Nymphoides peltata 简体中文 正體中文

System: Terrestrial

Kingdom	Phylum	Class	Order	Family
Plantae	Magnoliophyta	Magnoliopsida	Solanales	Menyanthaceae

Common name yellow floatingheart (English), floating heart (English), xing cai (Chinese), asaza (Japanese), entire marshwort (English, New Zealand), fringed water lily (English)

Synonym *Limnanthemum peltatum* , Gmel.
Nymphoides nymphaeoides , (L.) Britt.

Similar species

Summary Nymphoides peltata is usually introduced as an aquatic ornament though it is not the case in its native area. However, the sale and distribution of Nymphoides peltata is slowing becoming more controlled. It can become extremely invasive in shallow, slow-moving swamps, rivers, lakes and ponds. Currently there is little information available on the control of Nymphoides peltata but hand removal for small infestations and herbicides for larger infestations seem to be the most effective.

view this species on IUCN Red List

Species Description
According to NWCB (2003), *N. peltata* is an “aquatic, bottom-rooted perennial with long branched stolons extending up to one metre or more and lie just beneath the waters surface. The node on the stolons typically produces a plant and many thread-like roots. The floating heart to almost circular shaped leaves are 3-10cm long on long stalks, and they arise from creeping underwater rhizomes. The leaves are frequently purplish underneath, with slightly wavy, shallowly scalloped margins. The flowers are bright yellow, 5-petaled and 3-4cm in diameter. The flowers are held above the water surface on long stalks, with one to several flowers per stalk. The flower edges are distinctively fringed (its common name is Fringed water lily). The fruit is a capsule up to 2.5cm long containing numerous seeds. The seeds are flat, oval and about 3.5mm long with hairy edges.”

Notes
With its floating leaves *N. peltata* effects a vigorous competition for light, notably with phytoplankton, and it seems not to suffer from turbid waters in the numerous eutrophic waterbodies it colonises.

Lifecycle Stages
The growing season ranges from April/May to late October. Biomass of above-ground organs peaks in late Summer and represents up to 50-60% of total plant biomass. As in most floating-leaved plants, primary production is relatively high and mainly results from high turn over rates (3,4-7,3). Leaf life span varies from 23 to 43 days in relation to several factors (substrate, water level fluctuations, degree of exposure to wind and wave action). The plant overwinters as dormant tuberous rhizomes.

Uses
Yellow floating heart can be a popular aquatic garden ornamental for outdoor water gardens (NWCB, 2003).

Habitat Description
According to NWCB (2003), *N. peltata* prefers slow moving rivers, lakes, reservoirs, ponds and swamps 0.5 to 4 metres deep. It can also grow on damp mud. It is usually restricted to a belt between the helophytes and other floating leaved and submerged macrophytes at deeper sites.

Reproduction
NWCB (2003) writes that "*N. peltata* reproduces by seeds and vegetatively by broken stems. Seed hairs help the seeds float and aid their attachment to waterfowl, which can be a vector in spreading this plant to new areas. However hydrochory seems to be the main dispersal mode of seeds. Viable seeds are produced abundantly and germinate readily. Broken leaves with attached stem parts will also form new plants."

Nutrition
The plant, as in most of rooted-macrophytes, functions as an important nutrient pump from the sediment. Nutrients are then partitioned between the decomposition pathway and the resorption by the rhizomes during senescence of the above-ground organs.

General Impacts
WSDE (2003) states that "like other floating leaved plants, yellow floating heart / fringed water lily grows in dense patches, excluding native species and even creating stagnant areas with low oxygen levels underneath the floating mats. The structural complexity of its mats make it difficult to fish, water ski, swim, or even paddle a canoe through. NWCB (2003) would add "fish and wildlife habitat, recreation and water quality is negatively impacted when the dense mats of *N. peltata* outcompete native and beneficial plant species. Another problem is that \"Hitchiker\" plants, such as the invasive *Hydrilla verticillata* (hydrilla), can be introduced to an area with *N. peltata* when mail-ordered.

Management Info
Preventative measures: New Zealand and the US states of Washington, Maine, New Hampshire, Connecticut, Vermont, South Carolina, Canada are also attempting to use regulations to control the invasive. \r\nIntegrated management: According to DECFW, VANR, and TNCV (1998), "little information is available on the control of *N. peltata*. Based on the plant's characteristics, mechanical and hand removal would most likely be effective. It is not known whether biological or chemical controls are effective on *N. peltata*. According to WSDE (2003), "*N. peltata* has a similar growth habit to the fragrant waterlily and it is expected that methods used to manage waterlilies would also be effective on yellow floating heart. Waterlilies (and yellow floating heart) can be controlled by cutting, harvesting, covering with bottom barrier materials, and aquatic herbicides (Rodeo®). Grass carp do not eat waterlilies in Washington and it is not known if they would readily eat *N. peltata*." According to NWCB (2003), "New Zealand information suggests that hand clearing is possible with small infestations and herbicides need to be used for larger infestations."

Principal source: *Nymphoides peltata* (NWCB, 2003)

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

Review: Jean-Marc Paillisson, UMR CNRS 6553 Ecobio - Population and Conservation Biology. University of Rennes - France.

Pubblication date: 2006-09-20

ALIEN RANGE

[1] IRELAND **[2]** NEW ZEALAND
[23] UNITED STATES

BIBLIOGRAPHY

13 references found for **Nymphoides peltata**

Managment information

Alien Plants in Ireland, 2007. *Nymphoides peltata*

Summary: The database of alien plants in Ireland contains detailed information on 715 alien plant taxa currently occurring in (semi-) natural habitats in Ireland (both the Republic and Northern-Ireland). This database was developed in 2006 at the School of Natural Sciences, Trinity College Dublin, as part of the BioChange project, funded by the Environmental Protection Agency (EPA), Ireland.
Available from: http://www.biochange.ie/alienplants/index.php [Accessed April 26 2007]
This page available from: http://www.biochange.ie/alienplants/result_species.php?species=628&volg=i&lang=latin&p=i [Accessed 26 April 2007]

Champion, P. Clayton, J. and Rowe, D. 2002. Alien Invaders Lake Managers Handbook. Ministry for the Environment.

Summary: Available from: http://www.mfe.govt.nz/publications/water/lm-alien-invaders-jun02.pdf [Accessed 3 February 2005]

Champion, P.D.; Clayton, J.S. 2000. Border control for potential aquatic weeds. Stage 1. Weed risk model. Science for Conservation 141. .

Summary: This report is the first stage in a three-stage development of a Border Control Programme for aquatic plants that have the potential to become ecological weeds in New Zealand.
Available from: http://www.doc.govt.nz/upload/documents/science-and-technical/sfc141.pdf [Accessed 13 June 2007]

Champion, P.D.; Clayton, J.S. 2001. Border control for potential aquatic weeds. Stage 2. Weed risk assessment. Science for Conservation 185. 30 p.

Summary: This report is the second stage in the development of a Border Control Programme for aquatic plants that have the potential to become ecological weeds in New Zealand. Importers and traders in aquatic plants were surveyed to identify the plant species known or likely to be present in New Zealand. The Aquatic Plant Weed Risk Assessment Model was used to help assess the level of risk posed by these species. The report presents evidence of the various entry pathways and considers the impact that new invasive aquatic weed species may have on vulnerable native aquatic species and communities.
Available from: http://www.doc.govt.nz/upload/documents/science-and-technical/SFC185.pdf [Accessed 13 June 2007]

National Pest Plant Accord, 2001. Biosecurity New Zealand.

Summary: The National Pest Plant Accord is a cooperative agreement between regional councils and government departments with biosecurity responsibilities. Under the accord, regional councils will undertake surveillance to prevent the commercial sale and/or distribution of an agreed list of pest plants.
Available from: http://www.biosecurity.govt.nz/pests-diseases/plants/accord.htm [Accessed 11 August 2005]

New Zealand Plant Conservation Network, 2005. Unwanted Organisms. Factsheet *Nymphoides peltata*

Paillisson, J.-M., Marion, L., 2002. Functions and management of floating vegetation in an eutrophic lake ecosystem: assessment after two decades. In: Conservatoire du Patrimoine Naturel de Savoie (Ed.), European Symposium of Management and Conservation of Lake Littoral Vegetation. Conservatoire du Patrimoine Naturel de Savoie, Le Bourget-du-Lac, pp. 179-192.

Royal New Zealand Institute of Horticulture (RNZIH), 2005. Fringed waterlily *Nymphoides peltata*

Summary: Available from: http://www.rnzih.org.nz/pages/nppa_042.pdf [Accessed 1 October 2005]

General information

ITIS (Integrated Taxonomic Information System), 2005. Online Database *Nymphoides peltata*

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.cbif.gc.ca/pls/itisca/taxastep?king=every&p_action=containing&taxa=Nymphoides+peltata&p_format=&p_ifx=plglt&p_lang=
[Accessed March 2005]

Lammens, E. H. R. R. and G. Van der Velde (1978). Observations on the decomposition of *Nymphoides peltata* with special regard to the leaves. Aquatic Botany 4: 331-346.

Marion L. & Paillisson J.-M. 2003. A mass balance assessment of the contribution of floating-leaved macrophytes in nutrient stocks in an eutrophic macrophyte-dominated lake. Aquat. Bot. 75: 249260.

USDA-NRCS (Natural Resource Conservation Service). 2005. *Nymphoides peltata*. 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=Nymphoides+peltata [Accessed 27 February 2006].

Van der Velde, Th.G. Giesena and L. Van Der Heijdena, 1979. Structure, biomass and seasonal changes in biomass of *Nymphoides peltata*, a preliminary study. Aquatic Botany 7: 279-300