

## Mini data sheet on *Lagarosiphon major* (Hydrocharitaceae)

In 2013, the EPPO Secretariat prepared a mini data sheet on *Lagarosiphon major*, an invasive species which had been added to the EPPO List of invasive alien plants in 2004.

*Lagarosiphon major* (Hydrocharitaceae) is an aquatic plant originating from Southern Africa. One of its English common names is 'Curly waterweed'. The species is listed on the EPPO List of Invasive Alien Plants and widely distributed in the EPPO region, Africa and Oceania. An assessment of the ecological risk that represents *L. major* for the Netherlands has been performed following the Belgian Invasive Species Environmental Impact Assessment (ISEIA), concluding that *L. major* was rated as a medium risk species.

### Geographical distribution

**EPPO Region:** Belgium, France (including Reunion), Germany, Ireland, Italy, the Netherlands, Spain, Switzerland, the United Kingdom.

**Africa:** Botswana (native), Lesotho (native), Réunion, South Africa (native), Zimbabwe (native), Zambia (native).

**Oceania:** Australia (New South Wales, Tasmania), New Zealand.

*Note:* In Austria, transient population had been observed in 1938 but the species is not reported as established. In Australia, the species is reported as established in the coastal districts of northern New South Wales and possibly in Tasmania. Small infestations near Melbourne, in Victoria, and Newcastle, in New South Wales, were eradicated in the late 1970s. No verified record could be found on the presence of *L. major* in Mauritius and Rodrigues Island.

### Morphology

*L. major* is a perennial, submerged, rhizomatous aquatic plant with leaves that alternate spirally along the stems. The leaves are minutely toothed, 5-20 mm long, 2-3 mm wide. Stems are sparsely branched until they approach the water surface. At the nodes, single, pale adventitious roots are produced for additional nutrient uptake. Additional adventitious roots attach the plant to the substrate. The female flower is very small with 3 white/pink petals with a very thin stalk emerging above the water's surface. The male flowers are free floating, and are moved by wind and currents. However, outside of its native range, only female plants are known to occur, and reproduction is only vegetative. Fragments or branches detach and subsequently root.

### In which habitats

*L. major* can colonize freshwater lakes, water-bodies, slow-moving streams, deep reservoirs and dams. It is also reported to occur in wetlands, riparian zones as well as in canals and drainage ditches. According to the Corine Land Cover nomenclature, the following habitats are invaded: Continental waters (water courses, water bodies).

### Biology and ecology

*L. major* usually develops in clear, still and slow-flowing water systems where it can grow at a depth of up to 3 meters. It can live in a wide range of trophic conditions providing that a silty or sandy bottom rich in nutrients is available. It grows faster in temperate alkaline waters. It is tolerant to low nutrient waters but grows best in waters with a good nutrient supply, and in conditions of high light density. It prefers the cooler waters of the temperate zone, with optimum temperatures of 20-23°C, and a maximum temperature around 25°C. The plant can tolerate cold temperatures as it overwinters in the South of Britain, and vegetative plant parts remain alive throughout winter.

### Pathways

*L. major* is traded as an aquarium plant and as an ornamental plant in ponds, it is even considered as an 'oxygenating plant' although dense stands consume more oxygen than they produce. The species may then spread naturally through water currents, and possibly via waterfowl. Vegetative fragments are spread through different waterbodies by boats and trailers, fishing, and machinery.

## Impacts

As observed for most non-native Hydrocharitaceae species, this submerged perennial aquatic plant makes dense monospecific populations which often colonise all of water bodies, restrict water movement, cut off light, produce anoxic conditions and trap sediments. *L. major* has been reported to outcompete native aquatic plants (e.g. *Charophytes*, *Myriophyllum*, *Potamogeton*) especially in Ireland, and following invasion, the number of native plants decreased significantly. It also affects associated populations of fish and aquatic macroinvertebrates, especially in alkaline waters. Dense beds of the plant provide a poor habitat for aquatic animals and are not consumed by fish. These dense beds also attract herbivorous birds and detritivores such as crayfish, which in turn adversely affect the native flora. The presence of dense stands of *L. major* increases dissolved reactive phosphorous and dissolved inorganic nitrogen and results in changes in temperature and dissolved oxygen level. *L. major* is known to modify and to raise the water pH over 10 and to deplete dissolved CO<sub>2</sub> concentrations, creating stressful conditions for other aquatic organisms. The dense stands also interfere with recreation activities as swimming and angling. *L. major* may have a negative impact agriculture by limiting flows in irrigation channels. In the United Kingdom, the estimated yearly cost of *L. major* is 1 173 214 GBP. *L. major* has also negative effects on water cooling systems for power stations and increases the risk of adjacent land flooding.

## Control

Manual removal of the plant may be effective for newly colonized sites at low densities. Mechanical control trials have been undertaken with the use of a blunt V-blade behind a boat. Chemical control includes spraying with the active substance 'diquat' approved for use in aquatic environments. In all cases, stem fragmentation should be avoided, and manual removal may be combined with mechanical harvesting through handpicking of the remaining fragments. All these management methods are costly, may not provide good results over the long term, and may have adverse environmental effects.

## Sources

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