

BROADLEAF ARROWHEAD

Sagittaria latifolia Willd.
Plant Symbol = SALA2

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Robert Mohlenbrock
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Alternate Names

Arrowhead, Indian potato, tule potato, wapato

Uses

Ethnobotanic: *Sagittaria* is an aquatic plant with tuberous roots that can be eaten like potatoes. Lewis and Clark found it at the mouth of the Willamette and considered it equal to the potato, and valuable for trade. Indian women collected it in shallow water from a canoe, or waded into ponds or marshes in the late summer and loosened the roots with their toes. The roots would rise to the top of the water where they were gathered and tossed into floating baskets. Today, the tubers are harvested with a hoe, pitchfork, or rake. Tubers are baked in fire embers, boiled, or roasted in the ashes. Tubers are skinned and eaten whole or mashed.

After roasting, some tubers were dried and stored for winter use. The Chippewa gathered the "Indian potatoes" in the fall, strung them, and hung them overhead in the wigwam to dry. Later they were boiled for use.

The tubers of *Sagittaria* species were eaten by many different indigenous groups in Canada, as well as many groups of Washington and Oregon (Kuhnlein and Turner 1991). The tubers were also widely traded from harvesting centers to neighboring areas. The tubers were also a major item of commerce on the Lower Columbia in Chinook Territory. Katie families owned large patches of the plant and clearing the patches claimed ownership. Family groups would camp beside their claimed harvesting sites for a month or more.

A species of *Sagittaria* grows in China, and is sold in the markets of China and Japan as food, the corms being full of starch. *Sagittaria latifolia* is extensively cultivated in the San Francisco Bay area in California to supply the Chinese markets, and the tubers are commonly to be found on sale. The Chinese, on coming to California, used it for food and may have cultivated it somewhat. In so doing, they are believed to have extended its range into the southern part of the state (Mason 1957).

Medicinally, the Maidu of California used an infusion of arrowhead roots to clean and treat wounds. The Navajo use these plants for headaches. The Ojibwa and the Chippewa used *Sagittaria* species as a remedy for indigestion. The Cherokee used an infusion of leaves to bathe feverish babies, with one sip given orally. The Iroquois used it for rheumatism, a dermatological aid, and a laxative. The Iroquois used it as a ceremonial blessing when they began planting corn.

Wildlife: Tubers are planted as a wildlife food. Ducks eat the small, flat seeds of arrowheads, but the tubers are the most valuable to wildlife. Muskrat and porcupine are known to eat the tubers. Swans, geese, wood ducks, blue-winged teal, lesser and greater scaup, ruddy duck, ring necked duck, pintail, mallard, mottled duck, gadwall, canvasback, black duck and king rail are known to eat arrowhead seeds and tubers. For wildlife use, the tubers of *Sagittaria latifolia* are often too large and too deeply buried to be useful to ducks (Martin 1951).

Muskrats have evolved with wetland ecosystems and form a valuable component of healthy functioning wetland communities. Muskrats use emergent wetland vegetation such as *Sagittaria* species for food. Muskrat grazed areas increase wetland diversity by opening up the dense stands of *Typha* and *Schoenoplectus* (*Scirpus*) species, and providing opportunities for aquatic vegetation such as *Sagittaria* to become established in the open water. Muskrat huts provide a substrate for shrubs and other plant species. Indian people often sought caches of *Sagittaria* tubers stored by muskrat and beaver.

Status

Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status, such as, state noxious status and wetland indicator values.

Description

General: Arrowhead Family (Alismataceae). Both *Sagittaria latifolia* and *Sagittaria cuneata* are aquatic plants growing in swampy ground or standing water in ponds, lakes, stream edges, and ditches (Hickman 1993). Both species have white or bluish tubers, which are edible. The leaves are sagittate, with leaf blades are either erect or floating on the surface of the water. *S. cuneata* leaf blades are smaller, from 5-15 cm, and the lower lobes of emergent leaf blades are less than the terminal lobe. In *S. latifolia*, leaf blades are from 6-30 cm, and the lower lobes of the emergent leaf blade are approximately equal to the terminal lobe. The inflorescence is simple or branching, often with the lower flowers pistillate and the upper ones staminate. The flowers are white, with three white petals and 3 sepals. Stamens are numerous and bright yellow. The pistils are numerous, spirally arranged on the receptacle. The fruit is an achene and is greenish colored. A diagnostic feature distinguishing the two species is the beak on the fruit of *S. cuneata* is ascending to erect and <0.5 mm; the beak on the fruit of *S. latifolia* is spreading and 1-2 mm.

Distribution

For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site. *Sagittaria* species are obligate wetland plants found in marshes and wetlands throughout temperate North America. The ranges of *S. cuneata* and *S. latifolia* overlap. *S. latifolia* is found from central and southern British Columbia to Nova Scotia and Prince Edward Island, south to California and into South America. In California, *S. latifolia* is confined to lower elevations <1500 m. *Sagittaria* species

grow in ponds, slow streams, ditches and freshwater wetlands.

Establishment

Sagittaria species may be planted from bare root stock, by transplanting the tubers, and by seeding directly into wetland soil. Live plant transplants or transplanting tubers are preferred revegetation methods where there is moving water. It takes two years for seed to germinate; planting bare root stock or tubers gives faster revegetation results.

Live Plant Collections: No more than 1/4 of the plants in an area should be collected. If no more than 0.09 m² (1 ft²) are removed from a 0.4 m² (4 ft²) area, the plants will grow back into the hole in one good growing season. A depth of 15 cm (6 in) is sufficiently deep for digging plugs. This will leave enough plants and rhizomes to grow back during the growing season.

Wild plants should be collected after the leaves begin to emerge in the spring until the first frost. The plants can be pulled up easily from wet soil. When collecting wild plants, rinse roots gently. Leaves and stems can be clipped from 15 to 25 cm (6 to 10 inches); this allows the plant to allocate more energy into root production. The roots should always remain moist or in water until planted. Plants should be transported and stored in a cool location prior to planting. Water depth should be 0 to 6" and the soils should be wet.

Sagittaria grows prolifically around ponds or wetlands in shallow water. Plug spacing of 25-30 cm will fill in within one growing season. Soil should be kept saturated, with approximately 1/2" of water over the surface of the soil after planting. If water is low in nutrients (oligotrophic), fertilization will speed biomass production and revegetation. Many surface waters are already rich in nutrients (eutrophic), and fertilization is not necessary.

Indian potatoes transplant success may be greater with the tubers than with bare root stock. The little underground potatoes can be separated from the parent plants with a rake, hoe, or shovel. In unconsolidated soils, the tubers can be pulled up by hand by searching around the roots of the plant.

After collecting, the *Sagittaria* potatoes should be kept moist and cool, and stored in peat moss. Potatoes are then planted in shallow water, in the same conditions as described above for the whole plants. Potatoes should be collected and planted

when plants are dormant, in the fall, winter and early spring.

Seed Germination: Seeds of *Sagittaria* species take two years to germinate, because they have a double dormancy requiring cold then warm then cold temperatures. Temperature has a multiple role in the regulation of timing of germination. Dormant seeds become non-dormant only at specific temperatures, non-dormant seeds have specific temperature requirements for germination, and non-dormant seeds of some species are induced into dormancy by certain temperatures. Once *Sagittaria* seeds germinate, they have fairly high viability. Procedures for growing *Sagittaria* seeds in the greenhouse have not been developed at this time.

Sagittaria seeds can be planted directly in wetlands or ponds. Prepare the area by creating a washboard in shallow water, at mudflat consistency. Seeds should then be scattered on the surface of the soil, as the seeds need sunlight to germinate well. Light and temperature in natural conditions will promote seed germination, and in two years *Sagittaria* plants will emerge.

Management

Hydrology is the most important factor in determining wetland type, revegetation success, and wetland function and value. Changes in water levels influence species composition, structure, and distribution of plant communities. Water management is absolutely critical during plant establishment, and remains crucial through the life of the wetland for proper community management. *Sagittaria* species require moist soils to standing water for successful revegetation.

We have no record of specific traditional resource management techniques other than anecdotal information of the use of fire to keep dense tule marshes open, which provided an opportunity for colonization and spread of *Sagittaria* species. The harvest of arrowhead was usually made in late summer as the stems and leaves were dying (and usually when the water table was lower) (Balls 1962).

Cultivars, Improved and Selected Materials (and area of origin)

Available from native plant nurseries specializing in aquatic plants. Contact your local Natural Resources Conservation Service (formerly Soil Conservation Service) office for more information. Look in the phone book under "United States Government." The Natural Resources Conservation Service will be

listed under the subheading "Department of Agriculture."

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USDA, NRCS 1999. *The PLANTS database.* National Plant Data Center, Baton Rouge, Louisiana. <<http://plants.usda.gov>>. Version: 05apr1999.

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Edited: 05dec00 jsp; 03jun03 ahv; 060816 jsp

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