

Mini data sheet on *Limnophila sessiliflora* (Plantaginaceae)

Added in 2012 - Deleted in 2013

Reasons for deletion:

Limnophila sessiliflora was added to the EPPO Alert List in 2012 but as no immediate risk was perceived, it was transferred to the Observation List in 2013.

Why

Limnophila sessiliflora (Plantaginaceae) is an aquatic perennial plant originating from Asia. One of its English common names is "Asian marshweed". This species has been introduced into North America, where it is considered invasive. The species is imported in large amounts as an aquatic ornamental plant into the EPPO region, but so far has only been found as casual in thermal waters in Slovakia and Hungary. Considering the invasive behavior of this species in the USA, flowing freshwater bodies of the Mediterranean and Macaronesian countries may be at risk, and the species should usefully be monitored, particularly in countries currently importing this species as an aquarium plant.

Geographical distribution

EPPO region: the species has also been found in thermal ponds in Hungary and in Slovakia since 1995 near Bojnice, but is not considered as established.

North America (alien): USA (Florida, Georgia, Texas).

South America (alien): Bolivia.

Asia (native): Bhutan, China (Anhui, Fujian, Guangdong, Guangxi, Guizhou, Henan, Hunan, Jiangsu, Jiangxi, Liaoning, Sichuan, Yunnan, Zhejiang), India, Japan (alien) (Honshu, Kyushu, Ryukyu Islands, Shikoku) Indonesia (Java, Kalimantan), Democratic People's Republic of Korea, Republic of Korea, Malaysia, Myanmar, Nepal, Philippines, Sri Lanka, Taiwan, Viet Nam.

Morphology

L. sessiliflora roots in the sediments hydro soil. It has emerged stems of 2 to 3 mm in diameter, 2 to 15 cm above the surface of water, branched, pubescent to somewhat glabrous, green to pink. Emerged leaves are 5 to 8 in number, verticillate, elliptic to lanceolate, 10 to 20 mm long with toothed margins, dark green. Submerged stems are branched, sparsely pubescent to somewhat glabrous, green to reddish. Submerged leaves are 6 to 10 or more in number, verticillate, ovate, elliptic to broadly lanceolate, 5 to 40 mm long (Yang & Yen, 1997). Flowers are solitary in the leaf axis, with 5 green sepals with hairy lobes, while the 5 petals are purple, blue or pink, forming a tube with 2 lips. The fruit is a capsule, ellipsoid, 3.5-5.5 mm long, green-brown when submersed, dark brown when emerged.

In which habitats

L. sessiliflora is reported in a variety of habitats, including swamps, ditches, lakes, rice fields and damp soils. According to the Corine Land Cover nomenclature, the following habitats are invaded: Continental waters (water courses, water bodies).

Biology and ecology

L. sessiliflora is a fast growing plant which can grow in waters up to three meters deep. It is reported to flower from April to November in Japan, and from July to November in Northern Florida and Texas. The fruit may contain up to 150 seeds according to Hall & Vendiver (2003). Spencer & Bowes (1985) report 200-300 seeds with a germination rate as high as 96%. *L. sessiliflora* does not only reproduce by seeds but can also regrow from fragments.

The Center for Aquatic and Invasive Plants, University of Florida, considers that the species can survive at a minimum temperature of 15°C and a maximum of 28°C, while its optimum is comprised between 20°C and 26°C. On the other hand, Hall *et al.* (2012) mention that the plant can tolerate low temperatures. *L. sessiflora* prefers acidic or to slightly alkaline waters.

Pathways

The species is currently imported into the EPPO region as an aquatic ornamental plant (at least in the Netherlands, France, Hungary and Estonia).

Machinery used in waterways has also been reported to spread the species. The species can also spread naturally as individual plants/fragments spread via water currents, or through floating mats (particularly with heavy rains).

Impacts

L. sessiliflora is a weed in paddy rice fields in China, India, Japan and the Philippines, although references mentioning these impacts are quite old, dating back to the 1970s. A hybrid between *L. sessiliflora* and *L. indica* has been found to be a weed in rice. This hybrid has also been reported to clog irrigation and flood-control canals, as well as pumping and power stations.

In terms of environmental impacts, *L. sessiliflora* is able to shade out and thus outcompete totally submerged species. It can start growing in low light before other plants can do so. It is even able to compete with the very invasive *Hydrilla verticillata* (Hydrocharitaceae). In addition, a toxin present in the stem tissue may prevent herbivorous fish from eating the plant (Hall & Vendiver, 2003). In Florida, the species has not been reported as a major concern during the past 25 years.

However, a large surface biomass of *L. sessiliflora* could nevertheless be a nuisance for recreational activities.

Control

In the USA, *L. sessiliflora* is listed in the Federal Noxious Weed List as well as in State Noxious Weed lists (in Alabama, California, Florida, Massachusetts, North Carolina, Oregon, South Carolina and Vermont).

Mechanical control may spread the species, and should therefore be undertaken with great care. Registered aquatic herbicides provide limited control of the species, but high levels of 2-4,D or daily spraying of paraquat for 8 consecutive days at 1000 ppm are reported to kill the plant. *L. sessiliflora* is also reported to have developed a resistance to Sulfonylurea herbicides, but not to amide or phenoxy herbicides (Wang *et al.*, 2000). There are very few literature sources on the possible management measures against this species.

Sources:

Discover Life Website, *Limnophila sessiliflora* (Vahl) Blume.

<http://www.discoverlife.org/mp/20q?search=Limnophila+sessiliflora>

Euro+Med Plant Database.

<http://ww2.bgbm.org/EuroPlusMed/PTaxonDetailOccurrence.asp?NameId=63415&PTRefFk=7200000>

Global Invasive Species Database, *Limnophila*

sessiliflora. <http://www.issg.org/database/species/ecology.asp?si=602&fr=1&sts=&lang=EN>

Germplasm Resources Information Network (GRIN), *Limnophila sessiliflora* (Vahl) Blume. <http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?316416>

Hall DW, Vandiver VV, Gray CJ (2012) *Limnophila*, *Limnophila sessiliflora* (Vahl). University of Florida. IFAS Extension.

<http://edis.ifas.ufl.edu/pdf/FILES/FW/FW02500.pdf>

Lukács BA, Dorotovič Cs, Hűvös-Récsi A, Barina Z & Matus G (2008) Exotic aquatic macrophytes in the Pannonicum: flora and vegetation of the Fényes-springs of Tata (Hu) and the Pece-creek of Sinmartin (RO). (Abstract of a paper presented at the 8th conference on Floristical and vegetation research in the Carpathian basin). *Kitaibelia* 13(1), 113.

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University of Florida, Centre for Aquatic and Invasive Plants Website, *Limnophila sessiliflora*.

<http://plants.ifas.ufl.edu/node/234>

USDA Natural resources Conservation Service, Plants profile *Limnophila sessiliflora*.

<http://plants.usda.gov/java/profile?symbol=LISE3>

Wang GX, Watanabe H, Uchino A, Itoh K (2000) Response of a sulfonylurea (SU)-resistant biotype of *Limnophila sessiliflora* to selected SU and alternative herbicides. *Pesticide biochemistry and physiology* 68(2), 59-66.

Wisconsin Department of Natural Resources - Aquatic Invasive Species Literature Review.

<http://dnr.wi.gov/invasives/classification/pdfs/Limnophila%20sessiliflora.pdf>

Yang YP & Yen SH (1997) Notes on *Limnophila* (Scrophulariaceae) of Taiwan. *Botanical Bulletin of Academia Sinica* 38, 285-295. <http://ejournal.sinica.edu.tw/bbas/content/1997/4/bot384-11.html>