

WATER CHESTNUT

Trapa natans

Trapa natans, which is different from the water chestnut you find in Chinese take-out, is a rooted aquatic plant that can dominate ponds, shallow lakes, and rivers. It grows in thick, dense colonies that displace native vegetation and limit recreation and navigation.

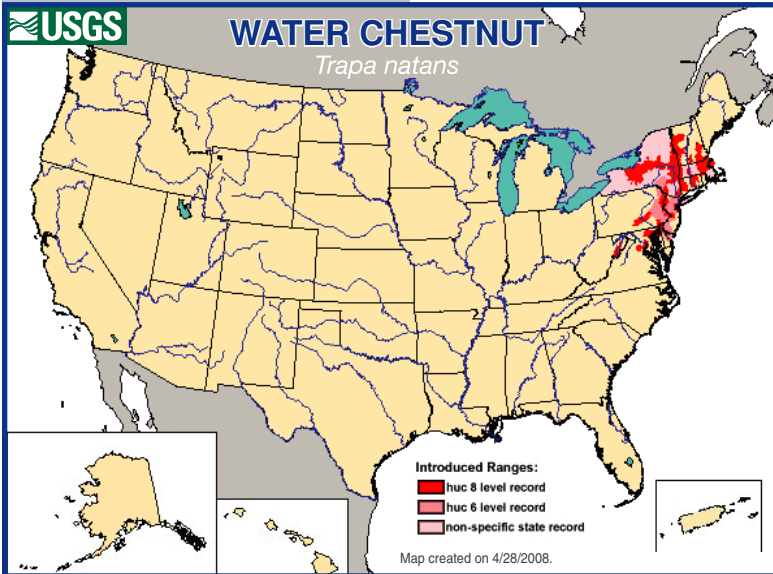
NATIVE & INTRODUCED RANGES

The water chestnut's native range includes Europe, Asia, and Africa. It was first observed in North America near Concord, Massachusetts in 1859. Since then, its rapid reproduction and dense mats have invaded the waters of New England and Mid Atlantic states including Maryland, Massachusetts, New York, and Pennsylvania. In Pennsylvania, water chestnut is most common in the upper Delaware River, but populations have also been established in the Schuylkill and Susquehanna rivers, and Lake Nockamixon in eastern Pennsylvania.

SPREAD

Water chestnut was brought to the United States by water gardeners in the 1800s and quickly became established. Water chestnut has a high reproductive rate; each plant can produce up to 15 nuts per season, and within each nut can be hundreds of seeds. It can also spread vegetatively. As the "rosettes" of floating leaves break apart, fragments can attach to boats and

trailers, or float to new locations. The sharp spines of the nut can also get caught on other objects, birds, and animals. Canada geese have been observed with the nuts clinging to their feathers.



IMPACTS

Threat to Biodiversity

Dense floating mats of water chestnut can choke a water body, limiting light and oxygen. Water chestnut colonies crowd and outcompete native organisms for nutrients and space. They alter the habitats of many native species and offer little nutritional value for wildlife. With time, water chestnut plants can completely dominate an aquatic ecosystem.

Economic Costs

Water chestnut infestations can block waterways making fishing, boating, and swimming nearly impossible. Its sharp nuts, which are capable of tearing through a shoe, can cause painful puncture wounds. Water chestnut is difficult and expensive to control. The primary economic costs are associated with chemical and mechanical control efforts. For example, the state of Vermont spent nearly \$500,000 in 2000 to remove water chestnut using mechanical harvesters and hand removal.

Photo courtesy of Pennsylvania Sea Grant.



Photo courtesy of Leslie Mehrhoff, IPANE.



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 CHESTNUT

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PREVENTION & CONTROL

Since water chestnut is an annual plant, control requires preventing plants from blooming and setting seed. A combination of manual, mechanical, and chemical techniques is often the most effective. However, eradication requires several years of monitoring because seeds can remain viable for 12 years. Larger infestations require the use of mechanical harvesters or the application of aquatic herbicides. Infested waters may need to be monitored for 5-12 years to eliminate the invader, and some infestations are so severe that total eradication may never be achieved.

The key to water chestnut control is early detection. It is vital to spot small populations while they are easy to remove by hand. If you see water chestnut, pull it out and dispose of it far away from the water. Any plant you destroy will prevent up to 120 new plants from growing the next year!

SPECIES DESCRIPTION

Water chestnut is a rooted, annual aquatic plant consisting of submerged leaves as well as a buoyant rosette of floating leaves. The floating leaves are green, glossy, and triangular with toothed edges. The submerged leaves are feathery and whorl around a cord-like stem that can reach 12-15 feet (4-5 meters) in length. Water chestnut flowers are small and white and form at the center of the stem. The fruit is a nut that has four short, sharp spines.

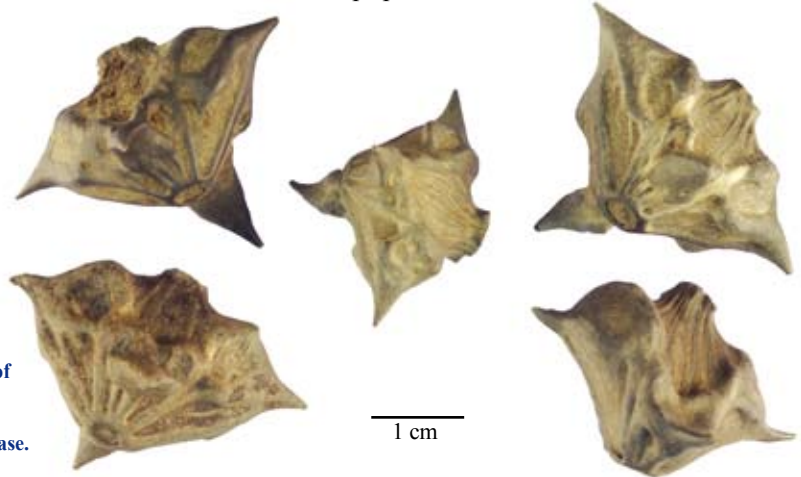


Photo courtesy of Steve Hurst at USDA-NRCS PLANTS Database.

HABITAT & BIOLOGY

The water chestnut plant begins to flower in mid to late July in Pennsylvania. The nuts ripen approximately one month later and seed production continues into the fall until frost kills the floating rosettes. Each nut that sinks to the bottom produces new plants and seeds may remain viable for up to 12 years, although most will germinate within the first two years. Water chestnut can grow in any freshwater setting; however, it prefers nutrient rich waters less than 16 feet (5 meters) deep in ponds, lakes, slow moving streams, and rivers.



Photo courtesy of Leslie Mehrhoff, IPANE.

References:

Trapa natans L. – *Waterchestnut*. Plants Profile. United States Department of Agriculture – Natural Resources Conservation Service. <<http://plants.usda.gov/java/profile?symbol=TRNA>>

Van Driesche, R., et al. 2002. *Biological Control of Invasive Plants in the Eastern United States*. USDA Forest Service Publication FHTET-2002-04, 413 p. <<http://invasiveplants.net/InvasivePlants/WaterChestnut/WaterChestnut.asp>>

Water chestnut. 2007. U.S. Fish and Wildlife Service. <http://www.fws.gov/r5cwc/water_chestnut.htm>