

Najas minor

System: Terrestrial

Kingdom	Phylum	Class	Order	Family
Plantae	Magnoliophyta	Liliopsida	Najadales	Najadaceae

Common name slender-leaved naiad (English), brittle naiad (English), brittle waternymph (English), slender naiad (English), European naiad (English), minor naiad (English), spiny-leaf naiad (English)

Synonym *Caulinia minor*, (All) Coss. & Germ.

Similar species *Najas flexilis*, *Ceratophyllum*, *Najas gracillima*, *Najas guadalupensis*

Summary *Najas minor* is a submerged aquatic herb native to Europe and Asia that has established in eastern United States and Ontario. Initially recorded in the 1930s, it has established populations in 26 states in the US. It creates dense, monospecific stands that may displace native aquatic plants and reduce the recreational and aesthetic value of lakes, ponds, and rivers.



[view this species on IUCN Red List](#)

Species Description

Najas minor is a submersed, annual, aquatic herb. Its growth is usually compact and relatively bushy. The stems may reach up to 2.5 m long and are profusely branched near their apex. Leaves are opposite or subopposite, about 1 mm wide and 0.5 to 3.5 cm long, becoming stiff and recurved with age. Leaves have 7 to 15 small, but conspicuous teeth along each side of the leaf. Sheaths at the base of the leaf are truncate to auriculate, with fine teeth along the upper margin. Flowers are small, inconspicuous, and borne in the leaf axils on the same plant. Fruits are single seeded but abundantly produced. Fruits are 1.5 to 3.0 mm long and slightly curved with rectangular areolae arranged in distinct longitudinal rows. (EL-ERDC, 2007; Cao, 2010).

Lifecycle Stages

The reproductive season of *Najas minor* starts in July, when flowers appear. Seed production peaks in September, and continues into October. During the late summer or early fall, the stems become brittle, and the profusely branched apical portions of the stem break into small fragments. Seeds remain attached in the leaf axils, and the fragments are dispersed by wind and water currents. Seed germination occurs in early spring to late summer (Cao, 2010; DNR, 2007).

Uses

Najas minor is a preferred food source for waterfowl who readily consume its abundant seed supply (DNR, 2007).

Habitat Description

Najas minor prefers calm waters such as ponds, lakes, and reservoirs but may grow in streams and rivers as well. It prefers alkaline environments and is known to inhabit pH levels of 6.0-9.3 with an optimum range of about 6.6-7.2. It occurs of depths of up to 5 m with an ideal optimum of about 0.5-2 m and temperatures down to 8°C. It may inhabit brackish waters with a salinity of up to 0.3 ppt. *N. minor* is tolerant to turbidity and eutrophic conditions, which may allow it to out compete and replace native species (DNR, 2007; Wentz & Stuckey, 1971; Robinson, 2004)



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Reproduction

Najas minor reproduces sexually and asexually. Sexual production of an abundant seed supply and seed banks of up to tens of millions of seeds/ha appears to be its primary means of reproduction. It may also reproduce vegetatively producing clonal populations that may fragment and propagate (DNR, 2007; EL-EDRC, 2007)

General Impacts

Najas minor establishes dense monocultures that may exclude other native aquatic plants and replaces native *Najas* species. Unlike some of the other invasive aquatic plants *N. minor* does not produce long stems that spread on the surface of the water; it grows very densely under the surface producing shoots up to a meter long that shade out other plants and interfere with recreational activity such as swimming, boating, and fishing and reduce the aesthetic value of waters. It is also believed to induce conditions that are adverse to fish and waterfowl. *N. minor* may reduce the discharge capacity of channels as well. Its negative effects are typically amplified in enriched, low-energy systems (DNR, 2007; Hellquist & Straub, 2002; Cao, 2010; Capers *et al*, 2005).

Management Info

Preventative measures: *Najas minor* is reported as noxious and is regulated in Alabama, Connecticut, Maine, Massachusetts, New Hampshire, South Carolina, Washington. It is illegal to possess, import, purchase, sell, propagate, transport, or introduce *N. minor* in Minnesota. *N. minor* was included on a Washington Department of Agriculture list of quarantined species in 2000, and it is illegal to sell, trade, or transport in the state of Washington. Education and population monitoring are recommended to help prevent its establishment (DNR, 2007; Hamel & Parsons, 2001).

Chemical: Small scale herbicide treatments of endothall, dipotassium, and endothall mono have been conducted in hopes to provide "nuisance relief." However, it has been reported that some non-target plant species have been affected as well. The following herbicides and brands were reported to yield excellent control for *N. minor* by the US Army Corp of Engineers: diquat: Reward, Weedtrine-D; fluridone: Sonar AS, Sonar SRP, Sonar PR, Sonar Q, and Avast!; and endothall Aquathol K, Aquathol Super K, Hydrothol 191. *N. minor* was found to be completely unaffected by the herbicide butachlor (DNR, 2007; EL-EDRC, undated; Chattopadhyay *et al*, 2006).

Mechanical: The use of aquatic plant harvesters, large boats that cut and remove vegetation, has been recommended as a means to remove large quantities of *Najas minor*. Similarly, rotovators, basically large underwater rototillers that remove aquatic plant tissue and root crowns, are another recommended mechanical control. The use of hand cutters may be effective for smaller populations (EL-EDRC, undated).

Pathway

Najas minor may be introduced through disposal of aquarium species (DNR, 2007). *Najas minor* or its seeds may cling to boat hulls or boat trailers in inconspicuous places and be transported to other locations where they can establish (Capers *et al*, 2005).

Principal source: [Department of Natural Resources \(DNR\), Wisconsin., 2007. Aquatic Plant Brittle/Lesser/Bushy/Slender/Spiny/Minor Naiad: Waterynymph Environmental Laboratory \(EL\) U.S. Army Engineer Research and Development Center \(ERDC\), 2007. Information Sheet: *Najas minor* L. \(Spiny Naiad\)](#)
[Ling Cao. 2010. *Najas minor*. USGS Nonindigenous Aquatic Species Database, Gainesville, FL.](#)

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[2] CANADA

[34] UNITED STATES

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