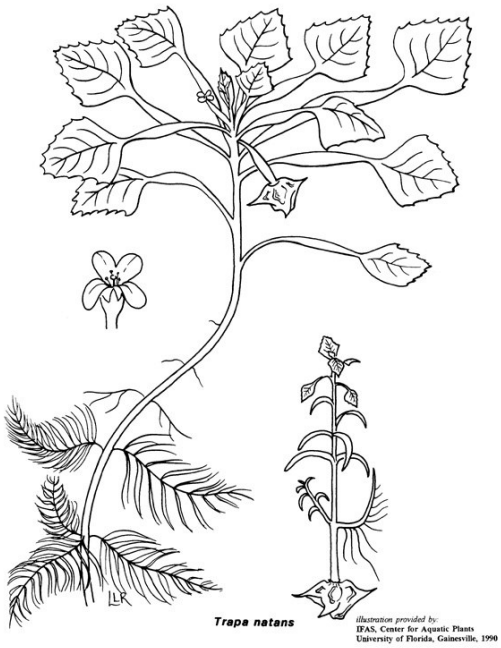
Water Chestnut: An Exotic Invasive Aquatic Plant

Trapa natans

Description

- Water Chestnut is an annual, rooted floating leaved non-native plant that can form dense impenetrable mats at the water's surface.
- The green triangular 2-4 cm wide floating leaves form rosettes, which are attached to the main stem by an inflated petiole (leaf stem). The upper side of the leaves is waxy and shiny and the underside is coated with fine hairs. An air bladder is located at the base of the floating leaves, and the leaf margins are wavy.
- The submerged leaves are feathered and whorled around the stem.
- The slender stems can reach lengths of 15 feet.
- Small white flowers with 4 petals develop from July until the first frost.
- Nuts are 3 cm large and armed with 4 very sharp ½" barbs.

Water Chestnut



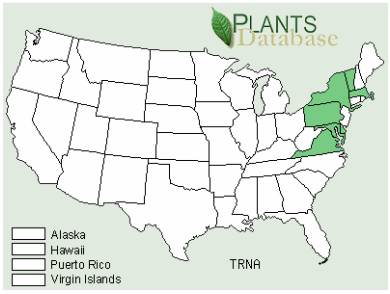
Habitat

Water Chestnut is a very hardy species that is well established in the Concord River and Charles River systems and continues to spread across the state.

- Prefers quiet, nutrient rich water bodies but can occasionally be found in slow moving water.
- Can withstand a pH range of 6.7-8.2 and can over-winter in the frozen lakes of northern climates.

Distribution Map

Trapa natans



states with Water Chestnut infestations

Reproduction

Water Chestnut reproduces primarily via the production of nuts.

- Each nut can produce 10-15 plants and each of these plants may produce up to 20 seeds.
- The 6 gram nuts are released in the fall and quickly sink into the sediments, where they can remain viable for up to 12 years. Nuts have also been observed attached to the feathers of waterfowl, and are possibly spread to new locations if the birds travel.
- *T. natans* seeds can float downstream or attach to wildlife to disperse and begin new colonies.

Impacts and Threats Posed by Water Chestnut

Water Chestnut is a highly competitive plant that is capable of rapid growth and spread. Water Chestnut displaces native species, reduces biodiversity, hampers recreational uses, reduces real estate value and diminishes aesthetic values.

- *T. natans* can negatively impact native vegetation and fish populations by forming large dense mats of vegetation on the water surface, thus intercepting sunlight to the exclusion of other submerged plants.
- The thick mats greatly impede boaters, fisherman, water skiers and swimmers, and these limitations on water use can negatively impact real estate values.
- *T. natans* can deplete the available oxygen in the water, and the resulting low oxygen condition (anoxia) can lead to fish kills and harm other aquatic organisms.
- The sharp ½" barbs can penetrate shoes with leather soles and pose a hazard to swimmers and beach visitors.
- *T. natans* can trap organic matter (which creates breeding grounds for mosquitoes) and silt (leading to increased sediment level).

Sharp barbed nut

Management Methods

Management methods currently include mechanical removal, drawdowns and herbicides. No known biological controls exist.

- Hand pulling and mechanical harvesting are suitable removal techniques. These methods should be performed before the nutlets are released in the fall.
- Drawdowns can be an effective mode of Water Chestnut control if the drawdown is of adequate time and depth to prevent re-growth from seeds. Drawdowns may affect fish, reptiles, amphibians, aquatic organisms and downstream conditions.
- Herbicides, such as 2,4-D have been used to control Water Chestnut.

T. natans leaves

Hand pulling *T. natans*

T. natans

Other Information

- Water Chestnut is on the Massachusetts Prohibited Plant List (as of January 1, 2006)
- For more information on hand pulling visit: http://www.northeastans.org/docs/waterchestnutpull.pdf
- Water Chestnut is native to Eurasia and was planted intentionally in Fresh Pond, Cambridge MA (and a few other ponds) in 1897 by a gardener. The plant rapidly spread into nearby rivers and ponds, and reached western portions of the state by 1920.
- Water Chestnut is considered rare in many of its original native regions.
- The fruits of *T. natans* have been used in liniments for treating sunburns and sores.
- Over 3 million dollars have been spent on Lake Champlain, VT from 1982-2000 to remove Water Chestnut.
- During a single season, one acre of Water Chestnut can produce enough seeds to cover 100 acres the following year.
- Informational websites:
  http://infoweb.magi.com/~ehaber/factnut.html (Invasive Exotic Plants of Canada)
  http://www.anr.state.vt.us/dec/waterq/ans/wcpage.htm (Vermont State Web site)
  www.ProtectYourWaters.net (Aquatic Nuisance Species web site)
  http://www.ipcnys.org/ipc_twentytn.html (Invasive Plant Council of NY)
  http://aquat1.ifas.ufl.edu/ (Center for Aquatic and Invasive Species)
- There are no plants that Water Chestnut can be easily confused with.

References:

1) http://webapps.lib.uconn.edu/ipane/browsing.cfm?descriptionid=25(Invasive Plant Atlas of NE)
   http://www.anr.state.vt.us/dec/waterq/ans/wcpage.htm (Vermont State Web Site)
   http://infoweb.magi.com/~ehaber/factnut.html (Invasive Exotic Plants of Canada)
   http://www.ipcnys.org/ipc_twentytn.html (Invasive Plant Council of NY)
2) Photographs were obtained from:
   Unknown (Cover photo)
   http://www.des.state.nh.us/factsheets/bb/bb-43.htm (line drawing of Water Chestnut)
   http://www.dnr.state.md.us/bay/sav/water_chestnut.html (Water Chestnut nutlet)
   http://www.anr.state.vt.us/dec/waterq/ans/ans-index.htm (*T. natans* leaves)
   Michelle Robinson DEM Lakes and Ponds (*T. natans* hand pulling)
   http://www.anr.state.vt.us/dec/waterq/ans/wcpage.htm (*T. natans* complete plant)
3) The *T. natans* distribution map was taken from:
   http://plants.usda.gov/cgi_bin/plant_profile.cgi?symbol=TRNA (USDA Plant Data Base)

For more information please contact:

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