

Mini data sheet on *Salvinia molesta* (Salviniaceae)

Added in 2007 - Deleted in 2012

Reasons for deletion:

Salvinia molesta was added to the EPPO Alert List in 2007 and transferred to the List of Invasive Alien Plants in 2012.

Why

Salvinia molesta (Salviniaceae) is a floating aquatic fern originating from South America. Its common name is 'Giant Salvinia' in English. The plant is traded as an aquatic ornamental plant, as well as an aquarium plant. It is thought that many infestations have arisen from discarded aquarium material. Within the EPPO region, it has recently been recorded in 2 localities in Italy (in 2000 in a canal (Fosso del-Acqua calda) near Pisa, and in 2003 in the Pozzo del Merro lake near Rome). Because this plant has shown invasive behaviour where it has been introduced elsewhere in the world, and is still of very limited distribution in the EPPO region, it can be considered a new emerging invader in Europe.

Geographical distribution

EPPO region (invasive): France (Corse - first found in 2010, in a water reservoir), Italy (Fosso del-Acqua calda near Pisa in 2000, Toscana - Pozzo del Merro lake in 2003, Lazio), Portugal (one locality - Odemira - in Algarve).

Africa (invasive): Botswana, Burkina Faso, Côte d'Ivoire, Ghana, Kenya, Madagascar, Mauritius, Namibia, Senegal, South Africa, Swaziland, Tanzania, Uganda, Zambia.

Asia (invasive): India (south), Indonesia (Kalimantan), Malaysia (Sabah, Sarawak), Philippines, Singapore, Sri Lanka, Thailand.

Caribbean (native): Cuba, Trinidad and Tobago.

North America: Mexico (native), USA (invasive - Arizona, California, Florida, Hawaii, Louisiana, Mississippi, North Carolina, Texas).

Oceania (invasive): Australia (Australian Capital Territory, New South Wales, Queensland, Tasmania, South Australia, Victoria, Western Australia), Fiji, French Polynesia, New Caledonia, New Zealand, Papua New Guinea, Vanuatu.

South America (native): Argentina, Brazil (south-eastern), Colombia, Guyana

Note: in the USA, the plant has been eradicated from the District of Columbia and from South-Carolina. Its presence is uncertain in Alabama.

Morphology

S. molesta is a free floating aquatic fern. It lacks true roots, but it produces a horizontal rhizome (that lies below the water surface), and two types of fronds: buoyant and submersed, the later functioning as roots. Individual plants are up to 30 cm long with numerous leaves which usually form a mat from 2.5 cm up to 1 m thick.

The floating leaves are light to medium green, often with brownish edges in mature plants, elliptic and entire. The plant greatly varies morphologically depending on the habitat conditions (i.e. space and nutrient availability) and leaves can vary from 1.5 cm to 6 cm wide.

Habitats

It grows preferably in stagnant or slow-flowing waters such as lakes, water courses, wetlands, ditches, ponds, canals.

Biology and Ecology

S. molesta prefers tropical, sub-tropical or warm temperate areas of the world. Depending on the climate, it can either be a perennial or an annual (in non-tropical regions). In nutrient rich waters, it may reach a density of 30 000 small plants per m² and can double its biomass in 2 days under optimal conditions. Optimal growth is observed at water temperatures ranging from 20°C to 30°C. Buds are killed if exposed for more than two hours to temperatures below -3°C or above 43°C. The plant can tolerate a wide pH range, the optimum being between pH 6 and pH 7.5. The plant is able to tolerate salinity, and growth is greatly stimulated by an increase in nutrients levels.

The plant only reproduces vegetatively and is dispersed by wind and water. Vegetative parts of the plant may be spread by human activities such as fishing, movement of boats, etc. It has also been reported as being spread by animals (hippos in Africa and water buffaloes in Australia).

Impact

S. molesta reduces oxygen diffusion into the water, reducing the quality of the habitat for flora and fauna. Native aquatic plants are eliminated; dead plants release large amounts of nutrients into the water, thereby increasing eutrophication. In the Kakadu national park (Australia), bird species that used open waters declined in areas that were heavily infested. Small fish and snake abundance was also reduced. In India and on the islands of Borneo and Sri Lanka, the plant impacts upon fisheries and is also a serious weed in ricelands. It blocks irrigation channels and makes fluvial transport more difficult. It may also provide an ideal breeding ground for mosquitoes, which are vectors of diseases (malaria in Sri Lanka, encephalitis in Australia).

Control

Integrated control: Proliferation of *S. molesta* as well as other aquatic weeds is often indicative of increased nutrient levels in water. Sustainable management of the whole ecosystem by decreasing the nutrient level and improving sewage drainage and effluent treatment is likely to reduce the biomass of floating plants. Following *S. molesta* removal, continuous monitoring of infestation sites is necessary to detect new outbreaks. Large infestations may be mechanically harvested, but this may cause fragmentation and further spread. Manual control is considered difficult, costly and inefficient. Herbicides used are diquat formulated for use in running waters, hexazinone, chlorsulfuron, or fluridone.

Biological control: *Cyrtobagous salviniae* (Coleoptera: Curculionidae) has been successfully used as a biological control agent in Australia, Kenya, Malaysia, Namibia, Papua New Guinea, Philippines, Senegal, South Africa, South India, Sri Lanka, USA (Texas, Louisiana), Zambia, Zimbabwe, etc.

Sources

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