GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: ***Nymphaea odorata***

Nymphaea odorata 简体中文 正體中文

System: Terrestrial

Kingdom	Phylum	Class	Order	Family
Plantae	Magnoliophyta	Magnoliopsida	Nymphaeales	Nymphaeaceae

Common name

American waterlily (English), fragrant waterlily (English), white waterlily (English), American white waterlily (English)

Synonym

Castalia lekophylla , Small
Castalia minor , (Sims) Nyar
Castalia odorata , (Ait.) Wood
Castalia reniformis , DC.
Nymphaea minor , (Sims) DC.
Nymphaea odorata , var. *gigantea* Tricker
Nymphaea odorata , var. *godfreyi* Ward
Nymphaea odorata , var. *minor* Sims
Nymphaea odorata , var. *rosea* Pursh
Nymphaea odorata , var. *stenopetala* Fern.
Nymphaea odorata , var. *villosa* Caspary
Castalia minor , (Sims) DC. ex Small
Castalia odorata , (Aiton) Woodv. & Wood var. *minor* (Sims) G.Lawson
Castalia odorata , (Aiton) Woodv. & Wood var. *gigantea* (Tricker) Fernald
Castalia odorata , (Aiton) Woodv. & Wood forma *rosea* (Pursh) Britton
Castalia pudica , Salisb.
Castalia reniformis , (Walter) Trel. ex Branner & Coville
Cyamus reniformis , (Walter) Pursh
Leuconymphaea odorata , (Aiton) MacMill.
Leuconymphaea parkeriana , (Lehm.) Kuntze
Leuconymphaea reniformis , (Walter) Kuntze
Nelumbo reniformis , (Walter) Willd.
Nuphar lekophylla , (Small) Cory
Nymphaea alba , L. var. *canadensis* Graham
Nymphaea lekophylla , (Small) Cory
Nymphaea maculata , Raf.
Nymphaea odorata , Aiton var. *glabra* Casp.
Nymphaea odorata , Aiton forma *rubra* (Guillon) Conard
Nymphaea odorata , Aiton var. *rubella* Raf.
Nymphaea odorata , Aiton var. *rubra* Guillon
Nymphaea odorata , Aiton var. *chlorhiza* Raf.
Nymphaea odorata , Aiton var. *parviflora* Raf.
Nymphaea parkeriana , Lehm.
Nymphaea reniformis , Walter
Nymphaea rosea , Raf.
Nymphaea spiralis , Raf.

Similar species

Nymphaea tetragona, Nuphar lutea, Brasenia schreberi

Summary

Nymphaea odorata is an aquatic plant with floating leaves that can thrive in a variety of aquatic habitats and tolerates variable environmental conditions. It forms dense floating mats of vegetation that prevent light from penetrating through the surface. Distributions of phytoplankton, zooplankton, aquatic insects and fish populations are altered. Nymphaea odorata can also restrict waterfront access and eliminate swimming opportunities.

view this species on IUCN Red List

Species Description
Nymphaea odorata is an aquatic perennial plant with floating leaves and branched creeping rhizomes. The horizontal creeping and branching rhizomes (2-3cm in diameter) are attached by adventitious roots arising in groups below the leaf bases and the rhizomes are densely covered with short black hairs. The petioles leave crescent-shaped scars on the rhizome when shed. Mature *N. odorata* leaves are spherical, cleft at the base, smooth to 25cm across, and usually purple on the lower surface. Leaves are attached to underwater stalks rising from thick fleshy rhizomes. Flowers rise on long solitary stalks and are borne at the surface of the water or elevated slightly above it. Flowers measure up to 25cm across and have yellow centers surrounded by 25 or more petals. Flowers are fragrant and can be white or pink with yellow centers. After the flower has finished, the stalk forms a spiral and draws the fruit below the water. The fruit is an ovoid berry-like capsule 1-2cm in diameter containing many seeds (2-3mm long) (Alaska Natural Heritage Program, 2006; Flora of North America, undated; and Washington Department of Ecology, 2003).

Lifecycle Stages
Each spring new shoots appear from the rhizomes and grow up through the water until they reach the surface. The flowers appear from in late summer. Each blossom opens in the morning and closes in the early afternoon for two to five consecutive days. Pollination is performed mainly by beetles, but bees have also been observed visiting the flowers. After the flowers have closed for the final time, the flower stalk \"corkscrews\" and draws the developing fruit below the water. The plant senesces in the fall and over winters as the rhizome (Washington Department of Ecology, 2003).

Uses
Beaver, moose, muskrat, porcupine, and deer eat *N. odorata* leaves and roots and waterfowl eat the seeds. *N. odorata* also provide excellent cover for largemouth bass, sunfish, and frogs. Beetles and bees have been observed visiting the flowers of *N. odorata*. When managed to form a patchy distribution interspersed with open water, *N. odorata* can provide excellent habitat (Alaska Natural Heritage Program, 2006; and Washington Department of Ecology, 2003).

Habitat Description
Nymphaea odorata grows rooted in mucky or silty sediments in water up to six to seven feet deep and can survive in both acid and alkaline waters. This species grows in shallow ponds, lakes and their margins, ditches, swamps, slow streams. It tends to form dense monospecific stands that can cover hundreds of acres that persist until senescence in the fall (Alaska Natural Heritage Program, 2006; and Washington Department of Ecology, 2003).

Reproduction
Nymphaea odorata seed germination requires light and the presence of ethylene, a gas whose production is stimulated when seeds are crowded together. Germination is enhanced by cold stratification for several months. When adult density is high, seedlings are rare but a large number of seeds will germinate after the removal of adult plants when increased light levels break dormancy and stimulates germination (Alaska Natural Heritage Program, 2006).

General Impacts
Nymphaea odorata form dense floating mats of vegetation, preventing light penetration for native aquatic plants. These mats alter distributions of phytoplankton, zooplankton, aquatic insects, and fish populations. *N. odorata* in moderate proportions provides important habitat for fish, frogs, and invertebrates, but once 40% surface area coverage is exceeded declines occurs. These extensive infestations may alter water quality by creating low oxygen conditions beneath the canopy, changing nutrient dynamics, pH level or light regimes while simultaneously promoting exotic species like carp, which easily tolerate low oxygen conditions to establish. Dense infestations may also accelerate the natural siltation process in shallow bodies of water (Alaska Natural Heritage Program, 2006 and Washington Department of Ecology 2005).
Left unmanaged, *N. odorata* will restrict lake-front access and eliminate swimming opportunities. *N. odorata* can clog irrigation ditches or streams, retarding water flow and accelerating water loss through transpiration (Washington Department of Ecology, 2003).
Extracts from leaf petioles, and rhizomes have allelopathic potential and may suppress the germination and growth of other aquatic species (Quayyum *et al.* 1999, Spence 1998). Often noxious plants such as *Hydrilla* can also be introduced to lakes when waterlilies are planted (Washington Department of Ecology 2005).

Management Info
Nymphaea odorata can be controlled by cutting, harvesting, covering with bottom barrier materials and aquatic herbicides. After control treatments dead and decomposing leaves and rhizomes may form floating mats in the lake. Removing all dead materials from the water is recommended (Washington Department of Ecology 2005).
Mechanical: Persistent picking of emerging leaves every other day during two to three growing seasons will eventually kill the plants. Localized control (in swimming areas and around docks) can be achieved by covering the sediment with a opaque fabric which blocks light from the plants (bottom screening). Managers of reservoirs and some lake systems may have the ability to lower the water level as a method of managing aquatic plants, but the response of the *N. odorata* to water level draw down has been variable (Washington Department of Ecology 2005, and Washington Department of Ecology, 2003).
Cutting is less efficient than harvesting because cut plants must then be removed from the water. Harvesters both cut and collect the plants. Cutting and harvesting must occur several times a year in order to be effective (Washington Department of Ecology, 2003).
Underwater rototilling (called rotovation) was successfully used to remove *N. odorata* from a small Seattle area lake where the drowning of two people was attributed to the presence of dense plant beds. Rotovation dislodges the large, fleshy *N. odorata* rhizomes which can then be removed from the water. Experimentation has also occured using a barge-mounted backhoe to excavate *N. odorata* rhizomes from the sediment. Both methods result in permanent removal of the plant, but require a number of environmental permits before proceeding (Washington Department of Ecology, 2003).
Chemical: Glyphosate reportedly is an excellent herbicide to control *N. odorata* and it can be directly applied to floating leaves. Two applications of glyphosate will most likely be required to achieve control. Control has also been obtained with endothall dipotassium salt and fluridone, but must be applied to the water (Washington Department of Ecology, 2003).

Pathway
N. odorata is a common and popular ornamental for ponds and it is easily available at nurseries (Alaska Natural Heritage Program, 2006).

Principal source: Alaska Natural Heritage Program, 2006 *N. odorata*
Washington Department of Ecology, 2003. Technical Information about *Nymphaea odorata* - the Fragrant Water Lily

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

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ITIS (Integrated Taxonomic Information System), 2005. Online Database *Nymphaea odorata*
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.
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