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Golden Mussel

Limnoperna fortunei (Dunker, 1857)
syn. *Limnoperna depressa, L. lacustris, L. supoti, Dreissena siamensis, Modiola fortunei, M. lacustris, Volsella fortunei*

ALBERTA REGULATION: FISHERIES ACT

Last Updated: February 2018

Limnoperna fortunei (golden mussel)

Carlos Henckes

Overview:

The golden mussel is a bivalve mollusc of the Mytilidae family and the *Limnoperna* genus, which are brackish to freshwater mussels.[1] They are native to China and Southeastern Asia. Golden mussels became established in Hong Kong in 1965 and then Japan, Taiwan and South America (via ballast water) in the 1990s.[1] According to a U.S. Fish and Wildlife Service ecological risk screening summary completed in 2014, golden mussels are not yet present in North America.[3]

Golden mussels are fast-growing filter-feeders with high reproductive potential.[3] Juvenile mussels are free-swimming, planktonic larvae, which eventually settle and attach to hard substrates by byssal threads that are secreted from a gland at the muscular foot.[1]

L. fortunei will attach to virtually any hard surface - buoys, rocks, rooted plants, boat hulls, and even the shells of other molluscs.[1] Colonies can reach densities around 5,000-250,000 individuals per square metre, less on soft substrates.[4] Native mussel mortalities result from starvation and suffocation by golden mussel colonies.[1] Bio-fouling of water treatment plants and hydroelectric infrastructure occur due to pipe/filter obstruction and increased corrosion due to mussel infestations.[3]

Golden mussels are similar to zebra mussels, *Dreissena polymorpha*. Due to ballast water programs, the introduction of golden mussels to the Great Lakes is low; however, the probability of establishment is high. *L. fortunei* have wider habitat tolerances than both zebra and quagga mussels, *D. rostriformis bugensis*, and therefore, would have more significant environmental impacts.[4] Any mussel which attaches to substrates or is not free-living is not native and should be reported.

As of January 1, 2016, the possession, sale, or transport of this species in Alberta is illegal under the Fisheries Act.

Habitat:

Slow-moving, freshwater or brackish lakes, rivers, streams, lakes, dams, and estuaries. In temperate South America *Limnoperna* populations can develop in water temperatures 11 to 28°C. It is tolerant of pollution, low calcium levels and low pH.[1] Can tolerate salinities up to 3 ppt.[2] Experiment research indicates a minimum survival threshold of 5°C under prolonged exposure.[4]

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Golden Mussel *(continued)*

Identification:

Golden mussel generally occur in clumps. The triangular, shiny shells of adults are dark brown above the umbone and a paler yellow-brown below.[1] Shell length is commonly 20 mm but shells 40-60 mm have been found in some populations.[3] The outer layer of the shell is smooth and shiny, and thick where it curls inward at the dorsal ligamental margin (the shell's hinge). The umbones are nearly at the tip and the dorsal ligamental margin is generally straight. The ventral margin of the shell is variable, being either straight or distinctly bowed.[1] Distinguished from other Dreissena species with the presence of a nacreous layer (the interior surface of the shell), which is purple.[2] Hinge teeth and a byssal notch are absent, but valves are bilaterally symmetrical.[1]

Ecology:

Golden mussels have two sexes and reach sexual maturity by year one.[1] Spawning occurs at water temperatures of 16 to 28°C, 1-2 times per year.[3] Fertilization occurs in the water. The larval offspring are planktonic veligers that go through three stages of growth: trocophores (80-146 um), veliconcha (90-237 um), and pediveliger/umbonate (more than 256 um).[2] Veligers are dispersed by water currents.[1] The larval stage lasts between 30 and 70 days.[3] Larvae then settle to the bottom and attach to various substrates by byssal threads, secreted by their muscular foot.[1] Maturity is reached when approximately 5.5 mm long.

Golden mussels feed on algae, zooplankton and organic matter. The veligers feed on bacteria.[1] The golden mussel lifespan is about 3.2 years.[2]

Economic Impacts:

Golden mussels would cause significant costs to water treatment plants and hydro power stations by clogging pipes and filters, as well as surface corrosion due to mussel attachment.[1] Environmental impacts of *L. fortunei* could have impacts on recreation and tourism.

Environmental Impacts:

Golden mussel colonies smothering native bivalves and attaching to gastropods (snails) impacts the native biodiversity.[2] Golden mussels both consume and compete with zooplankton for food sources[4], which disrupts aquatic food chains.[1] Regular data collection from a golden mussel infested reservoir in Argentina found that water transparency increased, while suspended matter and primary production decreased significantly.[3]

Sociological Impacts:

The transformation of native aquatic communities results in the intrinsic loss of natural capital and enjoyment of natural areas. Golden mussel infested waterbodies could have negative impacts on shoreline property values.

Prevention:

Learn how to identify golden mussels and how to prevent spread. If you find a mussel, which has attached to an object, report it. Never empty your aquarium into natural water bodies.

The Canadian government's Ballast Water Program and The International Convention for the Control and Management of Ships' Ballast Water and Sediments are designed to prevent the introduction of non-native aquatic species.

Control:

Currently there are no established control options for golden mussels other than preventing introduction.

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Golden Mussel *(continued)*

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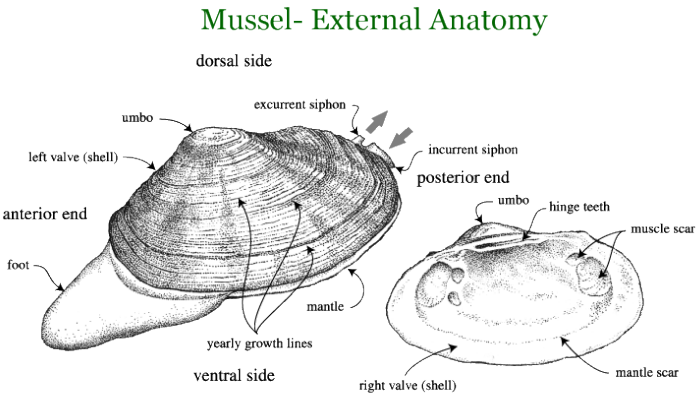

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