

Water Chestnut: An Invasive Aquatic Plant

Trapa natans

Common Name: Water chestnut, European water chestnut

Biology

Water chestnut is a floating, rooted annual plant, which can grow to lengths of 16 feet. Its slender stem serves as central axis to submersed and floating leaves. Arranged in an alternating pattern around the stem, the submerged leaves are feather-like and can grow to 6 inches in length. The floating leaves form rosettes, which attach to the main stem by an inflated leaf stem. Floating leaves are characterized by a waxy, shiny upper side and hairy, venous underside. Also, an air bladder attaches at the base of each floating leaf. Flowering occurs in July to October, creating flowers with four long, white petals and four green sepals in the center of the rosettes. Within a month of flowering, flowers develop a 3cm nut with four, half-inch sharp barbs.

Reproduction

Water Chestnut can reproduce sexually by seed formation and asexually by vegetative reproduction. Of the two, the seed formation (via the production of nuts) is more common. During the fall, the sharp, heavy nuts are released, sink to the bottom, and establish in the sediment where they may remain viable for up to twelve years. Although less common, vegetative reproduction occurs by fragmentation, which allows this species to re-sprout and grow into new plants.

Habitat

Historically, this plant species is native to the warm temperate regions of Eurasia. Human introductions have allowed this species to invade all states in New England except Maine and Rhode Island. Outside of New England, this plant has infested New York, Pennsylvania, Maryland, Delaware, and Virginia. It is commonly found in quiet, nutrient rich water bodies with a pH of 6.7-8.2. Nearly unaffected by temperature gradients, this aquatic plant is “cold-hardy” and can overwinter in frozen lakes and ponds.

Impacts and Threats Posed by Water Chestnut

Water Chestnut forms extremely dense mats on the subsurface, which outcompetes and shades out native vegetation. Species that depend on the native vegetation must relocate or perish; thereby, leading to a reduction in the local biodiversity. In the fall, the dense mats decay. This decaying event causes a reduction in the oxygen levels. Substantial depletion of oxygen can result in anoxic conditions, which kill fish and other organisms in the water body. Additionally, the dense mats trap organic matter and silt, which leads to the creation of mosquito breeding ground and increased sedimentation. Furthermore, thick mats and sharp barbs impose limitations on water use for recreational purposes, such as boating and fishing, which leads to negative impacts on real estate values and tourism.

Management methods

General management methods include:

- mechanical harvesting
- drawdowns
- hand harvesting
- herbicides

Literature Cited

1. <http://nbii-nin.ciesin.columbia.edu/ipane/icat/browse.do?specieId=25>
2. <http://www.mass.gov/dcr/watersupply/lakepond/factsheet/Water%20Chestnut.pdf>