Hydrocharis morsus-ranae 简体中文 正體中文

System: Terrestrial

Kingdom	Phylum	Class	Order	Family
Plantae	Magnoliophyta	Liliopsida	Hydrocharitales	Hydrocharitaceae

Common name common frogbit (English), European frog's-bit (English)

Synonym

Similar species *Limnobium spongia*

Summary Hydrocharis morsus-ranae is a free-floating herbaceous annual aquatic that can reach 20cm in length. It does well in calm open waters, and can be found in marshes, ditches and swamps. *H. morsus-ranae* produces dense floating mat of vegetation which restrict available light, dissolved gases, and nutrients. This species displaces native flora and is perhaps impacting the fauna. There is currently no management information available but there is currently a study that started in 2003 and will go through 2005 that is looking into and researching methods of controlling *H. morsus-ranae* on the Great Lakes and St. Lawrence River.

view this species on IUCN Red List

Species Description
IPANE (2001) states that, \"*H. morsus-ranae* is an herbaceous, annual aquatic that can reach 20cm in length. The plant is free-floating. The leaves of this plant are usually floating, but if the vegetation is dense enough, they can be emergent. The leathery, glabrous leaves are cordate-orbicular in shape and measure 1.2-6cm in length and in width. The lower leaf surfaces are often dark purple in colour. *H. morsus-ranae* is a dioecious plant. One to five staminate flowers are contained in spathes borne on pedicels that measure 4cm long. There is only 1 pistilate flower on each plant. The 3-petalled pistilate flowers are white in colour with a yellow spot in the center. These flowers measure 1cm across. The pedicels of the pistilate flowers measure 9cm long. The seeds of *H. morsus-ranae* are around 1mm in size. It can also produce stolons, which allow it to reproduce asexually.\" Halpern 2002 states that, \"*H. morsus-ranae* is a floating-leaved monocotyledonous plant whose round, quarter-sized leaves may remind you of miniature lily pads. Each plant has numerous, fibrous, free floating roots which can attain a maximum lngth of 30cm. In early summer, the plants produce small, white, three petaled, unisexual flowers. Despite profuse flowering during the summer, *H. morsus-ranae* rarely produces seeds and instead relies on vegetative reproduction. Multiple plantlets develop along the stolons, or runners, of each plant during the growing season. In the fall, Eurasion frogs-bit produces buds, called turions, which sink to the substrate where they remain dormant until the springtime, at which time the developing buds floats to the surface and mature. One plant is capable of producing about one hundred of theses turions each year.\"

Notes
The Canadian Wildlife Service (2003) states that, \"It is the great capacity for vegetative reproduction that has allowed European frog-bit to spread and proliferate so quickly in eastern North America.\" Catling *et al.* (2003) states that, \"*H. morsus-ranae* was discovered in Canada in 1932 in Ottawa, but earlier introduction is possible. By 1955 its North American distribution extended from Ottawa to Montreal. By 1980 it had extended southwest to Lake Ontario and northeast to Quebec City. Recently it has spread throughout much of the central and southwestern parts of southern Ontario, and further into northern New York and Vermont and eastern Michigan. The maximum rate of spread has been 15.6 km yr-1.\"
Delisle *et al.*. (2003) state that, \"Although the proportion curves of *H. morsus-ranae* suggest that the range of this species is still expanding, it will probably not expand north-eastward along the St Lawrence River because of the salinity of surface waters and the scarcity of large riverine wetlands east of Trois-Pistoles (Catling & Porebski, 1995; Lachance & Lavoie, 2002, in Delisle *et al.* 2003). Nevertheless, Delisle (2002, in Delisle *et al.* 2003) found a *H. morsus-ranae* population in 2001 in a freshwater drainage ditch at St Roch-des-Aulnaies, which represents a major (93 km) north-eastward expansion of the range of this species.\" Halpern 2002 states that, \"Connected waterways canals, and watersheds facilitate its dispersal, and boats and waterfowl can transport both turions and plantlets, expediting the expansion from one region to another.\"

Lifecycle Stages
Delisle *et al.* (2003) state that, \"The rapid spread of *H. morsus-ranae* along the St. Lawrence River can be explained by the numerous overwintering buds (turions) that are produced each year and dispersed by water in spring (Scribailo & Posluszny, 1984, in Delisle*et al.* 2003).\" Heide (2001) states that, \"Similarly, turion formation in temperate aquatic plants, such as *H. morsus-ranae*, is under SD control (Vegis 1964, 1965, in Heide, 2001). These turions enter a state of true dormancy, the duration and depth of which increase with increasing temperature during and after SD induction (Vegis 1964, in Heide, 2001). Like winter buds of woody plants, their release from dormancy requires several weeks of chilling, a temperature of about 5°C being optimal (Vegis 1964, in Heide, 2001).\" The Canadian Wildlife Service (2003) states that, \"In the fall, *H. morsus-ranae* turions sink to the bottom, and remain dormant during the winter. In spring these turions rise again to the surface and begin growing.\"
Scribailo and Posluszny (1984) report that, \"The white, trimerous flowers of *H. morsus-ranae* are emergent and unisexual, with male flowers clustered in a cyme of up to 5 buds and females always solitary. Both sexes of flowers, once open, last a single day, with individual male flowers opening sequentially from a given inflorescence but not necessarily on successive days. The flowers produce a sweet nectar and scent which attract, and are easily accessible to, a wide variety of insects visiting the open bowl-shaped flowers. The most abundant insect visitors to the flowers were Homoptera (Aphididae) and *Hydrellia* and *Notiphila* spp. (Diptera: Ephydridae). Both groups were found to carry small pollen loads and because of their erratic anthophilous behaviour were not considered important in pollination. Although fewer in number, the more specialized hover flies, *Toxomerus marginatus* (Say) (Diptera: Syrphidae), and solitary bees, *Dialictus* sp. (Hymenoptera: Halictidae), were considered more likely to be the primary pollinators. After pollination and the day after anthesis, female flowers are drawn underwater by pedical recurvation and 4-6 wk later mature into globose berrylike fruits.\"

Uses
The Canadian Wildlife Service (2003) states that, \"In 1932 *H. morsus-ranae* was intentionally introduced for horticultural purposes to a trench or aquatic pond in the Arboretum of the Central Experimental Farm in Ottawa.\" Catling *et al.* (2003) states that, \"*Hydrocharis morsus-ranae* is a food plant for several water birds, rodents, fish and insects.\"

Habitat Description
H. morsus-ranae does well in quiet open water. It can be found in marshes, ditches and swamps. It grows well in sheltered coves and along the still water shorelines of rivers, lakes and streams (IPANE, 2001).

Reproduction
The Canadian Wildlife Service (2003) states that, \"*H. morsus-ranae* reproduces primarily vegetatively by means of strong cord-like stolons and the production of winter buds (turions). There is a well-developed root system, however, the roots generally do not anchor the plant to the bottom, rather, they become tangled amongst other vegetation and themselves and thus help form dense masses that stabilize the colony.\" Catling *et al.* (2003) states that, \"Reproduction by seeds is rarely reported but vegetative reproduction is very important in spread and colonization. In the fall, turions separate from the plant, sinking to the bottom where they overwinter. In the spring, these turions grow into small floating rosettes.\" Catling *et al.* (1988) states that, \"In spring the *H. morsus-ranae* develops free-floating mats comprised of interlocking plants that have recently developed from overwintering turions. These mats stabilize in position as water levels drop and roots elongate.\"

General Impacts
The Canadian Wildlife Service (2003) states that, \"Because of the dense floating mat of vegetation produced by *H. morsus-ranae*, available light, dissolved gases, and nutrients were restricted to submerged aquatics attempting to grow beneath this mat. The plant is often a dominant species in the wetlands within which it occurs. By dominating wetlands with its thick mats, *H. morsus-ranae* displaces native flora and is perhaps impacting the fauna. With *H. morsus-ranae* dominating the open water portions of a wetland and purple loosestrife dominating the relatively drier portions, such wetlands are receiving a double blow that could dramatically reduce their original biodiversity.\"
Catling *et al.* (2003) states that, \"Extremely rapid stoloniferous growth during the summer months results in the formation of large masses of interlocking plants that diminish native submerged aquatic plant communities by reducing available light. It is also of importance in limiting water flow in irrigation systems and restricting water traffic, thereby hindering recreational activity.\"

Management Info
The Canadian Wildlife Service (2003) states that, \"So far as is known no control measures have been reported for *H. morsus-ranae*.\" The Great Lakes Research Consortium (2003) reports that research is currently underway, under the direction of Donald J. Leopold, working with NOHA and NY Sea Grant. The project is titled \"Aquatic nuisance species: Ecology and control of the invasive plant *Hydrocharis morsus-ranae* in eastern Lake Ontario and St. Lawrence River wetlands\" and appears that research began in 2003 and will continue until 2005.

Principal source: Canadian Wildlife Service, 2003. European frog-bit (*Hydrocharis morsus-ranae* L.)
IPANE, 2001 *Hydrocharis morsus-ranae* (European frogbit)

Compiler: National Biological Information Infrastructure (NBII) & IUCN/SSC Invasive Species Specialist Group (ISSG)

Review: Dr. Paul M. Catling\ Research Scientist and Curator\ Biodiversity, National Program on Environmental Health\ Agriculture and Agri-food Canada, Research Branch Ottawa Canada

Pubblication date: 2005-08-29

ALIEN RANGE

[4] CANADA
[1] LAKE ERIE
[1] LAKE ST. CLAIR
[6] UNITED STATES
[1] LAKE CHAMPLAIN
[1] LAKE ONTARIO
[1] NORTH AMERICA

BIBLIOGRAPHY
17 references found for **Hydrocharis morsus-ranae**

Managment information

CAIP (Center for Aquatic and Invasive Plants), 2001. University of Florida and Sea Grant *Hydrocharis morsus-ranae*.
Summary: Information on description, economic importance, distribution, habitat, history, growth, and impacts and management of species.
Available from: http://aquat1.ifas.ufl.edu/hydmor.html [Accessed 15 July 2004]

Canadian Wildlife Service. 2003. European frog-bit (*Hydrocharis morsus-ranae* L.). Invasive plants of natural habitats in Canada: Canadian Wildlife Service and the Canadian Museum of Nature.
Summary: Information on description, economic importance, distribution, habitat, history, growth, and impacts and management of species.
Available from: http://www.cws-scf.ec.gc.ca/publications/inv/p2_e.cfm [Accessed 18 March 2004]

Catling, P. M., and Z. S. Porebski. 1995. The spread and current distribution of European frogbit, *Hydrocharis morsus-ranae* L., in North America. Canadian Field Naturalist 109 (2): 236-241.
Summary: Information on spread of species through North America, especially Canada. Also includes lifecycle and reproduction information.

Catling, P. M., G. Mitrow, E. Haber, U. Posluszny, and W. A. Charlton. 2003. The biology of Canadian weeds. 124. *Hydrocharis morsus-ranae* L. Canadian Journal of Plant Science 83(4): 1001-1016.
Summary: Information on spread of species through North America, especially Canada. Also includes lifecycle and reproduction information.

Catling, P. M., K. W. Spicer, and L. P. Lefkovitch. 1988. Effects of the introduced floating vascular aquatic *Hydrocharsis morsus-ranae* Hydrocharitaceae on some North American aquatic macrophytes. Canadian Naturalist 115(2): 131-138.
Summary: Information on spread of species through North America, especially Canada. Also includes lifecycle and reproduction information.

Halpern, A. D. 2002. Leaping Into Frogs-bit: An introduction to an aquatic invasive.The Newsletter of the Invasive Plant Council of New York State 4(1):3
Summary: Information on spread of species through North America, especially Canada. Also includes lifecycle and reproduction information.

IPANE (Invasive Plant Atlas of New England). 2001. *Hydrocharis morsus-ranae* (European frogbit). Department of Ecology and Evolutionary Biology, University of Connecticut [Online Database].
Summary: Information on description, economic importance, distribution, habitat, history, growth, and impacts and management of species.
Available from: http://webapps.lib.uconn.edu/ipane/browsing.cfm?descriptionid=56 [Accessed 18 March 2004]

General information

Delisle, F., C. Lavoie, M. Jean, & D. Lachance, 2003. Reconstructing the spread of invasive plants: taking into account biases associated with herbarium specimens. Journal of Biogeography 30:1033-1042.
Summary: Information on spread of species through North America, especially Canada. Also includes lifecycle and reproduction information.

Great Lakes Research Consortium. 2003. Great Lakes Research at the SUNY College of Environmental Science and Forestry.
Summary: Information on management of species.
Available from: http://www.esf.edu/glrc/CampusResearch/ResearchatESF.htm#ExoticSpecies [Accessed 18 March 2004]

Halvorsen, R. 1989. *Hydrocharis morsus-ranae* in Skien Telemark, Norway. Blyttia 47(1): 45-48.
Summary: Information on spread of species through North America, especially Canada. Also includes lifecycle and reproduction information.

Heide, O. M. 2001. Photoperiodic control of dormancy in *Sedum telephium* and some other herbaceous perennial plants. Physiologia Plantarum 113: 332-337.
Summary: Research projected with information on lifecycle of species.

ITIS (Integrated Taxonomic Information System), 2002. Online Database *Hydrocharis morsus-ranae*.
Summary: An online database that provides taxonomic information, common names, synonyms and geographical jurisdiction of a species. In addition links are provided to retrieve biological records and collection information from the Global Biodiversity Information Facility (GBIF) Data Portal and bioscience articles from BioOne journals.
Available from: http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=503098 [Accessed 18 March 2004]

Lumsden, HG; McLachlin, D. J., 1988. European frog-bit, *Hydrocharis morsus-ranae*, in Lake Ontario marshes. Canadian field-naturalist. Ottawa ON [CAN. FIELD-NAT.]. Vol. 102, no. 2, pp. 261-263. 1988.
Summary: Available from: http://md1.csa.com/partners/viewrecord.php?requester=gs&collection=ENV&recid=1882108&q=&uid=786659710&setcookie=yes [Accessed 19 August 2005]

Scribailo, R. W., and U. Posluszny. 1985. Floral development of *Hydrocharis morus-ranae* Hydrocharitaceae. American Journal of Botany 72(10): 1578-1589.
Summary: Information on spread of species through North America, especially Canada. Also includes lifecycle and reproduction information.

USDA-GRIN (Germplasm Resources Information Network). 2003. *Hydrocharis morsus-ranae*. National Genetic Resources Program [Online Database] National Germplasm Resources Laboratory, Beltsville, Maryland.
Summary: Information on common names, synonyms, and the distributional range of species.
Available from: http://www.ars-grin.gov/cgi-bin/npgs/html/tax_search.pl?Hydrocharis+morsus-ranae [Accessed 18 March 2004]

USDA-NRCS (Natural Resource Conservation Service). 2002. *Hydrocharis morsus-ranae*. The PLANTS Database Version 3.5 [Online Database] National Plant Data Center, Baton Rouge, LA.
Summary: Available from: http://plants.usda.gov/java/nameSearch?mode=Scientific+Name&keywordquery=Hydrocharis+morsus-ranae [Accessed 18 March 2006]
USGS-NAS (United States Geological Survey: Nonindigenous Aquatic Species). UNDATED. *Hydrocharis morsus-ranae*. Florida Integrated Science Center, Center for Aquatic Resource Studies.
Summary: Information on distribution of species.
Available from: http://nas.er.usgs.gov/queries/plants/PlantTextResults.asp?genus=hydro&sp=&com_nm=&Sortby=2 [Accessed 18 March 2004]