

European Frog-Bit (*Hydrocharis morsus-ranae*) – Floating Invader of Great Lakes Basin Waters

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Introduction

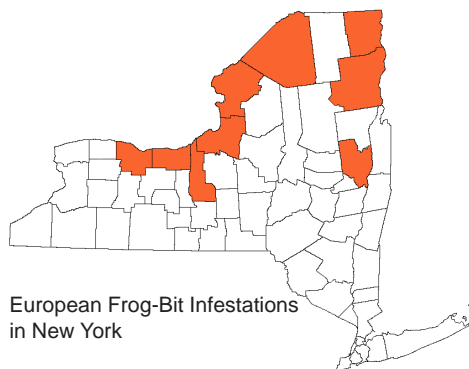
European frog-bit, *Hydrocharis morsus-ranae*, is an annual herbaceous aquatic plant (that is, it germinates, grows, flowers and dies in the space of one year). European frog-bit is free-floating (it has no roots attached to the bed of the water body), but in situations where the vegetation is dense enough, the leaves may become emergent. European frog-bit greatly resembles miniature water lilies. The plant looks similar to American frog-bit (*Limnobium spongia*). It has been found in the Great Lakes Basin since the 1930s, but is now spreading into inland streams and lakes within the Basin. It is considered invasive as it can displace native flora, possibly resulting in habitat impacts on native fauna.



European Frog-Bit in Lake Champlain
 Mark Malchoff, LCSGP

Introduction and Distribution

European frog-bit was introduced intentionally as a potential commercial ornamental plant in the Arboretum of the Central Experimental Farm in Ottawa in 1932. It escaped cultivation sometime before 1939 when the plant was found growing in the wild in the Rideau Canal. By 1952, the plant was collected at Montreal Island in the Ottawa River. By 1982, it could be found along the Canadian shore of Lake Ontario and down the St. Lawrence River in the Province of Quebec as far east as Quebec City. The first sighting in the United States was in 1974 in the Oswegatchie River, a tributary of the St. Lawrence, in Northern New York. A disjunct population (a population widely separated from other populations of the same species) was found on the Canadian shore of Lake



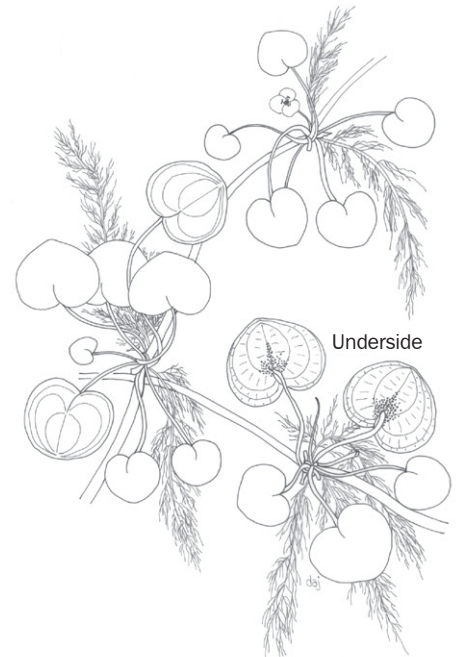
European Frog-Bit Infestations
 in New York

Erie in 1976. The plant spread to inland waterbodies in New York south of the St. Lawrence River by the early-1980s; by the early-1990s it had spread to the marshes and bays of Lake Ontario's south shore. In 1999, European frog-bit was found at several sites along the southeastern shore of Lake Champlain; by 2000 it was found in Mill Bay on the southern New York shore of Lake Champlain. Also in 2000, European frog-bit was found in marshes along Lake St. Clair and the Detroit River in Michigan. Another population was identified in 2002 in northwestern Washington. Populations have also been found in Central New York in Oneida Lake and Sterling Creek (Cayuga County). The most recent inland sighting in New York was in late-2006 in a pond at the Audubon Center and Sanctuary in Southern Chautauqua County.

Identification & Biology

The leathery leaves of *Hydrocharis morsus-ranae* are, heart-shaped, about one to two inches wide, green and veined on top and dark purplish-red with a spongy coating on the underside. They resemble the leaves of a miniature water lily. European frog-bit is a floating plant, with a spongy coating on the underside of the leaves that allows it to float on the water's surface. The plant has numerous roots up to 12 inches in length; the roots do not anchor in the substrate of the waterbody, instead they float freely.

Although the plant is dioecious (having separate male and female organs on different plants), most populations are dominated by one or the other sex and the small (about ½ inch), white, three-petaled unisexual flowers, produced in early-summer, seldom produce seeds. The plant, apparently, relies mainly on vegetative reproduction to maintain and spread populations. Stolons, (stem-like extensions) running from the center of the plant, produce juvenile plants, that tangle with other juvenile frog-bit stolons and free-floating frog-bit roots, to create dense mats. The stolons also produce vegetative winter buds, called turions, that break free from the main plant and sink to the bottom to lie dormant over the winter. In the spring, the turions float to the surface and begin to grow. A single European frog-bit plant can produce 100 to 150 turions in a season.



Hydrocharis morsus-ranae
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Habitat

Hydrocharis morsus-ranae prefers calcium-rich water. The plant grows best in low wave energy environments such as marshes and swamps; backwaters; quiet areas of bays; sheltered coves; low energy shorelines of rivers, streams and lakes; and in poorly drained ditches.

European frog-bit can be transported to new habitats as either plantlets or turions hitchhiking on boats, boat trailers, and waterfowl, or carried by flowing or wind-driven currents. Disturbingly, European frog-bit is also transported deliberately by humans as one of the numerous exotic aquatic plants sold for use in water gardens.

Impacts

Hydrocharis morsus-ranae populations increase in size rapidly by vegetative reproduction and form dense mats. These mats can limit light penetration into the water, limiting growth of vegetation beneath the mats. In addition, the dense mat of vegetation can also limit the amount of nutrients and dissolved gases reaching native plants beneath the frog-bit mats. In extreme cases in shallow water, the frog-bit may fill the water column, crowding out native vegetation. This change in plant

community diversity may also affect native aquatic fauna. In autumn, as the mats decompose and settle to the bottom of the waterbody, dissolved oxygen levels can be dramatically decreased, resulting in the death of fish and native vegetation. Dense mats of European frog-bit can also inhibit movement of waterfowl, large fish and boats, and limit recreational activities such as swimming. On the other hand, European frog-bit can serve as a food plant for some types of water birds, some fish and insects.



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Management & Control

At the present time, there are no technologies for the control of European frog-bit. In areas off docks or in swimming areas where boating or swimming are impaired, hand-harvesting can provide limited, temporary relief. Currently, the best offense is a good defense: boaters, anglers, hunters and water gardeners all need to work together to prevent the spread of the plant into new, heretofore uninfested, waters.

Boaters/Anglers/Hunters:

- Drain all bilge water, live wells, bait buckets, and other water from your boat, engine and equipment immediately after loading your boat onto its trailer (the same is true for canoes and kayaks transported on roof racks). Dump any leftover bait into appropriate trash containers to prevent it from washing into a waterway. Live bait and/or bait bucket water should not be moved from waterbody to waterbody.
- At the ramp, thoroughly inspect your boat's hull, drive unit, trim and trolling plates, prop, prop guards, transducers, anchor and chain/rope, trailer, decoys and nets. Remove all plant or animal material; dispose of into appropriate trash containers to prevent it from washing into a waterway.
- After boating, fishing or hunting in infested waters, flush, using hot water (104° F or hotter), the hull, drive unit, live wells and pumping system, bilge, engine cooling system, trailer, bait bucket, decoys, nets, waders and other items that have gotten wet, or take the boat through a do-it-yourself carwash. If the boat or equipment is not going to be used for a while, a hard spray from a garden hose will suffice. Wash water should not drain to uninfested waters or storm sewers leading to uninfested waters. Do not use chlorine bleach or environmentally unsound solutions.
- Boats and equipment should be thoroughly dried for at least 5 days (preferably in sunlight).

For more information on general prevention procedures for preventing the movement of aquatic hitchhikers, visit <http://www.protectyourwaters.net>.

Water Gardeners:

- Isolate your water garden from runoff into any surface waters or storm sewers.
- Utilize native vegetation species whenever possible to minimize the threat of introducing a non-native invasive species through an accidental release from your water garden.
- Purchase only plants that are legal in your locale (contact your local regional office of New York State Department of Environmental Conservation to determine what plants may be prohibited).
- Dry unwanted plants completely and dispose of in the garbage; never discard them in streams or in yards or fields where they might be washed, blown or carried by animals into streams.

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