

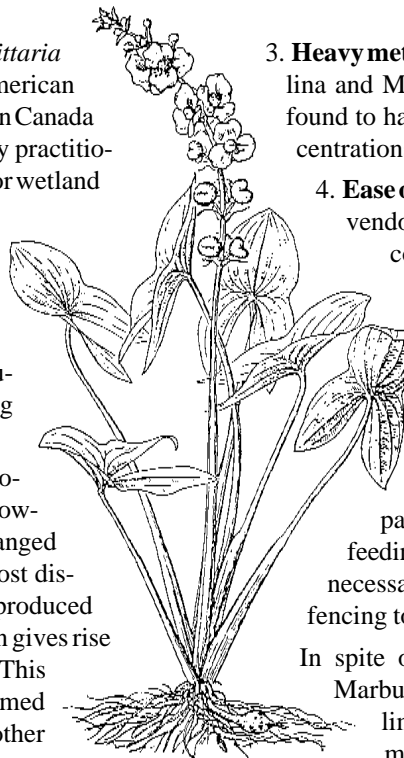
Broad-Leaf Arrowhead: A Workhorse of the Wetland

The broad-leaf arrowhead (*Sagittaria latifolia*) is a native North American wetland plant found in southern Canada and much of the United States. Many practitioners have found it especially useful for wetland enhancement, restoration, and creation projects because of several desirable characteristics. However, Marburger (1993) points out there is still much to be learned about its ecology and physiology before routinely investing in large scale planting and management schemes.

The plant is identified by its rosettes of arrowhead-shaped leaves. Flowers are white with three petals and arranged in whorls around a long stalk. Its most distinctive feature is the starchy tuber produced from the rhizomes. This phenomenon gives rise to its common name of *duck potato*. This "potato" portion of the plant is consumed by muskrats, porcupines, geese, and other animals. Native Americans and European settlers also used the tuber as a food source.

While its days as human food have long since past, other beneficial characteristics of broad-leaf arrowhead have propelled it into the field of wetland restoration. Special characteristics include the following.

1. **Adaptation to a wide range of conditions.** The plant persists under stabilized water levels of less than 50 cm and few drawdowns and survives in pHs from 5.9 to 8.8. It has been found in highly calcareous water and in a variety of soil types including sandy loams and silty clays. While it can withstand turbid conditions, it does not tolerate severe sediment deposition.
2. **Nutrient uptake.** Arrowhead rapidly takes up phosphorus from the sediments and retains it in its tissue. In one South Carolina study it had the highest leaf tissue composition of phosphorus of 17 wetland plants analyzed (Boyd, 1970). For this reason arrowhead is often selected for use in municipal and domestic wastewater treatment systems, constructed wetlands, and for stormwater runoff treatment.



Adapted from Fassett, 1960

3. **Heavy metal uptake.** In surveys in South Carolina and Michigan, broad-leaf arrowhead was found to have the highest leaf dry weight concentrations of several metals.

4. **Ease of plant propagation.** Wetland plant vendors can supply achenes, tubers, and container-grown plants. Tubers are generally preferred because they require less site preparation. Plants are more costly, but survive a wider range of initial conditions.

5. **Resistance to disease and damage.** There are few reports of population reductions due to pathogens, insect pests, and animal feeding. In some limited situation it may be necessary to enclose areas with protective fencing to keep out muskrats and waterfowl.

In spite of many apparent field successes, Marburger points out there exists only a limited database on the installation and management of the broad-leaf arrowhead, especially for large-scale applications. Before incorporating the arrowhead in a wetland design the practitioner needs to work with plant vendor to identify the following:

- If the environmental factors at the site are more favorable for germinating/growing achenes, tubers, or seedlings
- If environmental factors are right for sustaining a mature population of arrowheads
- If pathogens, animal herbivory, and/or other plant species are likely to impact the plant

References

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- Fassett, N.C. 1960. *A Manual of Aquatic Plants*. The U. of Wisconsin Press, 405 pp.
- Marburger, J.E., 1993. "Biology and Management of *Sagittaria latifolia* Willd. (Broad-leaf Arrowhead) for Wetland Restoration and Creation." *Restoration Ecology* 1(4) 248-257.