



Aquatic Nuisance Series: Water Chestnut

European water chestnut (*Trapa natans*) is a non-native aquatic plant that is slowly spreading through the northeast. It is native to Western Europe, Africa, and northeast Asia. It was introduced to the United States in the second half of the nineteenth century. It is an aggressive plant that is best controlled as soon as it is observed in a waterbody.



North American Distribution of water chestnut as of September 2014.

New York State Invasive Species Information

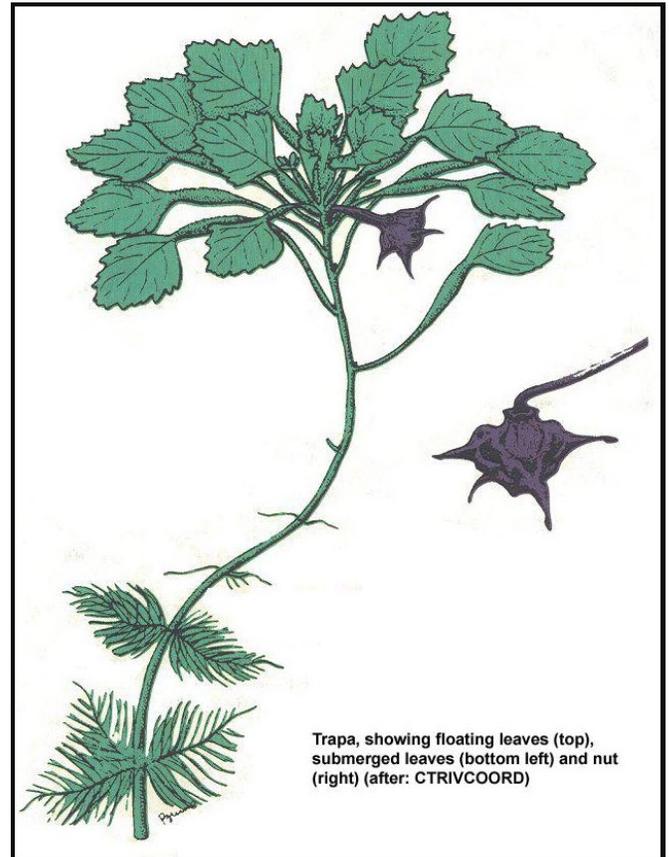
This plant is not the same as the water chestnut (*Eleocharis dulcis*) that you get from a Chinese restaurant.

Description and Habitat

Water chestnut grows in slow moving streams and lakes. It can take root in calm areas of rivers. It can grow in depths of 12 feet, but will usually start close to a shoreline.

Water chestnut is an annual plant that dies back at the end of the growing season. It needs to drop its seeds into the lake bottom to come up the following spring. Each seed produces 10-15 stems with submerged and floating leaves, forming whorls around the stem. The waxy leaves are around $\frac{3}{4}$ to $1\frac{1}{2}$ inches long with toothed edges. The transition from stem to leaf has a spongy, buoyant bladder allowing the leaves to float on the water. Single small, white flowers sprout in the center of the floating leaves. Nuts form in July with four very

sharp spines. These tend to fall directly beneath the plant, but can travel with water movement.



Trapa, showing floating leaves (top), submerged leaves (bottom left) and nut (right) (after: CTRIVCOORD)

New York State Invasive Species Information

Because of its aggressive growth and ability to float its leaves on the surface of the water, water chestnut can dominate a lake in just a few years. Its effects can be devastating. It will completely shade the water beneath it, crowding out other aggressive invasive species. It will also form a thick tangle below the leaves making life difficult for the aquatic organisms that try and seek shelter under it. Water chestnut has little nutritional value to fish and waterfowl.

Another side effect of a large infestation is that dissolved oxygen levels can fall dangerously low when the plants die back at the end of the growing season. In Yonkers, NY, a water chestnut infestation has made a lake unusable for recreation

and the local residents complain about its smell during the end-of-season die off.

Management and Control

The water chestnut seeds can remain viable for up to 12 years. This means that once you have an established population, eliminating it will be a long-term project. In parts of New York, aggressive campaigns have been ruined by lax follow up with the water chestnut reestablishing itself quickly. One acre of water chestnut produces enough seed to cover 100 acres the following year.

As with most invasive aquatic plants, the best method of control is prevention. Fortunately, water chestnut can be stopped quickly if it is identified early in its first season. It is even possible that it can be completely eliminated in one season if it is removed before the fruit has ripened and fallen to the lake bottom.

Even if the early detection is missed, a small patch of water chestnut can be controlled with manual hand pulling. This may have to be repeated year after year, but proper diligence will keep the population on a decline until it is eliminated. Because of the spiny nuts, gloves should be worn when pulling in June or July.



Kitchell Pond Morris County Parks. 2011. Photo courtesy Peter Nitzsche RCE Morris County Agricultural Agent

Unlike many other non-native invasive plants, water chestnut will not spread from fragments that can result from harvesting. With its strong stem and relatively shallow roots, hand pulling is quite effective at getting the plant out of the waterbody. There is little risk that harvesting will spread the

plant through the lake, especially if this is done before the nuts appear in July. This can be done from the shore or a kayak as the root will pull out with little effort.

Once a population is covering more than hand pulling can manage, a mechanical harvester can be used. Again, this should take place before the fruit has ripened and fallen to the bottom. Repeated treatment is generally needed for 5-12 years. It is important to continue removal until the seed bank has been completely exhausted.

Chemical control is not used as often as other species because of its effect on non-target species. Since water chestnut grows around the same time as more desirable species, there is no good timing window to limit the side effects of treatment. Lake managers should consult their professional treatment company on chemical options if harvesting is not feasible.



Lower Hudson Partnership for Regional Invasive Species Management

Biological controls are also being investigated, but effects on other native plants is a concern. A leaf beetle (*Galerucella birmanica*) that keeps the plant in check in its native range is the best candidate.

Additional Resources

http://nyis.info/invasive_species/water-chestnut/

<https://njaes.rutgers.edu/pubs/publication.php?pid=FS1119>

<https://www.lhprism.org/species/trapa-natans>