Established

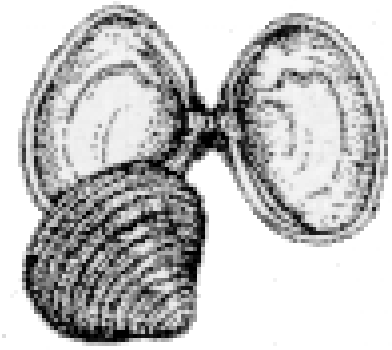
Asian Clam: An Exotic Aquatic Species

Corbicula fluminca

Description

- Asian clams are native to South East Asia and were first reported on the west coast of the United States around 1930. They have since spread to over 39 states, including three waterbodies in Massachusetts.
- Asian Clams are small, averaging less than 25mm (1.5 inches) and rarely exceed 50 mm.
- Shells are light green/light brown with distinctive elevated concentric ridges on their shell.
- Asian Clams have two lateral teeth and 3 cardinal teeth visible inside their shell.

Asian Clam

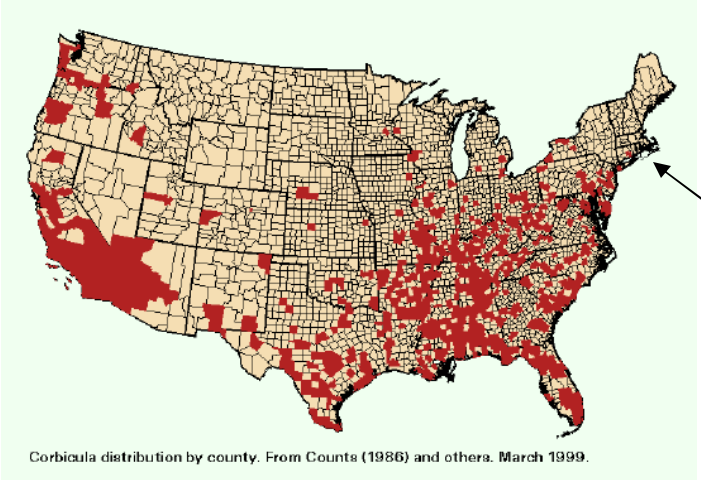


Habitat

The Asian Clam is a very hardy and persistent species that has become established across the United States above 40 ^{0} latitude.

- Asian Clams prefer quiet waters with low salinity and sandy substrates, however, populations have been found in thriving in brackish estuaries and in water bodies with silty sediments.
- Asian Clams prefer to colonize sunlight warmer areas near the shore, and typically avoid the low oxygen levels and cooler conditions associated with the deeper layer (hypolimnion) of the water body. Usually, due to their short siphons, one third of the shell protrudes above the substrate.
- Although they are able to withstand freezing conditions, their ability to reproduce decreases with exposure to lower temperatures.
- This species has been documented in a few locations in MA, and is established in bordering states (VT NY).

Distribution Map



Corbicula distribution by county. From Counts (1986) and others. March 1999.

Asian Clams are established in Webster Lake and Tispaquin Pond. A pioneer infestation was documented in Fort Meadow Reservoir in 2005. There were also sightings of Asian Clams in the Charles River in the 1970's.

Reproduction

Mature Asian Clams are hermaphroditic and it is believed that they occasionally self fertilize. The young are incubated within the safety of the parent's shell, and are released 4-5 days later. The young microscopic pedivelligers travel along the substrate to new locations and attach to any available suitable substrate with byssus fibers. Young that are hatched in the spring usually attain sexual maturity by the fall, and may live for up to seven years. Asian Clams typically spawn between July and September.

- Asian Clams can release over 320-387 offspring *daily*, depending on the conditions.
- Water temperature extremes (above 37^0 C and below 1^0C) can inhibit spawning.

Impacts and Threats Posed by Asian Clam

Asian Clam is a prolific and highly competitive species that is capable of rapid growth and spread. Asian Clam can displace native species, reduce biodiversity, alter the food chain, and damage equipment (including boat motors, intake pipes, diving gear, commercial water systems).

- Asian Clams can clog intake pipes causing boat engines to overheat, power plant cooling systems to fail and result in millions of dollars of damage each year.
- Asian Clams are efficient filter feeders that consume microscopic plants and animals from the base of the food chain, and their intensive filtering activity can drastically decrease the quantity of food available in the waterbody. Many juvenile fish species require a source of microscopic plants and animals to eat in order to survive and must compete with the Asian Clams for food. A decrease in the survival rate of juvenile fish can impact the entire the fish population in future years.
- Asian Clams form dense clusters, often over 6000 animals per square meter. The heavy clusters occasionally cover the benthic area of a waterbody, destroy historic underwater sites and alter the benthic community.
- Many native mussels are now threatened and in danger of becoming extinct due to infestations of Asian Clams.

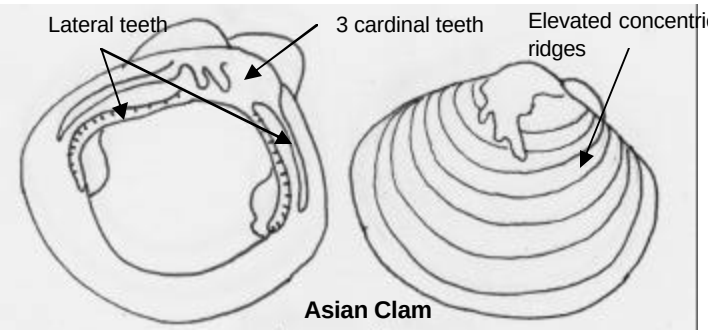
Management Methods

Management methods currently include mechanical methods, chemical control and temperature alteration, although many of these are not suitable options for lakes and ponds

- Clusters of shells can be removed manually by labor intensive scraping. Although this removes the mussels, microscopic veligers remain in the water and will re-colonize the area.
- Birds, raccoons, bass, carp and numerous other species consume Asian Clams, however, there are too few of these predators to have a significant impact on the overall Asian Clam population.
- Heating the water in pipes above 27O C can kill adults and larva.
- Exposure to extended periods drying, high salinity, and low concentrations of chlorine or bromine can kill adult and juvenile stages of *Corbicula*, however this is more suitable for factories than lake managers.
- Prevention is the best line of defense when dealing with Asian Clams. In 1987 Massachusetts passed a regulation that prevents the importation, sale or transport of this species.

Other Facts:

- It is believed that Asian Clams were introduced by Chinese immigrants who intended to harvest the clams as a food source.
- There are two morphs of Asian Clam in the United States. The dark morph is found in the southwest, and the light morph is common in the northeast.
- Researchers are investigating the possibility that there are two separate species of Asian Clam, *Corbicula fluminalis* and *Corbicula manilensis*.
- Asian Clams are still sold commercially as bait throughout the United States, and in the aquarium trade as pygmy or gold clams.
- Asian Clams can be confused with native Fingernail Clams, however, Fingernail Clams lack the three cardinal teeth and two lateral teeth.



Asian Clam

Prevent The Spread!

- Never release any plant or animal into a waterbody unless it came from that waterbody.
- Flush engines, dispose of bait, bilge water, bait bucket water on dry land away from shore.
- Report any suspected sightings of this species ASAP to michelle.robinson@state.ma.us
- Spread the word to other boaters and fisherman.

Other Exotic Species Informational websites:

http://nas.er.usgs.gov/queries/plants/PlantState.html (USGS- search for exotic species by state)
www.ProtectYourWaters.net (Aquatic Nuisance Species national web site)

References:

1) Literature References:
-USGS Exotic Species Website: http://nas.er.usgs.gov/mollusks/docs/co_flumi.html
-Gulf States Marine Fisheries Commission http://nis.gsmfc.org/nis_alphabetic_list.php#mollusks
-Illinois Natural History Survey www.inhs.uiuc.edu/cbd/musselmanual/page174_5.html
-SGNIS "Aquatic Immigrants of the Northeast. No. 4: Asian Clam, *Corbicula fluminea*" Balcom, N.C., 1994 Conneticut Sea Grant College Program
2) Photographs were obtained from:
Asian Clam: Noel M. Burkhead- USGS
1st Asian Clam line drawing: EPA website at: www.epa.gov/maia/ images/clam.gif
2d Asian Clam line drawing: re-drawn by Michelle Robinson
3) The distribution map was taken from:
USGS Exotic Species Website: http://nas.er.usgs.gov/mollusks/docs/co_flumi.html

For more information please contact:

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Or visit the Lakes and Ponds web site at: http://www.mass.gov/lakesandponds
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