

## WAPATO

### *Sagittaria cuneata* E. Sheldon

Plant Symbol = SACU

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#### Alternate Names

Indian potato, arrowhead

#### Uses

*Ethnobotanic:* *Sagittaria* is an aquatic plant with tuberous roots that can be eaten like potatoes. 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 widely traded from harvesting centers to neighboring areas. On the Lower Columbia in Chinook Territory, Katzie families owned large patches of the wapato plants. Family groups camped beside their harvesting sites for a month or more.

Indian women collected wapato 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 cooking, 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.

Medicinally, the Maidu of California used an infusion of arrowhead roots to clean and treat wounds. The Navaho 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 bath feverish babies, with one sip given orally. The Iroquois used wapato for rheumatism, a dermatological aid, a laxative, and as a ceremonial blessing when they began planting corn.

*Wildlife:* The small, flattish seeds of arrowheads are eaten by ducks, and the tubers are valuable to many species of 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 (Martin 1951).

#### 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). *Sagittaria cuneata* is an aquatic plant growing in swampy ground or standing water in ponds, lakes, stream edges, and ditches (Hickman 1993). Wapato have white or bluish tubers, which are edible. The leaves are sagittate, with 5-15 cm long erect or floating leaf blades; the lower lobes of the emergent leaf blades are less than 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 a greenish colored achene.

#### 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. *Sagittaria cuneata* is transcontinental, extending from north central Alaska to Labrador, extending south to California and

northern Texas. In California, *Sagittaria cuneata* ranges from middle to high elevations < 2500 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. 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 from the time leaves emerge in spring until first frost. 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 cm 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.

*Transplanting tubers:* 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* tubers should be kept moist and cool, and stored in peat moss. Wapato tubers are then planted in shallow water, in the same conditions as described above for the whole plants. Tubers should be collected and planted when plants are dormant, in the fall, winter and early spring.

*Seeds:* 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 nondormant only at specific temperatures, nondormant seeds have specific temperature requirements for germination, and nondormant 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; however, *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.

Muskrats have evolved with wetland ecosystems and form a valuable component of healthy functioning wetland communities. Muskrat eat-outs increase wetland diversity by opening up the dense tule and cattail stands, 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. Caches of *Sagittaria* tubers stored by muskrat and beaver were often sought by Indian people.

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)**

This species is readily available from native plant nurseries within its range. 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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