



# Invasive Plant Atlas of New England

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[Related Information](#)
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[Data & Distribution Maps](#)

## COMMON NAME

Water chestnut  
European water chestnut

## FULL SCIENTIFIC NAME

*Trapa natans* L.

## FAMILY NAME COMMON

Water-nut family

## FAMILY SCIENTIFIC NAME

*Trapa natans*

## IMAGES



Floating rosettes



Close-up of flower



Incursion



Habit



Flower



Fruit



Close-up of Fruits

## NOMENCLATURE/SYNONYMS

**Synonyms:** None

## DESCRIPTION

[Botanical Glossary](#)

*Trapa natans* is an aquatic annual that grows as a rooted, floating plant. Its floating leaves are arranged in a rosette. Individually, the 2-4 cm (0.75-1.5 in.) long upper leaves are slightly rhombic to rhombic-ovate and are sharply dentate along the leaf margins. There are conspicuous veins on the lower surface as well as short, stiff hairs. The submerged lower leaves are alternate and feather-like and can

reach up to 15 cm (6 in.) long. The petioles of the floating leaves are 0.6-1.8 m (2-6 ft.) long. The inconspicuous white flowers consist of four 8 mm (0.3 in.) long, white petals and four green sepals, and are located in the center of the rosette. Flowering begins in the northeastern United States in July and continues until the plants are killed by frost. The fruit is a four-horned nut-like structure about 3 cm (1.2 in.) wide that develops underwater. Fruits ripen in about a month and can remain viable for up to about twelve years. Each seed can give rise to ten to fifteen rosettes, and each rosette may produce as many as twenty seeds. [Page References](#) Bailey 734, Crow & Hellquist 209, Fernald 1050, Gleason & Cronquist 313, Holmgren 293, Magee & Ahles 768. See reference section below for full citations.

## SIMILAR SPECIES

None

## REPRODUCTIVE/DISPERSAL MECHANISMS

It has often been reported that waterfowl or water currents can move the seeds of *Trapa natans* long distances. However, the fruits weigh 6g and have been described as falling to the bottom of lakes "like sinkers," making them unlikely to be carried in the feathers of birds or downstream by moving water. The empty husks of the fruits do tend to float, possibly leading to the belief that they could be moved in these ways. *Trapa natans* may also disperse by fragmentation. Plant fragments can be carried by water, waterfowl and boats to new locations.

## DISTRIBUTION

*Trapa natans* is native to the warm temperate regions of Eurasia. It has been naturalized in Australia and has recently (1998) been reported from Ontario, Canada. In the United States it is present in the northeast in the states of New York, New Jersey, Pennsylvania, Delaware, Maryland and Virginia. In New England, it has been reported from Massachusetts, Vermont, New Hampshire and Connecticut.

## HISTORY OF INTRODUCTION IN NEW ENGLAND

Sometime before 1879, *Trapa natans* was intentionally planted by a gardener at the Cambridge botanical garden in Fresh Pond, Cambridge, MA. This gardener reported planting it in other ponds as well. It was also distributed up to Concord, MA, where it was planted in a pond near the Sudbury River. By 1899, it was extremely invasive in the pond and the river, and needed to be pulled out. There is an 1859 record from Concord, MA, but notes on the specimen and from the New England Botanical Club indicate that this date is in error, and that it was actually from 1879. By 1920, *Trapa natans* had reached western Massachusetts. Since then, it has spread into Lake Champlain in Vermont, the Nashua River in New Hampshire (1998) and most recently the Connecticut River in Connecticut in 1999. Any area that is downstream of these incursion sites is threatened.

## HABITATS IN NEW ENGLAND

,Aquatic,Lake or Pond,River or Stream,Yard or Garden

*Trapa natans* is commonly found in placid, nutrient rich lakes and rivers with a pH of 6.7-8.2. Plants have also been found in freshwater regions of estuaries and exposed mud flats.

## THREATS

Threats from *Trapa natans* are a result of the surface mats it forms, which cause competition for nutrients and space. These plants also have little nutritional value for wildlife. Its blooms and decomposition may contribute to lower levels of dissolved oxygen in shallow water, and its spiny fruit can founder horses or dogs. Furthermore, the spread of water chestnut has economic impacts resulting from the plant's ability to impede fishing, hunting, swimming, boating and commercial navigation. Control measures to restore these uses can be expensive, such as the \$5,249,685 spent from 1982 to 2005 to clean-up Lake Champlain.

## MANAGEMENT LINKS

[Cornell Cooperative Extension \(Onondaga County\)](#)

General information including management options

## DOCUMENTATION NEEDS

Documentation required: Photograph of floating rosette of leaves.

Best time for documentation: Summer, fall.

## ADDITIONAL INFORMATION

[Integrated Taxonomic Information System](#)

Taxonomic information about the species

[PLANTS database](#)

General information and a map

[New Hampshire Department of Environmental Services](#)

General information

[Invasive Plant Council of New York State](#)

Photographs and general information

[Vermont Department of Environmental Conservation](#)

General information, drawings and management

[Invasive Plants of the Eastern United States \(invasives.org\)](#)

Information on biological controls

[Lake Champlain Basin Program](#)

Information on Water Chestnut in Lake Champlain

[National Park Service: plant invaders of Mid-Atlantic natural areas](#)

General information

[The Chesapeake Bay Program](#)

General information

## REFERENCES

- Andersen, R. N. (1968). Germination and Establishment of Weeds for Experimental Purposes. Weed Science Society of America Handbook. WSSA, Illinois.
- Bailey, L. H. 1949. Manual of Cultivated Plants. Macmillan, New York.
- Clark, F., C. Mattrick and S. Shonbrun. "Rogues Gallery: New England's Notable Invasives." Sarah Shonbrun ed. New England Wild Flower: Conservation Notes of the New England Wild Flower Society. New England Wild Flower Society, Massachusetts.
- Cozza, R., G. Galanti, M.B. Bitonti, A.M. Innocenti. 1994. Effect of storage at low-temperature on the germination of the waterchestnut (*trapa-natans* l). *Phyton Annales Rei Botanicae* 34 (2): 315-320.
- Crow G.E. and C.B. Hellquist. 2000. Aquatic and Wetland Plants of Northeastern North America. Vol 1. University of Wisconsin Press, Madison.
- Fernald, M.L. 1950. Gray's Manual of Botany 8th edition. American Book Company, New York.
- Flora of North America Association ed. 2000. Flora of North America vol. 22. Oxford University Press, Oxford, New York.
- Gleason H.A. and A.C. Cronquist. 1991. Manual of Vascular Plants of the Northeastern United States and Adjacent Canada. 2nd ed. New York Botanical Garden, Bronx, New York.
- Groth, A.T., L. LovettDoust, J. LovettDoust. NOV 1996. Population density and module demography in *Trapa natans* (Trapaceae), an annual, clonal aquatic macrophyte. *American Journal of Botany* 83 (11): 1406-1415.
- Holmgren N.H. 1998. Illustrated Companion to Gleason and Cronquist's Manual. New York Botanical Garden, Bronx, New York.
- Les, D.H. and L.J. Mehrhoff. 1999. Introduction of nonindigenous aquatic vascular plants in southern New England: a historical perspective. *Biological Invasions* 1: 281-300.
- Magee D.W and H.E. Ahles. 1999. Flora of the Northeast. University of Massachusetts Press, Amherst.
- Methe, B.A., R.J. Soracco, J.D. Madsen, C.W. Boylen. JAN 1993. Seed production and growth of waterchestnut as influenced by cutting. *Journal of Aquatic Plant Management* 31: 154-157.
- Pemberton, R.W. MAR 1999. Natural enemies of *Trapa* spp. In Northeast Asia and Europe. *Biological Control* 14 (3): 168-180.
- Tsuchiya, T., T. Iwakuma. DEC 1993. Growth and leaf life-span of a floating-leaved plant, *trapa natans* l., as influenced by nitrogen flux. *Aquatic Botany* 46 (3-4): 317-324.
- USDA, NRCS. 2001. The PLANTS Database, Version 3.1. (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

Vermont Department of Environmental Conservation, Water Quality Division.

[http://www.anr.state.vt.us/dec/waterq/lakes/htm/ans/lp\\_wc.htm](http://www.anr.state.vt.us/dec/waterq/lakes/htm/ans/lp_wc.htm) Accessed March 2006.

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