1 liter of water each day. By doing so, they can quickly strip the water of the phytoplankton, bacteria, and organic detritus that serves as the base of most aquatic food webs.

Zebra and quagga mussels have a life span of three to nine years. They typically spawn from May to October when the water temperatures are warmer (9°C or higher). Males and female become mature and able to reproduce at ~8-9 mm in size.

Unlike most native North American freshwater mussels, dreissenid mussels do not need a fish host for reproduction and dispersal. Instead, they use external fertilization and water currents to spread their planktonic larvae.

During each spawning cycle, adult females can release up to 40,000 eggs. They can potentially go through 20 spawning cycles each year, so one female could release up to 1 million eggs per year. One male can release up to 200,000,000 sperm each year.

BENTHIC JUVENILE
~0.25mm to 8mm



PLANKTONIC POSTVELIGER
~150-200µm (0.15-0.2 mm)

4. The larvae drift as plankton for up to one month. During this time it eats, builds a shell, and develops internal organs.

5. After one month, the juvenile mussel has developed all of its internal organs. At this time, it sinks and settles on the bottom or to a nearby structure. The juvenile mussel uses its muscular foot to move along the benthic (bottom) substrate to find a suitable habitat. It then attaches to the substrate with its strong byssal threads.

PLANKTONIC VELIGER
~70-150µm (0.07-0.15 mm)

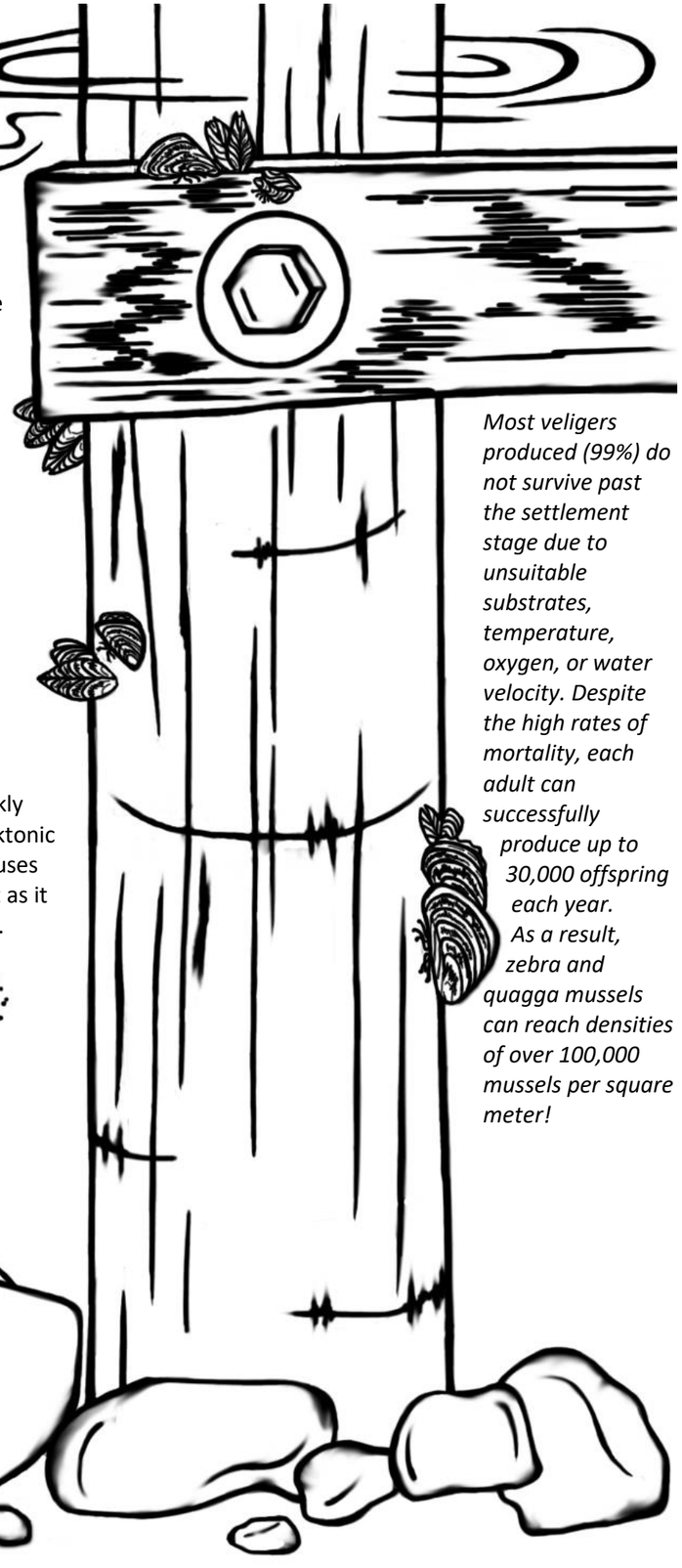
BENTHIC ADULT
9-50mm

6. Once secured to the substrate, the mussels live a sedentary life. They eat, grow, and reproduce. They can live for 3-9 years.

3. The embryo quickly develops into a planktonic veliger (larvae) that uses cilia to move and eat as it drifts with the water.

1. During each spawning cycle, the females and males release their eggs and sperm directly into the water.

2. External fertilization occurs in the water when the sperm and egg combine to create an embryo.



Most veligers produced (99%) do not survive past the settlement stage due to unsuitable substrates, temperature, oxygen, or water velocity. Despite the high rates of mortality, each adult can successfully produce up to 30,000 offspring each year. As a result, zebra and quagga mussels can reach densities of over 100,000 mussels per square meter!

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