

## *Fraxinus nigra*

**Black Ash - a.k.a. Basket Ash, Hoop Ash**

### **Habitat/Plant Community and Geographic Range**

**Habitat/Community:** Flood plain forest, wooded or cedar swamps, peat bogs, edge of bogs, along streams, low lake margins, alluvial flats and wet depressions in forests. [7, 11, 22, 36] **Range:** All but sw. Minn. (Eco-Range: 1, 2, 4-8), Wis., Mich. Nfld. and Que. to Man., s. to Del., W.Va., Ind. and Iowa. [7, 21]

### **Description**

**General:** A stout-twigged, deciduous tree with narrow, rounded crown of upright branches 50-75' tall and 35-50' wide. **Flower:** 1/8" long, purplish flower during April and May before the leaves emerge. Male and female flowers are on separate trees. **Leaf:** Opposite and pinnately compound 12-16" long. Leaflets number 7-11 and are 1-2½" long, toothed, sessile and paired (except at end). Leaf scars are nearly circular. Dark green above, paler beneath, with tufts of rust-colored hairs along midvein, and a burgundy-purple fall color. One of the last species to leaf out in the spring. **Bark:** Gray, corky, furrowed into soft, scaly plates that rub off easily. **Twigs:** Branches are circular, gray, stout, becoming hairless. **Fruit:** Flat samaras, 1-1½" long wing to the base, and blunt on both ends that hang in clusters and matures in late summer. **Root:** Very shallow and wide-spreading roots. **Soil:** Prefers lowland wet soils, though will tolerate most soils and a pH of 4.6-6.5. [7, 11, 22, 36, 37]

### **Normal Water Level**

This species prefers upland moist to wet/saturated conditions. [21, 37]

### **Flooding/Fluctuation Tolerances**

**Frequency:** High. **Depth:** 60". **Duration:** Long – 5 days (decreasing 12"/day). This species is tolerant of both seasonal and irregular inundation and somewhat tolerant to flood duration. [1, 22, 37]

### **Sensitivities or Other Tolerances**

**Exposure:** Full sun to part shade. **Salt:** High. **Nutrient:** Low. **Siltation:** Moderate. **Insect:** Frequent – oystershell scale, ash borer. **Other:** This species is resistant to 2,4-D, lighting, drought, heat, mine spoils and soil compaction. It is frequently damaged by wind and ice and is susceptible to leaf spot, anthracnose, rust and canker. It has a moderate to low tolerance to general disturbance and stress. [1, 22, 37]

### **Design Considerations**

A good species for lake edges, restorations of wooded swamps and other wooded wetlands. It is a tough species that can tolerate many adverse conditions. **Concerns:** A couple of cultivars exist.

### **Wildlife Use**

Black ash provides seeds for a number of birds (especially wood ducks, turkeys, bobwhites, red-winged blackbirds, cardinals, purple finches, and pine grosbeaks), sap for yellow-bellied sapsuckers, and nesting habitat for mourning doves and evening



**Indicator Status:** FACW+

grosbeaks. It also provides habitat for deer, moose, beavers, porcupines, squirrels and rodents. [21, 22, 32, 37]

**Nursery/Plant Information**

**Available:** Becoming more widely available.

**Types:** Bareroot, balled-and-burlapped and potted stock.

**Planting Techniques**

Black ash is readily transplanted in spring or autumn with care. [22]

**Additional Notes**

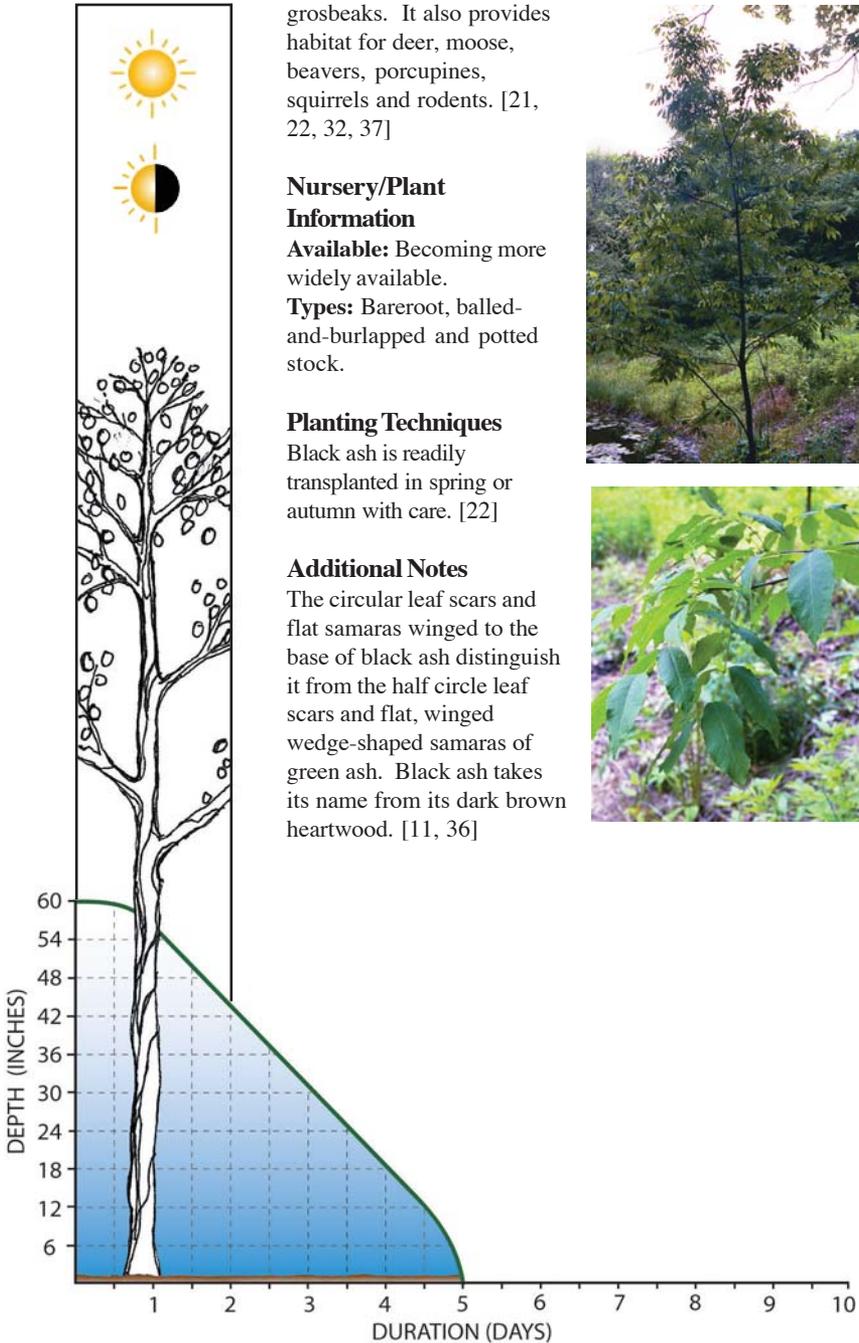
The circular leaf scars and flat samaras winged to the base of black ash distinguish it from the half circle leaf scars and flat, winged wedge-shaped samaras of green ash. Black ash takes its name from its dark brown heartwood. [11, 36]



Photo: Rusty Schmidt



Photo: Rusty Schmidt





## *Fraxinus pennsylvanica*

Green Ash - a.k.a. *F. pennsylvanica subintegerrima*, *F. pennsylv lanceolata* -

Swamp Ash, Water Ash

### Habitat/Plant Community and Geographic Range

**Habitat/Community:** Flood plain forests, swamps, shores, lake edges, stream banks, Midwest windbreaks and farmstead plantings. [7, 11, 22, 36, 44] **Range:** Minn. (Eco-Region: All), Wis., Mich. N.S. and Que. to Alta., s. to Fla. and Tex. [7, 21]

### Description

**General:** Early successional, deciduous tree with a height of 50-75' and width of 35-50'. Trees have dense, rounded or irregular crowns of shiny green foliage; fast growing on dry soils. **Flower:** Small clusters of many yellow flowers that bloom before leaves in early spring. Male and female flowers are on separate trees. **Leaf:** Opposite, pinnately compound, shiny green above, green or paler and slightly hairy beneath; turn yellow in autumn. The leaflets number 5-9 (usually 7) and are toothed, slightly petioled and 2-5" long. The leaf scars are in a half circle. **Bark:** Furrowed in a very tight, regular diamond pattern of crisscrossing ridges with reddish inner layer. **Twigs:** Smooth and round, becoming gray and hairless. **Fruit:** A wedge-shaped samara, with a round or somewhat round body and a flat 1¼-2¼" long wing that is yellowish and hangs in clusters that mature in late summer and autumn. **Root:** Shallow, fibrous roots. **Soil:** It tolerates most soil types, although it prefers moist alluvial soils of sand to sandy loam and a pH range of 6.1-7.5. This species may be found in rich, upland habitats. [7, 8, 11, 22, 36, 44]

### Normal Water Level

This species prefers upland moist to wet/saturated conditions, although it will tolerate dry, rich, upland soils. [21, 37]

### Flooding/Fluctuation Tolerances

**Frequency:** High. **Depth:** 60" in spring and 24" in summer. **Duration:** Long for spring, medium long for summer – 10 and 4 days, respectively (decreasing 6"/day in spring and 12" over 2 days in summer). This species has a high flood tolerance in spring, especially at the thaw and rainy season. It has a tolerance to irregular inundation throughout the rest of the year. Adults are very tolerant to flood depth increases; seedlings are moderately tolerant. [1, 8, 22, 44]

### Sensitivities or Other Tolerances

**Exposure:** Not much shade; full to part sun. **Salt:** Moderate. **Nutrient:** High. **Siltation:** High. **Insect:** Frequent – ash borer, oystershell scale, brown headed ash sawfly, lilac leaf minor, lilac borer. **Other:** Green ash is resistant to 2,4-D, lighting, drought, heat, alkaline soils, mine spoils and soil compaction. It is the most tolerant of the ashes. It is damaged by wind and ice and is sensitive to SO<sub>2</sub> and O<sub>3</sub>. It has a moderate tolerance to general disturbance and stress. [1, 2, 8, 10, 22, 25, 37, 44]

### Design Considerations

Green ash is one of the more common shade trees being planted because of its toughness and ease of growth. It is used for restorations of wet depressions, flood plain forests, stream bank stabilization, slope buffers and shelterbelts. It thrives along roads, streets, and restrictive urban landscapes. **Concerns:** Green ash may be

## Indicator Status: FACW

overplanted. It is often used in place of slower-growing species such as hard maples and oaks. [11, 36, 44]

### Wildlife Use

The twigs and seeds provide forage for many mammals like deer, beavers and mice.

This ash also provides habitat for many bird species (especially wood ducks, turkeys, bobwhites, red-winged blackbirds, cardinals, purple finches and pine grosbeaks), sap for yellow-bellied sapsuckers, and nesting habitat for mourning doves and evening grosbeaks. Fallen logs provide habitat for amphibians, reptiles and insects. [21, 22, 32, 37, 44]

### Nursery/Plant Information

**Available:** Widely. **Types:** Balled-and-burlapped, potted and bareroot stock.

### Planting Techniques

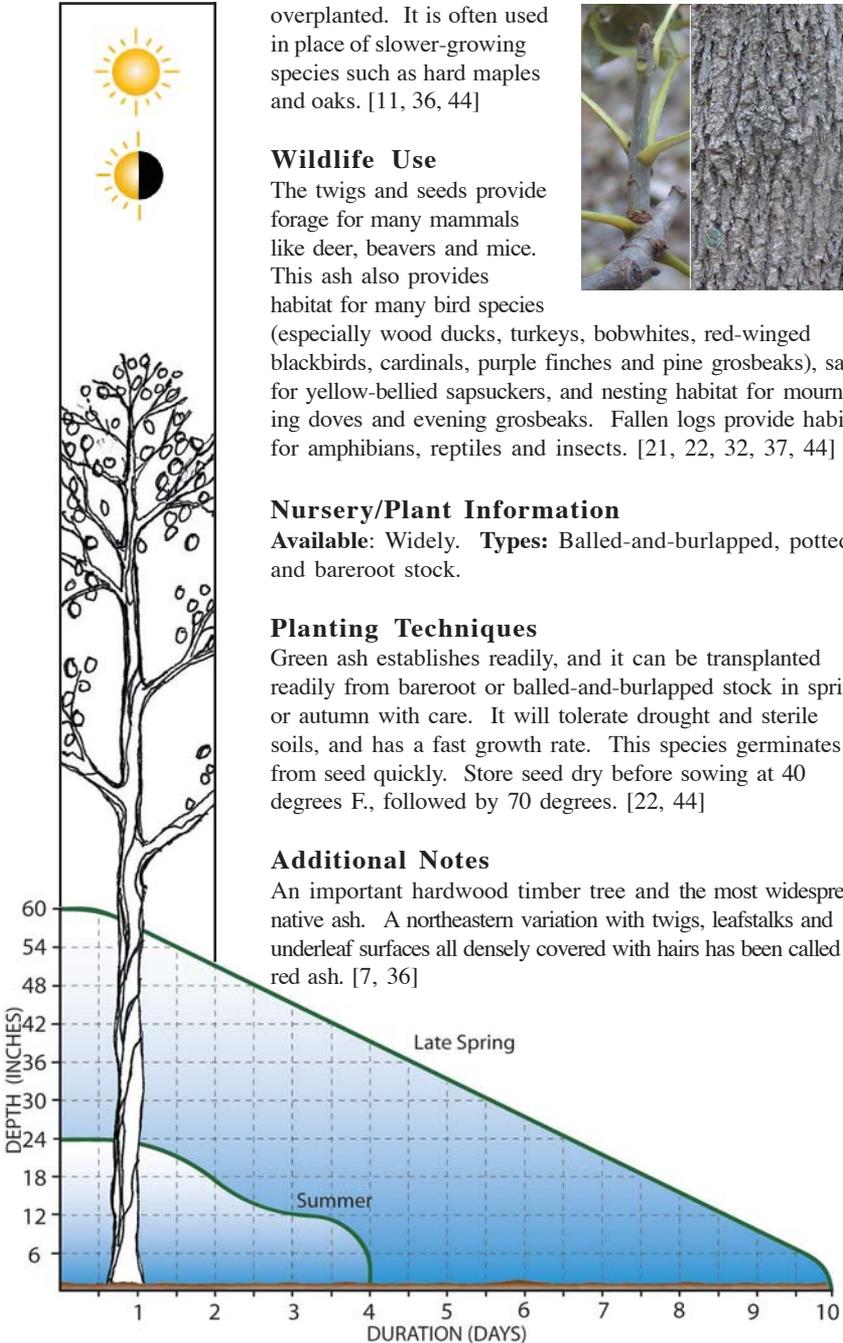
Green ash establishes readily, and it can be transplanted readily from bareroot or balled-and-burlapped stock in spring or autumn with care. It will tolerate drought and sterile soils, and has a fast growth rate. This species germinates from seed quickly. Store seed dry before sowing at 40 degrees F., followed by 70 degrees. [22, 44]

### Additional Notes

An important hardwood timber tree and the most widespread native ash. A northeastern variation with twigs, leafstalks and underleaf surfaces all densely covered with hairs has been called red ash. [7, 36]



Photo: www.caia2.unm.edu/0574





# *Galium boreale*

Northern Bedstraw - a.k.a. Snow Bedstraw

## Habitat/Plant Community and Geographic Range

**Habitat/Community:** Stream banks, shores, thickets, swamps, common along roads and wet-to-moist meadows (also in drier woods and fields). It usually grows in well-drained, open places. [7, 16, 35, 41] **Range:** Common; Minn. (Eco-Region: All), Wis., Mich. Circumboreal, s. to Del., Ky., Mo. and Calif. [7, 21]

## Description

**General:** Northern bedstraw is a native, perennial herb standing 10-36". It often grows in large clumps and is an impressive sight when in bloom. **Flower:** Small, rather showy, 4-petaled, white flowers in a dense cluster (1-3" wide) at the top of the square stem. The flowers are sweet scented, and each flower is ¼" wide and blooms from June to July. **Leaf:** Elongate, without teeth, and in whorls of 4. Each leaf is very narrow, ¼" wide, linear, ¾-2" long, with a minutely rounded end and 3-nerved. **Stem:** A square-stemmed plant with many smooth stems that are commonly short-bearded just beneath the nodes. Sterile axillary branches with smaller leaves often develop. **Fruit:** Fruit with 2 carpels, 1-seeded, 2 mm, smooth or with short, straight or curled (not hooked) hairs. **Root:** Rhizomes. **Soil:** A variety of not-too-dry soils, though prefers old fields. [7, 35, 41]

## Normal Water Level

This species prefers upland moist to wet/saturated conditions, although it will tolerate some drought. [21]

## Flooding/Fluctuation Tolerances

**Frequency:** Moderate. **Depth:** 12". **Duration:** Short – 1 day (decreasing 12" in 1 day). This species is somewhat tolerant to flood duration. [1]

## Sensitivities or Other Tolerances

**Exposure:** Full sun to partial sun. **Salt:** Unknown. **Nutrient:** Low.

**Siltation:** Unknown. **Insect:** Infrequent. **Other:** This species is moderately low in tolerance to general disturbance and stress. [1, 47]

## Design Considerations

This species may be used in landscapes or rock gardens as a ground cover and provides good cutflower. **Concerns:** It may become overly aggressive due to its rhizomonous spread, though this may be preferred in some situations to compete with non-native species. [16]

## Nursery/Plant Information

**Available:** Limited. **Types:** Plants and seed.

## Planting Techniques

No seed treatment is needed, and this species divides well. Approximately 1,008,000 seeds/lb. [16]

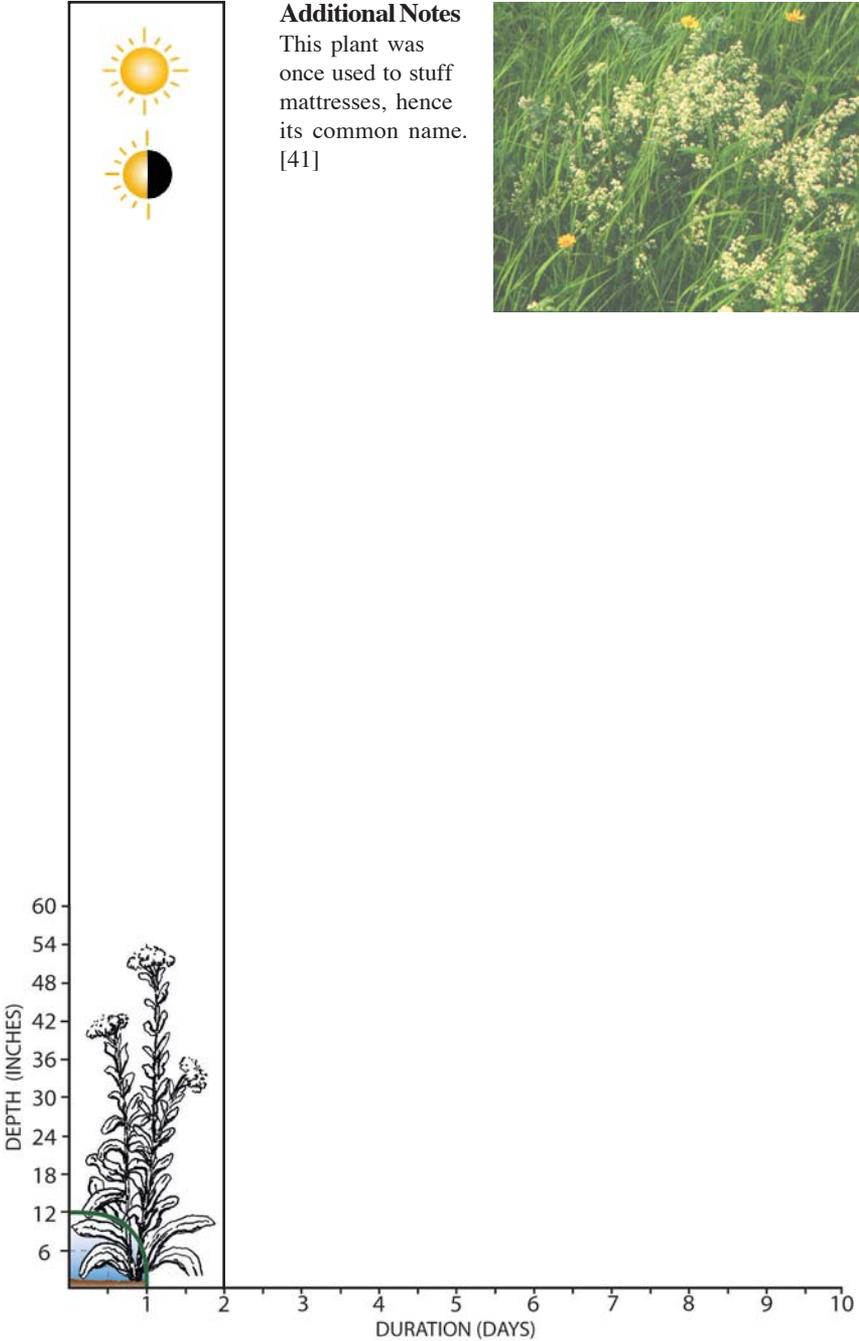
Indicator Status: FAC

**Additional Notes**

This plant was once used to stuff mattresses, hence its common name. [41]



Photo: Paul Jackson





## *Gentiana andrewsii*

**Bottle Gentian** - a.k.a. **Prairie, Closed Blue or Blind Gentian**

### **Habitat/Plant Community and Geographic Range**

**Habitat/Community:** Wet meadows, swamps, wet woods, mesic savannas, thickets, low prairies, shores and ditches. It is found in moist, undisturbed open or somewhat shaded areas, especially along railroad beds and old fields. [7, 16, 35, 41] **Range:** Minn. (Eco-Region: All), Wis., Mich. Que. to Man., s. to N.J., N.C., Ohio, Mo. and Neb. [7, 21]

### **Description**

**General:** A beautiful, slow-growing, native, perennial herb that is usually 1-2' tall. It has maroon-to-bronze fall color. **Flower:** Stems end in clusters of bottle-shaped, 1- to 1½"-long, blue flowers. The top of the flower is closed or nearly so by 5 fused petals, making the interior available only to large insects such as bumblebees, which can push the petals apart. Blooms August-October in second year if competition is minimized. **Leaf:** Toothless opposite, lance-shaped leaves with a pair of nerves in addition to the midrib. The leaf sides bend upward to form a trough. **Stem:** Upright simple stems. **Fruit:** Papery pod, roughly the size and shape of the flowers, contains hundreds of tiny, brown seeds. **Root:** Cluster of fleshy-fibrous to sometimes tuberous-thickened roots. **Soil:** Found in most soil types. [7, 35, 41]

### **Normal Water Level**

This species prefers upland mesic moist-to-wet/saturated conditions. [21]

### **Flooding/Fluctuation Tolerances**

**Frequency:** Moderate. **Depth:** 12". **Duration:** Short – 1 day (decreasing 12" in 1 day).

### **Sensitivities or Other Tolerances**

**Shade:** Full to part sun. **Salt:** Low. **Nutrient:** Low. **Siltation:** Low.

**Insect:** Infrequent. **Other:** This species has a moderate tolerance to general disturbance and stress. [1, 47]

### **Design Considerations**

A wonderful perennial for perennial gardens, rain gardens and rock gardens. It is used in restorations of prairies, wet meadows, lake edges, calcareous situations and ditches where it will be provided with enough sun the first growing season. It provides great cut and dried flowers. **Concerns:** It can be hard to establish in areas with significant competition. [16, 41]

### **Wildlife Use**

Bottle gentian is a good nectar source for bumblebees. [21, 35, 41]

### **Nursery/Plant Information**

**Available:** Widely. **Types:** Plants. It does not start well from seed in competition.

**Indicator Status: FACW**

**Planting Techniques**

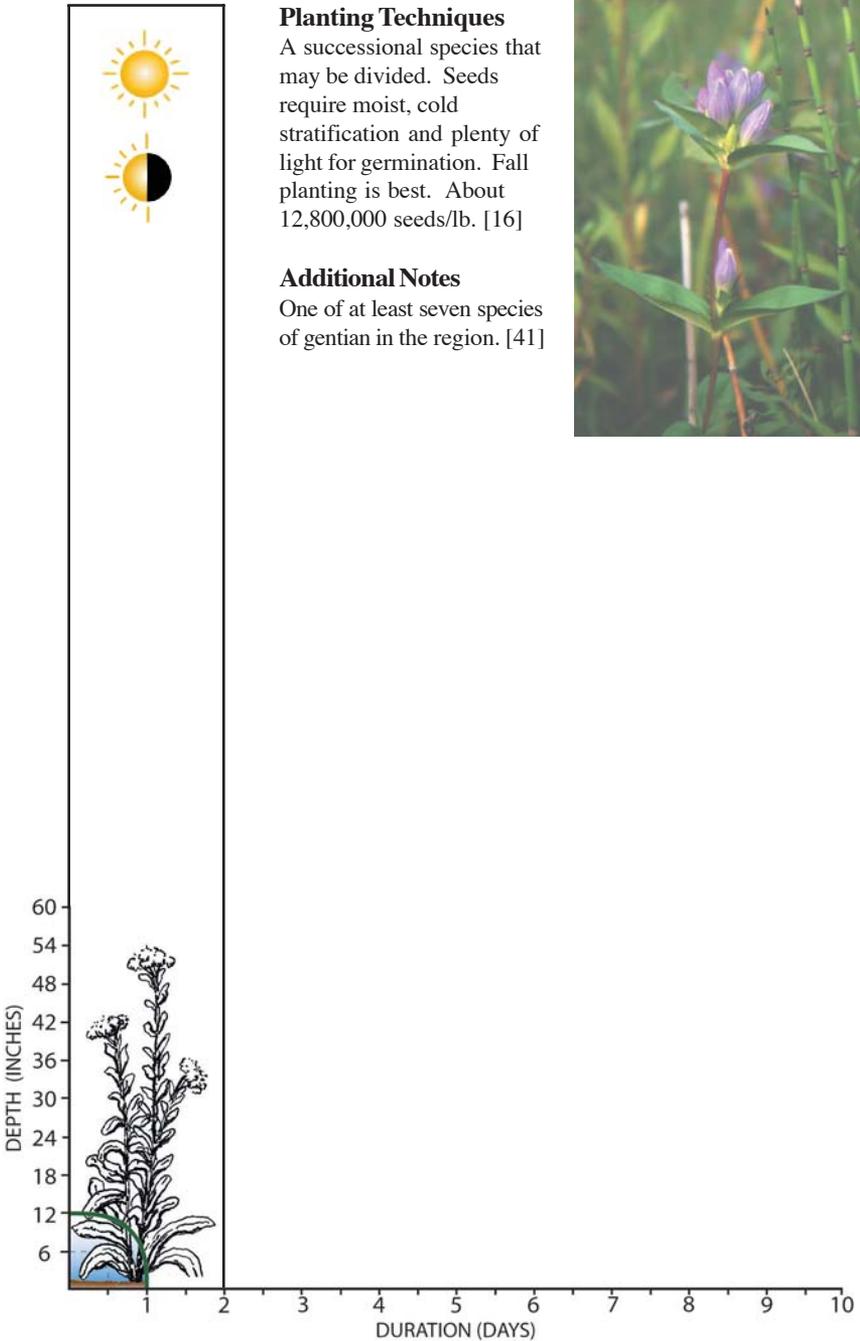
A successional species that may be divided. Seeds require moist, cold stratification and plenty of light for germination. Fall planting is best. About 12,800,000 seeds/lb. [16]

**Additional Notes**

One of at least seven species of gentian in the region. [41]



Photo: Paul Jackson





## *Glyceria grandis*

**Giant Manna Grass** - a.k.a. *Panicularia (Glyceria) grandis* -  
American, Reed, or Tall Manna Grass

### **Habitat/Plant Community and Geographic Range**

**Habitat/Community:** Shallow and deep marshes, fresh (wet) meadows, ditches, streams, lakes, ponds, open bogs, peatlands and fens (usually in shallow water and mud). [7, 11, 16] **Range:** Minn. (Eco-Region: All), Wis., Mich. Que. and N.S. to Alaska, s. to Va., Tenn., La., Neb., N.M., Ariz. and Wash. [7, 21]

### **Description**

**General:** Loosely clumped, perennial grass with culms growing 4-6' tall. Light-green-to-tan, cool-season plant. **Flower:** A large panicle 3" long. Spikelets each have 5-9 flowers. The lemmas are distinctly 7-ribbed and usually purple, blooming from June to August. **Leaf:** Long and flat, usually smooth underneath and rough on top and 1/3-1/2" wide. **Stem:** Clustered stout culms. **Fruit:** The seeds are rounded at the base and sharp at the point. **Root:** Rhizomes usually rooting from the lower nodes. **Soil:** Shallow water or wet ground of muddy shores, peat or bogs. [7, 11]

### **Normal Water Level**

This species prefers shallow water of 12" of inundation or less to wet/saturated conditions. [21, 37]

### **Flooding/Fluctuation Tolerances**

**Frequency:** High. **Depth:** 24". **Duration:** Long – 8 days (decreasing 3"/day). Giant manna grass will tolerate regular inundation to saturation of 12" and has a moderate tolerance to flood duration. [1]

### **Sensitivities or Other Tolerances**

**Exposure:** Full to part sun. **Salt:** Low. **Nutrient:** Low. **Siltation:** Unknown. **Insect:** Minor. **Other:** This species has a moderate tolerance to general disturbance and stress. [1, 47]

### **Design Considerations**

Giant manna grass has been used for wetland restorations, especially in marshes, ditches and fens, where shallow water is constant or bounce is considerable. A good forage material for wildlife, and seems to increase with trampling and grazing. [14, 16]

### **Wildlife Use**

Giant manna grass provides good cover and food for waterfowl (especially wood ducks) and muskrats. It is grazed heavily by deer. [14, 32, 37]

### **Nursery/Plant Information**

**Available:** Widely. **Types:** Plants and especially seeds.

### **Planting Techniques**

Requires cold, moist stratification. Fall planting has better results. [16]

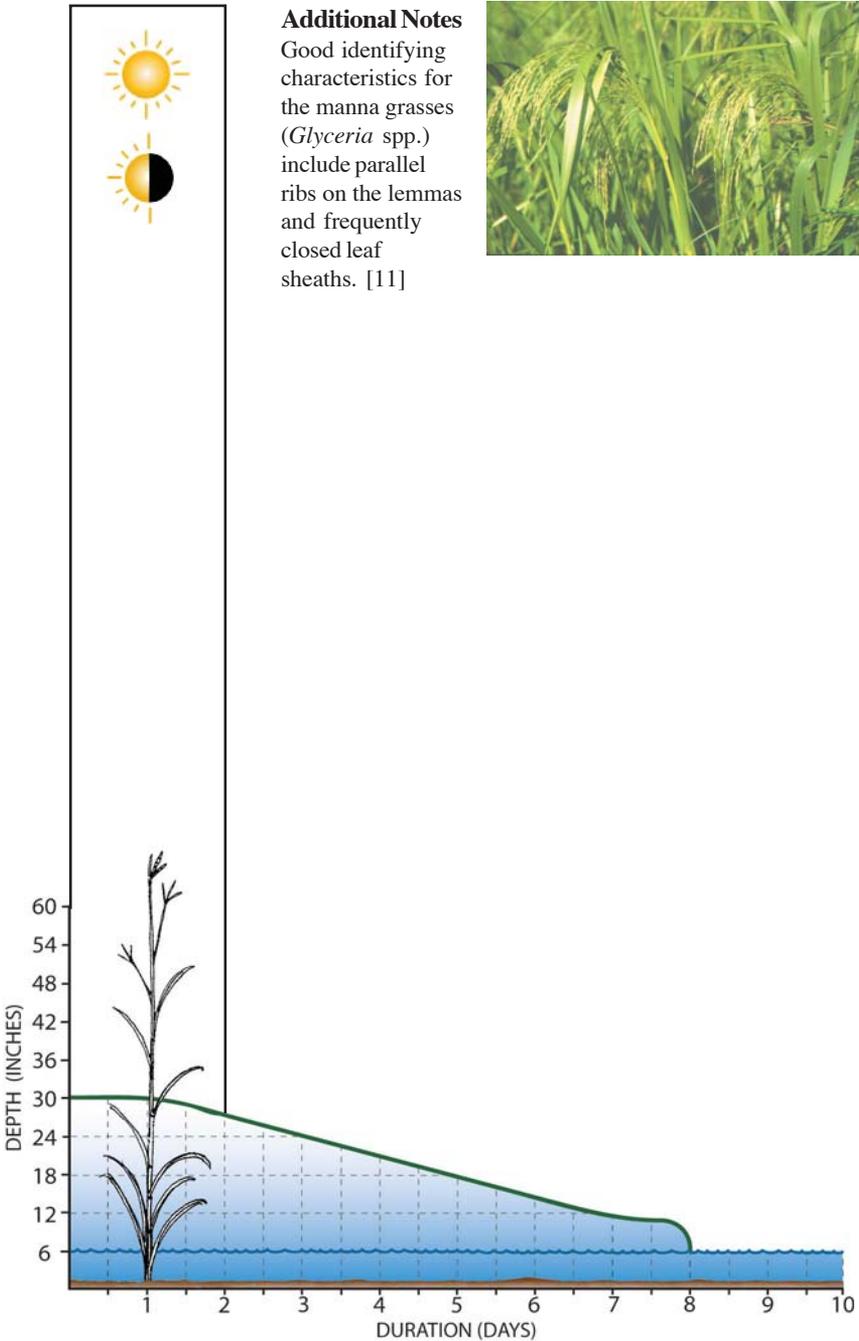
Indicator Status: OBL

**Additional Notes**

Good identifying characteristics for the manna grasses (*Glyceria* spp.) include parallel ribs on the lemmas and frequently closed leaf sheaths. [11]



Photo: Paul Jackson





# *Glyceria striata*

**Fowl Manna Grass - a.k.a. Fowl-Mannagrass**

## **Habitat/Plant Community and Geographic Range**

**Habitat/Community:** Swamps, thickets, low areas in forests, wet savannas, wet meadows, springs, lakeshores and streambanks. [7, 16, 17] **Range:** Common; Minn. (Eco-Region: All), Wis., Mich. Nfld. and Labr. to B.C., s. to Fla., Tex. and Calif. [7, 21]

## **General Description**

**General:** Loosely clumped, perennial, cool-season grass that is 1-4' tall and pale green. **Flower:** An open, loose panicle, 4-8" long and drooping. Ovate spikelets, often purplish, 3-7 flowered from June to August. **Leaf:** Greenish or purplish with slender, flat blades or folded, smooth, 1/16-1/4" wide with smooth sheaths. **Stem:** Erect, slender, 12-40" long. **Fruit:** Light brown achene from July to August. **Root:** Erect or decumbent at base and often rooting from the lower nodes. **Soil:** Moist, saturated, shallow water in most soil types. [7, 8, 44, 47]

## **Normal Water Level**

This species prefers innudated conditions of 3 to 6". [21, 44]

## **Flooding/Fluctuation Tolerances**

**Frequency:** High. **Depth:** 24". **Duration:** Long – 8 days (decreasing 3"/day). Giant manna grass will tolerate regular inundation to saturation of 12" and is somewhat tolerant to flood duration. [1, 8]

## **Sensitivities or Other Tolerances**

**Exposure:** Full to partial sun. **Salt:** Low. **Nutrient:** Low to moderate. **Siltation:** Moderate. **Insect:** Infrequent. **Other:** This species has a low tolerance to general disturbance and stress. [1, 8, 44, 47]

## **Design Considerations**

Fowl manna grass has been used for wetland restorations, especially in marshes, ditches and fens, where shallow water is constant or bounce is considerable. It is a good pioneer species for vegetated swales, stream banks and shorelines. A cool-season grass that bunches, fowl manna grass is a good forage material for wildlife, and seems to increase with trampling and grazing. **Concerns:** This species establishes well from seed, though it is not very competitive with non-natives, such as reed canary grass. [16, 44]

## **Wildlife Use**

This species provides good cover and food for waterfowl (especially wood ducks) and muskrats. Grazed heavily by deer. [6, 32, 37, 44]

## **Nursery/Plant Information**

**Available:** Widely. **Types:** Plants and seeds, although there may not be a local ecotype.

Indicator Status: OBL

### Planting Techniques

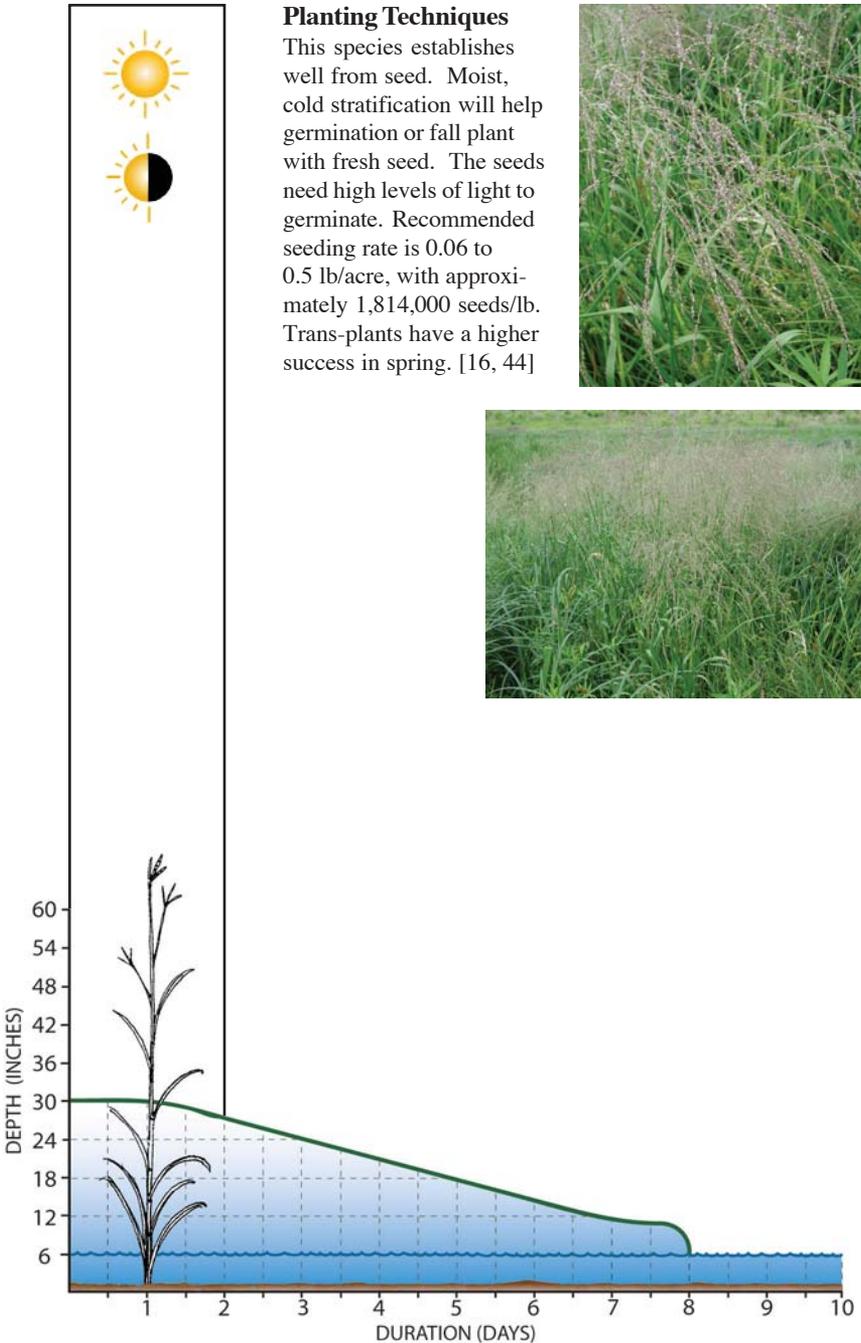
This species establishes well from seed. Moist, cold stratification will help germination or fall plant with fresh seed. The seeds need high levels of light to germinate. Recommended seeding rate is 0.06 to 0.5 lb/acre, with approximately 1,814,000 seeds/lb. Trans-plants have a higher success in spring. [16, 44]

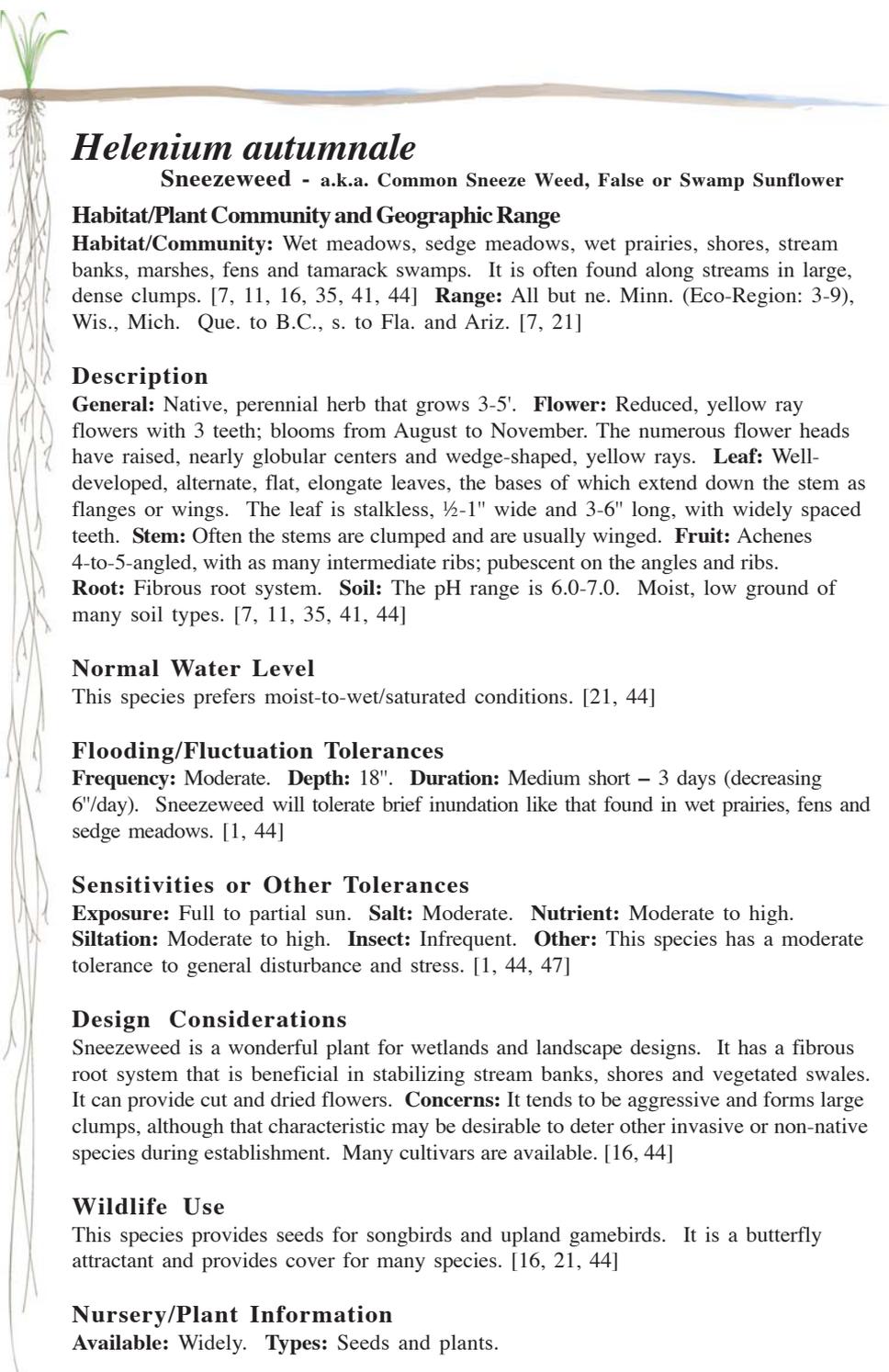


Photo: Rusiy Schmidt



Photo: Rusiy Schmidt





## *Helenium autumnale*

Sneezeweed - a.k.a. Common Sneezeweed, False or Swamp Sunflower

### Habitat/Plant Community and Geographic Range

**Habitat/Community:** Wet meadows, sedge meadows, wet prairies, shores, stream banks, marshes, fens and tamarack swamps. It is often found along streams in large, dense clumps. [7, 11, 16, 35, 41, 44] **Range:** All but ne. Minn. (Eco-Region: 3-9), Wis., Mich. Que. to B.C., s. to Fla. and Ariz. [7, 21]

### Description

**General:** Native, perennial herb that grows 3-5'. **Flower:** Reduced, yellow ray flowers with 3 teeth; blooms from August to November. The numerous flower heads have raised, nearly globular centers and wedge-shaped, yellow rays. **Leaf:** Well-developed, alternate, flat, elongate leaves, the bases of which extend down the stem as flanges or wings. The leaf is stalkless, ½-1" wide and 3-6" long, with widely spaced teeth. **Stem:** Often the stems are clumped and are usually winged. **Fruit:** Achenes 4-to-5-angled, with as many intermediate ribs; pubescent on the angles and ribs. **Root:** Fibrous root system. **Soil:** The pH range is 6.0-7.0. Moist, low ground of many soil types. [7, 11, 35, 41, 44]

### Normal Water Level

This species prefers moist-to-wet/saturated conditions. [21, 44]

### Flooding/Fluctuation Tolerances

**Frequency:** Moderate. **Depth:** 18". **Duration:** Medium short – 3 days (decreasing 6"/day). Sneezeweed will tolerate brief inundation like that found in wet prairies, fens and sedge meadows. [1, 44]

### Sensitivities or Other Tolerances

**Exposure:** Full to partial sun. **Salt:** Moderate. **Nutrient:** Moderate to high. **Siltation:** Moderate to high. **Insect:** Infrequent. **Other:** This species has a moderate tolerance to general disturbance and stress. [1, 44, 47]

### Design Considerations

Sneezeweed is a wonderful plant for wetlands and landscape designs. It has a fibrous root system that is beneficial in stabilizing stream banks, shores and vegetated swales. It can provide cut and dried flowers. **Concerns:** It tends to be aggressive and forms large clumps, although that characteristic may be desirable to deter other invasive or non-native species during establishment. Many cultivars are available. [16, 44]

### Wildlife Use

This species provides seeds for songbirds and upland gamebirds. It is a butterfly attractant and provides cover for many species. [16, 21, 44]

### Nursery/Plant Information

**Available:** Widely. **Types:** Seeds and plants.

Indicator Status: FACW+

### Planting Techniques

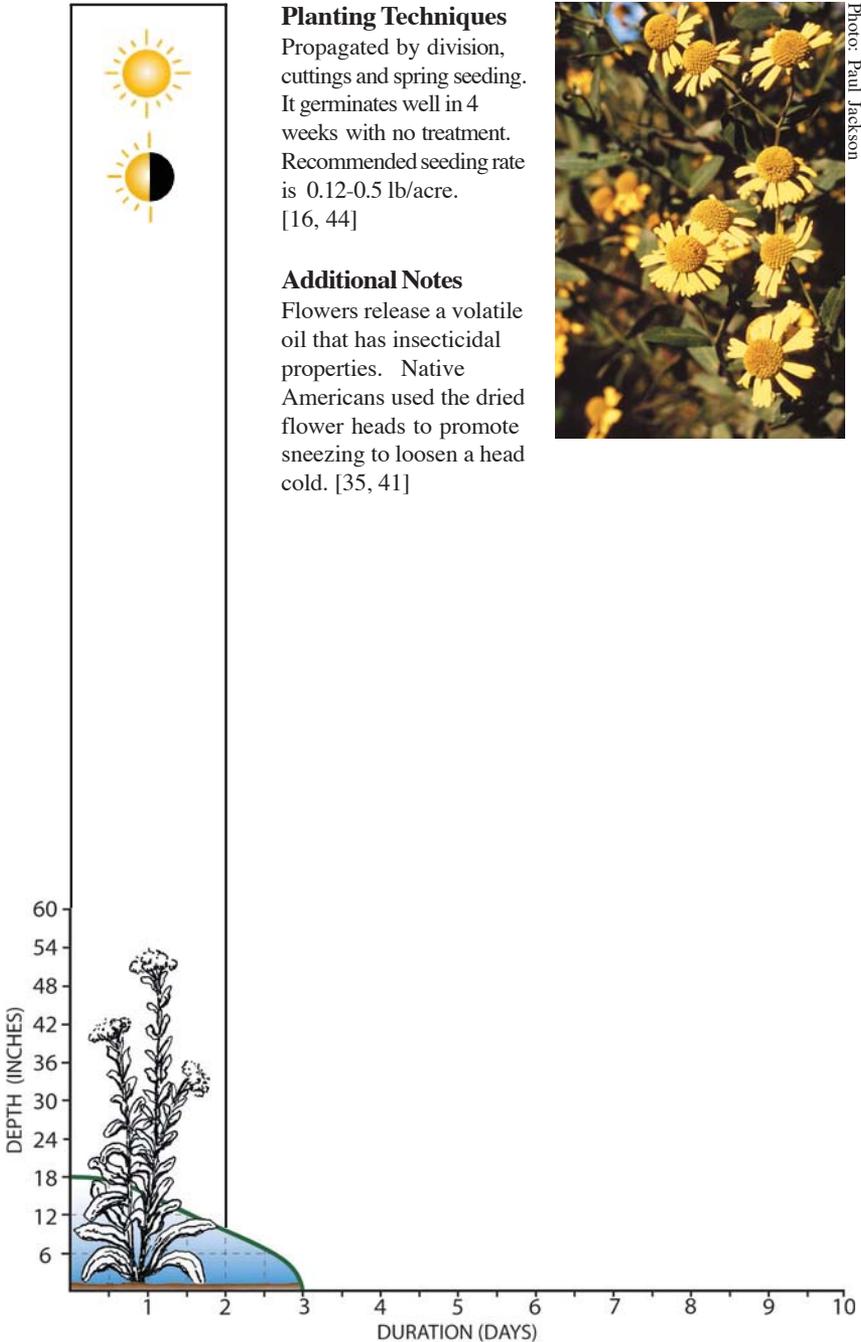
Propagated by division, cuttings and spring seeding. It germinates well in 4 weeks with no treatment. Recommended seeding rate is 0.12-0.5 lb/acre. [16, 44]

### Additional Notes

Flowers release a volatile oil that has insecticidal properties. Native Americans used the dried flower heads to promote sneezing to loosen a head cold. [35, 41]



Photo: Paul Jackson





# *Helianthus grosseserratus*

Sawtooth Sunflower - a.k.a. Serrated Sunflower

## Habitat/Plant Community and Geographic Range

**Habitat/Community:** Wet meadows, sedge meadows, low prairies, stream banks, swamps, ditches and roadsides. It also occurs along disturbed streambanks and in old fencerows. [7, 11, 16, 44] **Range:** Common; Minn. (Eco-Region: All), Wis, mostly s. LP of Mich. N.Y. to Sask., s. to Ark. and Tex.

## Description

**General:** A stately, perennial sunflower that produces an abundance of heads and stands up to 12' tall. **Flower:** Both yellow-to-cream ray and disc flowers are present from July to October. The conspicuous ray flowers are deciduous and sterile, whereas the disc flowers are perfect and fertile. **Leaf:** Lanceolate, sharply toothed leaves are densely hairy below and are often supported by winged leaf stalks and are alternate on the middle to upper stem. Basal leaves are absent or inconspicuous. **Stem:** Essentially without hairs below the inflorescence. **Fruit:** Achenes which are thick, moderately compressed at right angles to the involucellate bracts. **Root:** Coarse, fleshy, tuberous; spreading by elongate rhizomes and forming colonies. **Soil:** Prefers rich, moderately moist soil. [7, 11, 44]

## Normal Water Level

This species prefers moist-to-wet/saturated conditions, though it has been found in dry soils. [21, 44]

## Flooding/Fluctuation Tolerances

**Frequency:** High. **Depth:** 18". **Duration:** Medium short – 3 days (decreasing 6"/day). This species will tolerate seasonal inundation to greater levels. [44]

## Sensitivities or Other Tolerances

**Exposure:** Full to part sun. **Salt:** Moderate. **Nutrient:** Moderate. **Sitation:** Moderate. **Insect:** Infrequent. **Other:** This species has a moderate tolerance to general disturbance and stress. [1, 44, 47]

## Design Considerations

Sawtooth sunflower is a good pioneer species that self sows and grows from rhizomes quickly. It has been used for soil stabilization of vegetated swales and shores.

**Concerns:** Because this species self seeds and spreads by rhizomes, it can become weedy. This characteristic may be desirable if invasive plants are a concern. [16, 44]

## Wildlife Use

This sunflower, like many others, has large, nutritious seeds that are eaten by gamebirds (mourning doves, sharp-tailed grouse, pheasants and bobwhites) and songbirds (red-winged and yellow-headed blackbirds; crossbills; crows; eastern goldfinches; and English, Lincoln, savannah, vesper and white-crowned sparrows). It also provides nectar and pollen for bees and other insects. It is a host plant for the Gorgone checkerspot butterfly. Mammals that use this plant are the 13-lined ground squirrel and pocket gopher. [21, 32, 44]

Indicator Status: FACW-

### Nursery/Plant Information

**Available:** Widely.  
**Types:** Seeds and plants.

### Planting Techniques

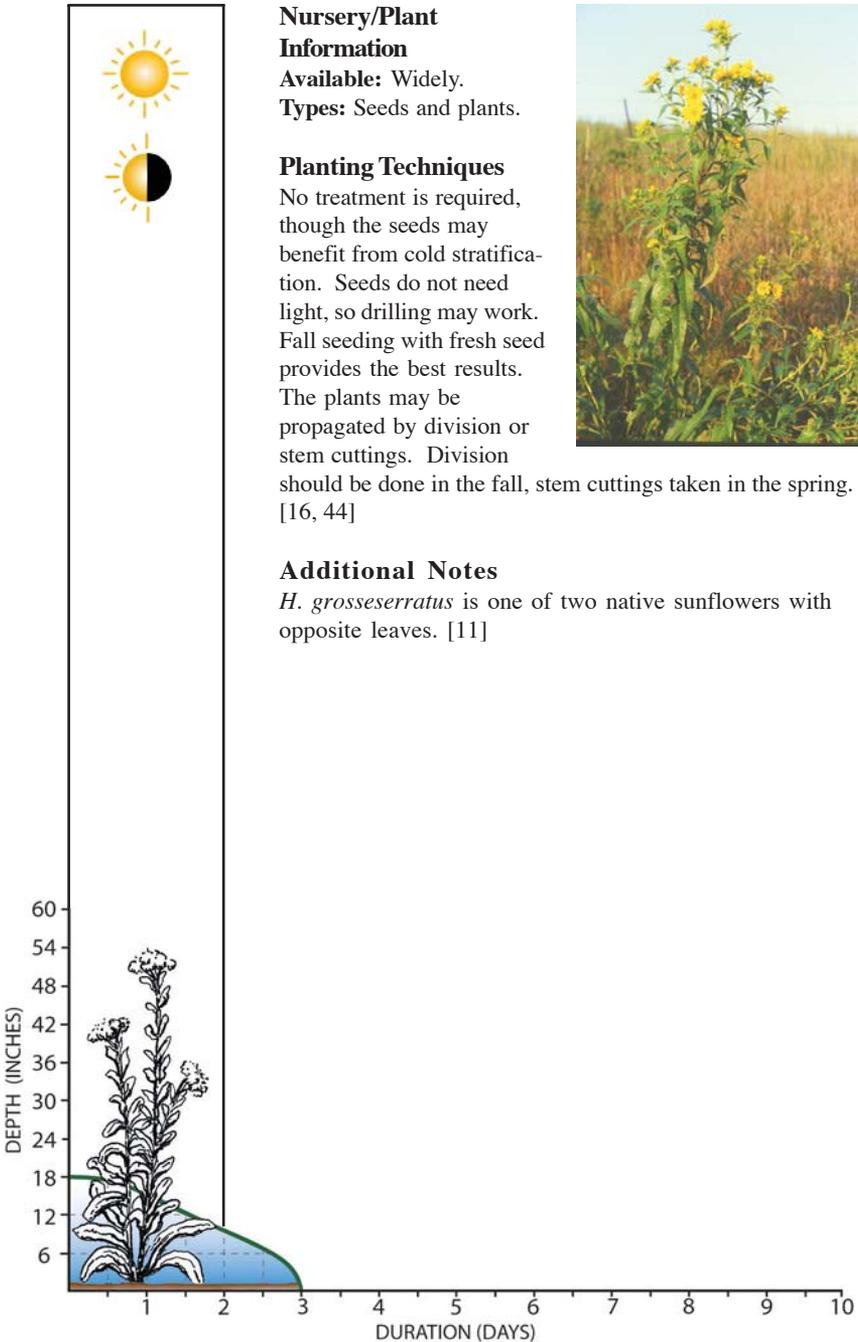
No treatment is required, though the seeds may benefit from cold stratification. Seeds do not need light, so drilling may work. Fall seeding with fresh seed provides the best results. The plants may be propagated by division or stem cuttings. Division should be done in the fall, stem cuttings taken in the spring. [16, 44]

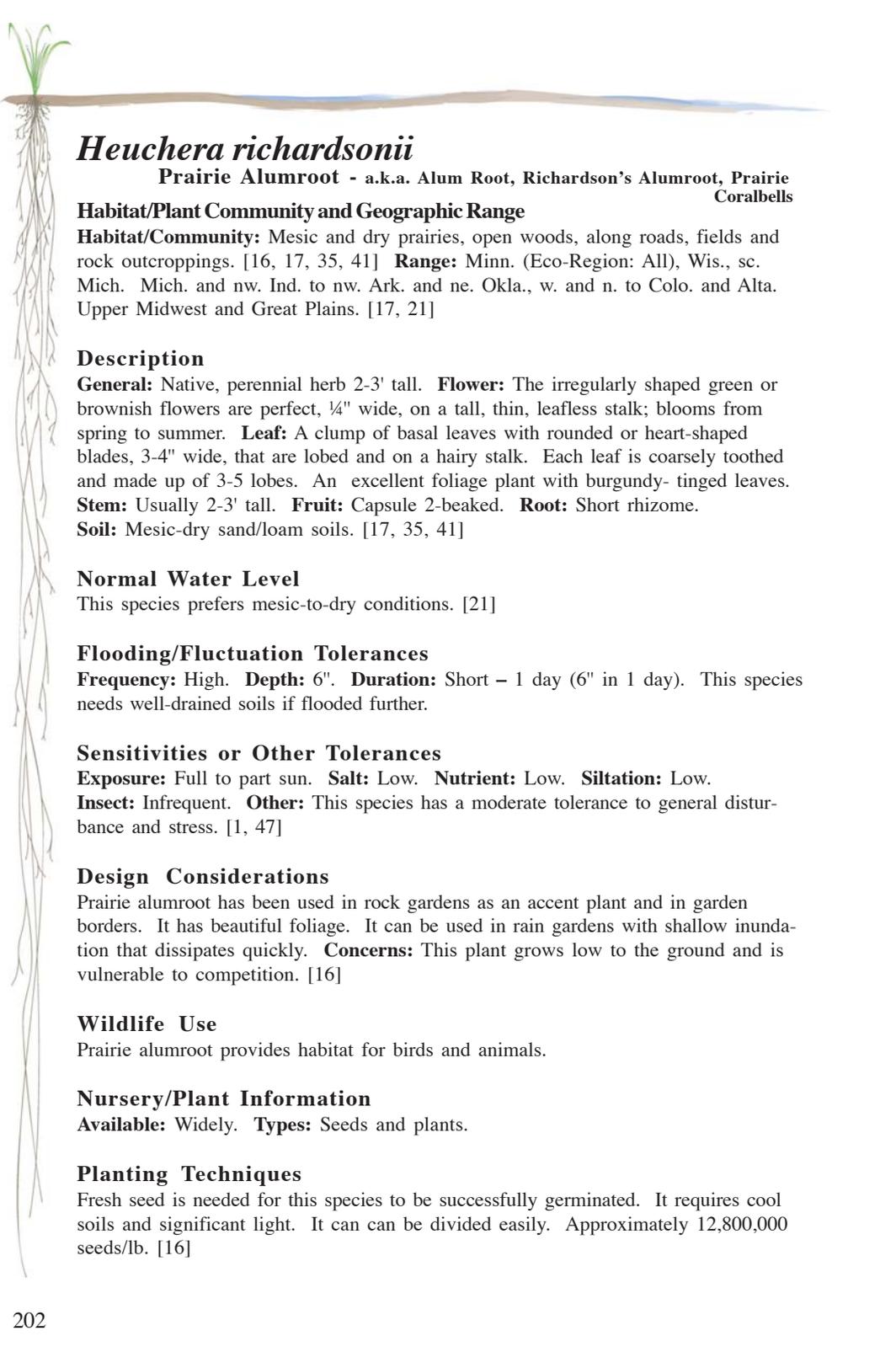
### Additional Notes

*H. grosseserratus* is one of two native sunflowers with opposite leaves. [11]



Photo: Paul Jackson





## *Heuchera richardsonii*

Prairie Alumroot - a.k.a. Alum Root, Richardson's Alumroot, Prairie Coralbells

### Habitat/Plant Community and Geographic Range

**Habitat/Community:** Mesic and dry prairies, open woods, along roads, fields and rock outcroppings. [16, 17, 35, 41] **Range:** Minn. (Eco-Region: All), Wis., sc. Mich. Mich. and nw. Ind. to nw. Ark. and ne. Okla., w. and n. to Colo. and Alta. Upper Midwest and Great Plains. [17, 21]

### Description

**General:** Native, perennial herb 2-3' tall. **Flower:** The irregularly shaped green or brownish flowers are perfect, ¼" wide, on a tall, thin, leafless stalk; blooms from spring to summer. **Leaf:** A clump of basal leaves with rounded or heart-shaped blades, 3-4" wide, that are lobed and on a hairy stalk. Each leaf is coarsely toothed and made up of 3-5 lobes. An excellent foliage plant with burgundy-tinged leaves. **Stem:** Usually 2-3' tall. **Fruit:** Capsule 2-beaked. **Root:** Short rhizome. **Soil:** Mesic-dry sand/loam soils. [17, 35, 41]

### Normal Water Level

This species prefers mesic-to-dry conditions. [21]

### Flooding/Fluctuation Tolerances

**Frequency:** High. **Depth:** 6". **Duration:** Short – 1 day (6" in 1 day). This species needs well-drained soils if flooded further.

### Sensitivities or Other Tolerances

**Exposure:** Full to part sun. **Salt:** Low. **Nutrient:** Low. **Siltation:** Low. **Insect:** Infrequent. **Other:** This species has a moderate tolerance to general disturbance and stress. [1, 47]

### Design Considerations

Prairie alumroot has been used in rock gardens as an accent plant and in garden borders. It has beautiful foliage. It can be used in rain gardens with shallow inundation that dissipates quickly. **Concerns:** This plant grows low to the ground and is vulnerable to competition. [16]

### Wildlife Use

Prairie alumroot provides habitat for birds and animals.

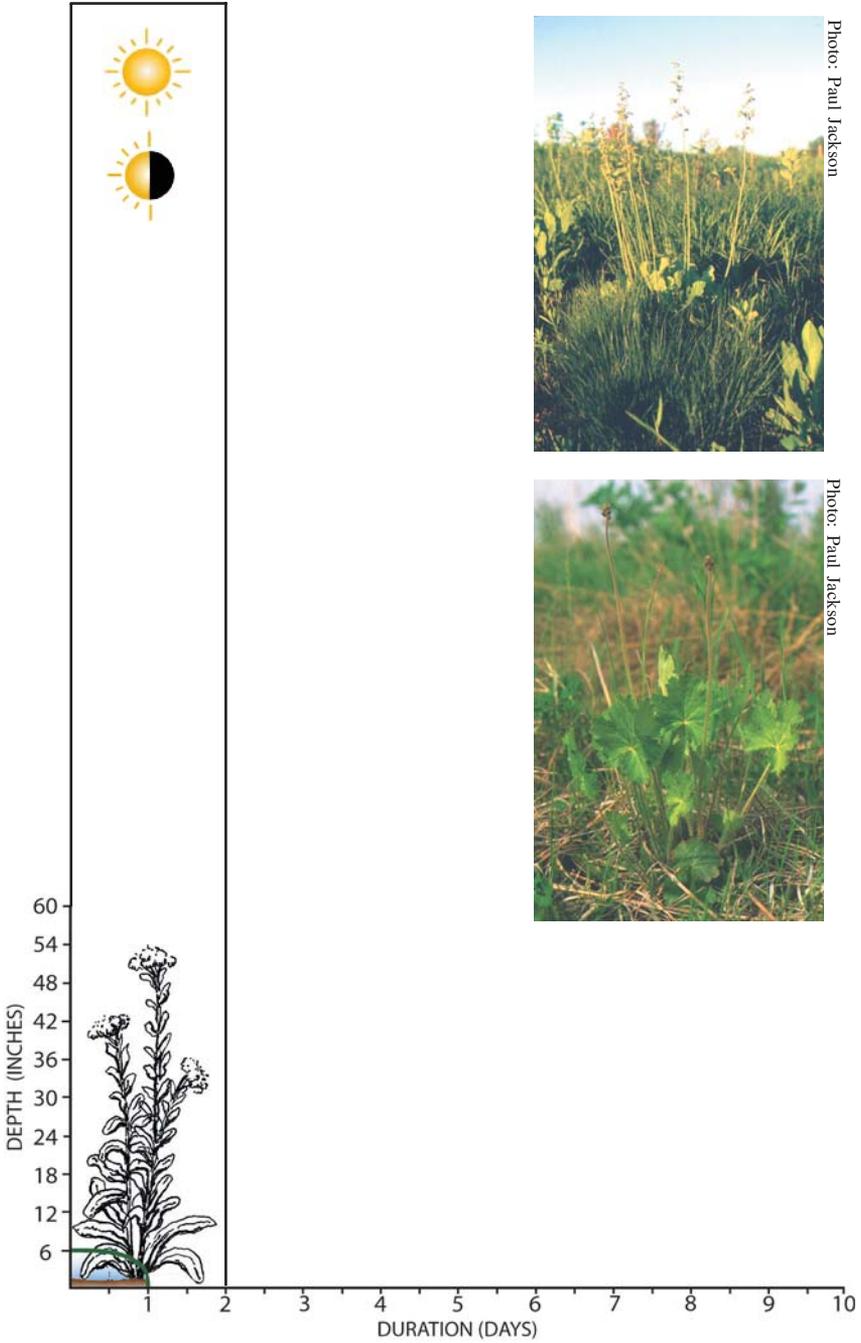
### Nursery/Plant Information

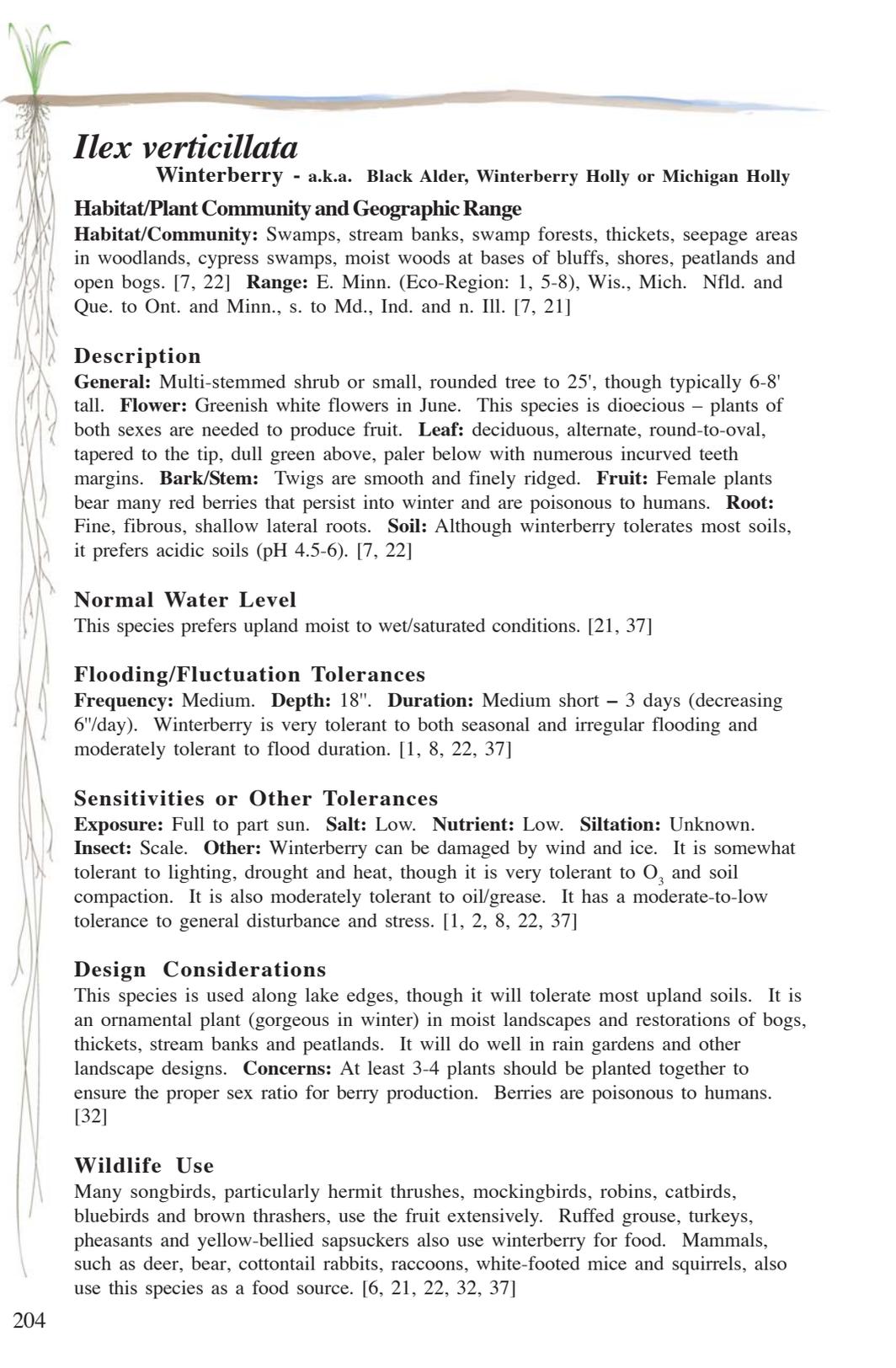
**Available:** Widely. **Types:** Seeds and plants.

### Planting Techniques

Fresh seed is needed for this species to be successfully germinated. It requires cool soils and significant light. It can be divided easily. Approximately 12,800,000 seeds/lb. [16]

Indicator Status: FAC-





## *Ilex verticillata*

Winterberry - a.k.a. Black Alder, Winterberry Holly or Michigan Holly

### Habitat/Plant Community and Geographic Range

**Habitat/Community:** Swamps, stream banks, swamp forests, thickets, seepage areas in woodlands, cypress swamps, moist woods at bases of bluffs, shores, peatlands and open bogs. [7, 22] **Range:** E. Minn. (Eco-Region: 1, 5-8), Wis., Mich. Nfld. and Que. to Ont. and Minn., s. to Md., Ind. and n. Ill. [7, 21]

### Description

**General:** Multi-stemmed shrub or small, rounded tree to 25', though typically 6-8' tall. **Flower:** Greenish white flowers in June. This species is dioecious – plants of both sexes are needed to produce fruit. **Leaf:** deciduous, alternate, round-to-oval, tapered to the tip, dull green above, paler below with numerous incurved teeth margins. **Bark/Stem:** Twigs are smooth and finely ridged. **Fruit:** Female plants bear many red berries that persist into winter and are poisonous to humans. **Root:** Fine, fibrous, shallow lateral roots. **Soil:** Although winterberry tolerates most soils, it prefers acidic soils (pH 4.5-6). [7, 22]

### Normal Water Level

This species prefers upland moist to wet/saturated conditions. [21, 37]

### Flooding/Fluctuation Tolerances

**Frequency:** Medium. **Depth:** 18". **Duration:** Medium short – 3 days (decreasing 6"/day). Winterberry is very tolerant to both seasonal and irregular flooding and moderately tolerant to flood duration. [1, 8, 22, 37]

### Sensitivities or Other Tolerances

**Exposure:** Full to part sun. **Salt:** Low. **Nutrient:** Low. **Siltation:** Unknown. **Insect:** Scale. **Other:** Winterberry can be damaged by wind and ice. It is somewhat tolerant to lighting, drought and heat, though it is very tolerant to O<sub>3</sub> and soil compaction. It is also moderately tolerant to oil/grease. It has a moderate-to-low tolerance to general disturbance and stress. [1, 2, 8, 22, 37]

### Design Considerations

This species is used along lake edges, though it will tolerate most upland soils. It is an ornamental plant (gorgeous in winter) in moist landscapes and restorations of bogs, thickets, stream banks and peatlands. It will do well in rain gardens and other landscape designs. **Concerns:** At least 3-4 plants should be planted together to ensure the proper sex ratio for berry production. Berries are poisonous to humans. [32]

### Wildlife Use

Many songbirds, particularly hermit thrushes, mockingbirds, robins, catbirds, bluebirds and brown thrashers, use the fruit extensively. Ruffed grouse, turkeys, pheasants and yellow-bellied sapsuckers also use winterberry for food. Mammals, such as deer, bear, cottontail rabbits, raccoons, white-footed mice and squirrels, also use this species as a food source. [6, 21, 22, 32, 37]

Indicator Status: FACW+

**Nursery/Plant Information**

**Available:** Widely. **Types:** Potted and bareroot stock.

**Planting Techniques**

Winterberry is easily transplanted. [22]



Photo: Paul Jackson



Photo: Paul Jackson





## *Impatiens capensis*

**Jewelweed** - a.k.a. Touch-me-not, Spotted Touch-me-not, Orange Jewelweed

### **Habitat/Plant Community and Geographic Range**

**Habitat/Community:** Found in a wide variety of wetland habitats, including swamps, low areas in moist soils, flood plain forests, thickets, shrub-carrs, fresh (wet) meadows, stream banks, shores, marshes, springs and fens (often where disturbed). [7, 11, 16, 41]

**Range:** Common; Minn. (Eco-Region: All), Wis., Mich. Nfld. and Que. to Sask., s. to Fla., Ala. and Tex. [7, 21]

### **Description**

**General:** Annual herb that grows 3-5' tall in wet areas. **Flower:** Pendent, conical, ¾-1" long, with a sharp-curved tube (spur) that curves forward. Flowers from June to September. Flower is usually orange-yellow with brown or reddish spots and a mouth that is half as wide as the flower is long. **Leaf:** Alternate, finely toothed, oval leaves, 1-4" long on petioles about 1/8" long. **Stem:** A succulent, smooth stem that is nearly translucent and contains a slippery juice that can be used to soothe the sting from nettles or poison ivy. **Fruit:** A thin, banana-shaped capsule that, when mature, pops open at the slightest touch (which gives this plant another common name, touch-me-not), throwing seeds in all directions. Within the seed's dark brown covering is a sky-blue seed. **Root:** Fibrous, shallow. **Soil:** Wet-to-mesic soils, though it prefers alluvial woodlands. [7, 11, 32, 41]

### **Normal Water Level**

This species prefers wet/saturated conditions, though will tolerate moist soils. [21]

### **Flooding/Fluctuation Tolerances**

**Frequency:** High. **Depth:** 18". **Duration:** Long – 30 days (decreasing 6"/day for the first 2 days and then a total of 6" over the next 30 days). This species is somewhat tolerant to flood duration. [1]

### **Sensitivities or Other Tolerances**

**Exposure:** Full sun to shade. **Salt:** Low to moderate. **Nutrient:** Moderate. **Siltation:** High. **Insect:** Infrequent. **Other:** This species is tolerant to general disturbance and stress. [1, 45]

### **Design Considerations**

Jewelweed is an annual that can be used to revegetate an area quickly. It is an important nectar source. **Concerns:** Plants only live 1 year. [16]

### **Wildlife Use**

Jewelweed is an important nectar source for hummingbirds, orioles and bees. Gamebirds and mice eat the seeds. It provides cover for frogs and other reptiles. [21, 32, 41]

### **Nursery/Plant Information**

**Available:** Limited. **Types:** Seeds.

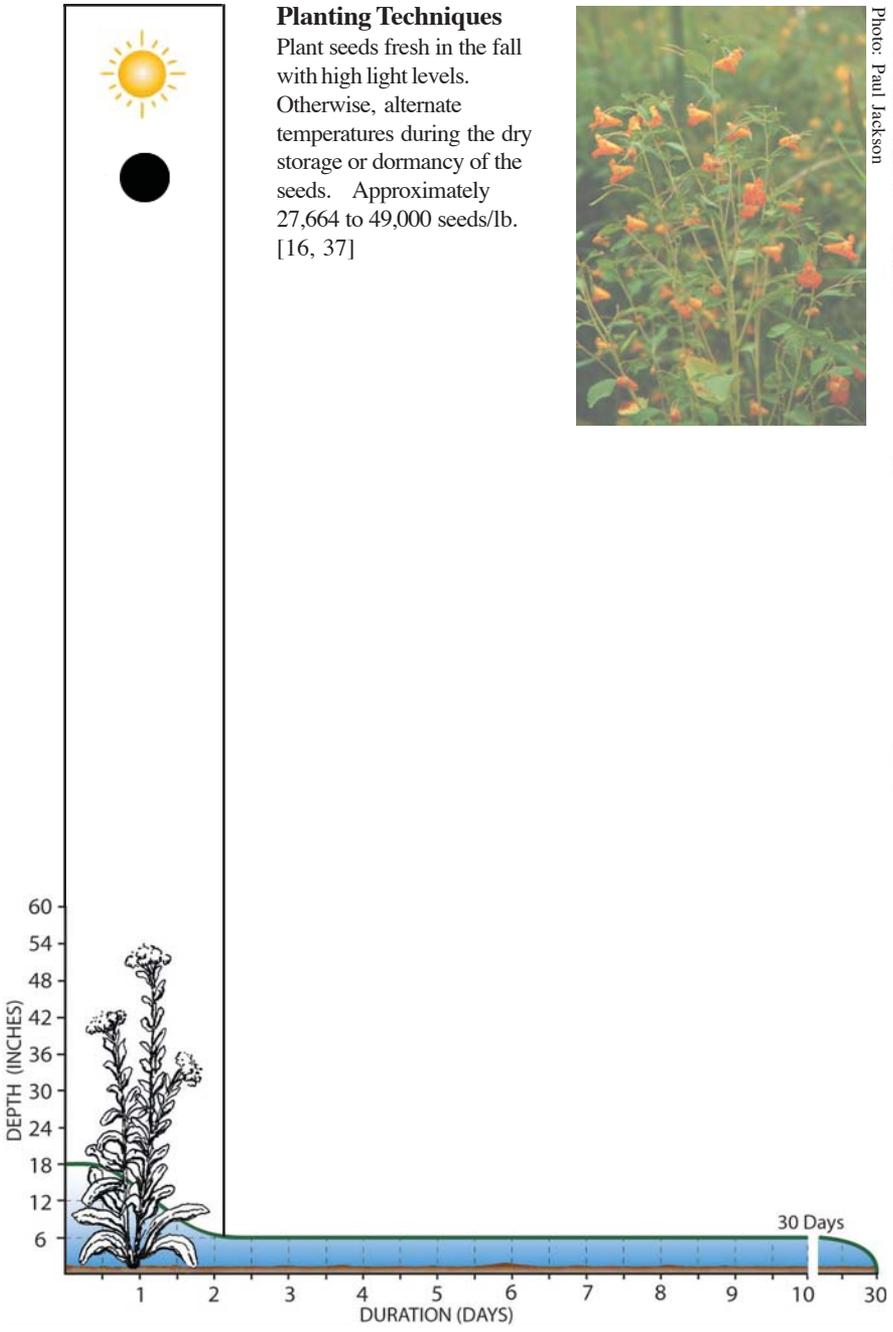
**Indicator Status: FACW**

**Planting Techniques**

Plant seeds fresh in the fall with high light levels. Otherwise, alternate temperatures during the dry storage or dormancy of the seeds. Approximately 27,664 to 49,000 seeds/lb. [16, 37]



Photo: Paul Jackson





## *Iris versicolor*

**Blueflag Iris** - a.k.a. Northern Blue Flag, Northern Iris, Blue Water Iris, Larger Blue Flag, Poison or Water-flag, Clajoux

### **Habitat/Plant Community and Geographic Range**

**Habitat/Community:** Marshes, shores, wet meadows, sedge meadows, open bogs, swamps, thickets, stream banks, shores, pond edges and wet depressions in forests (often in shallow water). [4, 7, 11, 16, 35, 41] **Range:** All but se. Minn. (Eco-Region: All), n. and c. Wis., UP and n. LP of Mich. Nfld. and Labr. to Man., s. to Va., Wis. and Minn. [7, 21]

### **General Description**

**General:** Native, perennial, emergent herb that forms colonies and reaches a height of 2½'. **Flower:** Usually light to deep blue, in bloom May to July. The flower has 3 spreading, downward-bent sepals and 3 shorter, ascending petals. The longer sepals are beardless (no bristles) with a white patch (throat) trimmed in yellow. The inferior ovary is bluntly angled. **Leaf:** Upright, sword-like, basal leaves that are more than 1" wide and 2-ranked. Leaves are folded on the midribs so that they form an overlapping, flat fan and are 8-30" long, similar to those of garden irises. **Stem:** Unwinged, erect, branched stems, up to 2' tall with conspicuous "cat-eye" cross section. **Fruit:** A large, green pod with rounded ends 1½-2½" long. The large seeds can be observed floating in the fall. **Root:** Thick, fleshy, creeping rhizomes. **Soil:** Wet-mesic sand/loam soils. [4, 7, 11, 35, 41, 44]

### **Normal Water Level**

This species prefers shallow water to wet/saturated conditions of 12" of inundation or less. [21, 37, 44]

### **Flooding/Fluctuation Tolerances**

**Frequency:** Medium. **Depth:** 12". **Duration:** Medium long – 4 days (decreasing 6" every 2 days). Blueflag iris can tolerate regular inundation, but young shoots should not be inundated. This species is moderately tolerant to flood duration and will decrease in abundance with an increase in depth. [1, 37, 44]

### **Sensitivities or Other Tolerances**

**Exposure:** Full to part sun. **Salt:** Low. **Nutrient:** Moderate. **Siltation:** Moderate. **Insect:** Infrequent. **Other:** Has a slow rate of spread and a moderately low tolerance to general disturbance and stress. [1, 37, 44]

### **Design Considerations**

Blueflag iris is used in the shoreline zones of wet meadows and vegetated swales. It is recommended for restorations of meadows, swamps, shorelines, open bogs and pools. It is a beautiful, decorative plant that is well suited for rain gardens and other landscape design. It provides cut flowers. **Concerns:** Severe dermatitis may result from handling rhizomes. It will not flower unless it is in full to partial sun. Many cultivars exist. [16, 44]

Indicator Status: OBL



### Wildlife Use

Blueflag iris provides nectar for hummingbirds and butterflies. Waterfowl and other birds eat the seeds. This species will persist under heavy grazing as cover for marsh birds. It provides food for muskrats and sometimes beaver. It provides cover for fish and amphibians, foraging habitat for snakes, and habitat for many insect species. [4, 6, 21, 32, 37, 44]



Photo: Dan Shaw

### Nursery/Plant Information

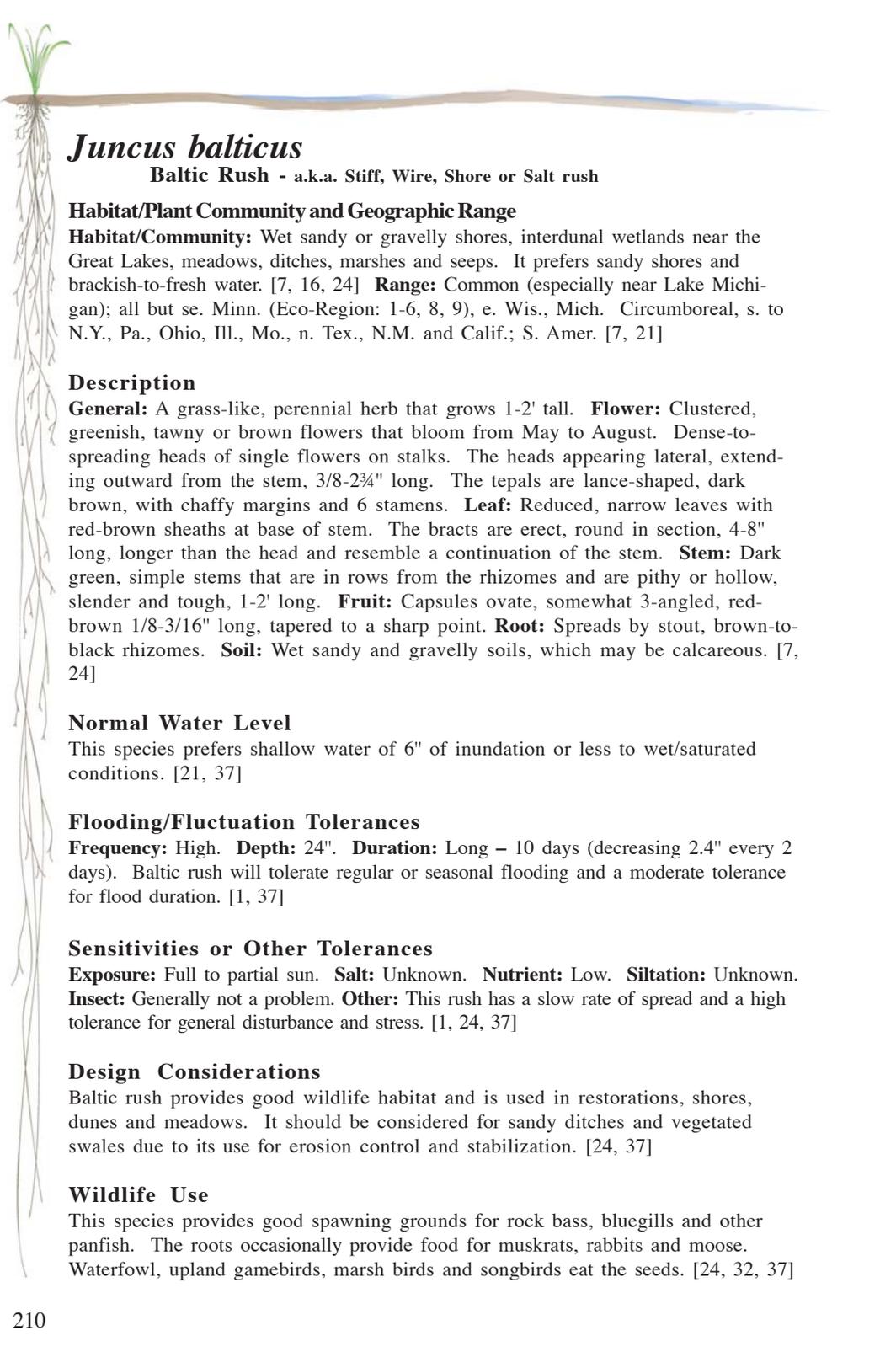
**Available:** Widely. **Types:** Seeds, rhizomes and plants.

### Planting Techniques

The seed requires moist, cold stratification for 120 days or less. Germination has been successful in greenhouse conditions that meet these requirements. Fall seeding with fresh seed will fulfill these requirements naturally, although birds and insects may eat the seeds. Recommended seeding rate is 0.06-0.25 lb/acre, with about 13,600-18,000 seeds/lb. Plants can be divided. Rhizomes and transplants give better results for permanent, on-site planting in spring. Plant rhizomes in 2-3" of saturated soil or plants in no more than 12" of inundation 0.5-1.5' apart or at a rate of 1,000/acre. Rhizomes can be toxic. [4, 16, 37, 41, 44]

### Additional Notes

*I. versicolor* is similar to southern blueflag iris (*I. virginica*) and sometimes is considered a variety of that species. Rootstocks are poisonous to cattle and people may develop skin reactions from handling. [7, 11, 35, 41]



## *Juncus balticus*

**Baltic Rush** - a.k.a. Stiff, Wire, Shore or Salt rush

### **Habitat/Plant Community and Geographic Range**

**Habitat/Community:** Wet sandy or gravelly shores, interdunal wetlands near the Great Lakes, meadows, ditches, marshes and seeps. It prefers sandy shores and brackish-to-fresh water. [7, 16, 24] **Range:** Common (especially near Lake Michigan); all but se. Minn. (Eco-Region: 1-6, 8, 9), e. Wis., Mich. Circumboreal, s. to N.Y., Pa., Ohio, Ill., Mo., n. Tex., N.M. and Calif.; S. Amer. [7, 21]

### **Description**

**General:** A grass-like, perennial herb that grows 1-2' tall. **Flower:** Clustered, greenish, tawny or brown flowers that bloom from May to August. Dense-to-spreading heads of single flowers on stalks. The heads appearing lateral, extending outward from the stem, 3/8-2¾" long. The tepals are lance-shaped, dark brown, with chaffy margins and 6 stamens. **Leaf:** Reduced, narrow leaves with red-brown sheaths at base of stem. The bracts are erect, round in section, 4-8" long, longer than the head and resemble a continuation of the stem. **Stem:** Dark green, simple stems that are in rows from the rhizomes and are pithy or hollow, slender and tough, 1-2' long. **Fruit:** Capsules ovate, somewhat 3-angled, red-brown 1/8-3/16" long, tapered to a sharp point. **Root:** Spreads by stout, brown-to-black rhizomes. **Soil:** Wet sandy and gravelly soils, which may be calcareous. [7, 24]

### **Normal Water Level**

This species prefers shallow water of 6" of inundation or less to wet/saturated conditions. [21, 37]

### **Flooding/Fluctuation Tolerances**

**Frequency:** High. **Depth:** 24". **Duration:** Long – 10 days (decreasing 2.4" every 2 days). Baltic rush will tolerate regular or seasonal flooding and a moderate tolerance for flood duration. [1, 37]

### **Sensitivities or Other Tolerances**

**Exposure:** Full to partial sun. **Salt:** Unknown. **Nutrient:** Low. **Siltation:** Unknown. **Insect:** Generally not a problem. **Other:** This rush has a slow rate of spread and a high tolerance for general disturbance and stress. [1, 24, 37]

### **Design Considerations**

Baltic rush provides good wildlife habitat and is used in restorations, shores, dunes and meadows. It should be considered for sandy ditches and vegetated swales due to its use for erosion control and stabilization. [24, 37]

### **Wildlife Use**

This species provides good spawning grounds for rock bass, bluegills and other panfish. The roots occasionally provide food for muskrats, rabbits and moose. Waterfowl, upland gamebirds, marsh birds and songbirds eat the seeds. [24, 32, 37]

Indicator Status: OBL

### Nursery/Plant Information

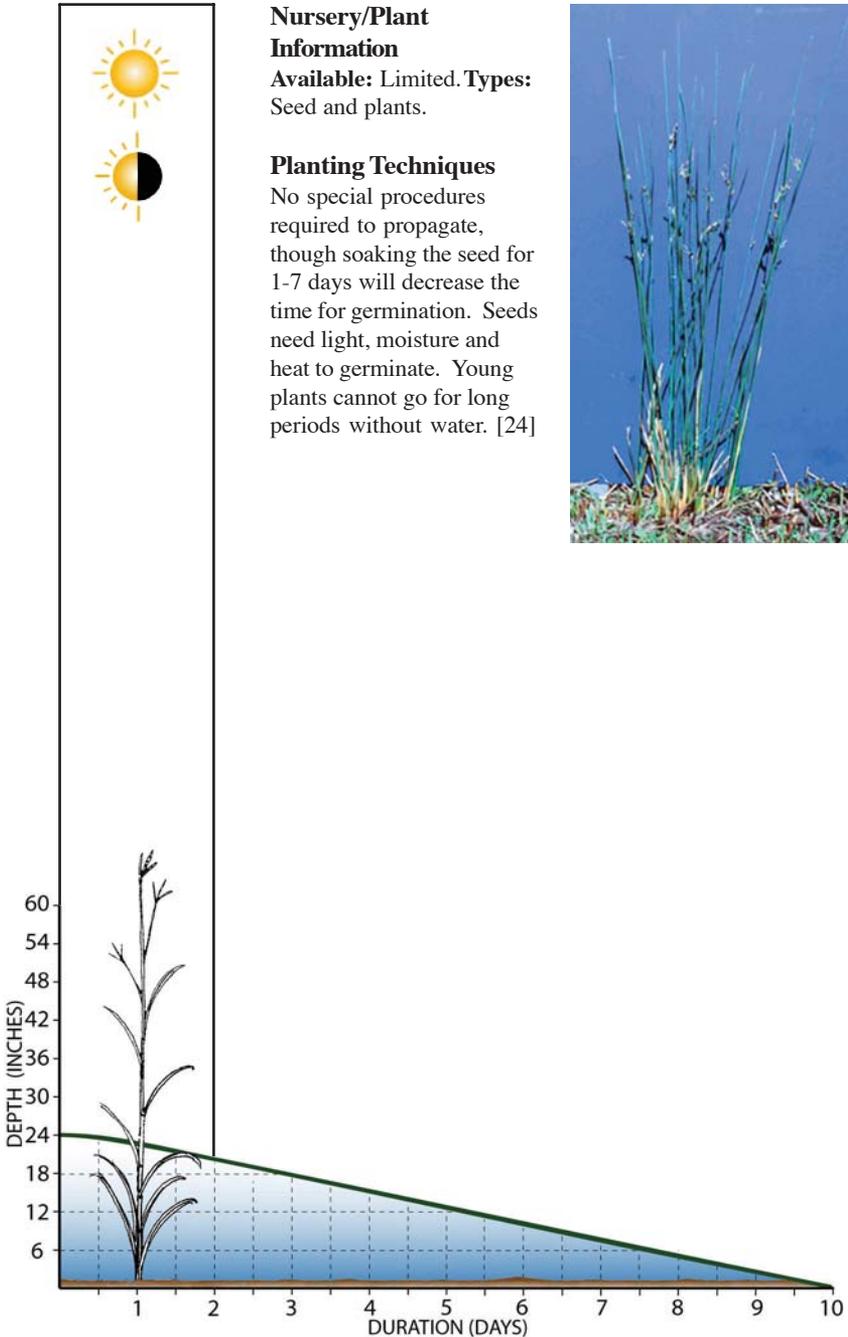
**Available:** Limited. **Types:** Seed and plants.

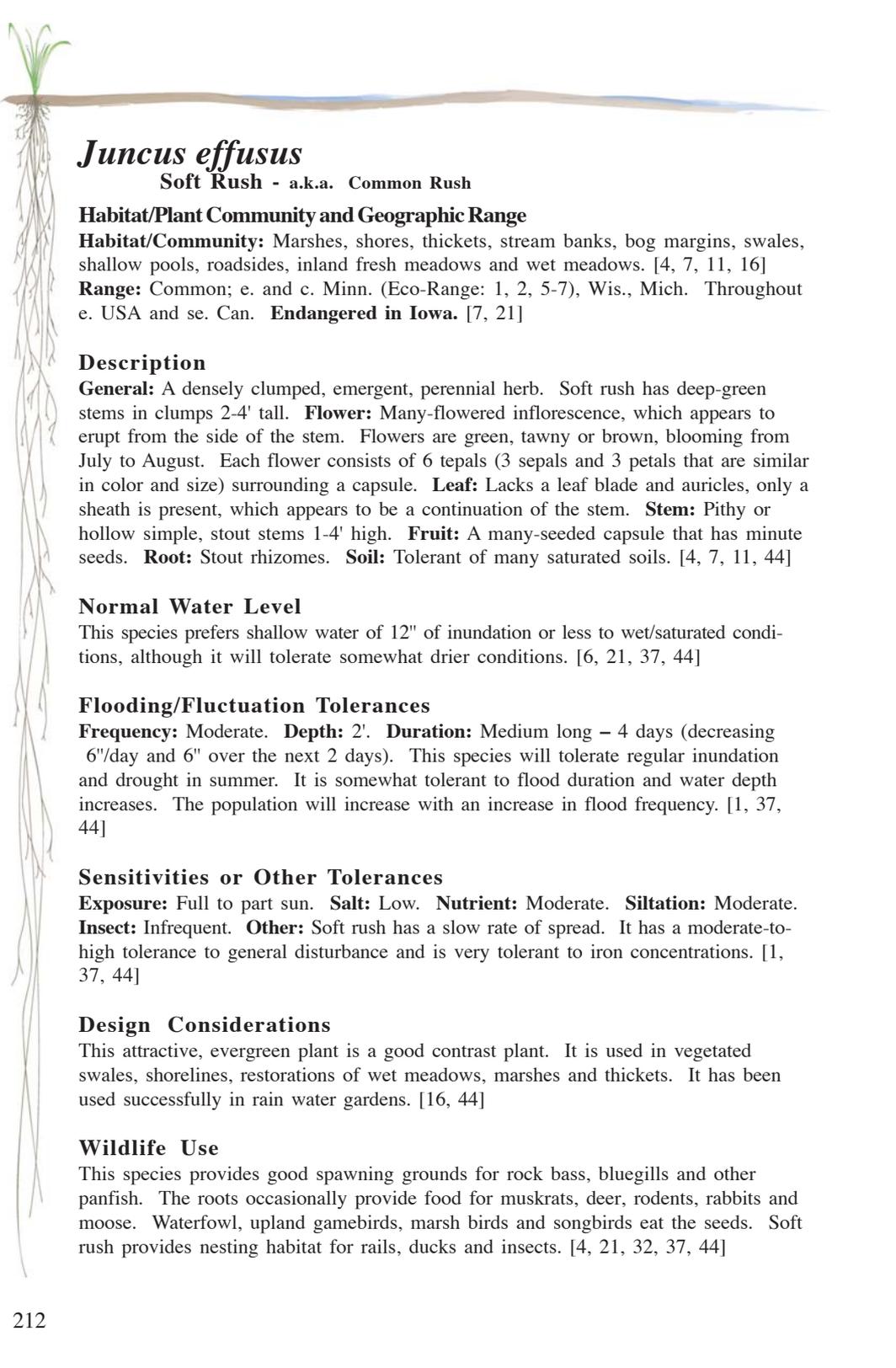
### Planting Techniques

No special procedures required to propagate, though soaking the seed for 1-7 days will decrease the time for germination. Seeds need light, moisture and heat to germinate. Young plants cannot go for long periods without water. [24]



*Photo: Selected North Dakota and Minnesota Range Plants*





## *Juncus effusus*

Soft Rush - a.k.a. Common Rush

### **Habitat/Plant Community and Geographic Range**

**Habitat/Community:** Marshes, shores, thickets, stream banks, bog margins, swales, shallow pools, roadsides, inland fresh meadows and wet meadows. [4, 7, 11, 16]

**Range:** Common; e. and c. Minn. (Eco-Range: 1, 2, 5-7), Wis., Mich. Throughout e. USA and se. Can. **Endangered in Iowa.** [7, 21]

### **Description**

**General:** A densely clumped, emergent, perennial herb. Soft rush has deep-green stems in clumps 2-4' tall. **Flower:** Many-flowered inflorescence, which appears to erupt from the side of the stem. Flowers are green, tawny or brown, blooming from July to August. Each flower consists of 6 tepals (3 sepals and 3 petals that are similar in color and size) surrounding a capsule. **Leaf:** Lacks a leaf blade and auricles, only a sheath is present, which appears to be a continuation of the stem. **Stem:** Pithy or hollow simple, stout stems 1-4' high. **Fruit:** A many-seeded capsule that has minute seeds. **Root:** Stout rhizomes. **Soil:** Tolerant of many saturated soils. [4, 7, 11, 44]

### **Normal Water Level**

This species prefers shallow water of 12" of inundation or less to wet/saturated conditions, although it will tolerate somewhat drier conditions. [6, 21, 37, 44]

### **Flooding/Fluctuation Tolerances**

**Frequency:** Moderate. **Depth:** 2'. **Duration:** Medium long – 4 days (decreasing 6"/day and 6" over the next 2 days). This species will tolerate regular inundation and drought in summer. It is somewhat tolerant to flood duration and water depth increases. The population will increase with an increase in flood frequency. [1, 37, 44]

### **Sensitivities or Other Tolerances**

**Exposure:** Full to part sun. **Salt:** Low. **Nutrient:** Moderate. **Siltation:** Moderate. **Insect:** Infrequent. **Other:** Soft rush has a slow rate of spread. It has a moderate-to-high tolerance to general disturbance and is very tolerant to iron concentrations. [1, 37, 44]

### **Design Considerations**

This attractive, evergreen plant is a good contrast plant. It is used in vegetated swales, shorelines, restorations of wet meadows, marshes and thickets. It has been used successfully in rain water gardens. [16, 44]

### **Wildlife Use**

This species provides good spawning grounds for rock bass, bluegills and other panfish. The roots occasionally provide food for muskrats, deer, rodents, rabbits and moose. Waterfowl, upland gamebirds, marsh birds and songbirds eat the seeds. Soft rush provides nesting habitat for rails, ducks and insects. [4, 21, 32, 37, 44]

Indicator Status: OBL

### Nursery/Plant Information

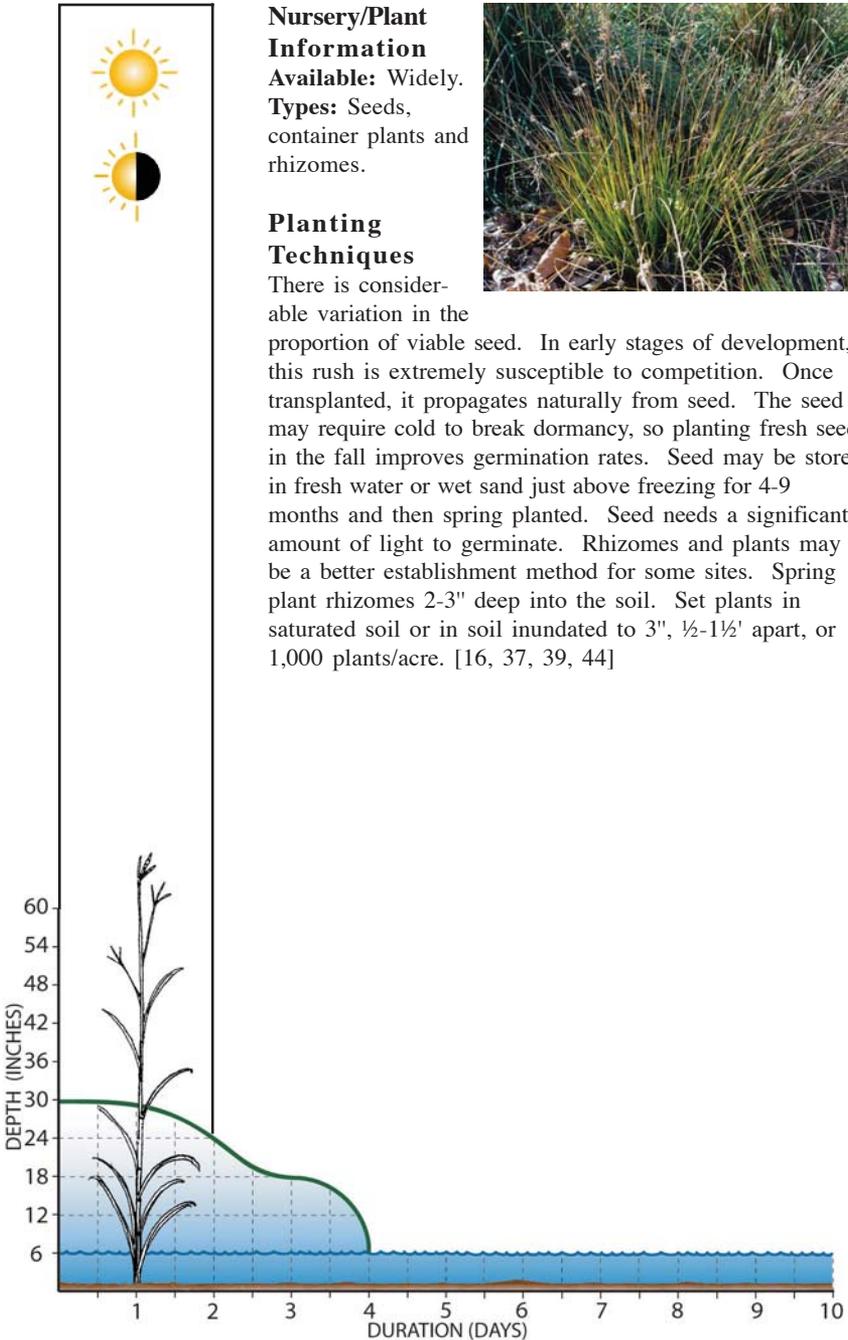
**Available:** Widely.  
**Types:** Seeds, container plants and rhizomes.

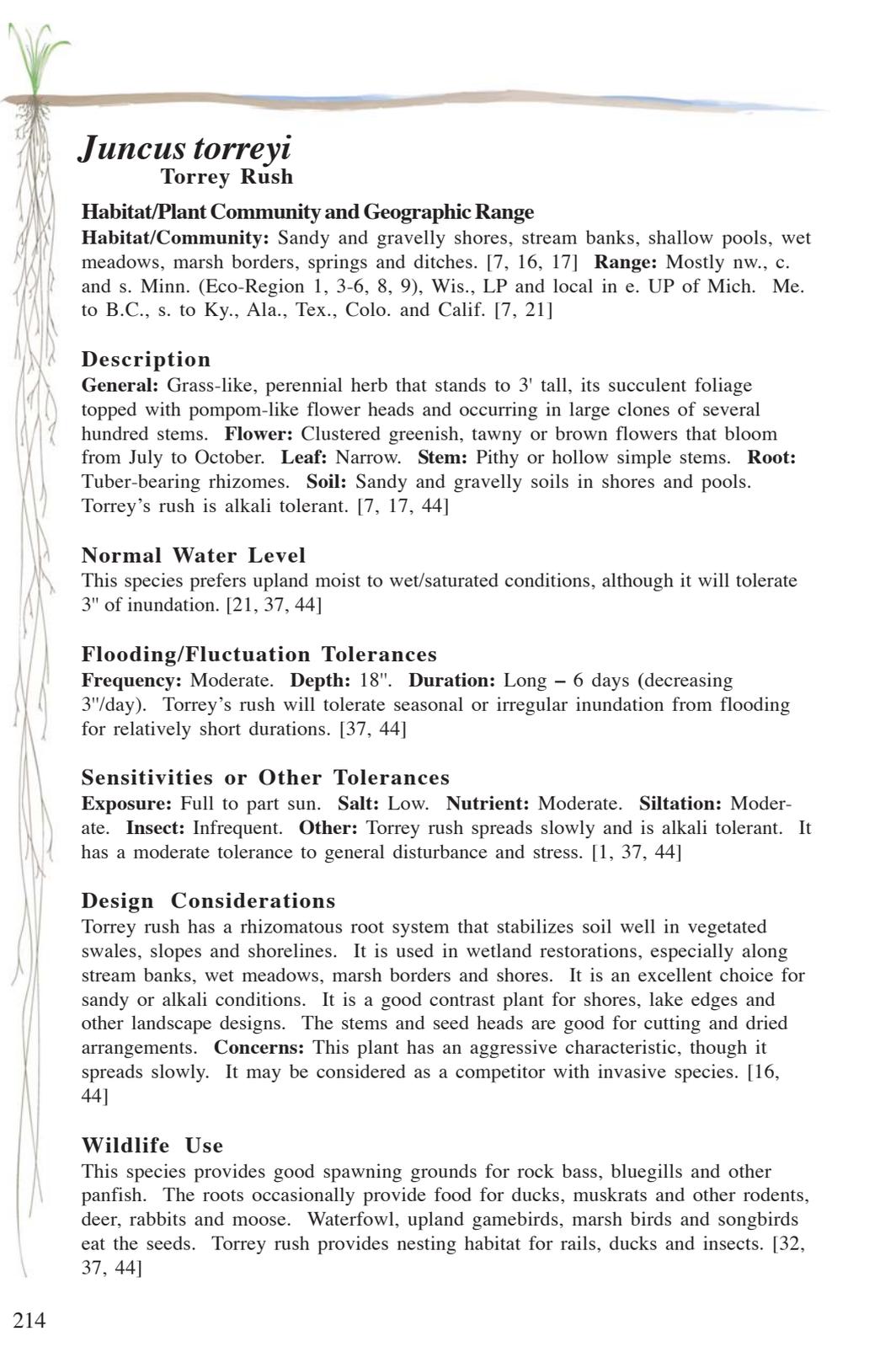
### Planting Techniques

There is considerable variation in the proportion of viable seed. In early stages of development, this rush is extremely susceptible to competition. Once transplanted, it propagates naturally from seed. The seed may require cold to break dormancy, so planting fresh seed in the fall improves germination rates. Seed may be stored in fresh water or wet sand just above freezing for 4-9 months and then spring planted. Seed needs a significant amount of light to germinate. Rhizomes and plants may be a better establishment method for some sites. Spring plant rhizomes 2-3' deep into the soil. Set plants in saturated soil or in soil inundated to 3", ½-1½' apart, or 1,000 plants/acre. [16, 37, 39, 44]



Photo: Rusty Schmidt





## *Juncus torreyi*

### Torrey Rush

#### **Habitat/Plant Community and Geographic Range**

**Habitat/Community:** Sandy and gravelly shores, stream banks, shallow pools, wet meadows, marsh borders, springs and ditches. [7, 16, 17] **Range:** Mostly nw., c. and s. Minn. (Eco-Region 1, 3-6, 8, 9), Wis., LP and local in e. UP of Mich. Me. to B.C., s. to Ky., Ala., Tex., Colo. and Calif. [7, 21]

#### **Description**

**General:** Grass-like, perennial herb that stands to 3' tall, its succulent foliage topped with pompom-like flower heads and occurring in large clones of several hundred stems. **Flower:** Clustered greenish, tawny or brown flowers that bloom from July to October. **Leaf:** Narrow. **Stem:** Pithy or hollow simple stems. **Root:** Tuber-bearing rhizomes. **Soil:** Sandy and gravelly soils in shores and pools. Torrey's rush is alkali tolerant. [7, 17, 44]

#### **Normal Water Level**

This species prefers upland moist to wet/saturated conditions, although it will tolerate 3" of inundation. [21, 37, 44]

#### **Flooding/Fluctuation Tolerances**

**Frequency:** Moderate. **Depth:** 18". **Duration:** Long – 6 days (decreasing 3"/day). Torrey's rush will tolerate seasonal or irregular inundation from flooding for relatively short durations. [37, 44]

#### **Sensitivities or Other Tolerances**

**Exposure:** Full to part sun. **Salt:** Low. **Nutrient:** Moderate. **Siltation:** Moderate. **Insect:** Infrequent. **Other:** Torrey rush spreads slowly and is alkali tolerant. It has a moderate tolerance to general disturbance and stress. [1, 37, 44]

#### **Design Considerations**

Torrey rush has a rhizomatous root system that stabilizes soil well in vegetated swales, slopes and shorelines. It is used in wetland restorations, especially along stream banks, wet meadows, marsh borders and shores. It is an excellent choice for sandy or alkali conditions. It is a good contrast plant for shores, lake edges and other landscape designs. The stems and seed heads are good for cutting and dried arrangements. **Concerns:** This plant has an aggressive characteristic, though it spreads slowly. It may be considered as a competitor with invasive species. [16, 44]

#### **Wildlife Use**

This species provides good spawning grounds for rock bass, bluegills and other panfish. The roots occasionally provide food for ducks, muskrats and other rodents, deer, rabbits and moose. Waterfowl, upland gamebirds, marsh birds and songbirds eat the seeds. Torrey rush provides nesting habitat for rails, ducks and insects. [32, 37, 44]

Indicator Status: FACW

### Nursery/Plant Information

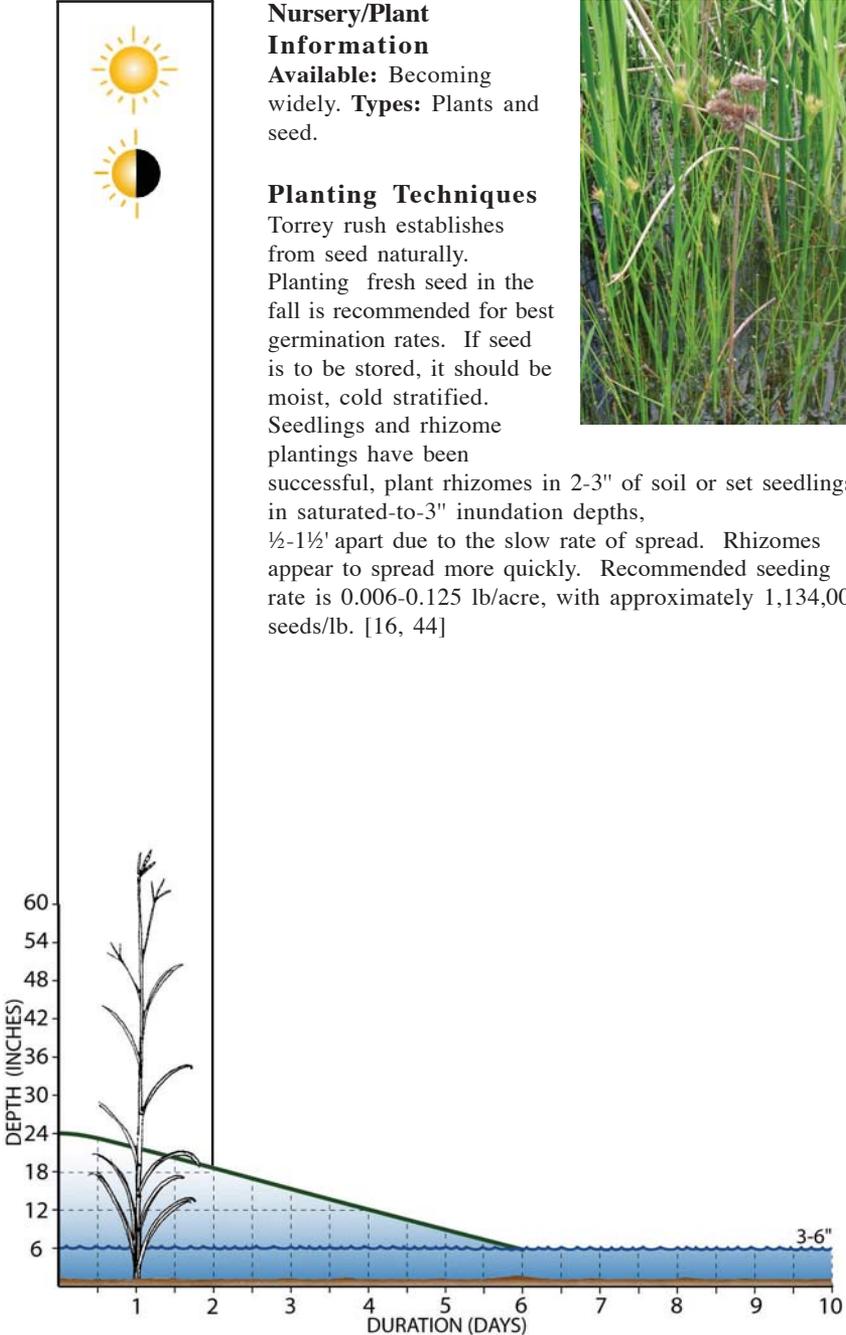
**Available:** Becoming widely. **Types:** Plants and seed.

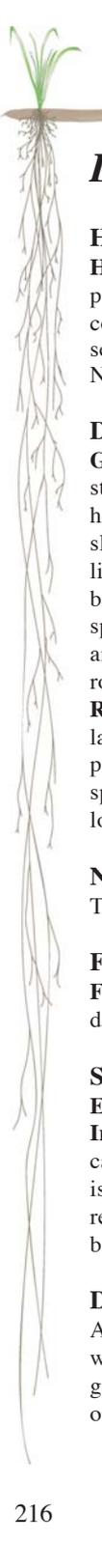
### Planting Techniques

Torrey rush establishes from seed naturally. Planting fresh seed in the fall is recommended for best germination rates. If seed is to be stored, it should be moist, cold stratified. Seedlings and rhizome plantings have been successful, plant rhizomes in 2-3" of soil or set seedlings in saturated-to-3" inundation depths, ½-1½' apart due to the slow rate of spread. Rhizomes appear to spread more quickly. Recommended seeding rate is 0.006-0.125 lb/acre, with approximately 1,134,000 seeds/lb. [16, 44]



Photo: Rusy Schmidt





## *Larix laricina*

Tamarack - a.k.a. Eastern Larch or Hackmatack

### Habitat/Plant Community and Geographic Range

**Habitat/Community:** Cold, poorly drained swamps, coniferous swamps, muck, peatlands, bogs, black spruce bogs, stream borders, seep areas and wet lakeshores – confined to wet depressions. [7, 11, 22, 36] **Range:** N. and c. (but uncommon in se.) Minn. (Eco-Region: 1-3, 5-8), Wis., Mich. Nfld. and Labr. to Alaska, s. to n. N.J., W.Va., n. Ohio, ne. Ill. and Minn. [7, 21] **State Threatened:** Illinois.

### Description

**General:** A deciduous conifer up to 60' high and 30-35' wide that is frequently stunted and scrubby. It has a narrow crown, with a straight, tapering trunk and horizontal branches. One of the last trees to lose its leaves. **Leaf:** Clusters of soft, slender, needle-like, deciduous leaves that are  $\frac{3}{4}$ -1" long and 3-angled. They are light blue-green, turning yellow in autumn before they are shed. **Bark:** Reddish brown, scaly and thin. **Twigs:** Orange-brown, stout, hairless twigs with many spurs. **Fruit:** Cones that are  $\frac{1}{2}$ - $\frac{3}{4}$ " long, elliptical, rose-red turning brown, upright and stalkless. The cones fall in their second year and have several overlapping, rounded cone-scales and paired, brown, long-winged seeds. Young cones are purple. **Root:** Shallow, fibrous roots. **Soil:** Neutral-to-acidic soils (sphagnum moss may be lacking) when south of the vegetation tension zone and when growing on acidic, peat soils north. Tamarack is associated with black spruce (*Picea mariana*) and sphagnum mosses (*Sphagnum* spp.). It is also tolerant of drier, upland and mesic, loamy soils. [7, 11, 22, 36]

### Normal Water Level

This species prefers upland moist to wet/saturated, often acidic, conditions. [21]

### Flooding/Fluctuation Tolerances

**Frequency:** Low. **Depth:** 12". **Duration:** Long – 5 days (decreasing 6" every 2.5 days). It is very tolerant of flooding for short periods. [1, 22]

### Sensitivities or Other Tolerances

**Exposure:** Full to part sun. **Salt:** High. **Nutrient:** Low. **Siltation:** Moderate. **Insect:** Frequent – larch casebearer, larch sawfly (will defoliate stands infrequently, causing death or damage). **Other:** This species is frequently damaged by wind. It is sensitive to SO<sub>2</sub>, O<sub>3</sub>, HFI, HCl, Cl, drought, heat and mine spoils, though resistant to soil compaction. It has a moderately low tolerance to general disturbance and stress. [1, 2, 21, 22, 25, 36]

### Design Considerations

An ornamental tree for very cold climates. It is used in restorations (especially in wetlands, peat and woodland depressions). It is a wonderful specimen or mass grouping tree for lake or bog edges. It is well suited for rain gardens and other ornamental situations. [36]

**Indicator Status: FACW**

### **Wildlife Use**

Tamarack provides food for red crossbills, spruce grouse and songbirds. Porcupine, deer, hares and squirrels use this species for food and habitat. [21, 22, 32]

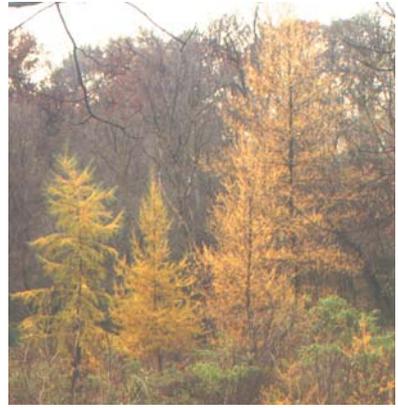


Photo: Jason Husveth

### **Nursery/Plant Information**

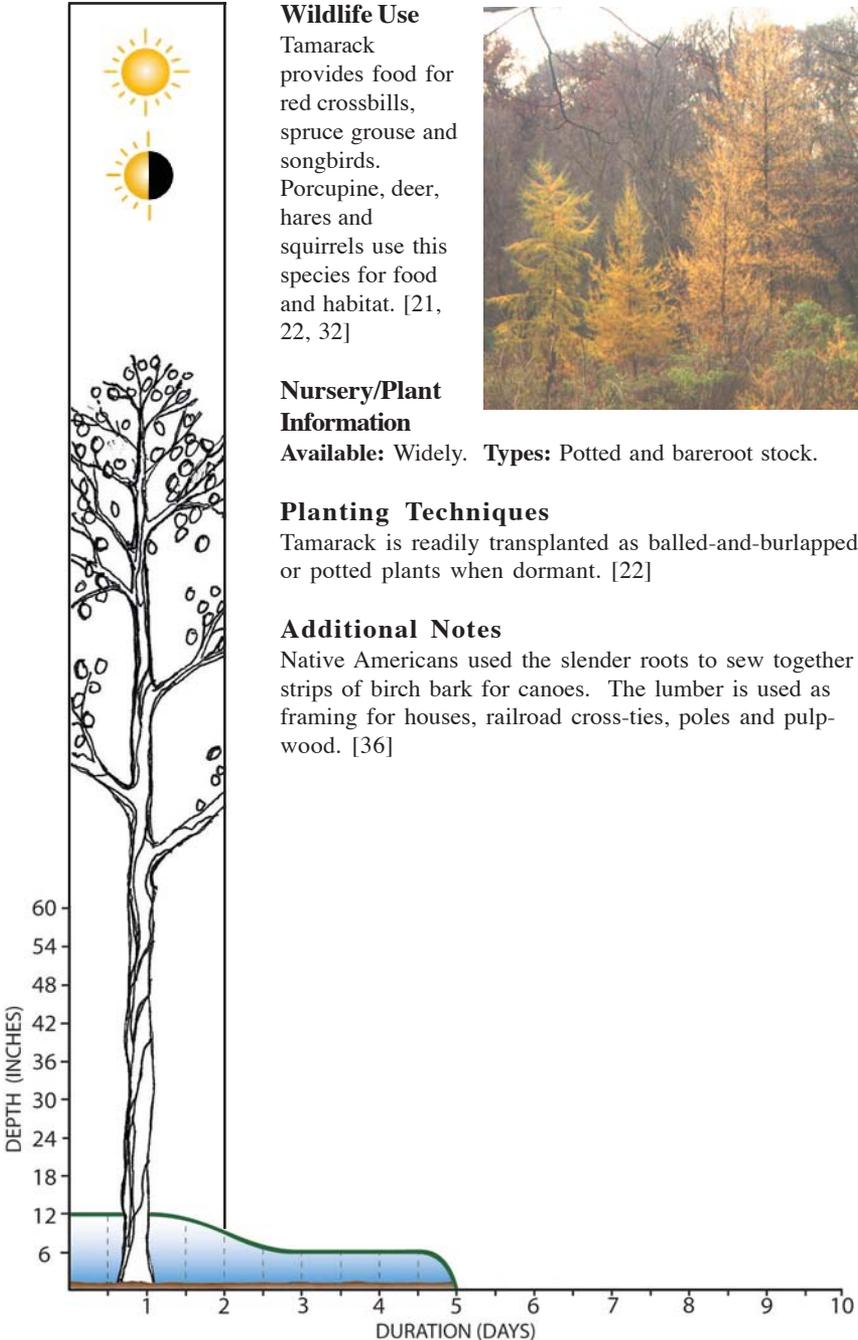
**Available:** Widely. **Types:** Potted and bareroot stock.

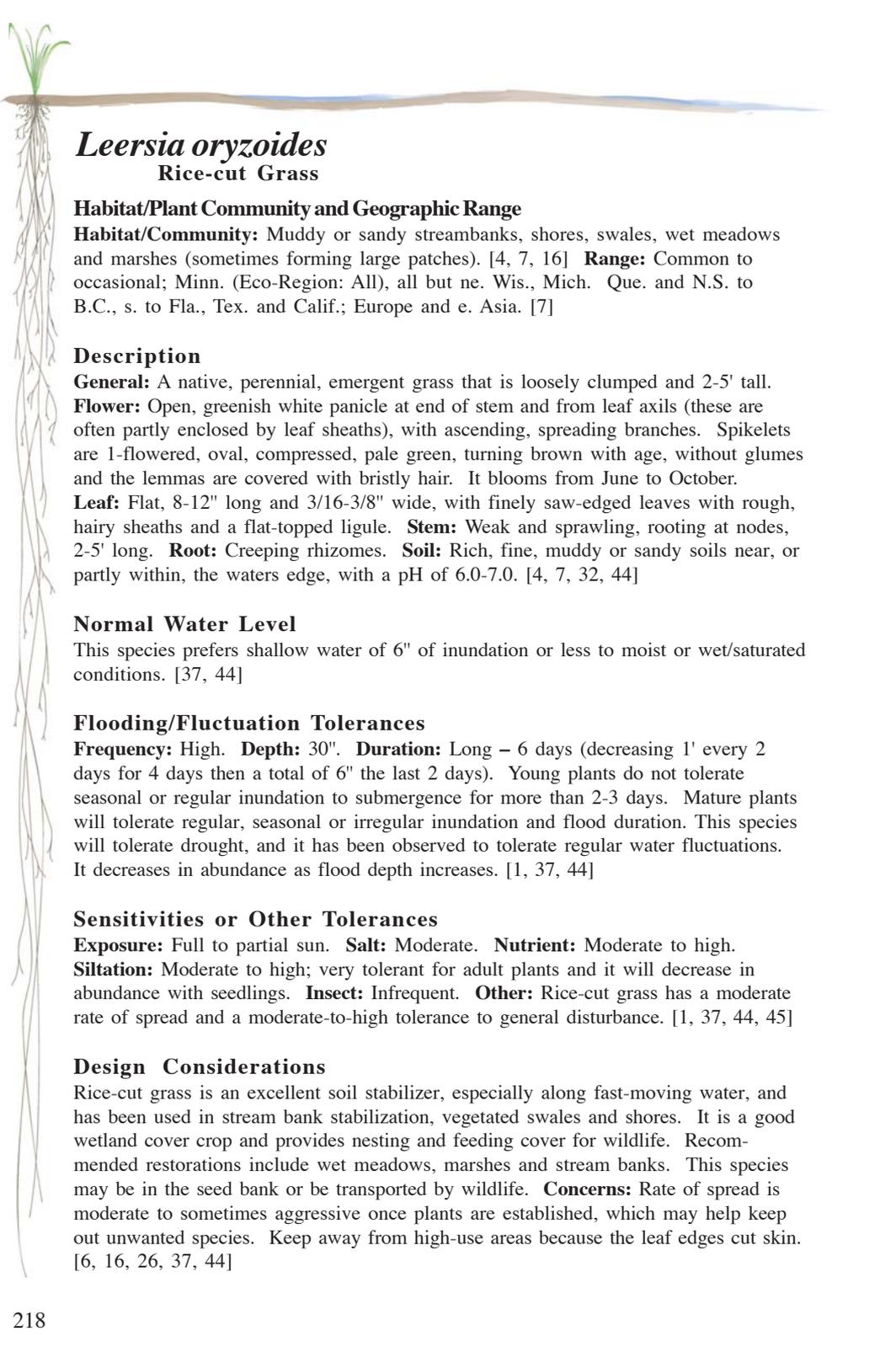
### **Planting Techniques**

Tamarack is readily transplanted as balled-and-burlapped or potted plants when dormant. [22]

### **Additional Notes**

Native Americans used the slender roots to sew together strips of birch bark for canoes. The lumber is used as framing for houses, railroad cross-ties, poles and pulpwood. [36]





## *Leersia oryzoides*

### Rice-cut Grass

#### Habitat/Plant Community and Geographic Range

**Habitat/Community:** Muddy or sandy streambanks, shores, swales, wet meadows and marshes (sometimes forming large patches). [4, 7, 16] **Range:** Common to occasional; Minn. (Eco-Region: All), all but ne. Wis., Mich. Que. and N.S. to B.C., s. to Fla., Tex. and Calif.; Europe and e. Asia. [7]

#### Description

**General:** A native, perennial, emergent grass that is loosely clumped and 2-5' tall.

**Flower:** Open, greenish white panicle at end of stem and from leaf axils (these are often partly enclosed by leaf sheaths), with ascending, spreading branches. Spikelets are 1-flowered, oval, compressed, pale green, turning brown with age, without glumes and the lemmas are covered with bristly hair. It blooms from June to October.

**Leaf:** Flat, 8-12" long and 3/16-3/8" wide, with finely saw-edged leaves with rough, hairy sheaths and a flat-topped ligule. **Stem:** Weak and sprawling, rooting at nodes, 2-5' long. **Root:** Creeping rhizomes. **Soil:** Rich, fine, muddy or sandy soils near, or partly within, the waters edge, with a pH of 6.0-7.0. [4, 7, 32, 44]

#### Normal Water Level

This species prefers shallow water of 6" of inundation or less to moist or wet/saturated conditions. [37, 44]

#### Flooding/Fluctuation Tolerances

**Frequency:** High. **Depth:** 30". **Duration:** Long – 6 days (decreasing 1' every 2 days for 4 days then a total of 6" the last 2 days). Young plants do not tolerate seasonal or regular inundation to submergence for more than 2-3 days. Mature plants will tolerate regular, seasonal or irregular inundation and flood duration. This species will tolerate drought, and it has been observed to tolerate regular water fluctuations. It decreases in abundance as flood depth increases. [1, 37, 44]

#### Sensitivities or Other Tolerances

**Exposure:** Full to partial sun. **Salt:** Moderate. **Nutrient:** Moderate to high.

**Siltation:** Moderate to high; very tolerant for adult plants and it will decrease in abundance with seedlings. **Insect:** Infrequent. **Other:** Rice-cut grass has a moderate rate of spread and a moderate-to-high tolerance to general disturbance. [1, 37, 44, 45]

#### Design Considerations

Rice-cut grass is an excellent soil stabilizer, especially along fast-moving water, and has been used in stream bank stabilization, vegetated swales and shores. It is a good wetland cover crop and provides nesting and feeding cover for wildlife. Recommended restorations include wet meadows, marshes and stream banks. This species may be in the seed bank or be transported by wildlife. **Concerns:** Rate of spread is moderate to sometimes aggressive once plants are established, which may help keep out unwanted species. Keep away from high-use areas because the leaf edges cut skin. [6, 16, 26, 37, 44]

Indicator Status: OBL



### Wildlife Use

The seeds of this plant provide food for ducks, swamp and tree sparrows, and sora rails. The root-stock is eaten by black, mallard, ring-necked ducks, teal and muskrats. It provides food and cover for invertebrates, reptiles, amphibians and fish. [4, 6, 32, 37, 44]

### Nursery/Plant Information

**Available:** Widely.

**Types:** Seeds, rhizomes, rootstocks and container-grown plants.

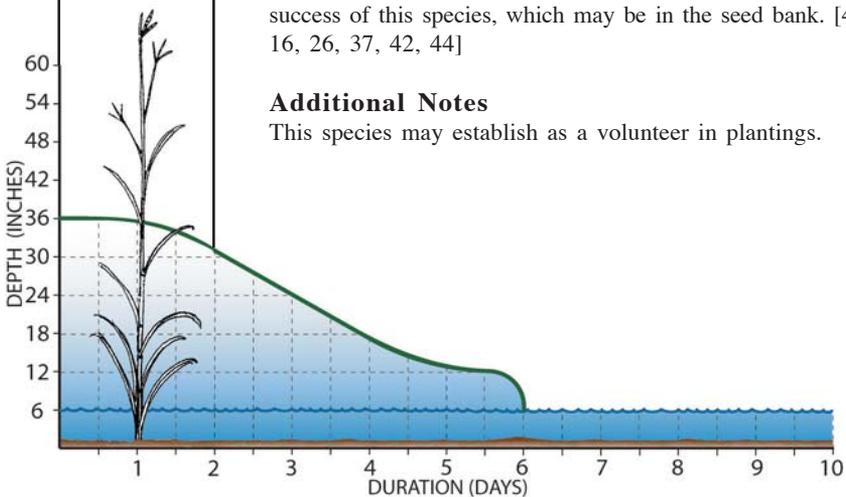


### Planting Techniques

Seeds require moist, cold stratification for 30 days, then they should be planted in saturated soils. Another option is to seed in the fall with fresh seed. Establishment from seeding restorations have been observed to be low. Recommended seeding rate is 0.1-0.25 lb/acre, with about 610,000-1,512,000 seeds/lb. Rhizomes should be planted 2-5" deep and seedlings should be planted in saturated or inundated soils to a depth of 3". Recommended spacing is 1-3' apart and drawdowns of water levels improve the success of this species, which may be in the seed bank. [4, 16, 26, 37, 42, 44]

### Additional Notes

This species may establish as a volunteer in plantings.





## *Liatris ligulistylis*

Meadow Blazingstar - a.k.a. Northern Plains Blazing Star or Meadow Blazingstar

### Habitat/Plant Community and Geographic Range

**Habitat/Community:** Mostly in damp, low places, occasionally drier; open, grassy meadows, prairies, savannas, hillside and jackpine forests. [17] **Range:** Minn. (Eco-Region: 3-9), Wis., Mich. Wis. to Alta., Colo. and N.M. [17, 21]

### Description

**General:** This tall (24-42"), native, perennial herb produces a brilliant, rosy-purple flower spike. **Flower:** Heads are arranged in a dense spike with small individual flowers. Each flower is tubular and perfect, rosy-purple, blooming from July to August with 30-100/head. **Leaf:** Green with a white mid-vein, 2-6" long, alternate, entire, narrow and sessile or with the blade tapering to the petiole. **Stem:** May grow to 42" tall and usually glabrous below the inflorescence. **Fruit:** Achenes 10-ribbed. **Root:** Thickened, usually corm-like rootstock. **Soil:** Moist to saturated, though will tolerate dry soils of many types. [17]

### Normal Water Level

Although this species prefers upland moist to wet/saturated conditions, it will tolerate dry soils. [21]

### Flooding/Fluctuation Tolerances

**Frequency:** Low. **Depth:** 12". **Duration:** Short – 1 day (decreasing all 12" in 1 day).

### Sensitivities or Other Tolerances

**Exposure:** Full to part sun. **Salt:** Moderate. **Nutrient:** Low to moderate. **Siltation:** Low. **Insect:** Infrequent. **Other:** This species has a moderate tolerance to general disturbance. [1, 47]

### Design Considerations

A great nectar source and butterfly garden plant. It also provides wonderful cut and dried flowers. This species does well in most landscape designs, including rain gardens as long as the water depth is 6" or less and dissipates within a day.

**Concerns:** Many cultivars are available that can be mistaken for the native variety. Seedlings and seeds take a couple of years to flower.

### Wildlife Use

Meadow blazingstar is said to be the best butterfly attractant within the *Liatris* genus. Birds eat the seeds as well.

### Nursery/Plant Information

**Available:** Widely. **Types:** Seeds and plants.

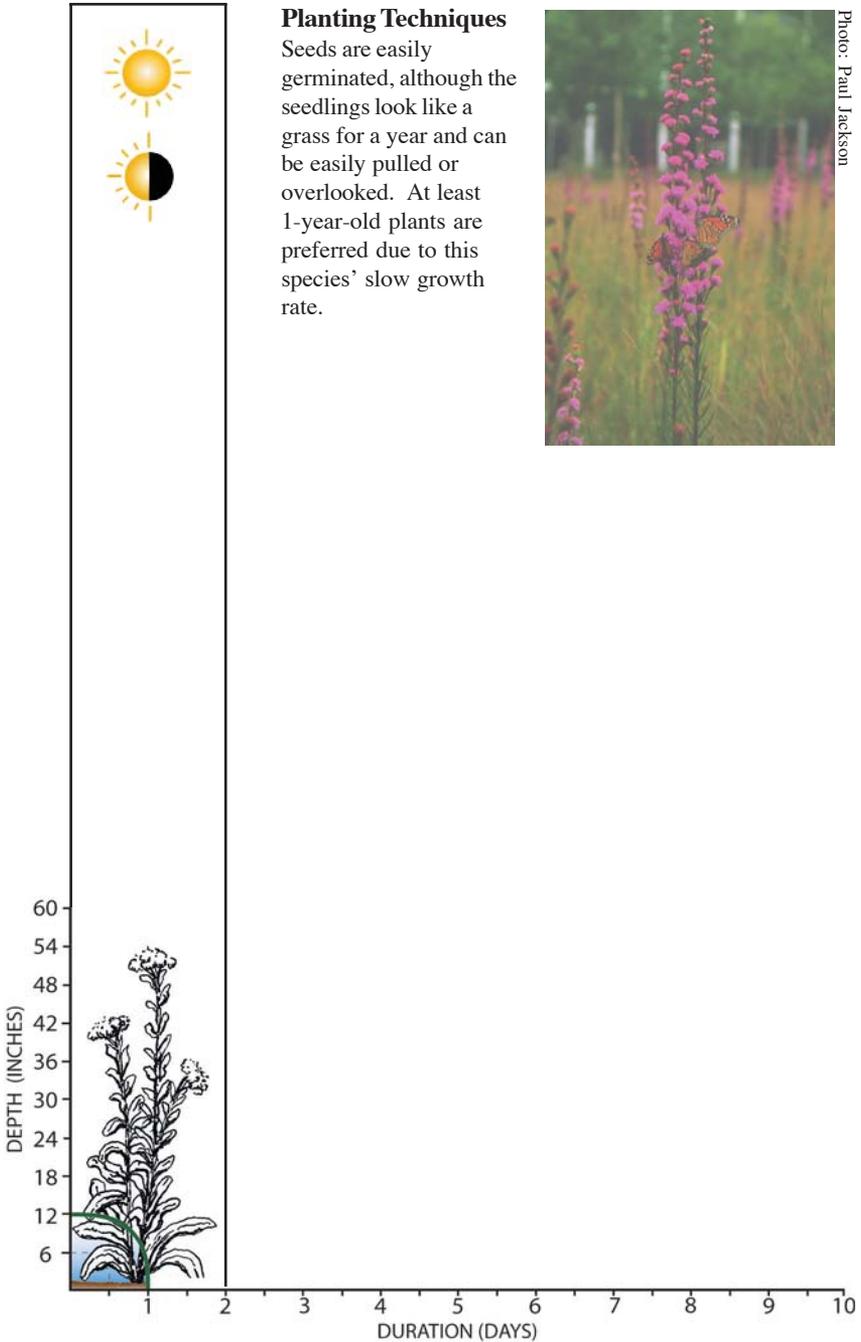
Indicator Status: FAC

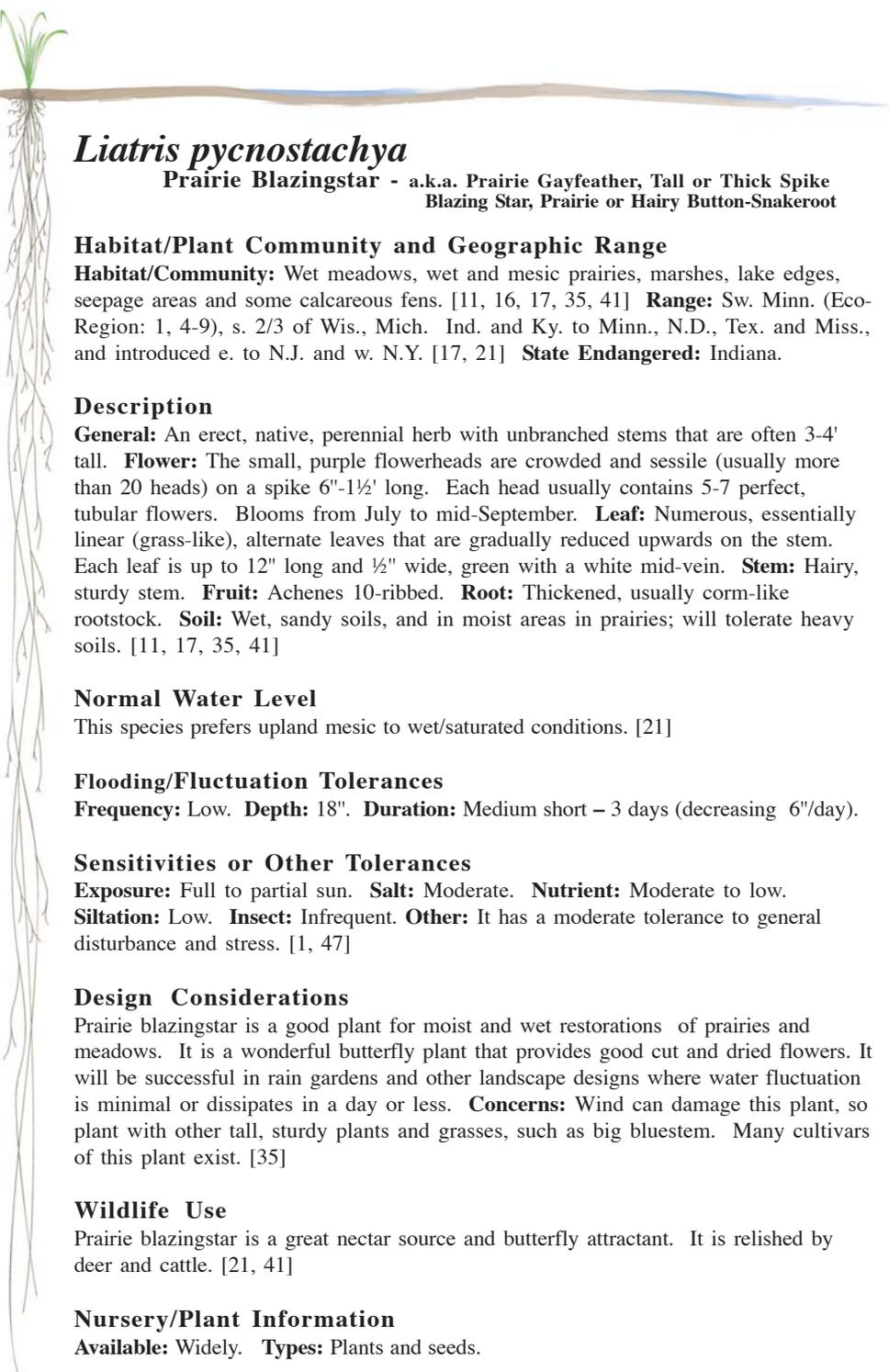
### Planting Techniques

Seeds are easily germinated, although the seedlings look like a grass for a year and can be easily pulled or overlooked. At least 1-year-old plants are preferred due to this species' slow growth rate.



Photo: Paul Jackson





## *Liatris pycnostachya*

**Prairie Blazingstar** - a.k.a. **Prairie Gayfeather, Tall or Thick Spike Blazing Star, Prairie or Hairy Button-Snakeroot**

### **Habitat/Plant Community and Geographic Range**

**Habitat/Community:** Wet meadows, wet and mesic prairies, marshes, lake edges, seepage areas and some calcareous fens. [11, 16, 17, 35, 41] **Range:** Sw. Minn. (Eco-Region: 1, 4-9), s. 2/3 of Wis., Mich. Ind. and Ky. to Minn., N.D., Tex. and Miss., and introduced e. to N.J. and w. N.Y. [17, 21] **State Endangered:** Indiana.

### **Description**

**General:** An erect, native, perennial herb with unbranched stems that are often 3-4' tall. **Flower:** The small, purple flowerheads are crowded and sessile (usually more than 20 heads) on a spike 6'-1½' long. Each head usually contains 5-7 perfect, tubular flowers. Blooms from July to mid-September. **Leaf:** Numerous, essentially linear (grass-like), alternate leaves that are gradually reduced upwards on the stem. Each leaf is up to 12" long and ½" wide, green with a white mid-vein. **Stem:** Hairy, upright stem. **Fruit:** Achenes 10-ribbed. **Root:** Thickened, usually corm-like rootstock. **Soil:** Wet, sandy soils, and in moist areas in prairies; will tolerate heavy soils. [11, 17, 35, 41]

### **Normal Water Level**

This species prefers upland mesic to wet/saturated conditions. [21]

### **Flooding/Fluctuation Tolerances**

**Frequency:** Low. **Depth:** 18". **Duration:** Medium short – 3 days (decreasing 6"/day).

### **Sensitivities or Other Tolerances**

**Exposure:** Full to partial sun. **Salt:** Moderate. **Nutrient:** Moderate to low. **Siltation:** Low. **Insect:** Infrequent. **Other:** It has a moderate tolerance to general disturbance and stress. [1, 47]

### **Design Considerations**

Prairie blazingstar is a good plant for moist and wet restorations of prairies and meadows. It is a wonderful butterfly plant that provides good cut and dried flowers. It will be successful in rain gardens and other landscape designs where water fluctuation is minimal or dissipates in a day or less. **Concerns:** Wind can damage this plant, so plant with other tall, sturdy plants and grasses, such as big bluestem. Many cultivars of this plant exist. [35]

### **Wildlife Use**

Prairie blazingstar is a great nectar source and butterfly attractant. It is relished by deer and cattle. [21, 41]

### **Nursery/Plant Information**

**Available:** Widely. **Types:** Plants and seeds.

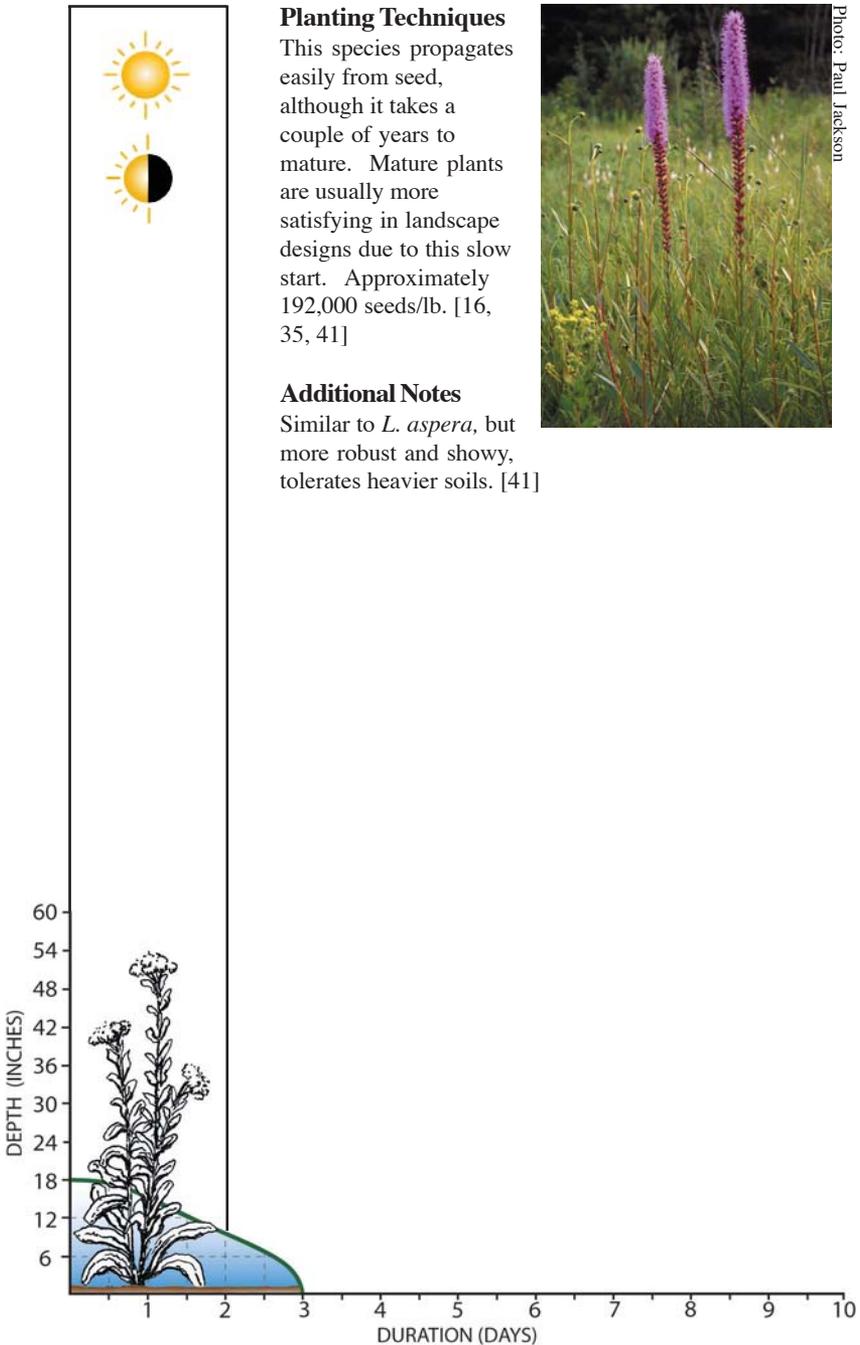
Indicator Status: FAC-

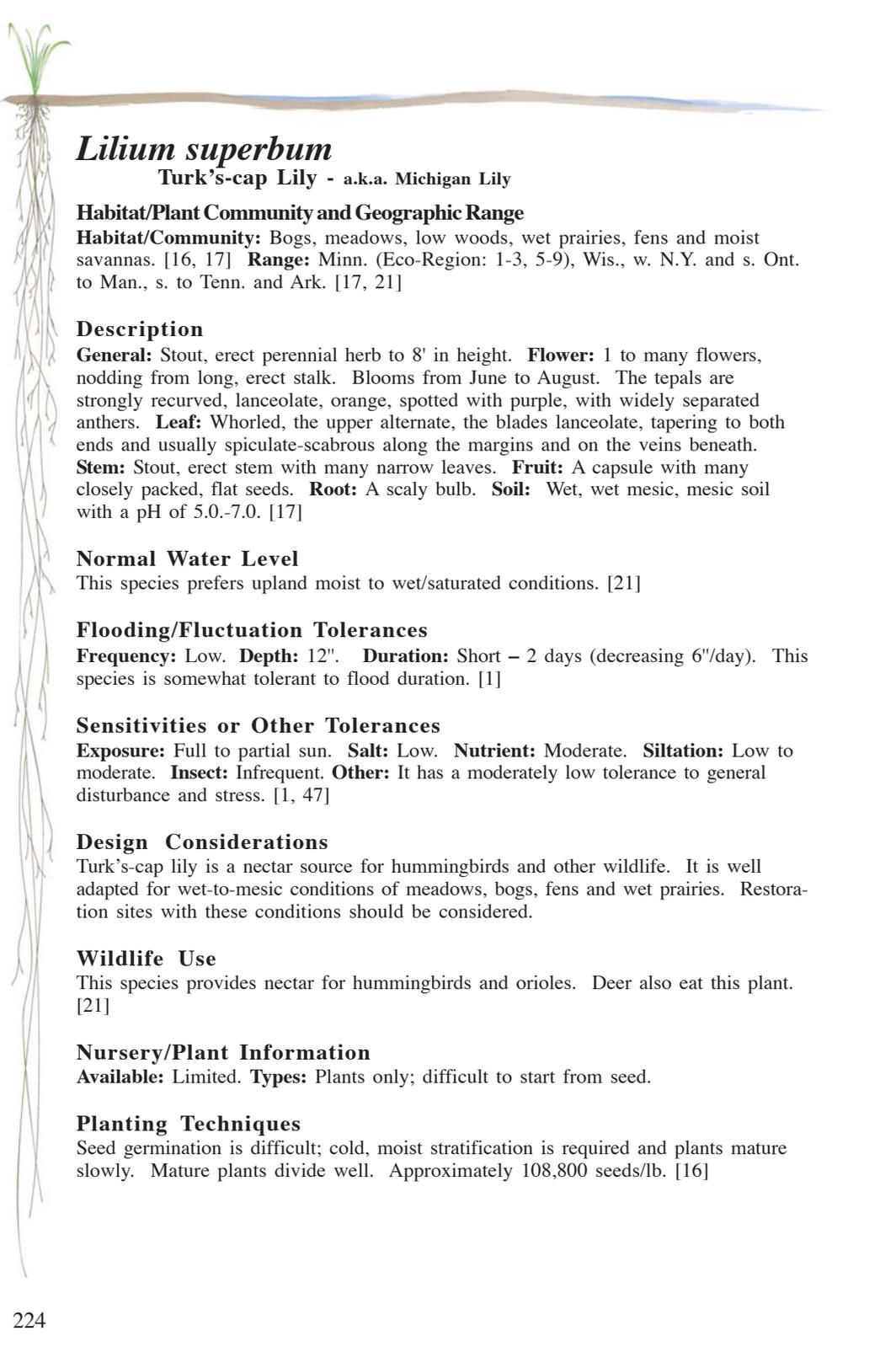
### Planting Techniques

This species propagates easily from seed, although it takes a couple of years to mature. Mature plants are usually more satisfying in landscape designs due to this slow start. Approximately 192,000 seeds/lb. [16, 35, 41]

### Additional Notes

Similar to *L. aspera*, but more robust and showy, tolerates heavier soils. [41]





## *Lilium superbum*

Turk's-cap Lily - a.k.a. Michigan Lily

### Habitat/Plant Community and Geographic Range

**Habitat/Community:** Bogs, meadows, low woods, wet prairies, fens and moist savannas. [16, 17] **Range:** Minn. (Eco-Region: 1-3, 5-9), Wis., w. N.Y. and s. Ont. to Man., s. to Tenn. and Ark. [17, 21]

### Description

**General:** Stout, erect perennial herb to 8' in height. **Flower:** 1 to many flowers, nodding from long, erect stalk. Blooms from June to August. The tepals are strongly recurved, lanceolate, orange, spotted with purple, with widely separated anthers. **Leaf:** Whorled, the upper alternate, the blades lanceolate, tapering to both ends and usually spiculate-scabrous along the margins and on the veins beneath. **Stem:** Stout, erect stem with many narrow leaves. **Fruit:** A capsule with many closely packed, flat seeds. **Root:** A scaly bulb. **Soil:** Wet, wet mesic, mesic soil with a pH of 5.0-7.0. [17]

### Normal Water Level

This species prefers upland moist to wet/saturated conditions. [21]

### Flooding/Fluctuation Tolerances

**Frequency:** Low. **Depth:** 12". **Duration:** Short – 2 days (decreasing 6"/day). This species is somewhat tolerant to flood duration. [1]

### Sensitivities or Other Tolerances

**Exposure:** Full to partial sun. **Salt:** Low. **Nutrient:** Moderate. **Siltation:** Low to moderate. **Insect:** Infrequent. **Other:** It has a moderately low tolerance to general disturbance and stress. [1, 47]

### Design Considerations

Turk's-cap lily is a nectar source for hummingbirds and other wildlife. It is well adapted for wet-to-mesic conditions of meadows, bogs, fens and wet prairies. Restoration sites with these conditions should be considered.

### Wildlife Use

This species provides nectar for hummingbirds and orioles. Deer also eat this plant. [21]

### Nursery/Plant Information

**Available:** Limited. **Types:** Plants only; difficult to start from seed.

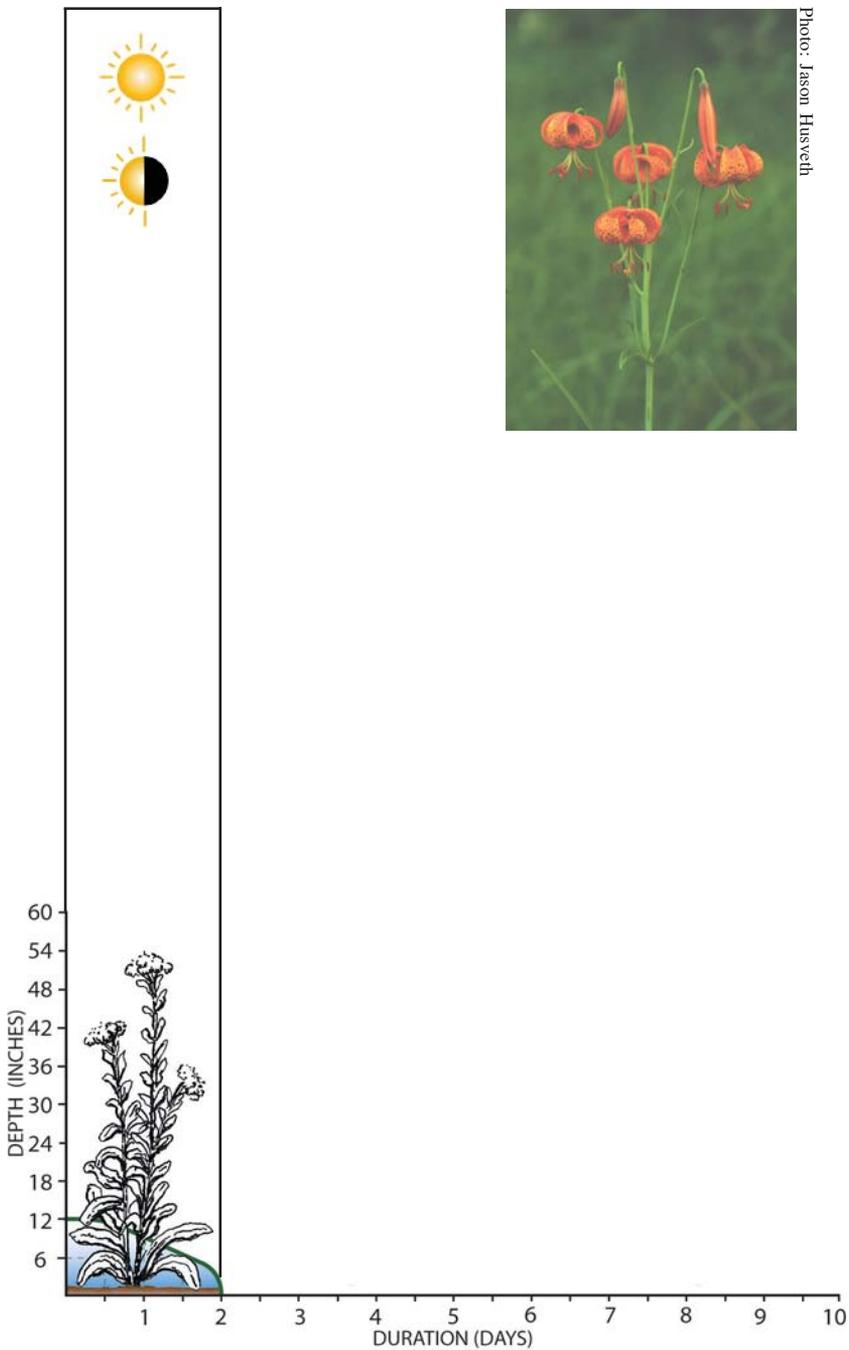
### Planting Techniques

Seed germination is difficult; cold, moist stratification is required and plants mature slowly. Mature plants divide well. Approximately 108,800 seeds/lb. [16]

Indicator Status: FAC+



Photo: Jason Husveth





## *Lobelia cardinalis*

Cardinal Flower - a.k.a. Red Cardinal-flower

### Habitat/Plant Community and Geographic Range

**Habitat/Community:** Flood plain forest, swamps, thickets, stream banks, shores, wet meadows and ditches (sometimes in shallow water). [7, 11,16, 35, 41]

**Range:** Ec. and se. along Miss. River in Minn. (Eco-Region: 7-8), Wis., s. UP and LP of Mich. N.B. to Minn., s. to Fla. and Tex. [7, 21]

### Description

**General:** Native, perennial herb 2-4' tall. **Flower:** Intense red flowers that alternate on a stem in an elongate cluster 1-2' long. Each flower is about 1" across and has 3 spreading lower petals and 2 upright petals united into a tube toward their base. Blooms from July to September. **Leaf:** Thin, smooth, dark green with some crimson, lanceolate-to-lance-ovate, and irregularly serrate up to 6" long and nearly clasped the stem. **Stem:** Usually a simple, reddish stem with milky, acrid juice. **Root:** Shallow, fibrous roots. **Soil:** Wet-to-mesic rich loams. [7, 11 ,35, 41]

### Normal Water Level

This species prefers moist-to-wet/saturated conditions. [21, 37]

### Flooding/Fluctuation Tolerances

**Frequency:** High. **Depth:** 18". **Duration:** Long – 5 days (decreasing 6" the first day and then 6" every 2 days thereafter). Cardinal flower will tolerate seasonal and regular flooding and is somewhat tolerant to flood duration. [1, 37]

### Sensitivities or Other Tolerances

**Exposure:** Full to part sun. **Salt:** Low. **Nutrient:** Moderate. **Siltation:** Unknown. **Insect:** Infrequent. **Other:** This species has a slow rate of spread and a moderate-to-low tolerance to general disturbance and stress. [1, 37]

### Design Considerations

Cardinal flower, a very attractive plant, is used in gardens, rainwater gardens, wetland restorations, stream bank stabilization and habitat restoration. It provides wonderful cutflowers. It is also a good nectar source. **Concerns:** Because this plant has shallow roots, the soil it grows in must be kept moist to wet at all times. Many gardens have failed because of this, some sun is necessary to flower. Only the hummingbird pollinates this species, so seeds are not always available. Plants may not be long lived. [16, 35, 41]

### Wildlife Use

A great nectar source for hummingbirds, orioles and butterflies, though it can only be pollinated by hummingbirds. [6, 21, 32, 37, 41]

### Nursery/Plant Information

**Available:** Widely. **Types:** Seeds and plants.

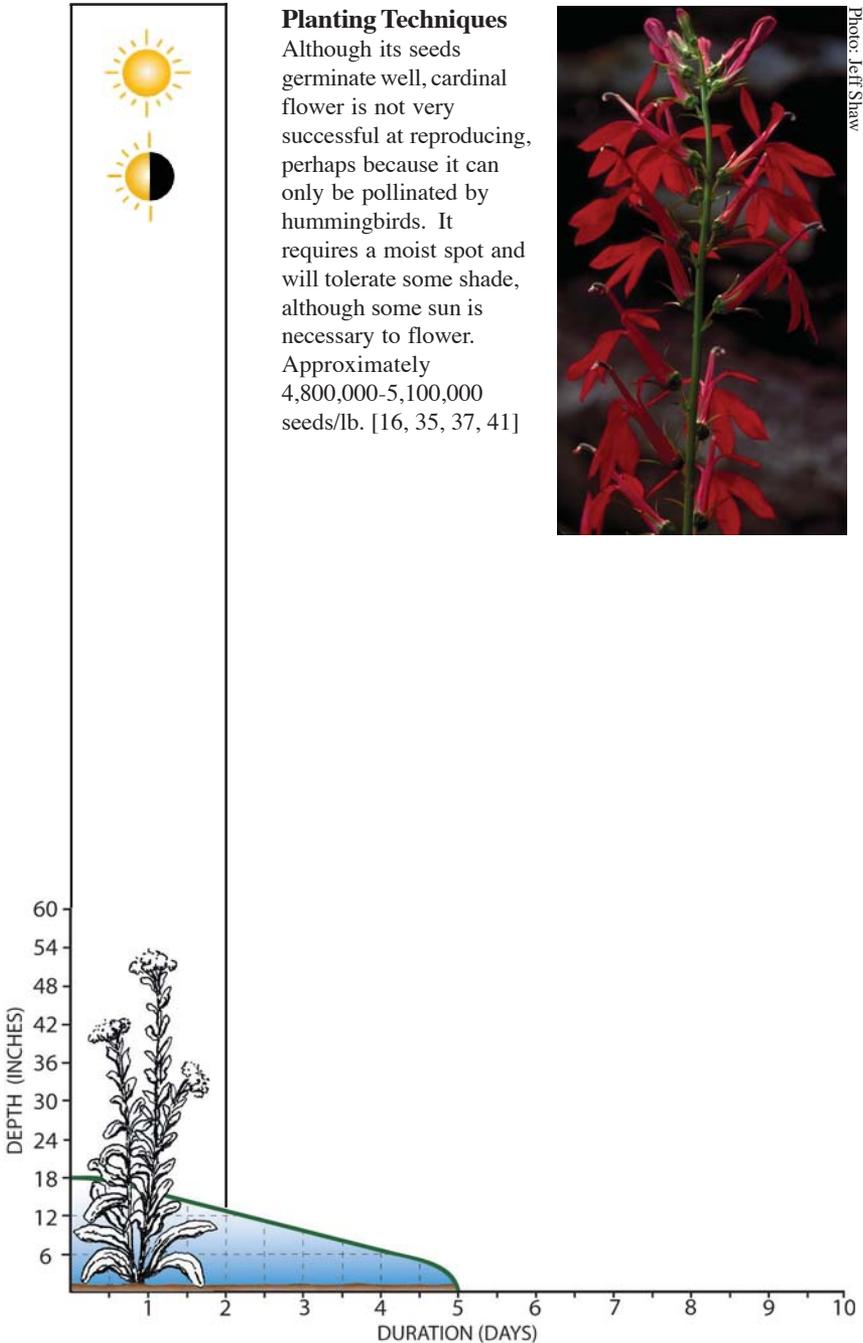
Indicator Status: OBL

### Planting Techniques

Although its seeds germinate well, cardinal flower is not very successful at reproducing, perhaps because it can only be pollinated by hummingbirds. It requires a moist spot and will tolerate some shade, although some sun is necessary to flower. Approximately 4,800,000-5,100,000 seeds/lb. [16, 35, 37, 41]



Photo: Jeff Shaw





## *Lobelia siphilitica*

**Blue Lobelia** - a.k.a. *Lobelia siphilitica* - **Blue Cardinal-flower, Great Blue Lobelia or Hi-belia**

### **Habitat/Plant Community and Geographic Range**

**Habitat/Community:** Swamps, flood plain forests, mesic savannas, thickets, stream banks, calcareous fens, peatlands and wet meadows. [7, 16, 35] **Range:** Common; Minn. (Eco-Region: 1, 4-9), Wis., local in e. UP of Mich. Me. to Man., s. to N.C., Tex. and Colo. [7, 21]

### **Description**

**General:** Erect, native, perennial herb usually 20-30" tall. **Flower:** Resembles that of the cardinal flower but is blue or occasionally white; alternate on a stem in an elongate cluster to 1' long. Each flower is about 1" across and has 3 spreading lower petals and 2 upright petals united into a tube toward their base. Blooms from July to October. Flowers in the axils of leafy bracts of this plant, the lower bracts lanceolate, the upper reduced. Leaf: Thin, narrowly oblong to lanceolate, mostly 3-5", narrowed to a sessile base and irregularly serrate. **Stem:** Leafy stem. **Root:** Shallow, fibrous roots. **Soil:** It prefers rich, lowland wood, meadows and swamps. [7, 35]

### **Normal Water Level**

This species is widely adapted to upland moist-to-wet/saturated conditions. [21]

### **Flooding/Fluctuation Tolerances**

**Frequency:** High. **Depth:** 18". **Duration:** Long – 5 days (decreasing 6" the first day and 6" every 2 days thereafter). This species is somewhat tolerant to flood duration. [1]

### **Sensitivities or Other Tolerances**

**Exposure:** Full to part sun. **Salt:** Moderate. **Nutrient:** Moderate. **Siltation:** Unknown. **Insect:** Infrequent. **Other:** This species has a moderate tolerance to general disturbance and stress. [1, 47]

### **Design Considerations**

Blue lobelia is an attractive forb well suited to perennial gardens, rainwater gardens and other landscape designs. It provides wonderful cutflowers. Recommended restorations include calcareous fens, wet meadows, stream banks and rich woodlands or swamps. **Concerns:** Blue lobelia self seeds readily in gardens. [16]

### **Wildlife Use**

Blue lobelia provides nectar and songbirds eat its seeds. Deer also like this plant. [21, 32]

### **Nursery/Plant Information**

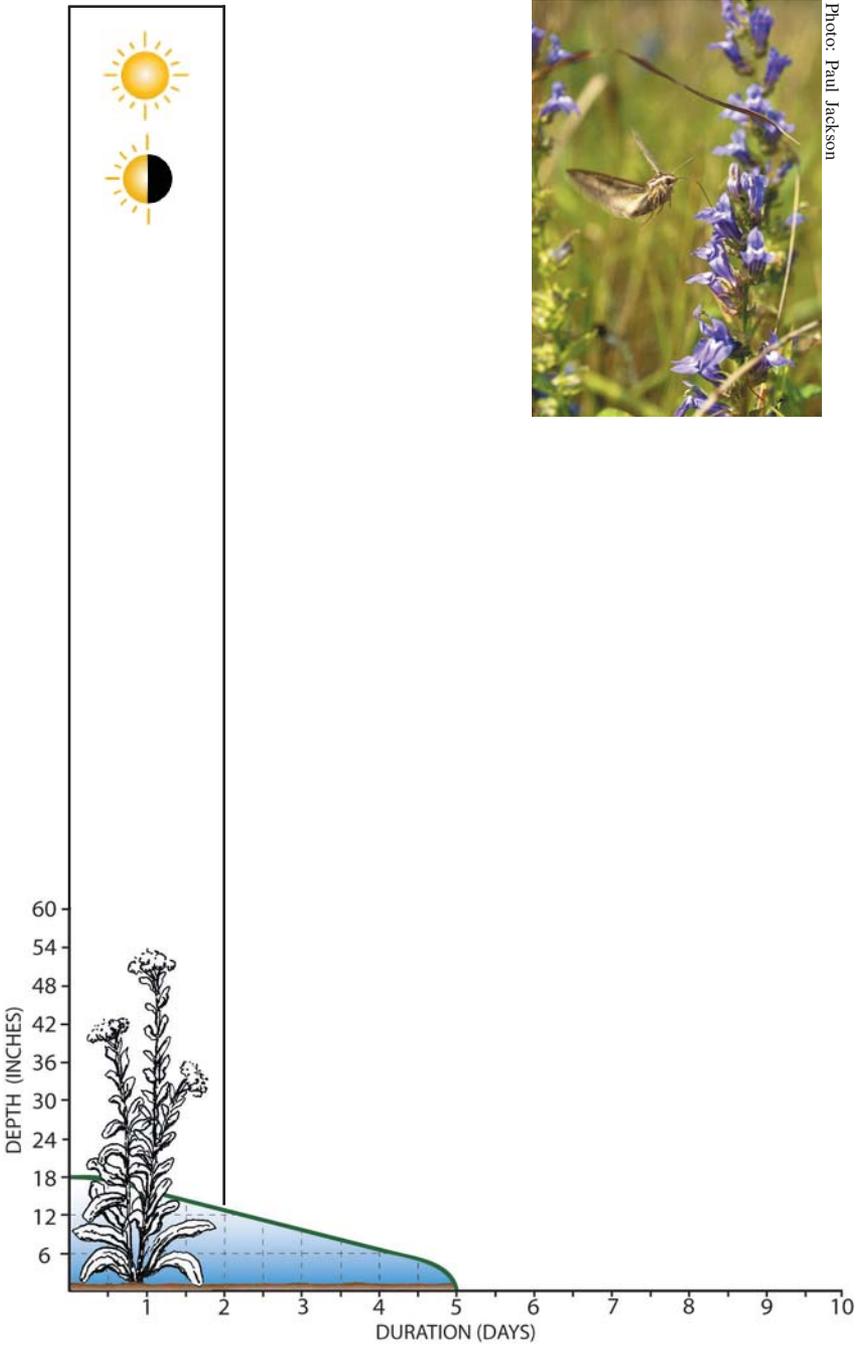
**Available:** Becoming widely. **Types:** Plants and seeds.

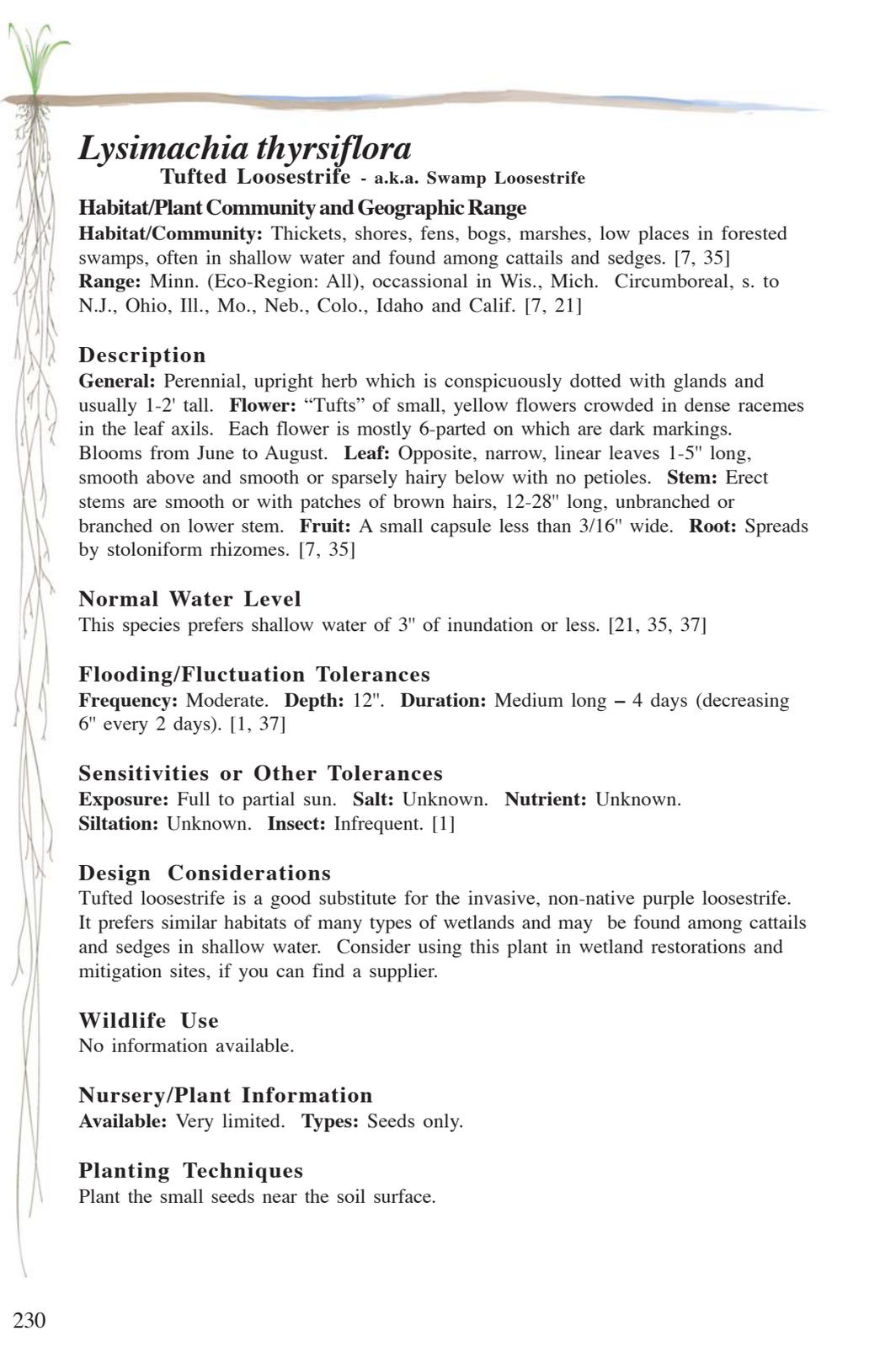
### **Planting Techniques**

Approximately 7,520,000 seeds/lb. Plant near the soil surface. [16]

Indicator Status: FACW+

Photo: Paul Jackson





# *Lysimachia thyrsiflora*

**Tufted Loosestrife** - a.k.a. Swamp Loosestrife

## **Habitat/Plant Community and Geographic Range**

**Habitat/Community:** Thickets, shores, fens, bogs, marshes, low places in forested swamps, often in shallow water and found among cattails and sedges. [7, 35]

**Range:** Minn. (Eco-Region: All), occasional in Wis., Mich. Circumboreal, s. to N.J., Ohio, Ill., Mo., Neb., Colo., Idaho and Calif. [7, 21]

## **Description**

**General:** Perennial, upright herb which is conspicuously dotted with glands and usually 1-2' tall. **Flower:** "Tufts" of small, yellow flowers crowded in dense racemes in the leaf axils. Each flower is mostly 6-parted on which are dark markings. Blooms from June to August. **Leaf:** Opposite, narrow, linear leaves 1-5" long, smooth above and smooth or sparsely hairy below with no petioles. **Stem:** Erect stems are smooth or with patches of brown hairs, 12-28" long, unbranched or branched on lower stem. **Fruit:** A small capsule less than 3/16" wide. **Root:** Spreads by stoloniform rhizomes. [7, 35]

## **Normal Water Level**

This species prefers shallow water of 3" of inundation or less. [21, 35, 37]

## **Flooding/Fluctuation Tolerances**

**Frequency:** Moderate. **Depth:** 12". **Duration:** Medium long – 4 days (decreasing 6" every 2 days). [1, 37]

## **Sensitivities or Other Tolerances**

**Exposure:** Full to partial sun. **Salt:** Unknown. **Nutrient:** Unknown.

**Siltation:** Unknown. **Insect:** Infrequent. [1]

## **Design Considerations**

Tufted loosestrife is a good substitute for the invasive, non-native purple loosestrife. It prefers similar habitats of many types of wetlands and may be found among cattails and sedges in shallow water. Consider using this plant in wetland restorations and mitigation sites, if you can find a supplier.

## **Wildlife Use**

No information available.

## **Nursery/Plant Information**

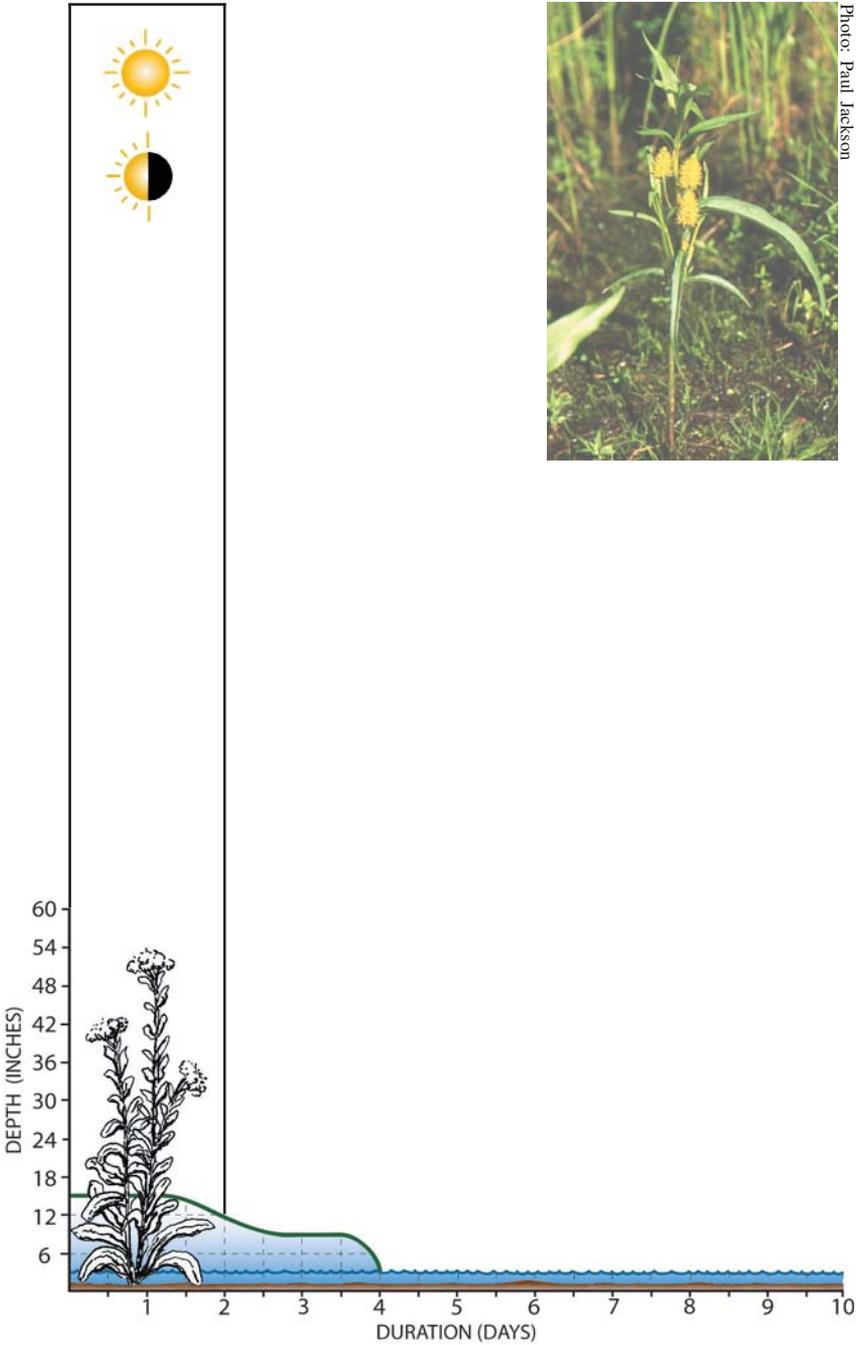
**Available:** Very limited. **Types:** Seeds only.

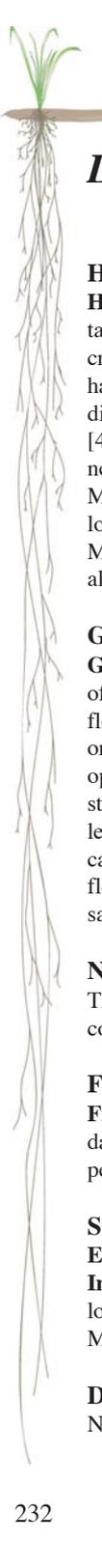
## **Planting Techniques**

Plant the small seeds near the soil surface.

Indicator Status: OBL

Photo: Paul Jackson





## *Lythrum salicaria*

**Purple Loosestrife** - a.k.a. **Spiked Loosestrife, Spiked Lythrum, Salicaire, or Bouquet Violet**

### **Habitat/Plant Community and Geographic Range**

**Habitat/Community:** Introduced from Europe and sometimes planted as an ornamental, escaping to deep and shallow marshes, wet ditches, wet meadows, stream banks, cranberry bogs and shores. It is a serious threat to outcompete our native flora and has little value to wildlife. It is often associated with wetlands that have been disturbed by agricultural use, drainage, pasturing, siltation or water level fluctuations. [4, 7, 11, 35, 41] **Range:** Most common in c. and s. portions of our region. Ec. near Mississippi River, local elsewhere in Minn. (Eco-Region: All), Wis., LP of Mich. especially s., local in UP. Naturalized over much of e. and c. USA, s. Can.; local in w. USA. Within the Twin Cities, it is most abundant in the Lake Minnetonka area west of Minneapolis, and has become abundant in many marshes and along streams since about 1940. [7]

### **General Description**

**General:** A stout, non-native, perennial herb often 3-6' tall. A very showy plant that often grows in large clones. **Flower:** Conspicuous, elongate clusters of purple flowers, 4-15" long composed of 6 crinkled petals. Each flower is ½-¾" wide, rising on short stalks near the leaf axils. Blooms from June to September. **Leaf:** Leaves are opposite or whorled, lance-shaped in 3s, entire, sessile, and sometimes clasping the stem and usually 1-4" long. One of the few plants that has both opposite and whorled leaves on the same plant. **Stem:** Woody, square or multiple-sided stems. **Fruit:** A capsule enclosed by the sepals. **Root:** Spreading and forming colonies by thick, fleshy rhizomes which send up new shoots. **Soil:** Tolerates many permanently saturated soil types. [4, 7, 11, 35, 41]

### **Normal Water Level**

This species prefers shallow water of 6" of inundation or less to wet/saturated conditions, though it has been seen growing on floating mats. [37]

### **Flooding/Fluctuation Tolerances**

**Frequency:** High. **Depth:** 36". **Duration:** Long – 10 days (decreasing 12" every 2 days). Purple loosestrife tolerates water fluctuation at regular, irregular and seasonal periods. [1, 37]

### **Sensitivities or Other Tolerances**

**Exposure:** Full to partial sun. **Salt:** High. **Nutrient:** Unknown. **Siltation:** High. **Insect:** Insects are used as a biological control for this species. **Other:** Purple loosestrife spreads rapidly. It is highly invasive and considered a pest species in the Midwest. [1, 37, 47]

### **Design Considerations**

No design considerations other than to eradicate this species.

Indicator Status: OBL



### Wildlife Use

This species has little wildlife value. The large colonies that this species creates actually result in a loss of plant and animal diversity because it replaces higher-valued plant species. [4, 7, 11]

### Nursery/Plant Information

This species does not seem to be available commercially anymore.

### Planting Techniques

This species is a serious threat to our native flora and is of little value to wildlife. In addition to spreading vegetatively, a single plant may produce several hundred thousand seeds each year. **Do not plant this species.** [4, 7, 11, 35, 41]

### Additional Notes

Purple loosestrife was once grown as a garden plant because of its striking, magenta flower spikes. Efforts are underway to reduce the loosestrife population by releasing beetles that feed on the plant's roots and leaves. [41]



Photo: Dan Shaw





# *Matteuccia struthiopteris*

**Ostrich Fern** - a.k.a. *Pteridium nodulosum* or *Matteuccia struthiopteris* var. *persylvanica*

## Habitat/Plant Community and Geographic Range

**Habitat/Community:** Wet woods, floodplain hardwoods, swampy woods, thickets, stream banks, seeps and ditches. Often found growing on alluvial deposits. [7, 11]

**Range:** Minn (Eco-Region: All), Wis, Mich. Circumboreal; Nfld. to Alaska, s. to Va., Ohio, Mo., S.D. and B.C.; Europe. This species typically occurs north of the tension zone. [7, 21]

## Description

**General:** Large, colony-forming perennial fern with erect, coarse, stout, leafy crowns growing to a height of 6'. **Leaf:** Two types of fronds. The sterile fronds are green and pinnate, which alternate and gradually reduce toward the base of the frond with a fine pubescence along the rachis. The fertile fronds are shorter, brown at maturity, and have inrolled pinnae, which enclose the sporangia. They are produced midsummer to early fall and persist through the winter. **Fruit:** Sori hidden by inrolled pinnule margins with green spores. **Root:** Black, scaly, stoloniferous, rhizomes deep and long-creeping, producing erect, leafy crowns. **Soil:** Often growing on alluvial deposits. [7, 11]

## Normal Water Level

This species prefers upland moist to wet/saturated conditions. [21]

## Flooding/Fluctuation Tolerances

**Frequency:** Moderate. **Depth:** 12". **Duration:** Short – 1 day (decreasing the entire 12" in 1 day). This species has a moderate tolerance to flood duration. [1]

## Sensitivities or Other Tolerances

**Exposure:** Part sun to full shade. **Salt:** Low. **Nutrient:** Low to moderate.

**Siltation:** Low to moderate. **Insect:** Infrequent. **Other:** This species has a moderate tolerance to general disturbance and stress. [1, 47]

## Design Considerations

A lovely, large fern that is used in wet woods, shaded landscapes that are moist, along wooded stream banks and seeps. It is ideal for alluvial deposits and other rich woodland soils. **Concerns:** Because this species spreads by rhizomes and forms large colonies, it may be aggressive in certain conditions. This may be desirable in some instances to compete with invasive species.

## Wildlife Use

Ferns are widespread, especially in moist woodlands. Yet as a wildlife food source, they are used to a minor extent. Their leaves are eaten by deer, hares and grouse especially when other green plants are scarce. Ferns provide good cover for small mammals and songbirds. [21, 32]

Indicator Status: FACW

**Nursery/Plant Information**

**Available:**

Widely.

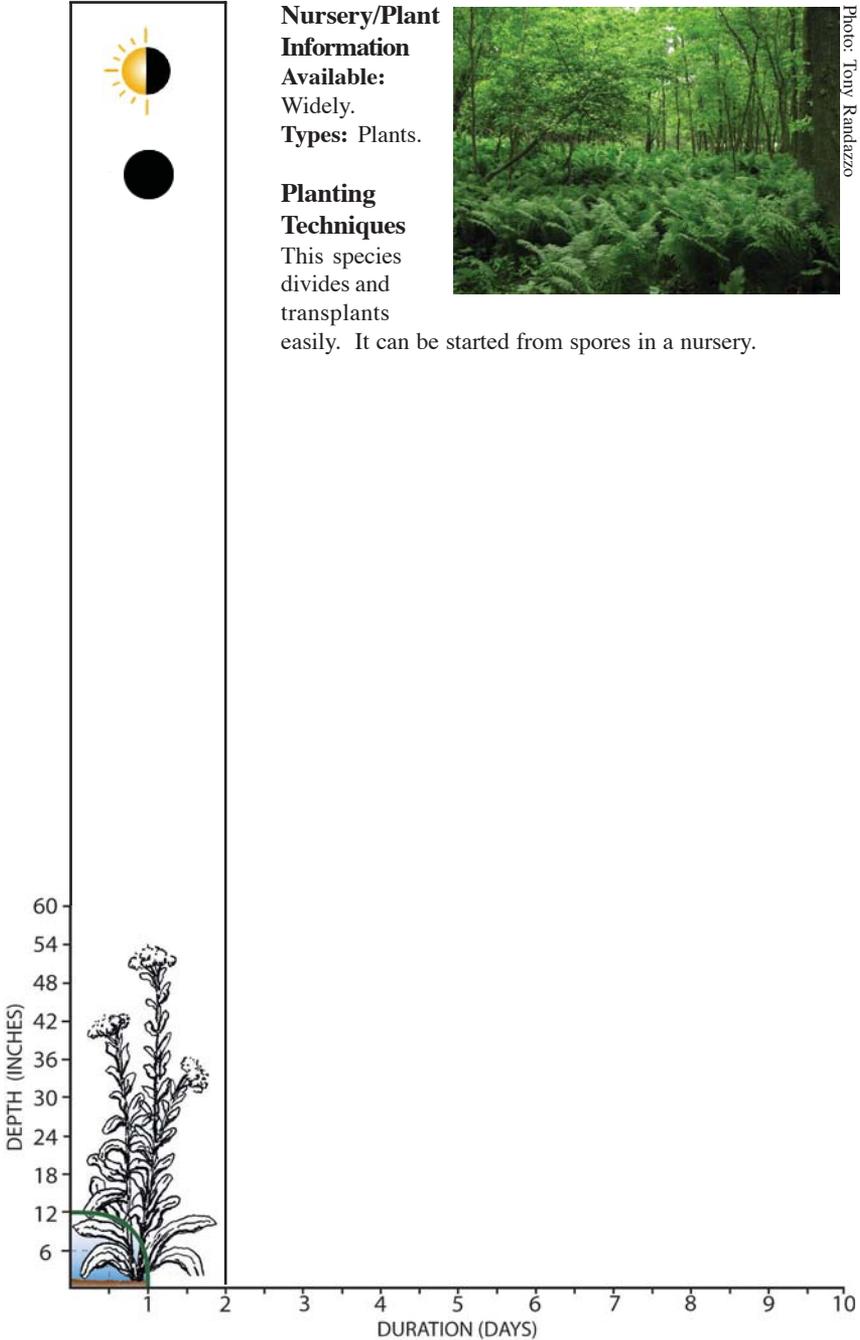
**Types:** Plants.

**Planting Techniques**

This species divides and transplants easily. It can be started from spores in a nursery.



Photo: Tony Randazzo





## *Monarda fistulosa*

Wild Bergamot - a.k.a. Horsemint or Bee Balm

### Habitat/Plant Community and Geographic Range

**Habitat/Community:** Mesic and dry prairies, savannas, open or brushy places, fields, often common on roadsides. [16, 17, 35, 41, 44] **Range:** Minn. (Eco-Region: All), Wis., Mich. Que. to Man. and B.C., s. to Ga., La. and Ariz. [17, 21]

### Description

**General:** A native perennial herb that is usually 3-4' tall and clumped.

**Flower:** Lavender flowers that have 2 lips and are arranged in heads with lance-shaped, bracteal leaves. Heads are a round cluster, 1-2" wide; individual flowers are ¼" long and tubular with a lower curved petal and a thin, straight petal. Blooms from July to August. **Leaf:** Hairy, opposite leaves with an odor of mint and citrus when crushed. The leaves are coarsely toothed, lance-shaped, 1-3" long and grow on short petioles. **Stem:** Erect, often branched, square stems that are usually hairy at least above, and produce a strong odor. **Root:** Spreads by rhizomes. **Soil:** Tolerates a wide variety of soil conditions. [17, 35, 41, 44]

### Normal Water Level

This species prefers upland moist to dry conditions. [21, 44]

### Flooding/Fluctuation Tolerances

**Frequency:** Moderate. **Depth:** 12". **Duration:** Short – 2 days (decreasing 6"/day). Wild bergamot has minimal inundation tolerance and is somewhat tolerant to flood duration. [1, 44]

### Sensitivities or Other Tolerances

**Exposure:** Full sun to part shade. **Salt:** Moderate. **Nutrient:** Moderate.

**Sitation:** Moderate. **Insect:** Low to moderate. **Other:** This species often suffers from mildew and is moderately tolerant to general disturbance. [1, 44, 47]

### Design Considerations

Wild bergamot is a beautiful mint that is used in slope and buffer stabilization because of its ability to hold soil. This species provides wonderful cut and dried flowers. It is used in landscape design where it may be a little unruly due to its aggressive behavior. It is an early successional species that is used in restorations, especially moist-to-dry prairies. It provides wildlife habitat and makes a great mint tea. **Concerns:** This species, though short lived, can be very aggressive. [16, 44]

### Wildlife Use

A nectar source for butterflies, bees and hummingbirds. It is also palatable in early growth by grazing species, such as deer, cattle and geese. [16, 21, 41, 44]

### Nursery/Plant Information

**Available:** Widely. **Types:** Plants and seed.

**Indicator Status:** FACU

### Planting Techniques

The seeds do not require treatment and establish easily. Seed will germinate better under high light levels and warm temperatures. Store the seed in a dry, cool area. Recommended seeding rate is 0.125-1.0 lb/acre, with approximately 1,248,000 seeds/lb. Mature clumps can be divided in March before stems emerge. Dig the entire plant before dividing and replant immediately. It will also establish from cuttings. [16, 44]

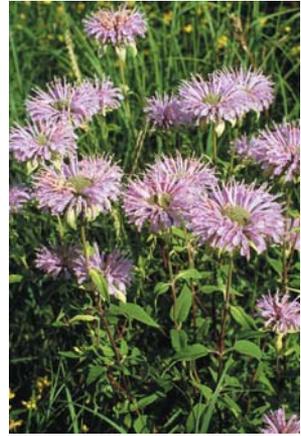
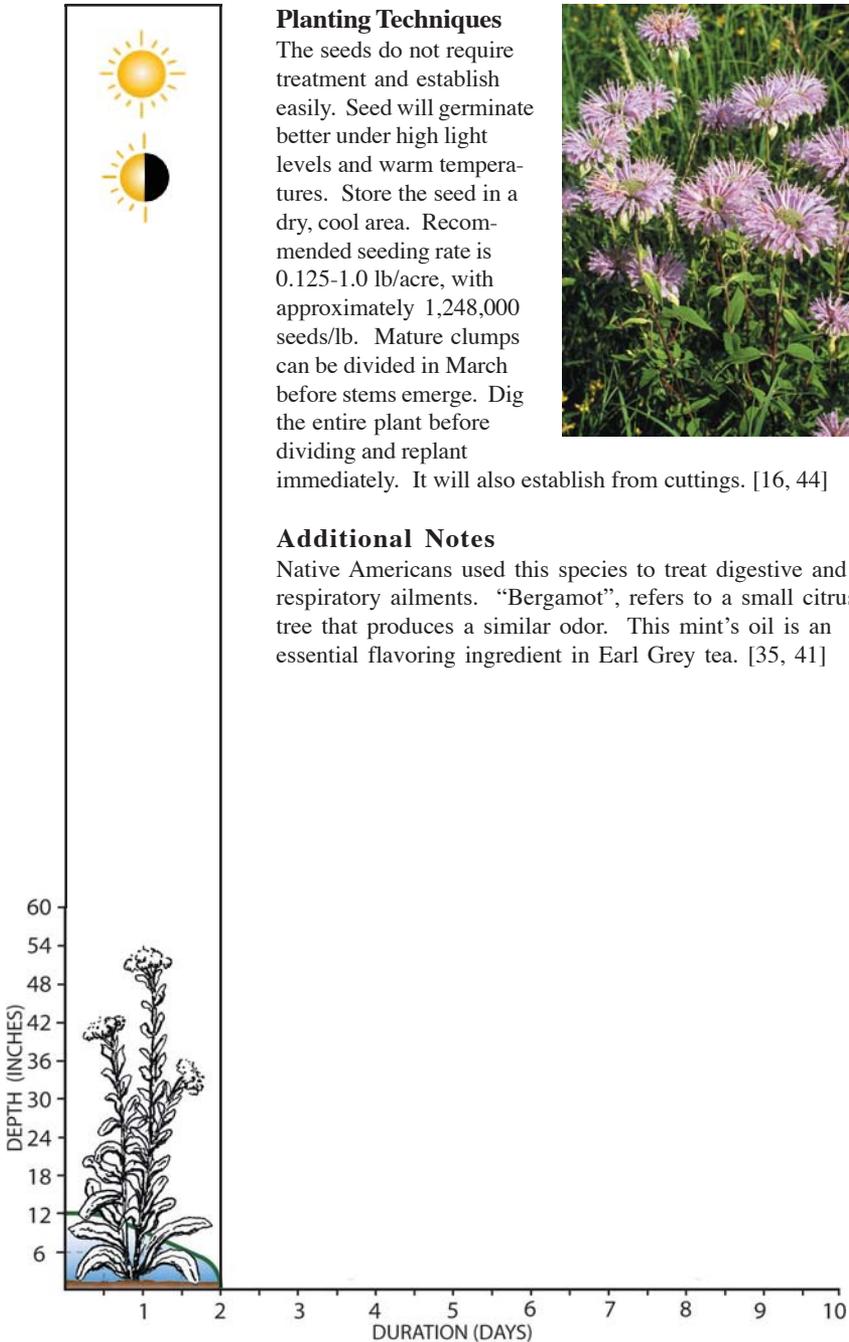
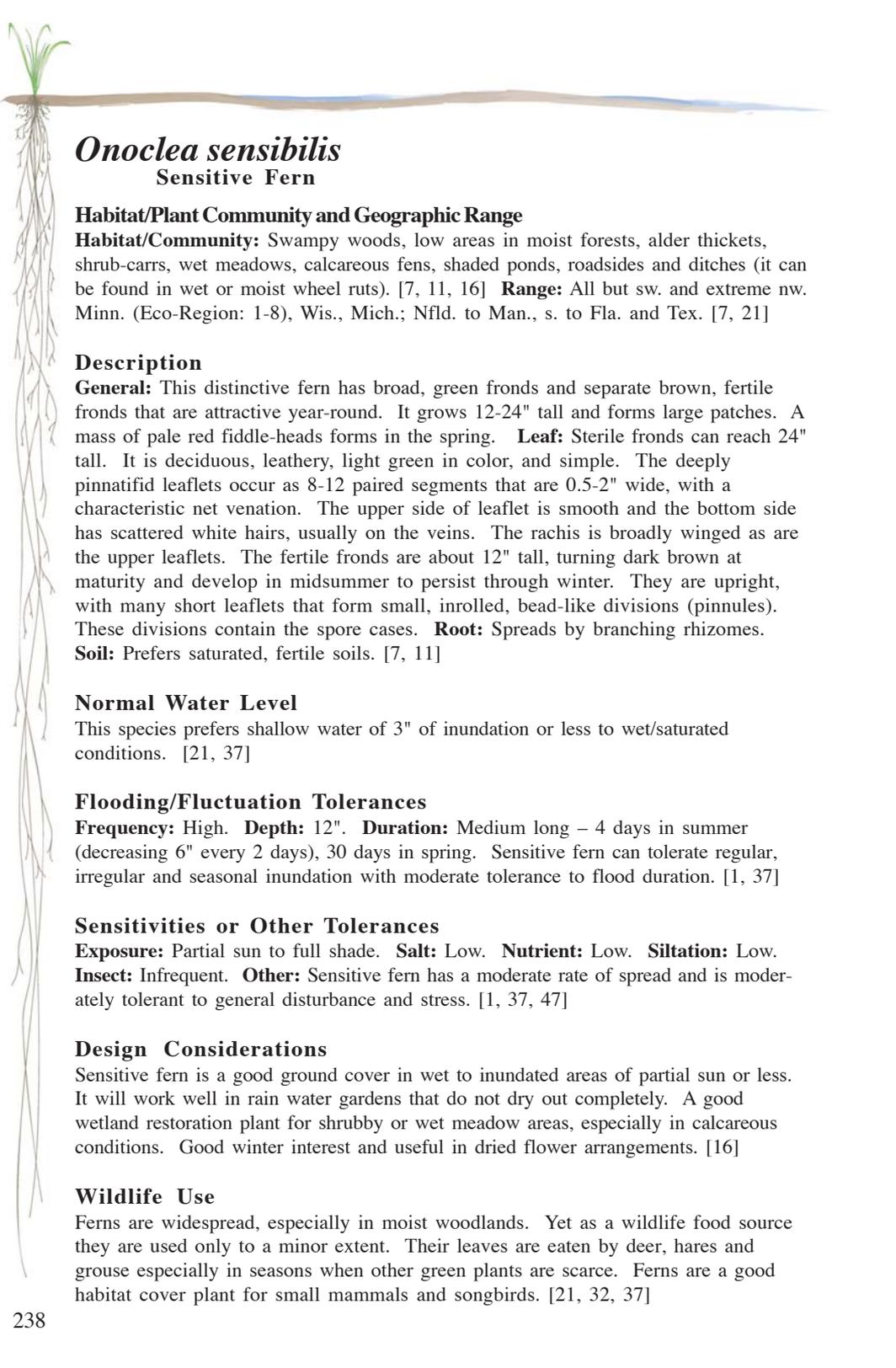


Photo: Paul Jackson

### Additional Notes

Native Americans used this species to treat digestive and respiratory ailments. “Bergamot”, refers to a small citrus tree that produces a similar odor. This mint’s oil is an essential flavoring ingredient in Earl Grey tea. [35, 41]





## *Onoclea sensibilis*

### Sensitive Fern

#### **Habitat/Plant Community and Geographic Range**

**Habitat/Community:** Swampy woods, low areas in moist forests, alder thickets, shrub-carrs, wet meadows, calcareous fens, shaded ponds, roadsides and ditches (it can be found in wet or moist wheel ruts). [7, 11, 16] **Range:** All but sw. and extreme nw. Minn. (Eco-Region: 1-8), Wis., Mich.; Nfld. to Man., s. to Fla. and Tex. [7, 21]

#### **Description**

**General:** This distinctive fern has broad, green fronds and separate brown, fertile fronds that are attractive year-round. It grows 12-24" tall and forms large patches. A mass of pale red fiddle-heads forms in the spring. **Leaf:** Sterile fronds can reach 24" tall. It is deciduous, leathery, light green in color, and simple. The deeply pinnatifid leaflets occur as 8-12 paired segments that are 0.5-2" wide, with a characteristic net venation. The upper side of leaflet is smooth and the bottom side has scattered white hairs, usually on the veins. The rachis is broadly winged as are the upper leaflets. The fertile fronds are about 12" tall, turning dark brown at maturity and develop in midsummer to persist through winter. They are upright, with many short leaflets that form small, inrolled, bead-like divisions (pinnules). These divisions contain the spore cases. **Root:** Spreads by branching rhizomes. **Soil:** Prefers saturated, fertile soils. [7, 11]

#### **Normal Water Level**

This species prefers shallow water of 3" of inundation or less to wet/saturated conditions. [21, 37]

#### **Flooding/Fluctuation Tolerances**

**Frequency:** High. **Depth:** 12". **Duration:** Medium long – 4 days in summer (decreasing 6" every 2 days), 30 days in spring. Sensitive fern can tolerate regular, irregular and seasonal inundation with moderate tolerance to flood duration. [1, 37]

#### **Sensitivities or Other Tolerances**

**Exposure:** Partial sun to full shade. **Salt:** Low. **Nutrient:** Low. **Siltation:** Low. **Insect:** Infrequent. **Other:** Sensitive fern has a moderate rate of spread and is moderately tolerant to general disturbance and stress. [1, 37, 47]

#### **Design Considerations**

Sensitive fern is a good ground cover in wet to inundated areas of partial sun or less. It will work well in rain water gardens that do not dry out completely. A good wetland restoration plant for shrubby or wet meadow areas, especially in calcareous conditions. Good winter interest and useful in dried flower arrangements. [16]

#### **Wildlife Use**

Ferns are widespread, especially in moist woodlands. Yet as a wildlife food source they are used only to a minor extent. Their leaves are eaten by deer, hares and grouse especially in seasons when other green plants are scarce. Ferns are a good habitat cover plant for small mammals and songbirds. [21, 32, 37]

**Indicator Status: FACW**

**Nursery/Plant Information**

**Available:** Becoming widely. **Types:** Plants only.

**Planting Techniques**

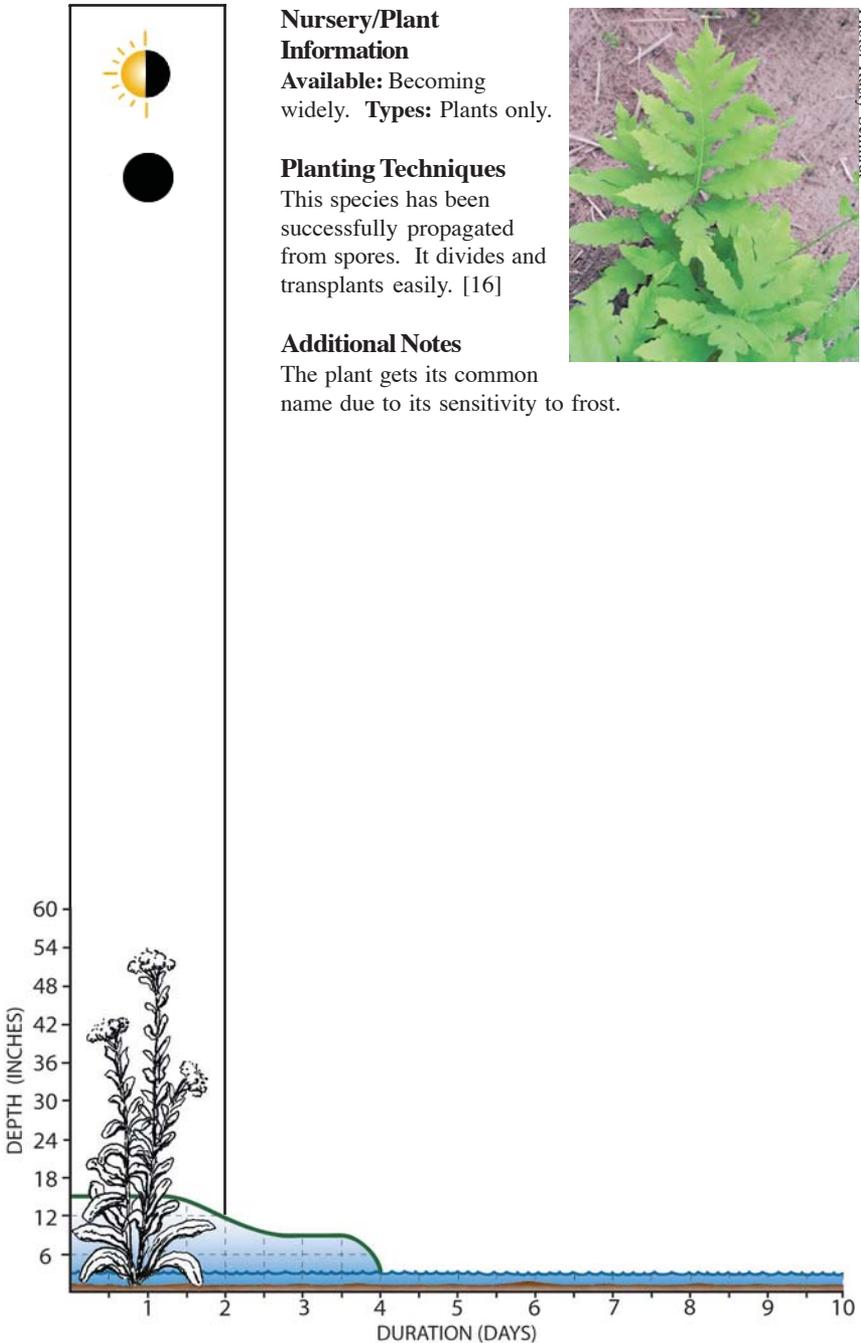
This species has been successfully propagated from spores. It divides and transplants easily. [16]

**Additional Notes**

The plant gets its common name due to its sensitivity to frost.



Photo: Rusty Schmidt





# *Osmunda regalis*

**Royal Fern** - a.k.a. Flowering Fern

## **Habitat/Plant Community and Geographic Range**

**Habitat/Community:** Bogs, swamps, forests, alder thickets, and shallow pools (soil is usually acidic). [7, 17] **Range:** Ne. and ec. Minn. (Eco-Region: 1, 6, 8), Wis., Mich. Circumboreal, Nfld. to Sask., s. to Fla., Tex. and tropical Amer. [7, 21]

## **Description**

**General:** Royal fern is a unique perennial fern 3' or more tall. **Leaf:** Highly attractive foliage of numerous erect fronds, reddish at first but becoming green. Blades are broadly ovate, 15-30" long and 12-20" wide with 2-pinnate opposite divisions (pinnules). The pinnules are well-spaced, oblong, rounded at tips, with entire or finely toothed margins. The fronds are rounded in back with broad, stipule-like basal wings. The fertile fronds have the uppermost several pinnae replaced by sporangia clusters. **Stem:** Smooth, green or red-green petioles to  $\frac{3}{4}$  length of blade.

**Root:** Stout rhizomes, with persistent leaf bases and fibrous roots but lacking scales.

**Soil:** Prefers acidic soil. [7, 17]

## **Normal Water Level**

This species prefers shallow water of 3" of inundation or less to wet/saturated conditions. [21, 37]

## **Flooding/Fluctuation Tolerances**

**Frequency:** High. **Depth:** 12". **Duration:** Medium long – 4 days in summer (decreasing 6" every 2 days). Royal fern is tolerant to regular, irregular and seasonal inundation with a moderate tolerance to flood duration. [1, 37]

## **Sensitivities or Other Tolerances**

**Exposure:** Full sun to full shade, though prefers partial shade. **Salt:** Low.

**Nutrient:** Low. **Siltation:** Low to moderate. **Insect:** Infrequent. **Other:** This species has a slow rate of spread and a moderately low tolerance to general disturbance and stress. [1, 37, 47]

## **Design Considerations**

Royal fern is a beautiful specimen plant for landscape designs and rainwater gardens. It is also a good ground cover plant for buffers to wetlands, especially pools, swamps and thickets. **Concerns:** Slow rate of spread.

## **Wildlife Use**

Ferns are widespread, especially in moist woodlands; yet, as a wildlife food source, they are used only to a minor extent. Their leaves are eaten by deer, hares and grouse, especially in seasons when other green plants are scarce. Ferns are a good habitat cover plant for small mammals and songbirds. [32, 37]

## **Nursery/Plant Information**

**Available:** Becoming widely. **Types:** Plants only.

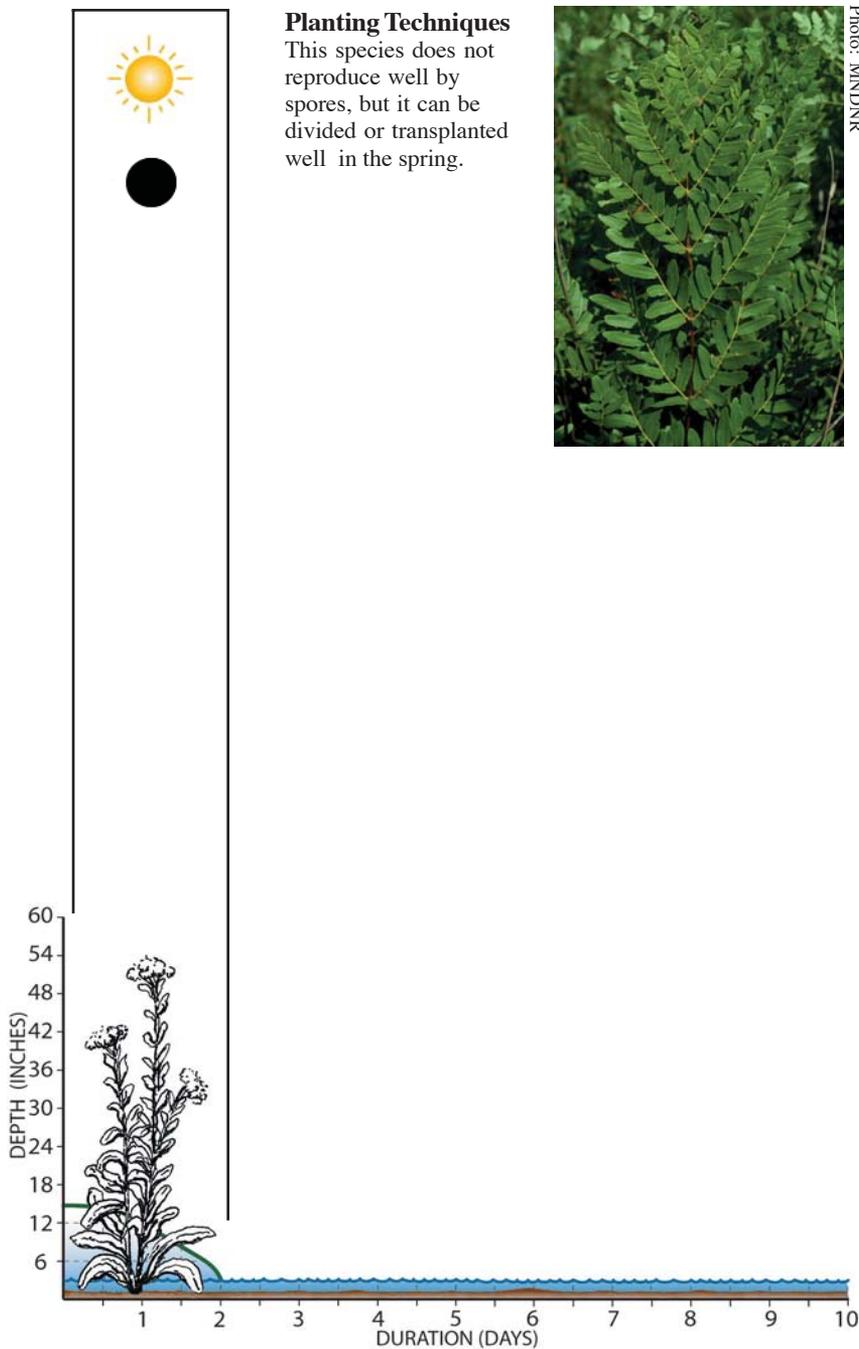
Indicator Status: OBL

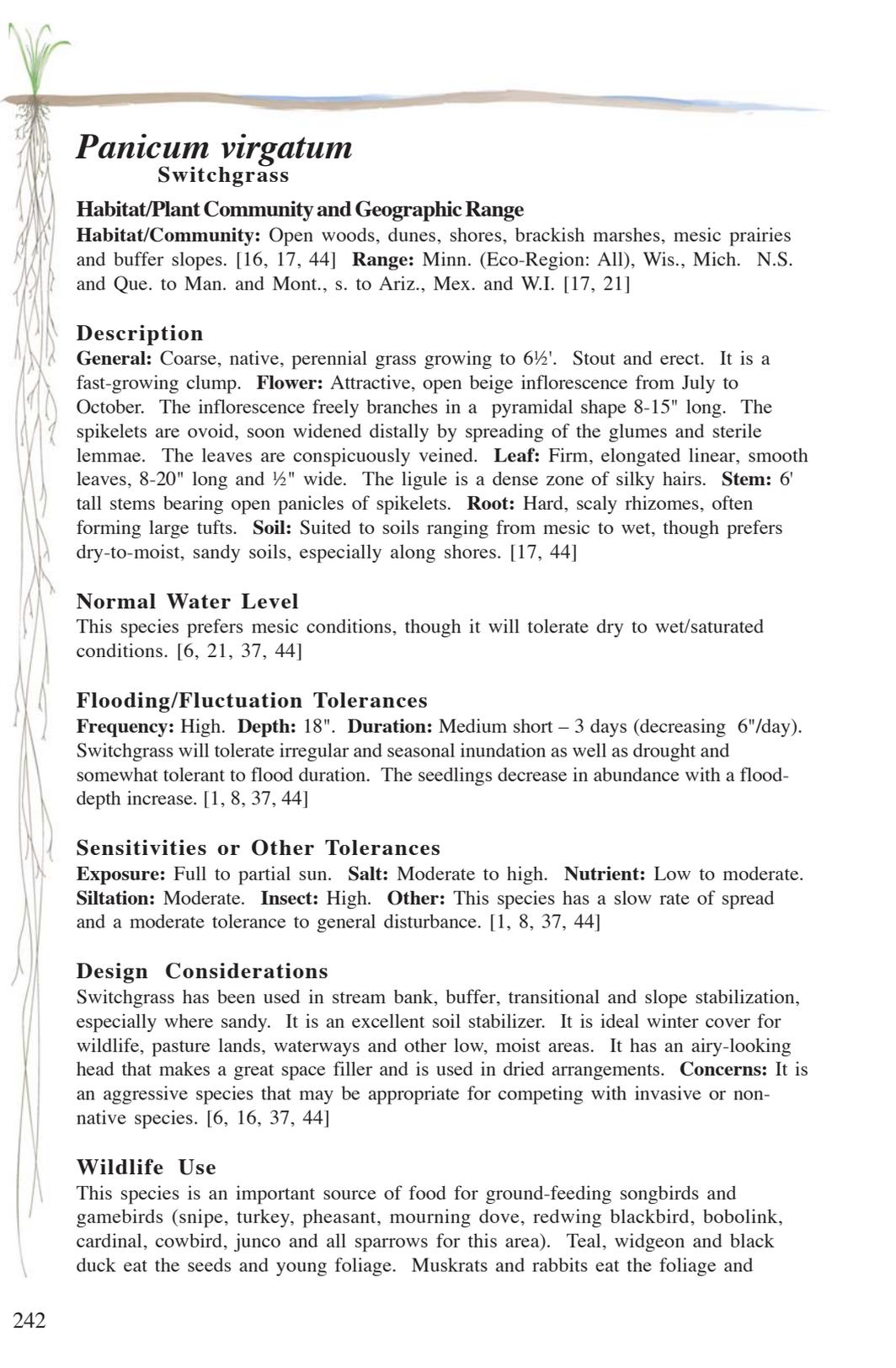
### Planting Techniques

This species does not reproduce well by spores, but it can be divided or transplanted well in the spring.



Photo: MINDNR





## *Panicum virgatum*

### Switchgrass

#### **Habitat/Plant Community and Geographic Range**

**Habitat/Community:** Open woods, dunes, shores, brackish marshes, mesic prairies and buffer slopes. [16, 17, 44] **Range:** Minn. (Eco-Region: All), Wis., Mich. N.S. and Que. to Man. and Mont., s. to Ariz., Mex. and W.I. [17, 21]

#### **Description**

**General:** Coarse, native, perennial grass growing to 6½'. Stout and erect. It is a fast-growing clump. **Flower:** Attractive, open beige inflorescence from July to October. The inflorescence freely branches in a pyramidal shape 8-15" long. The spikelets are ovoid, soon widened distally by spreading of the glumes and sterile lemmas. The leaves are conspicuously veined. **Leaf:** Firm, elongated linear, smooth leaves, 8-20" long and ½" wide. The ligule is a dense zone of silky hairs. **Stem:** 6' tall stems bearing open panicles of spikelets. **Root:** Hard, scaly rhizomes, often forming large tufts. **Soil:** Suited to soils ranging from mesic to wet, though prefers dry-to-moist, sandy soils, especially along shores. [17, 44]

#### **Normal Water Level**

This species prefers mesic conditions, though it will tolerate dry to wet/saturated conditions. [6, 21, 37, 44]

#### **Flooding/Fluctuation Tolerances**

**Frequency:** High. **Depth:** 18". **Duration:** Medium short – 3 days (decreasing 6"/day). Switchgrass will tolerate irregular and seasonal inundation as well as drought and somewhat tolerant to flood duration. The seedlings decrease in abundance with a flood-depth increase. [1, 8, 37, 44]

#### **Sensitivities or Other Tolerances**

**Exposure:** Full to partial sun. **Salt:** Moderate to high. **Nutrient:** Low to moderate. **Siltation:** Moderate. **Insect:** High. **Other:** This species has a slow rate of spread and a moderate tolerance to general disturbance. [1, 8, 37, 44]

#### **Design Considerations**

Switchgrass has been used in stream bank, buffer, transitional and slope stabilization, especially where sandy. It is an excellent soil stabilizer. It is ideal winter cover for wildlife, pasture lands, waterways and other low, moist areas. It has an airy-looking head that makes a great space filler and is used in dried arrangements. **Concerns:** It is an aggressive species that may be appropriate for competing with invasive or non-native species. [6, 16, 37, 44]

#### **Wildlife Use**

This species is an important source of food for ground-feeding songbirds and gamebirds (snipe, turkey, pheasant, mourning dove, redwing blackbird, bobolink, cardinal, cowbird, junco and all sparrows for this area). Teal, widgeon and black duck eat the seeds and young foliage. Muskrats and rabbits eat the foliage and

**Indicator Status:** FAC+

plants. This species is also a wonderful cover for many wildlife species. [16, 32, 37, 44]

**Nursery/Plant Information**

**Available:** Widely.

**Types:** Seed and plants.

**Planting Techniques**

Switchgrass germinates best with alternating temperatures, high-light levels and warm temperatures of approximately 70 degrees F.

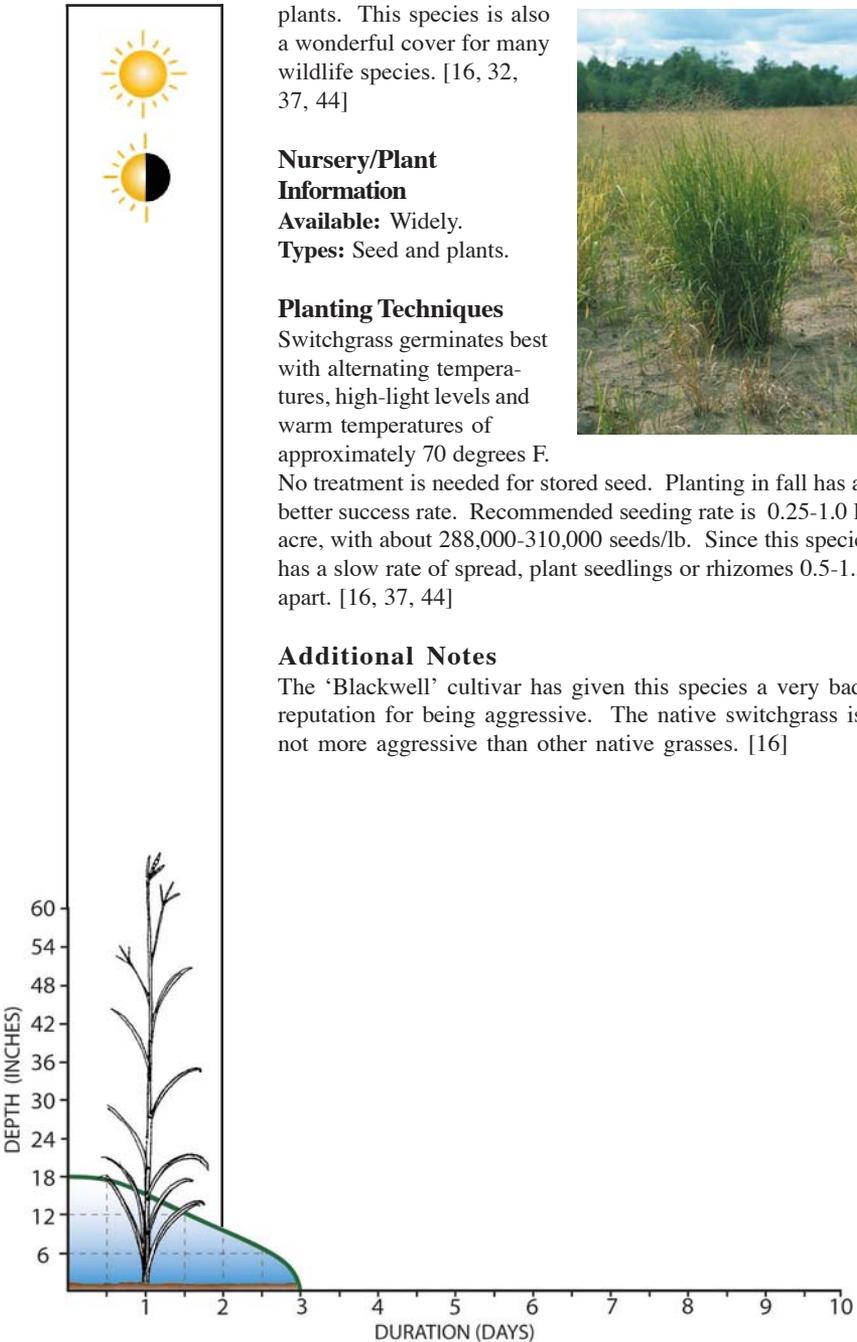
No treatment is needed for stored seed. Planting in fall has a better success rate. Recommended seeding rate is 0.25-1.0 lb/acre, with about 288,000-310,000 seeds/lb. Since this species has a slow rate of spread, plant seedlings or rhizomes 0.5-1.5' apart. [16, 37, 44]

**Additional Notes**

The 'Blackwell' cultivar has given this species a very bad reputation for being aggressive. The native switchgrass is not more aggressive than other native grasses. [16]



Photo: Paul Jackson





# *Phalaris arundinacea*

## Reed Canary Grass

### Habitat/Plant Community and Geographic Range

**Habitat/Community:** Wet meadows, shallow marshes, ditches, shores, shrub swamps, wooded swamps and streambanks. Reed canary grass is an extremely aggressive species that often forms persistent, monotypic stands on sites disturbed by agricultural use, drainage, filling, siltation and other factors. [4, 7, 11] **Range:** Common to abundant; Minn. (Eco-Range: All), Wis., Mich. Circumboreal, Nfld. to Alaska, s to N.C., Mo., Okla., N.M., Ariz. and Calif. [7, 21]

### Description

**General:** Tall, probably a non-native strain, perennial grass that typically forms large, dense colonies. **Flower:** A narrow, densely flowered panicle, 2-10" long, often purple-tinged. The branches are short and upright. Spikelets break above the glumes, with 1 fertile flower and 2 small, sterile lemmas below. Glumes are lance-shaped, tapered to tip, becoming straw-colored with age with 3 veins. The fertile lemma is ovate, shiny and blooms from June to July. **Leaf:** Flat and smooth, and usually 4-8" long and 1" wide, with smooth sheaths and a large, dry, papery ligule. **Stem:** Stout, smooth, branched stems 2-6' tall. **Root:** Spreading by rhizomes. **Soil:** Disturbed soils of any type, although it prefers it moist to wet. [4, 7, 11]

### Normal Water Level

This species prefers shallow water of 12" of inundation or less to wet/saturated conditions, although it will tolerate drier soils. Waterlogged conditions in the spring can stop growth of the rhizomes. [9, 37]

### Flooding/Fluctuation Tolerances

**Frequency:** High. **Depth:** 24". **Duration:** Long – 8 days (decreasing 6" every 2 days). This species will tolerate and even prefers regular and seasonal inundation with duration. Seedlings will decrease in abundance with flood depth increases, where mature plants are moderately tolerant. Mature plants are also tolerant with frequency increases and moderately so with flood depth decreases. [1, 37]

### Sensitivities or Other Tolerances

**Exposure:** Full to partial sun. **Salt:** High. **Nutrient:** High with increased abundance with an increase of N. **Siltation:** Moderate, 0-8 cm/year. **Insect:** Infrequent. **Other:** Reed canary grass has a rapid rate of spread. It has a high tolerance to general disturbance and stress. It has a moderate tolerance to iron concentrations. [1, 37]

### Design Considerations

It has no design considerations other than to remove and manage this species. Reed canary grass has been planted for erosion control on upland and wetland sites, and for lowland pasture. The European strain of this grass has essentially assimilated the native strain. **Concerns:** Reed canary grass is an extremely aggressive, probably non-native species that often forms persistent, monotypic stands on sites disturbed by agricultural use, drainage, filling, siltation and other factors, often to the detriment of other plants. [4, 7, 11, 37]

**Indicator Status:** FACW+

### Wildlife Use

This species provides cover for many types of wildlife, especially prairie voles, marsh wrens, red-winged blackbirds and wood ducks. Buntings and Savannah sparrows eat the seeds. [4, 32, 37]

### Nursery/Plant Information

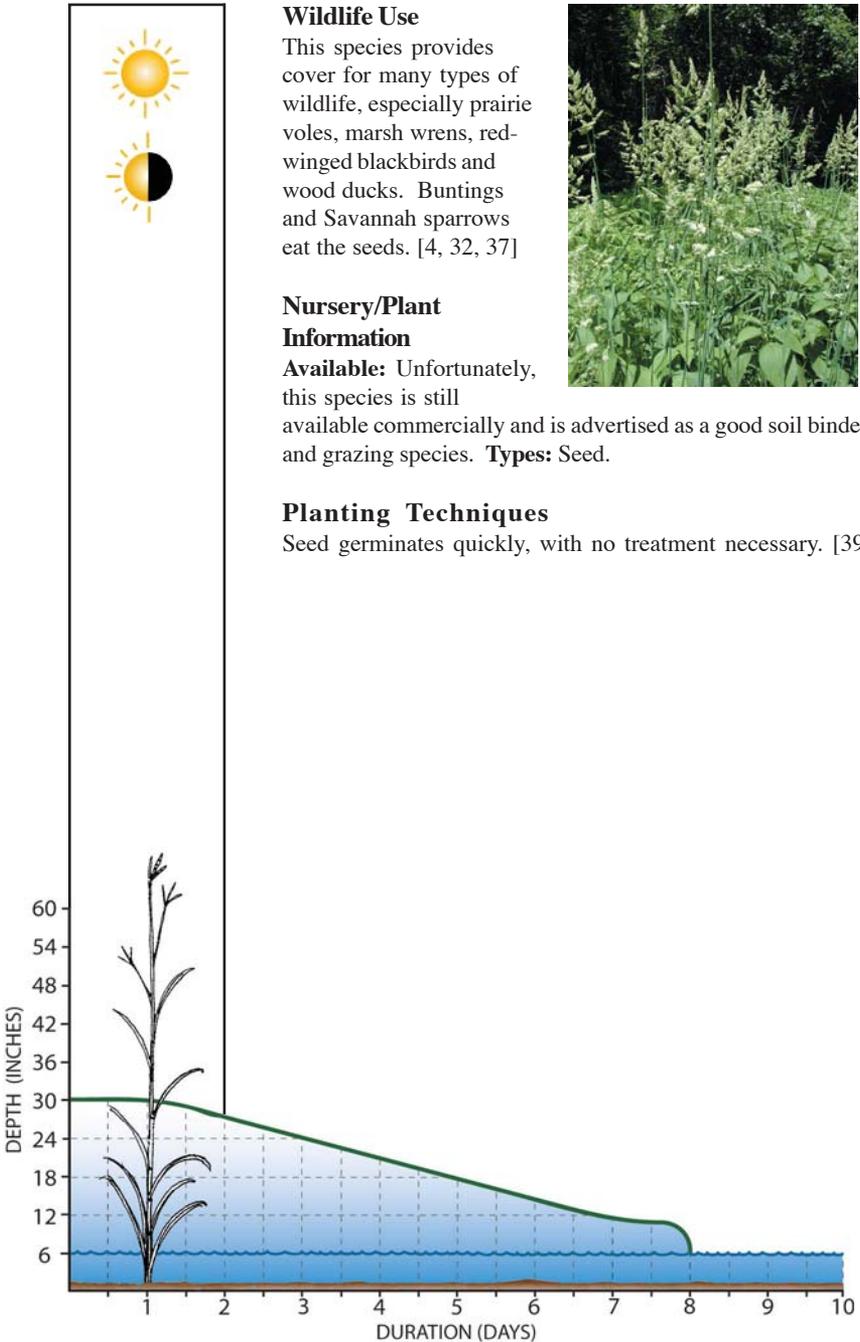
**Available:** Unfortunately, this species is still available commercially and is advertised as a good soil binder and grazing species. **Types:** Seed.

### Planting Techniques

Seed germinates quickly, with no treatment necessary. [39]



Photo: Rusty Schmidt





## *Physocarpus opulifolius*

Ninebark - a.k.a. Common Ninebark or Eastern Ninebark

### Habitat/Plant Community and Geographic Range

**Habitat/Community:** Stream banks, lake shores, swamps, rocky or sandy creek banks, sluggish streams, pond shores, seepage areas, bogs, moist limestone cliffs and rocky shores of the west side of Lake Superior. [7, 16, 22] **Range:** E. Minn., especially near Lake Superior and the Mississippi River (Eco-Region: 1,5-8), Wis., Mich.; Que. to N.D. and Colo., s. to N.C., Tenn. and Ark. [7]

### Description

**General:** Mound-forming shrub with closely spaced stems that grows 8-10' tall.

**Flower:** White flowers that are 5-parted, no wider than 3/8" with many in stalked, rounded clusters at ends of branches and in bloom from May to June. **Leaf:** Ninebark's maple-like leaves are alternate; ovate in outline; mostly 3-lobed; dark green above, paler and often sparsely hairy below. The margins are irregularly toothed, with 3/8-3/4"-long petioles. Yellow-green foliage turns to maroon-purple in autumn.

**Bark:** Loose bark, shredding in long, thin strips. **Twigs:** The long, greenish branches are covered with loose bark, slightly angled, smooth or finely hairy.

**Fruit:** A red-brown pod to 3/8" long in round clusters. The 3 or 4 seeds in each pod are shiny and produced from June to July. **Root:** Fibrous, shallow, lateral roots. **Soil:** Loams to clay soils. [7, 8, 22]

### Normal Water Level

This species prefers upland dry to wet/saturated conditions. [21]

### Flooding/Fluctuation Tolerances

**Frequency:** Moderate. **Depth:** 18". **Duration:** Medium short – 3 days (decreasing 6"/day). This species is very flood tolerant, though seedlings are somewhat tolerant to flood duration and saplings are moderately tolerant. [1, 8, 22]

### Sensitivities or Other Tolerances

**Exposure:** Full to part sun. **Salt:** Moderate. **Nutrient:** Low. **Siltation:** Unknown.

**Insect:** High. **Other:** Ninebark is damaged occasionally by wind and ice. It is resistant to drought, heat and soil compaction. This species has a moderate tolerance to general disturbance and stress. [1, 8, 21, 22, 25]

### Design Considerations

Ninebark is a popular foundation shrub because it is tough and easy to maintain. It is also a good shrub for restorations along streams, lakes, swamps, calcareous conditions and areas along Lake Superior. [7,16]

### Wildlife Use

This species provides food for waterfowl, marsh birds, shorebirds, upland gamebirds and small mammals. It is highly sought after by deer. The fruit is not edible to humans. [21, 22, 32]

Indicator Status: FACW-

### Nursery/Plant Information

**Available:**

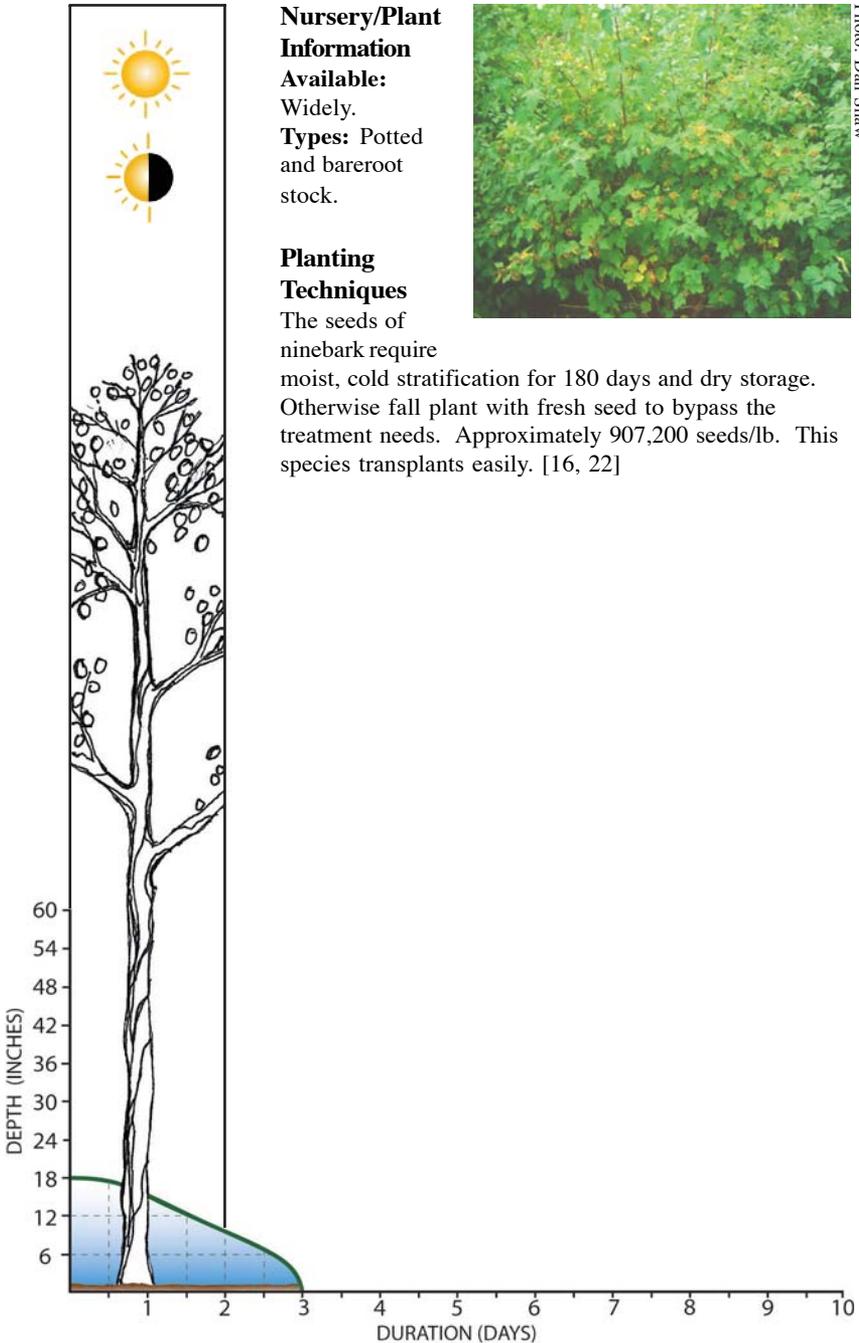
Widely.  
**Types:** Potted and bareroot stock.



Photo: Dan Shaw

### Planting Techniques

The seeds of ninebark require moist, cold stratification for 180 days and dry storage. Otherwise fall plant with fresh seed to bypass the treatment needs. Approximately 907,200 seeds/lb. This species transplants easily. [16, 22]





## *Physostegia virginiana*

Obedient Plant - a.k.a. *Physostegia virginiana speciosa* - Obedience,  
Lion's Heart, False or Showy False Dragonhead

### Habitat/Plant Community and Geographic Range

**Habitat/Community:** Sedge meadows, low prairies, marshes, moist and open woods, stream banks, shores, swamps, flood plain forests, thickets and ditches. [7, 16, 35] **Range:** Minn. (Eco-Region: All), Wis., Mich. Que. to Man., s to Va., Tenn., Ill., Mo. and ne. Kan. [7, 21]

### General Description

**General:** Erect, native, perennial herb, usually 2-3' tall. **Flower:** The showy, rosy-pink-purple flowers are about 1" long, borne in a spirelike, often branched, cluster that blooms from July to October. When the flower is pushed into a new position, it will remain there, giving the species its alternate name, obedient plant. **Leaf:** Elongate, oval, lance-shaped, opposite leaves that are smooth and without hairs, typically 3/4-6" long, with sharp teeth margins and stalkless, not clasping. **Stem:** Erect stems 2-3' long that are often branched near top, 4-angled and smooth, without hairs. **Fruit:** a small achene forming from July to September. **Root:** Spreading by rhizomes. **Soil:** Tolerant of many types. [7, 35]

### Normal Water Level

This species prefers shallow water of 3" of inundation or less to wet/saturated conditions and will tolerate moist, upland conditions. [21]

### Flooding/Fluctuation Tolerances

**Frequency:** Moderate. **Depth:** 12". **Duration:** Short – 2 days (decreasing 6"/day). This species is somewhat tolerant to flood duration. [1]

### Sensitivities or Other Tolerances

**Exposure:** Full to part sun. **Salt:** Low. **Nutrient:** Moderate. **Siltation:** Unknown. **Insect:** Infrequent. **Other:** This species has a moderate tolerance to general disturbance and stress. [1, 47]

### Design Considerations

A wonderful landscape plant that is a popular perennial for gardens. Obedient plant has been used successfully in rain water gardens and should be considered in lakescaping, pond edges and other shoreland zones. It provides good cut flowers. **Concerns:** This species has rhizomes and can be aggressive, though that may be desirable when competing against invasive or non-native species. Many cultivars are available. [7, 16]

### Wildlife Use

Obedient plant is a good nectar source for hummingbirds and butterflies. [16, 21]

### Nursery/Plant Information

**Available:** Widely. **Types:** Plants and seed.

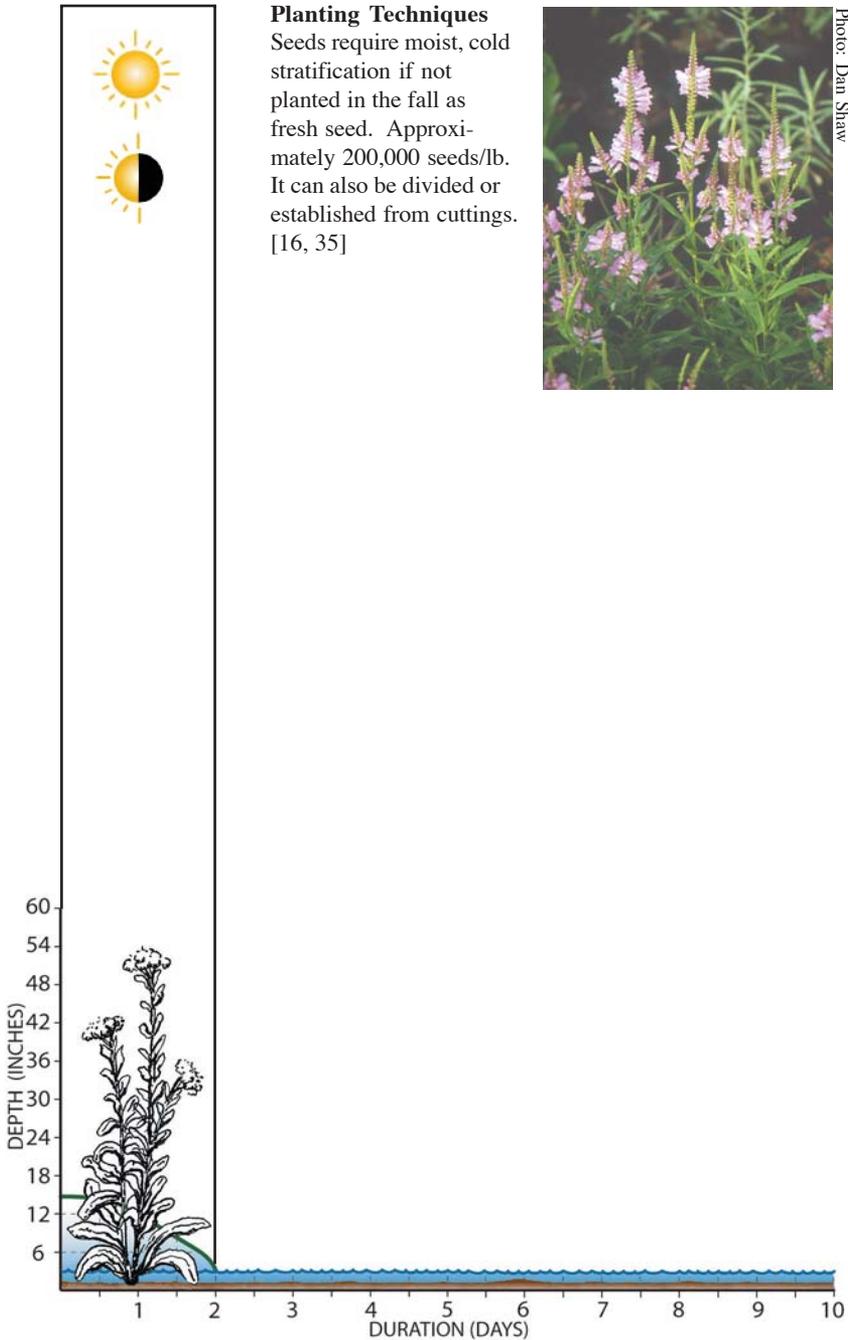
**Indicator Status: FACW**

**Planting Techniques**

Seeds require moist, cold stratification if not planted in the fall as fresh seed. Approximately 200,000 seeds/lb. It can also be divided or established from cuttings. [16, 35]



Photo: Dan Shaw





## *Polygonum amphibium*

Water Smartweed - a.k.a. *P. amphibium stipulaceum*, *P. coccinum* –  
Water Knot Weed; Marsh, Knotted or Nodding Smartweed

### Habitat/Plant Community and Geographic Range

**Habitat/Community:** Ponds, lakes, marshes, bog pools, shores, backwater areas and quiet streams. [7, 11] **Range:** Minn. (Eco-Region: All), Wis., Mich. Widespread in N. Hemisphere. [7, 21]

### Description

**General:** A highly variable perennial floating or emergent herb typically 3' tall. **Flower:** Usually a solitary terminal spike of densely crowded red-pink flowers. Blooms from June to August. **Leaf:** This species is divided into two forms -- an aquatic form and a "terrestrial" form. Both forms have several lance-shaped leaves along the elongate stem. The aquatic form (formerly known as *P. natans*) has submergent and glabrous, floating leaves  $\frac{3}{4}$ -6" long and under  $\frac{3}{4}$ " wide. The terrestrial form (formerly known as *P. coccineum*) has erect, densely hairy leaves usually less than 2" wide. **Stem:** Prostrate or erect stems to a length of under 3' when terrestrial and under 6' when aquatic. The ocrea of at least the aquatic form exhibits a green flange at its summit. **Fruit:** Lens-shaped achene, shiny, dark brown from June to September. **Root:** Spreading, long, forking rhizomes. **Soil:** Moist-to-wet soils with a pH range of 5.4-8.8. [7, 11, 44]

### Normal Water Level

This species prefers areas with 36" of inundation or less. [21, 37]

### Flooding/Fluctuation Tolerances

**Frequency:** High. **Depth:** 12". **Duration:** Short - 2 days though will have extended duration at 18". This species will tolerate a wide range of inundation at a regular to seasonal conditions and moderate duration. It is very tolerant to flood depth increases and will increase in abundance with depth decreases. [1, 37, 44]

### Sensitivities or Other Tolerances

**Exposure:** Partial to full sun. **Salt:** Low. **Nutrient:** Moderate to low. **Siltation:** Moderate to high. **Insect:** Infrequent. **Other:** It will tolerate waves and a wide range of inundation conditions. This species has a moderate-low tolerance to general disturbance and stress. [1, 44]

### Design Considerations

Water smartweed has been used in shoreland, wave-reducing and erosion-control zones. It should be considered for ponds, lakes, marshes and backwater-area restoration sites. This species is a good food source for wildlife. It will establish from the seedbank and is favored by drawdowns. **Concerns:** This species grows in large, dense beds, which may choke out other vegetation. [26, 42, 44]

### Wildlife Use

Water smartweed a good food source for wildlife. It is popular with waterfowl and valued by many of our most common and best-loved songbirds. The waterfowl include black, mallard, pintail, redhead, ring-necked, scaup, teal and wood ducks, Canada geese

**Indicator Status:** OBL



and trumpeter swans. The songbirds include redwing blackbird; cardinal; rose-breasted grosbeak; junco; redpoll; and fox, savannah, song, swamp, vesper, white-crowned and white-throated sparrow. This species also serves as a major food source for the purplish copper butterfly and provides cover for fish. Chipmunks and mice also use this plant as food. [6, 21, 32, 44]

**Nursery/Plant Information**

**Available:** Limited. **Types:** Plants and rhizomes.

**Planting Techniques**

The achenes of water smartweed should be cold, wet stratified for 90+ days. Germination requires high light levels. Fresh seeding in the fall has better establishment rates. Smartweeds does well from seedbanks, and drawdowns may promote germination. This species can also be established by taking cuttings from the top part of the stems and burying the lower portion of the cuttings. Or, cuttings can be broadcast and gently raked into loose soil and then rolled to firm the surface. Rhizomes may also be planted in moist soils. Seedlings can be planted in muddy soil to a depth of 12". Spring drawdowns followed by shallow flooding has improved establishment. Water smartweed is a fast colonizer. [6, 26, 42, 43, 44]



Photo: Jason Husveth



Photo: Jason Husveth





## *Pontederia cordata*

Pickerelweed - a.k.a. Pickerel Plant

### Habitat/Plant Community and Geographic Range

**Habitat/Community:** Lakes, ponds, rivers, marshes, bogs, swamps and Mississippi River backwaters, often forms large colonies (shallow water to 1 m deep). [4, 7, 11, 41] **Range:** E. Minn. (Eco-Region: 1, 6, 7), w. ½ of Wis., but local in UP of Mich. N.S. to Ont. and Minn., s. to S. Amer. [7, 21]

### Description

**General:** Pickerelweed is a nonpersistent, emergent, native, herbaceous perennial that is found in shallow water (rarely more than 3' deep) or saturated substrates to a height of 40". **Flower:** Violet-blue (rarely white) flowers are packed into a dense spike, 4-6" long that blooms from June to August. Individual flowers are ½" long and have 3 upper petals (the middle upper petal has 2 small, yellow spots) and 3 lower petals. **Leaf:** Heart-shaped to lanceolate leaves up to 7" long that has a potential of rosettes of submerged, ribbon-like leaves. The leaves are long-petioled and are dark green and glossy. **Stem:** Stout, upright, to 48" long, with 1 leaf. **Fruit:** A small, 1-seeded utricle produced from June to September. **Root:** Spreading, thick and creeping rhizomes, which form colonies. **Soil:** Shallow water or saturated substrates of muck or mud. [4, 7, 11, 41]

### Normal Water Level

This species prefers shallow water 12-18" deep, though it will tolerate wet/saturated conditions or water depths of 36" or less. It also prefers fresh or slightly brackish water. [11, 37, 41]

### Flooding/Fluctuation Tolerances

**Frequency:** Moderate. **Depth:** 12". **Duration:** Medium long – 4 days (decreasing 6" every 2 days). Pickerelweed will tolerate regular flooding of small levels and moderate duration. It is very tolerant to flood depth increases and will increase in abundance with depth decreases. [1, 37]

### Sensitivities or Other Tolerances

**Exposure:** Full sun to partial shade. **Salt:** Low. **Nutrient:** Unknown. **Siltation:** Unknown. **Insect:** Infrequent. **Other:** This species has a moderately low tolerance to general disturbance and stress. [1, 6]

### Design Considerations

Pickerelweed has been used in restorations of back waters, slow-moving streams and lake shores. It is a very decorative plant for water gardens and lake shores. It provides good habitat. **Concerns:** Pickerelweed does not always persist after planting, although once established it can produce very large beds.

### Wildlife Use

Pickerelweed provides seeds for waterfowl, especially black and wood ducks. Muskrats eat the plants and roots. It also provides wonderful cover for frogs and fish. The small solitary bee, *Halictoides novae-angliae*, will visit this plant exclusively for nectar

**Indicator Status:** OBL

and pollen. [4, 6, 21, 32, 37, 41]

**Nursery/Plant Information**

**Available:** Widely. **Types:** Roots, seeds and plants.

**Planting Techniques**

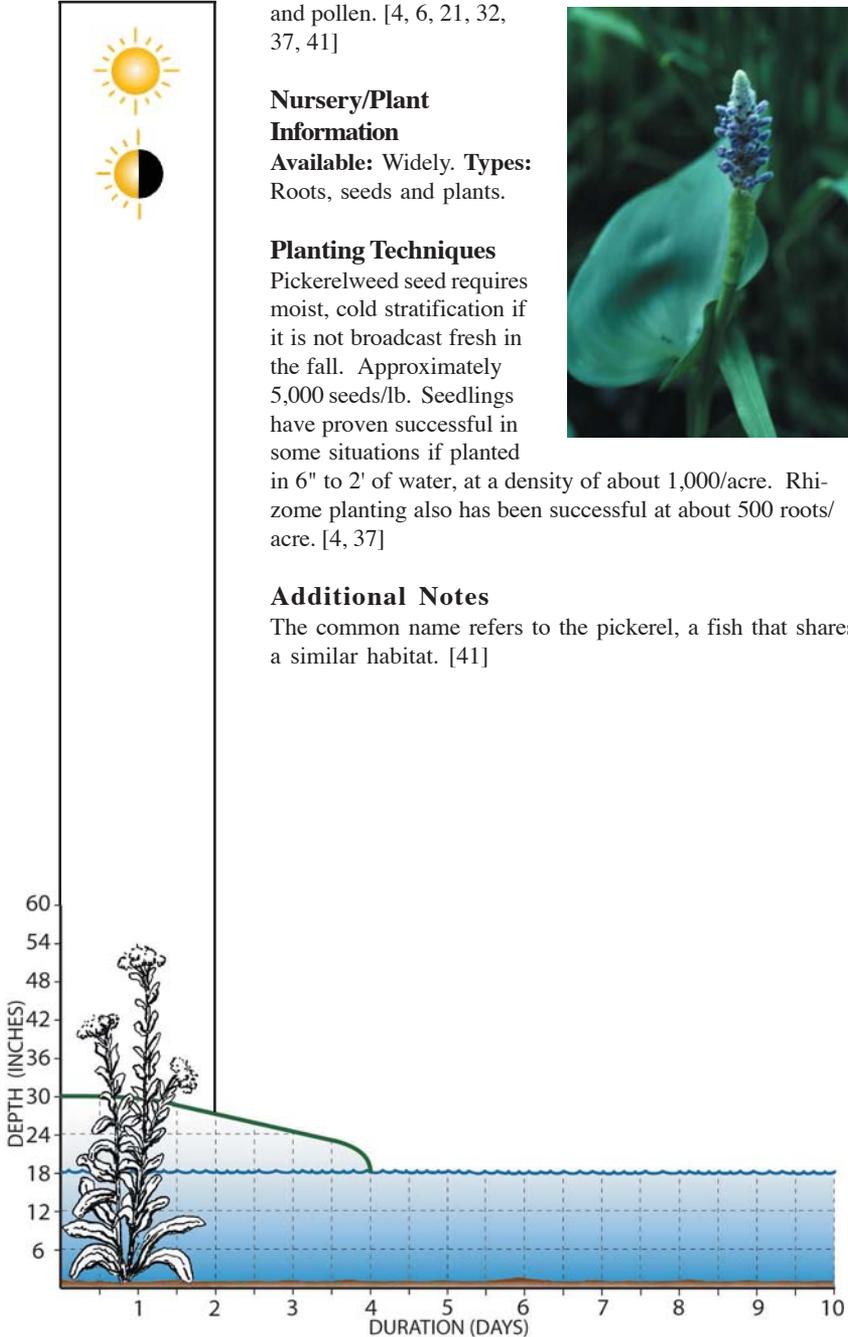
Pickerelweed seed requires moist, cold stratification if it is not broadcast fresh in the fall. Approximately 5,000 seeds/lb. Seedlings have proven successful in some situations if planted in 6" to 2' of water, at a density of about 1,000/acre. Rhizome planting also has been successful at about 500 roots/acre. [4, 37]

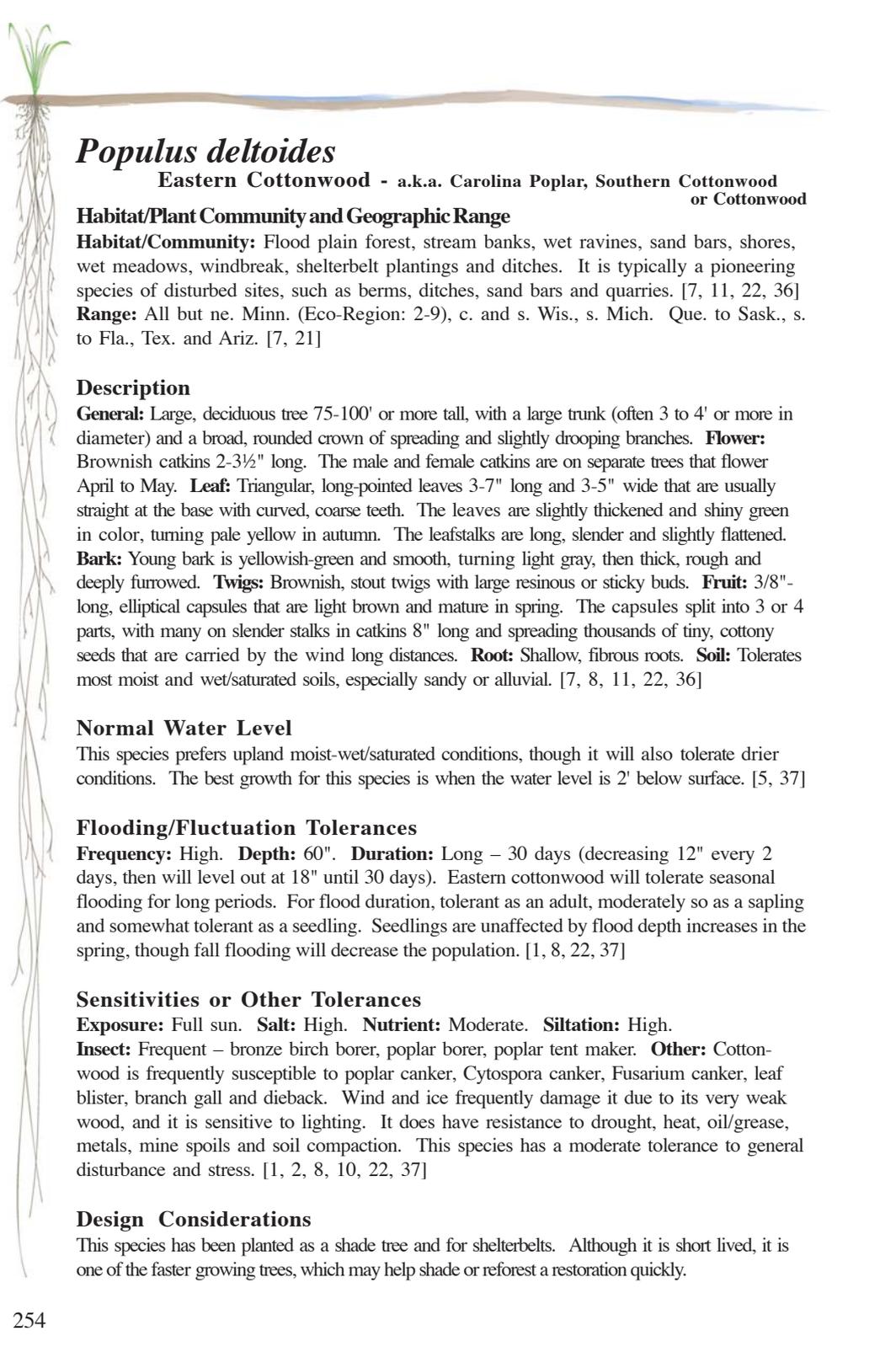
**Additional Notes**

The common name refers to the pickerel, a fish that shares a similar habitat. [41]



Photo: Jason Husweh





## *Populus deltoides*

Eastern Cottonwood - a.k.a. Carolina Poplar, Southern Cottonwood  
or Cottonwood

### Habitat/Plant Community and Geographic Range

**Habitat/Community:** Flood plain forest, stream banks, wet ravines, sand bars, shores, wet meadows, windbreak, shelterbelt plantings and ditches. It is typically a pioneering species of disturbed sites, such as berms, ditches, sand bars and quarries. [7, 11, 22, 36]  
**Range:** All but ne. Minn. (Eco-Region: 2-9), c. and s. Wis., s. Mich. Que. to Sask., s. to Fla., Tex. and Ariz. [7, 21]

### Description

**General:** Large, deciduous tree 75-100' or more tall, with a large trunk (often 3 to 4' or more in diameter) and a broad, rounded crown of spreading and slightly drooping branches. **Flower:** Brownish catkins 2-3½" long. The male and female catkins are on separate trees that flower April to May. **Leaf:** Triangular, long-pointed leaves 3-7" long and 3-5" wide that are usually straight at the base with curved, coarse teeth. The leaves are slightly thickened and shiny green in color, turning pale yellow in autumn. The leafstalks are long, slender and slightly flattened. **Bark:** Young bark is yellowish-green and smooth, turning light gray, then thick, rough and deeply furrowed. **Twigs:** Brownish, stout twigs with large resinous or sticky buds. **Fruit:** 3/8"-long, elliptical capsules that are light brown and mature in spring. The capsules split into 3 or 4 parts, with many on slender stalks in catkins 8" long and spreading thousands of tiny, cottony seeds that are carried by the wind long distances. **Root:** Shallow, fibrous roots. **Soil:** Tolerates most moist and wet/saturated soils, especially sandy or alluvial. [7, 8, 11, 22, 36]

### Normal Water Level

This species prefers upland moist-wet/saturated conditions, though it will also tolerate drier conditions. The best growth for this species is when the water level is 2' below surface. [5, 37]

### Flooding/Fluctuation Tolerances

**Frequency:** High. **Depth:** 60". **Duration:** Long – 30 days (decreasing 12" every 2 days, then will level out at 18" until 30 days). Eastern cottonwood will tolerate seasonal flooding for long periods. For flood duration, tolerant as an adult, moderately so as a sapling and somewhat tolerant as a seedling. Seedlings are unaffected by flood depth increases in the spring, though fall flooding will decrease the population. [1, 8, 22, 37]

### Sensitivities or Other Tolerances

**Exposure:** Full sun. **Salt:** High. **Nutrient:** Moderate. **Siltation:** High.  
**Insect:** Frequent – bronze birch borer, poplar borer, poplar tent maker. **Other:** Cottonwood is frequently susceptible to poplar canker, Cytospora canker, Fusarium canker, leaf blister, branch gall and dieback. Wind and ice frequently damage it due to its very weak wood, and it is sensitive to lightning. It does have resistance to drought, heat, oil/grease, metals, mine spoils and soil compaction. This species has a moderate tolerance to general disturbance and stress. [1, 2, 8, 10, 22, 37]

### Design Considerations

This species has been planted as a shade tree and for shelterbelts. Although it is short lived, it is one of the faster growing trees, which may help shade or reforest a restoration quickly.

**Indicator Status: FAC+**

**Concerns:** Many people consider it weedy as it can spread little seedlings quickly across a site. Some authorities discourage its planting due to its cottony seeds. Another concern is that it is a favorite species of beavers (if they are an issue for your site). [36]



Photo: [www.cala2.umn.edu/la5574](http://www.cala2.umn.edu/la5574)

### Wildlife Use

Eastern cottonwood provides habitat for many species, especially during winter. Ruffed and sharp-tailed grouse eat the buds and catkins in the winter and spring, as do the evening grosbeak and purple finch. The sap is utilized by the yellow-bellied sapsucker. The tender bark, twigs and foliage are eaten freely by rabbits, deer, elk and moose. The wood and bark is a favorite of beaver and porcupine. Many songbirds use this species for nesting and habitat as do small mammals such as chipmunks, squirrels and mice. [21, 22, 32, 37]

### Nursery/Plant Information

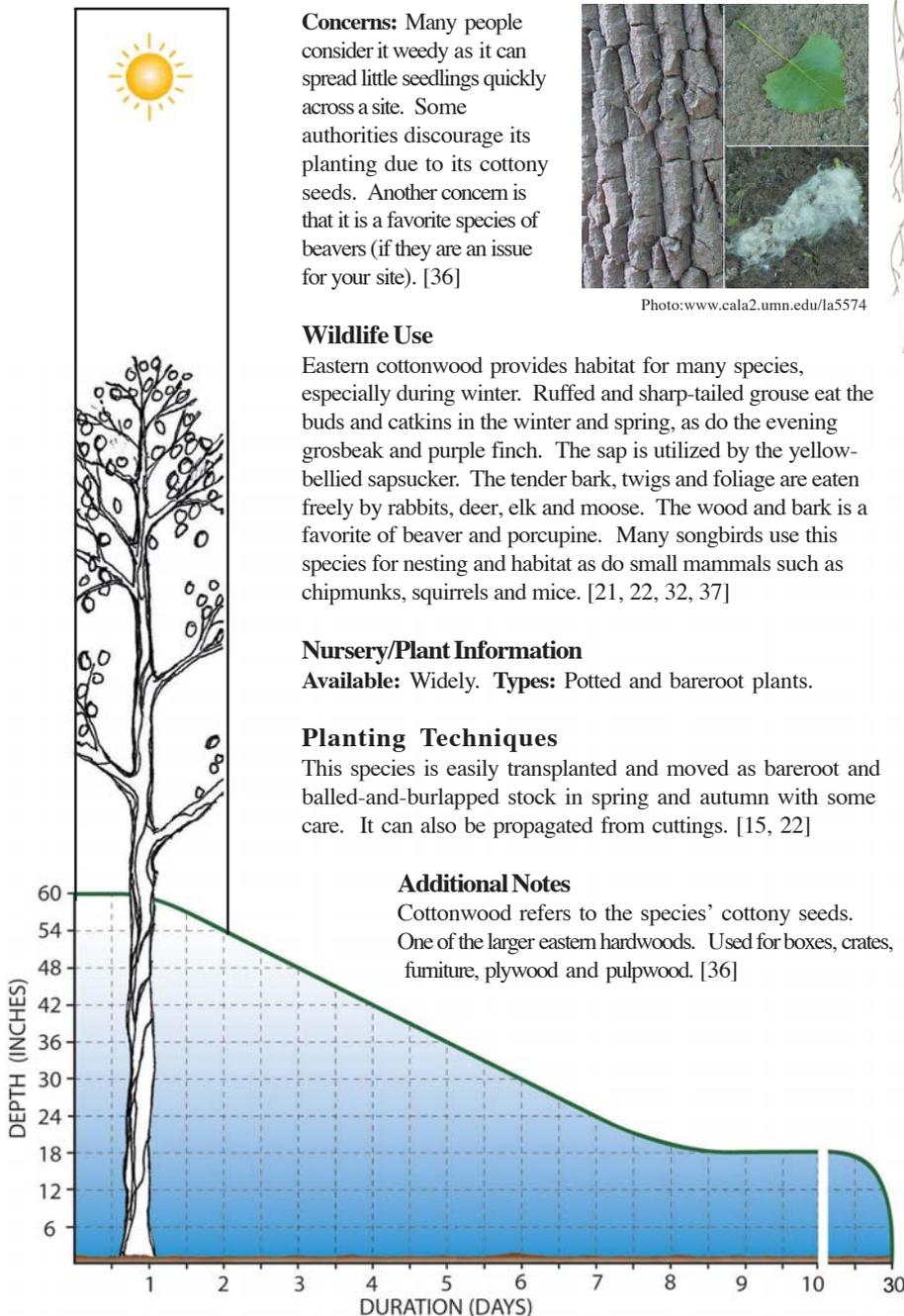
**Available:** Widely. **Types:** Potted and bareroot plants.

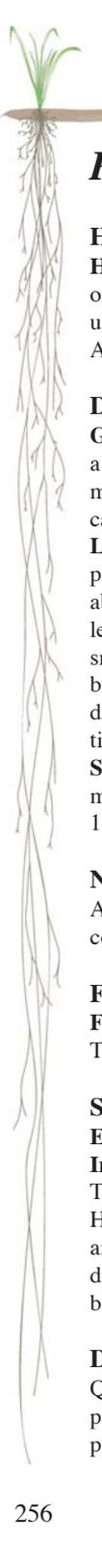
### Planting Techniques

This species is easily transplanted and moved as bareroot and balled-and-burlapped stock in spring and autumn with some care. It can also be propagated from cuttings. [15, 22]

### Additional Notes

Cottonwood refers to the species' cottony seeds. One of the larger eastern hardwoods. Used for boxes, crates, furniture, plywood and pulpwood. [36]





## *Populus tremuloides*

Quaking Aspen - a.k.a. Trembling Aspen, Golden Aspen or Popple

### Habitat/Plant Community and Geographic Range

**Habitat/Community:** Moist upland woods, seeps and streamsides, often on cut-over or burned land. Quaking aspen often invades abandoned agricultural lands and vacant urban lands. [17, 11, 22, 36] **Range:** Minn. (Eco-Region: All), Wis., Mich. Labr. to Alaska, s. to N.J., Va., Tenn., Mo. and Mex. [17, 21]

### Description

**General:** The most widely distributed, native, deciduous tree in North America with a narrow, rounded crown of thin foliage, growing 40-50' tall and 20-35' wide. Trunk may have a diameter of 1-1½'. **Flower:** Sexes are on separate trees with pistillate catkins 1-2½" long, brownish, blooming in early spring before the leaves emerge. **Leaf:** Simple, alternate, nearly round 1¼-3" long leaves that have an abrupt, short point with a rounded base and finely saw-toothed margins. They are shiny green above, dull green beneath and turn golden-yellow in autumn, with slender, flattened leafstalks. Leaves tremble in the slightest breeze. **Bark:** Young bark is whitish, smooth and thin. As it matures, it turns dark gray, furrowed and thick. **Twigs:** Shiny brown, slender and hairless. **Fruit:** Narrowly conical, light-green capsules ¼" long in drooping catkins to 4" long that mature in late spring and split in 2 parts, with many, tiny, cottony seeds. **Root:** Shallow, fibrous, prolific sprouts form broad colonies. **Soil:** Tolerates most soil types, although it prefers sandy and gravelly slopes and wet-moist, limy soils where it can form large colonies from an extensive root system. [17, 11, 22, 36]

### Normal Water Level

Although this species will tolerate saturated soils, it prefers upland moist to dry conditions. [21]

### Flooding/Fluctuation Tolerances

**Frequency:** Low. **Depth:** 18". **Duration:** Medium short – 3 days (decreasing 6"/day). This species is intolerant of flooding with somewhat of a tolerance to duration. [1]

### Sensitivities or Other Tolerances

**Exposure:** Full sun. **Salt:** Moderate to high. **Nutrient:** Low. **Siltation:** Unknown. **Insect:** Frequent – poplar borer, poplar gall, scale, red humped caterpillar. **Other:** This species is frequently susceptible to leaf spot, shoot blight, Cytospora canker, Hypoxylon canker and other cankers. It is also frequently damaged by wind and ice and is sensitive to SO<sub>2</sub>, O<sub>3</sub>, lighting and soil compaction. It can be sensitive to HFI, drought, heat and mine spoils. It has a moderately high tolerance to general disturbance and stress. [1, 2, 22, 25]

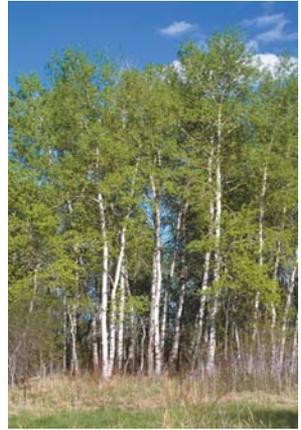
### Design Considerations

Quaking aspen has been used primarily for reforesting an area quickly, due to its pioneer qualities, especially in cut-over and burned areas. It is also a primary pulpwood species.

**Indicator Status:** FAC

Photo: Paul Jackson

**Concerns:** It has been very popular with the lumber industry lately, with cultivars being introduced for even faster growth. It can overtake native plant communities, especially prairies. Suckering can be a problem in gardens. Quaking aspen is a favorite food of beaver. [11, 22, 36]



**Wildlife Use**

Quaking aspen provides habitat for many species, especially during the winter. Ruffed and sharp-tailed grouse eat the buds and catkins in winter and spring, as do the evening grosbeak and purple finch. The sap is utilized by the yellow-bellied sapsucker. The tender bark, twigs and foliage are eaten freely by rabbits, deer, elk and moose. The wood and bark is a favorite of beaver and porcupine. Many songbirds use this species for nesting and habitat as do small mammals, such as chipmunks, squirrels and mice. [11, 22, 32, 36]

**Nursery/Plant Information**

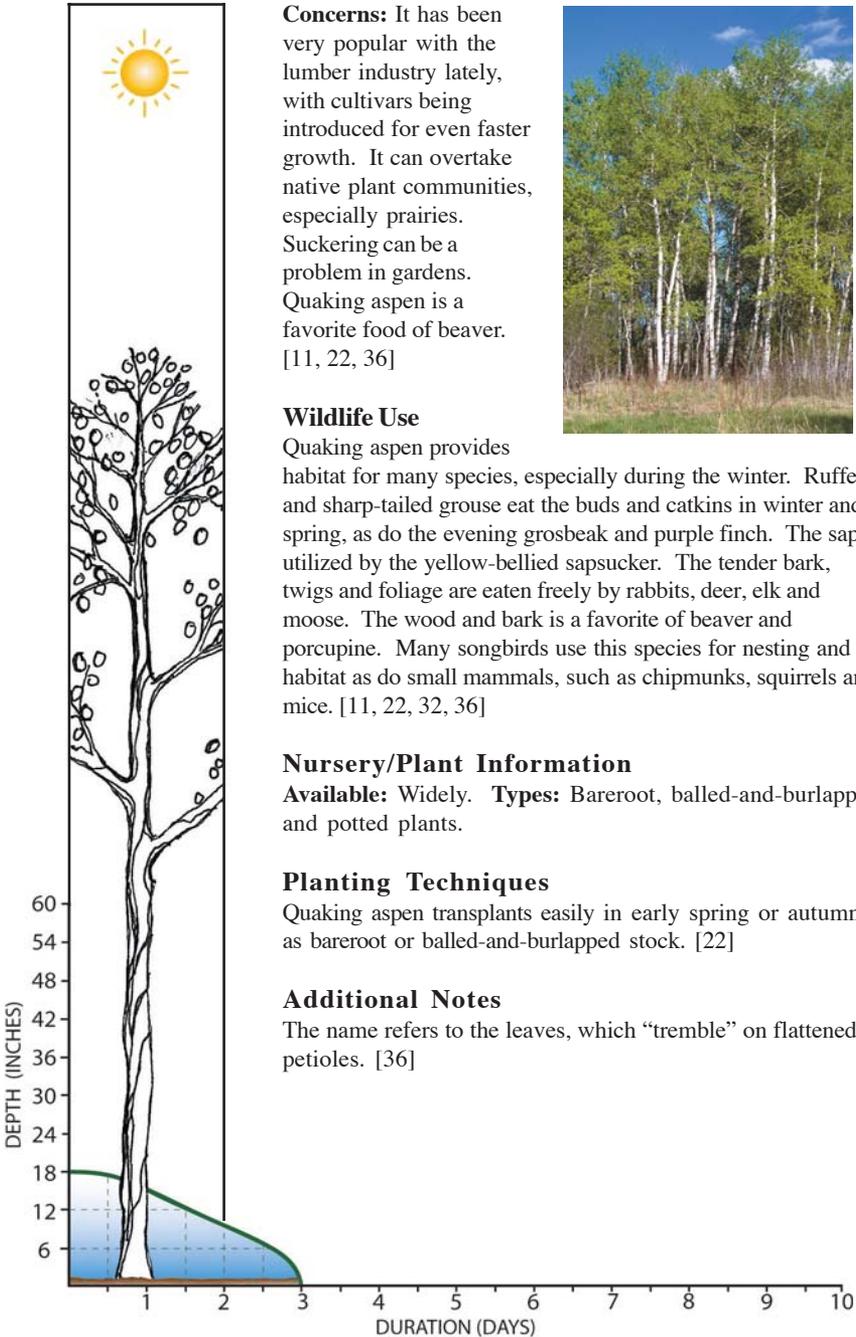
**Available:** Widely. **Types:** Bareroot, balled-and-burlapped and potted plants.

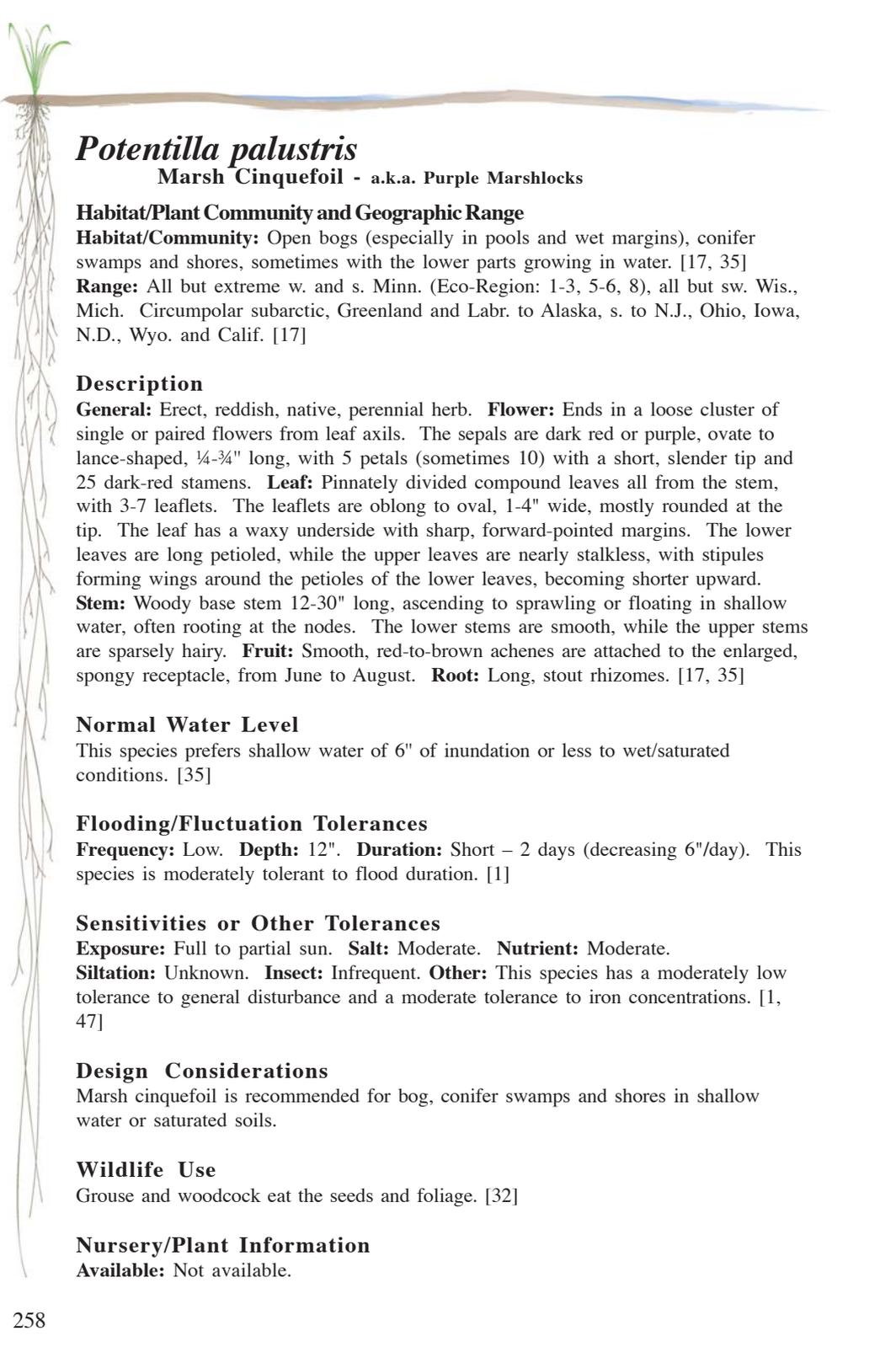
**Planting Techniques**

Quaking aspen transplants easily in early spring or autumn as bareroot or balled-and-burlapped stock. [22]

**Additional Notes**

The name refers to the leaves, which “tremble” on flattened petioles. [36]





## *Potentilla palustris*

Marsh Cinquefoil - a.k.a. Purple Marshlocks

### Habitat/Plant Community and Geographic Range

**Habitat/Community:** Open bogs (especially in pools and wet margins), conifer swamps and shores, sometimes with the lower parts growing in water. [17, 35]

**Range:** All but extreme w. and s. Minn. (Eco-Region: 1-3, 5-6, 8), all but sw. Wis., Mich. Circumpolar subarctic, Greenland and Labr. to Alaska, s. to N.J., Ohio, Iowa, N.D., Wyo. and Calif. [17]

### Description

**General:** Erect, reddish, native, perennial herb. **Flower:** Ends in a loose cluster of single or paired flowers from leaf axils. The sepals are dark red or purple, ovate to lance-shaped, ¼-¾" long, with 5 petals (sometimes 10) with a short, slender tip and 25 dark-red stamens. **Leaf:** Pinnately divided compound leaves all from the stem, with 3-7 leaflets. The leaflets are oblong to oval, 1-4" wide, mostly rounded at the tip. The leaf has a waxy underside with sharp, forward-pointed margins. The lower leaves are long petioled, while the upper leaves are nearly stalkless, with stipules forming wings around the petioles of the lower leaves, becoming shorter upward. **Stem:** Woody base stem 12-30" long, ascending to sprawling or floating in shallow water, often rooting at the nodes. The lower stems are smooth, while the upper stems are sparsely hairy. **Fruit:** Smooth, red-to-brown achenes are attached to the enlarged, spongy receptacle, from June to August. **Root:** Long, stout rhizomes. [17, 35]

### Normal Water Level

This species prefers shallow water of 6" of inundation or less to wet/saturated conditions. [35]

### Flooding/Fluctuation Tolerances

**Frequency:** Low. **Depth:** 12". **Duration:** Short – 2 days (decreasing 6"/day). This species is moderately tolerant to flood duration. [1]

### Sensitivities or Other Tolerances

**Exposure:** Full to partial sun. **Salt:** Moderate. **Nutrient:** Moderate.

**Siltation:** Unknown. **Insect:** Infrequent. **Other:** This species has a moderately low tolerance to general disturbance and a moderate tolerance to iron concentrations. [1, 47]

### Design Considerations

Marsh cinquefoil is recommended for bog, conifer swamps and shores in shallow water or saturated soils.

### Wildlife Use

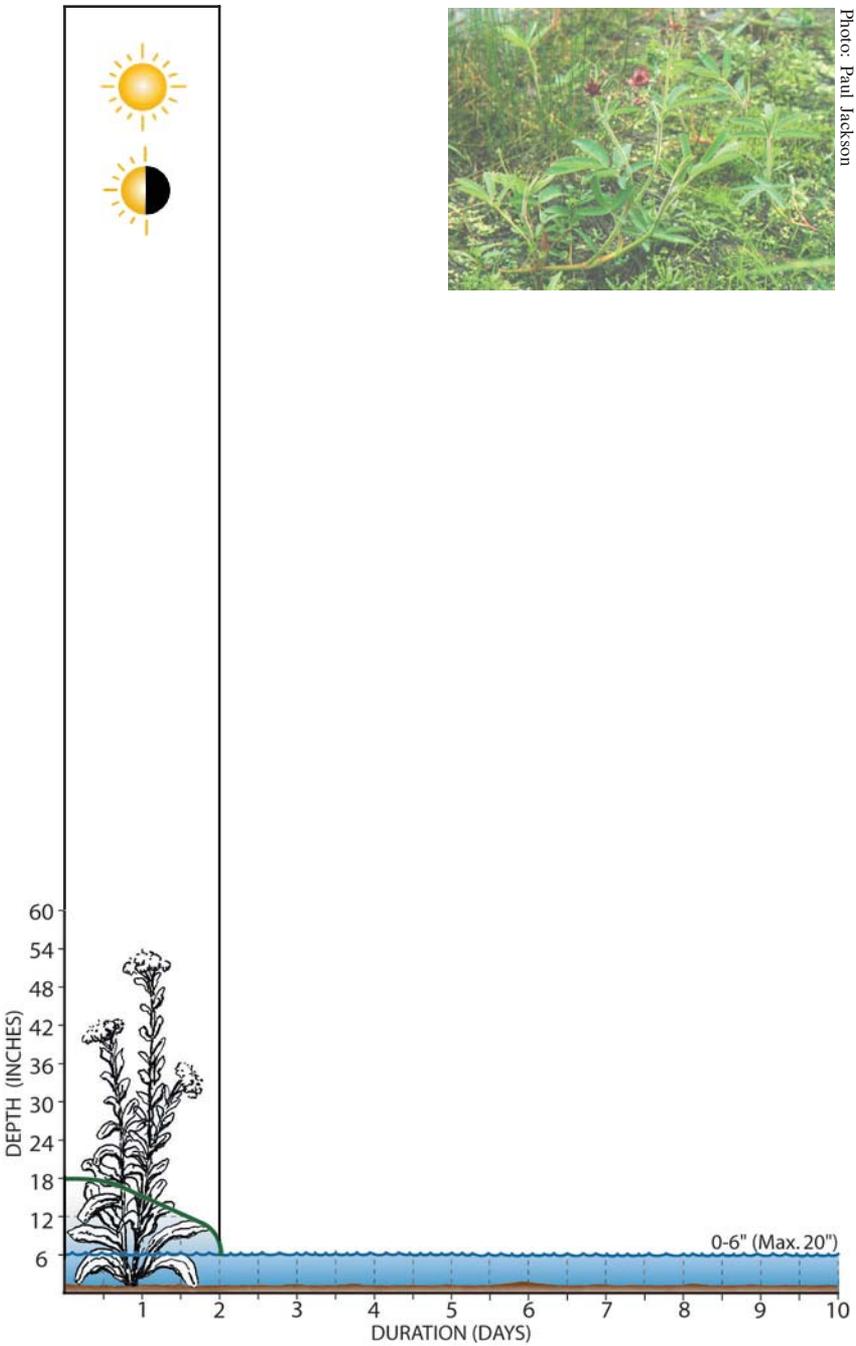
Grouse and woodcock eat the seeds and foliage. [32]

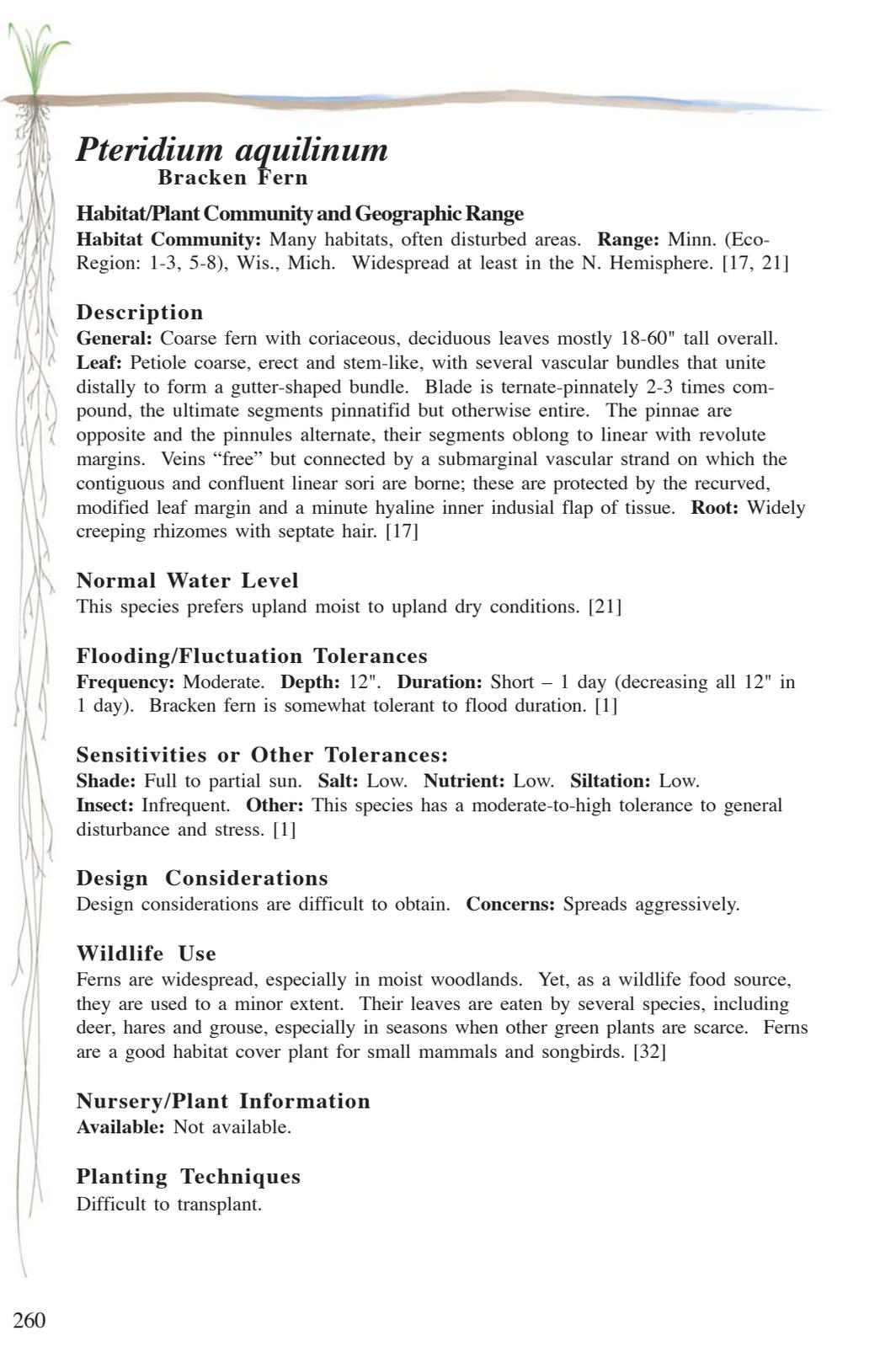
### Nursery/Plant Information

**Available:** Not available.

Indicator Status: OBL

Photo: Paul Jackson



A detailed illustration of a fern frond and its root system. The frond is shown at the top left, with its stem and several leaflets. Below the frond, the root system is depicted as a series of thin, fibrous roots extending downwards. The roots are shown in a light brown color, and the frond is in a light green color. The illustration is positioned on the left side of the page, partially overlapping the text.

## *Pteridium aquilinum*

### Bracken Fern

#### Habitat/Plant Community and Geographic Range

**Habitat Community:** Many habitats, often disturbed areas. **Range:** Minn. (Eco-Region: 1-3, 5-8), Wis., Mich. Widespread at least in the N. Hemisphere. [17, 21]

#### Description

**General:** Coarse fern with coriaceous, deciduous leaves mostly 18-60" tall overall.

**Leaf:** Petiole coarse, erect and stem-like, with several vascular bundles that unite distally to form a gutter-shaped bundle. Blade is ternate-pinnately 2-3 times compound, the ultimate segments pinnatifid but otherwise entire. The pinnae are opposite and the pinnules alternate, their segments oblong to linear with revolute margins. Veins "free" but connected by a submarginal vascular strand on which the contiguous and confluent linear sori are borne; these are protected by the recurved, modified leaf margin and a minute hyaline inner indusial flap of tissue. **Root:** Widely creeping rhizomes with septate hair. [17]

#### Normal Water Level

This species prefers upland moist to upland dry conditions. [21]

#### Flooding/Fluctuation Tolerances

**Frequency:** Moderate. **Depth:** 12". **Duration:** Short – 1 day (decreasing all 12" in 1 day). Bracken fern is somewhat tolerant to flood duration. [1]

#### Sensitivities or Other Tolerances:

**Shade:** Full to partial sun. **Salt:** Low. **Nutrient:** Low. **Siltation:** Low.

**Insect:** Infrequent. **Other:** This species has a moderate-to-high tolerance to general disturbance and stress. [1]

#### Design Considerations

Design considerations are difficult to obtain. **Concerns:** Spreads aggressively.

#### Wildlife Use

Ferns are widespread, especially in moist woodlands. Yet, as a wildlife food source, they are used to a minor extent. Their leaves are eaten by several species, including deer, hares and grouse, especially in seasons when other green plants are scarce. Ferns are a good habitat cover plant for small mammals and songbirds. [32]

#### Nursery/Plant Information

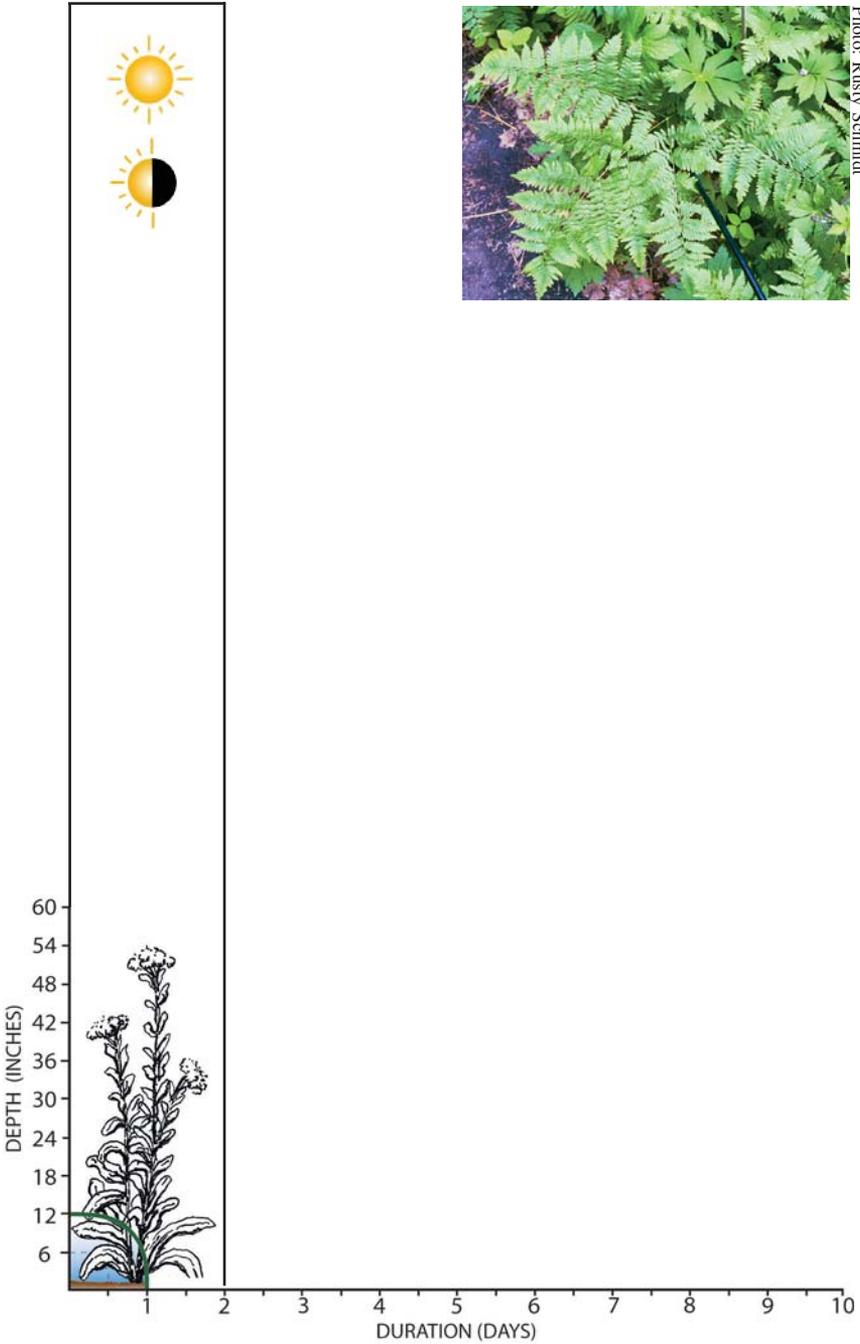
**Available:** Not available.

#### Planting Techniques

Difficult to transplant.

Indicator Status: FACU

Photo: Rusty Schmidt





## *Pycnanthemum virginianum*

Mountain Mint - a.k.a. Common or Virginia Mountain Mint

### Habitat/Plant Community and Geographic Range

**Habitat/Community:** Wet meadows, sedge meadow, marshes, tamarack swamps, calcareous fens and low prairies. Mountain mint may persist when other prairie species are eliminated by grazing. [7, 11, 16, 44] **Range:** Nw., c. and s. Minn. (Eco-Region: 1,3-9), Wisc., c. and s. LP of Mich. Me. to N.D., s. to Ga. and Okla. [7, 21]

### Description

**General:** Strongly scented (minty fragrance), native, perennial herb 20-36" tall with fine, attractive foliage. **Flower:** The small, triangular-shaped calyx lobes are shorter than the calyx tube. The inflorescence contains 4 or more flowers in dense, button-like cymes that terminate the stems and branches. Each white-with-purple-spot flower contains 4 stamens. Blooms from the end of June to the beginning of October. **Leaf:** Opposite, lance-linear-shaped leaves are entire, smooth above and usually average less than ¼" wide. The outermost modified leaves of the inflorescence are leafy and hairless above, without a prominent midvein. **Stem:** Square stems that are hairy along the angles. **Fruit:** 4-parted achene. **Root:** Stoloniferous rhizomes. **Soil:** The pH range is 5.0-7.0. [7, 11, 44]

### Normal Water Level

Although it will tolerate drier conditions, mountain mint prefers upland moist to wet/saturated conditions. [21, 44]

### Flooding/Fluctuation Tolerances

**Frequency:** Low. **Depth:** 12". **Duration:** Short – 2 days (decreasing 6"/day). [44]

### Sensitivities or Other Tolerances

**Exposure:** Full to part sun. **Salt:** Moderate. **Nutrient:** Moderate. **Siltation:** Low to moderate. **Insect:** Infrequent. **Other:** This species has a moderate tolerance to general disturbance and stress. [1, 44, 47]

### Design Considerations

Due to its stoloniferous growth habit, mountain mint has been used for stabilization of slopes, buffers, vegetated swales and shores. It is a good perennial for gardens and lake shore restorations. It has been used in a number of landscape designs where it is allowed to spread. It is a terrific plant for restorations of calcareous, wet meadows, marshes and low prairie conditions. It provides good cut and dried flowers that are very aromatic. **Concerns:** This species can be aggressive, although this may be a benefit in some situations where invasive species are a concern. [16, 44]

### Wildlife Use

Mountain mint attracts butterflies. [21, 44]

**Indicator Status: FACW+**

**Nursery/Plant Information**

**Available:** Widely.

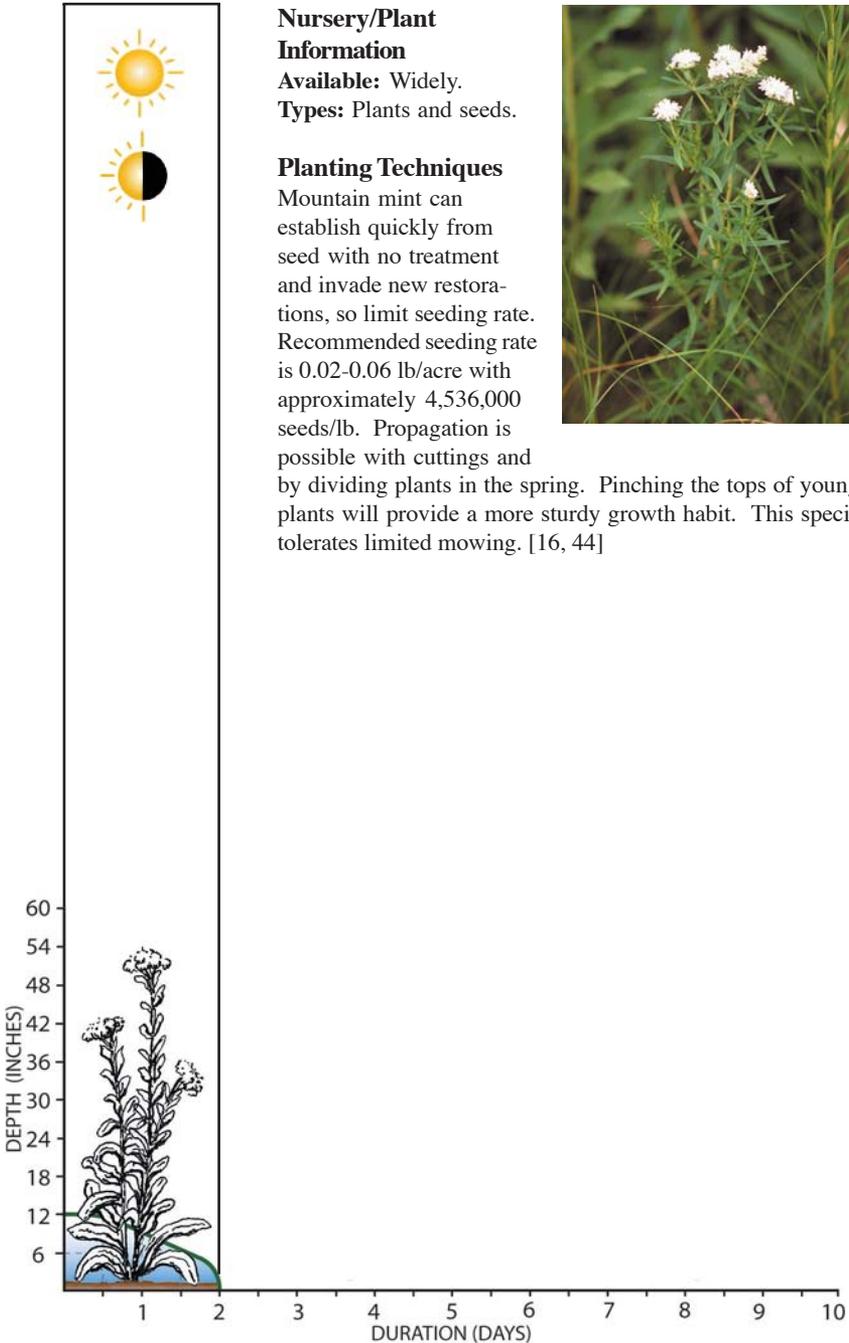
**Types:** Plants and seeds.

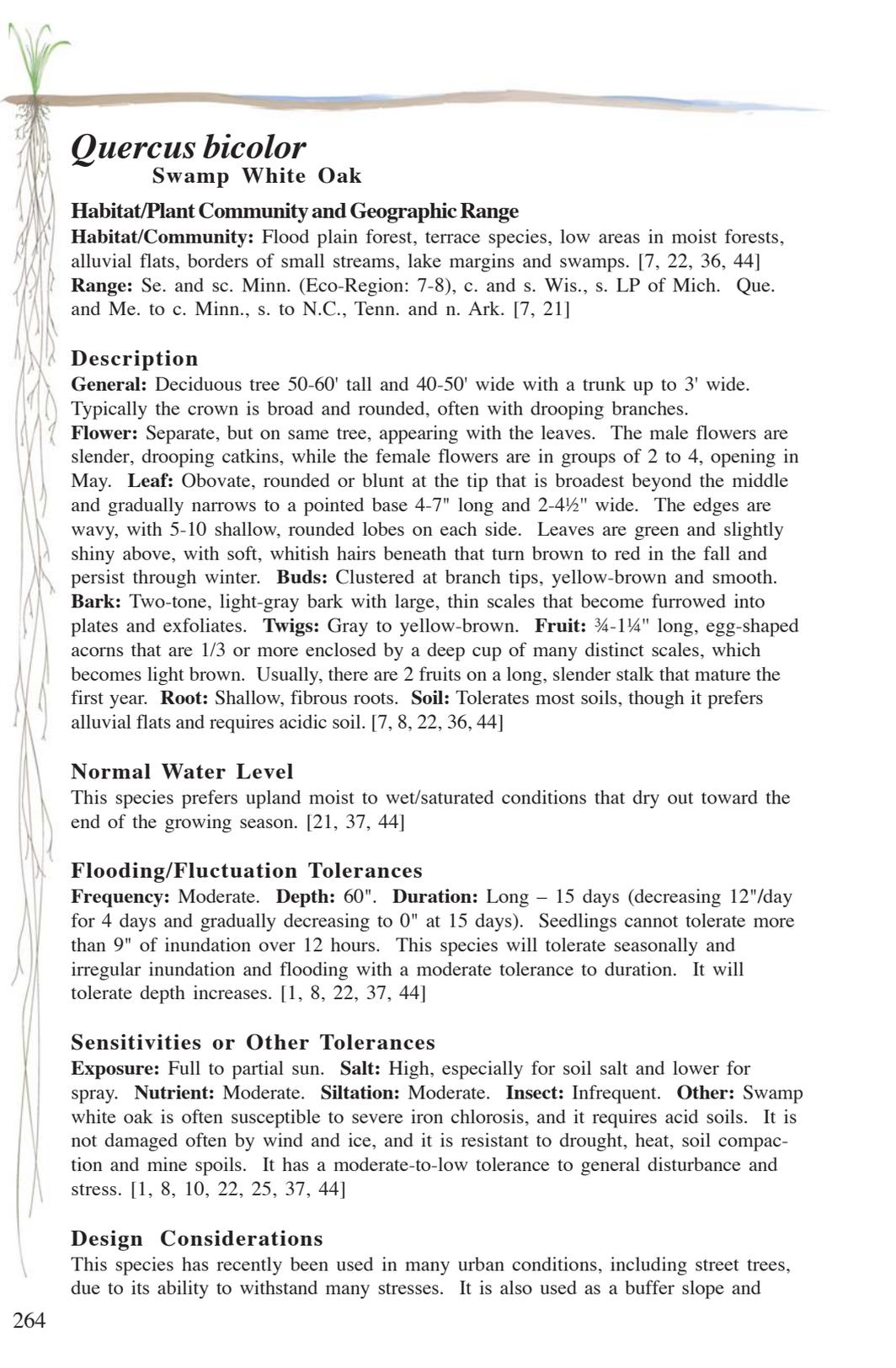
**Planting Techniques**

Mountain mint can establish quickly from seed with no treatment and invade new restorations, so limit seeding rate. Recommended seeding rate is 0.02-0.06 lb/acre with approximately 4,536,000 seeds/lb. Propagation is possible with cuttings and by dividing plants in the spring. Pinching the tops of young plants will provide a more sturdy growth habit. This species tolerates limited mowing. [16, 44]



Photo: Paul Jackson





# *Quercus bicolor*

## Swamp White Oak

### Habitat/Plant Community and Geographic Range

**Habitat/Community:** Flood plain forest, terrace species, low areas in moist forests, alluvial flats, borders of small streams, lake margins and swamps. [7, 22, 36, 44]

**Range:** Se. and sc. Minn. (Eco-Region: 7-8), c. and s. Wis., s. LP of Mich. Que. and Me. to c. Minn., s. to N.C., Tenn. and n. Ark. [7, 21]

### Description

**General:** Deciduous tree 50-60' tall and 40-50' wide with a trunk up to 3' wide. Typically the crown is broad and rounded, often with drooping branches.

**Flower:** Separate, but on same tree, appearing with the leaves. The male flowers are slender, drooping catkins, while the female flowers are in groups of 2 to 4, opening in May. **Leaf:** Obovate, rounded or blunt at the tip that is broadest beyond the middle and gradually narrows to a pointed base 4-7" long and 2-4½" wide. The edges are wavy, with 5-10 shallow, rounded lobes on each side. Leaves are green and slightly shiny above, with soft, whitish hairs beneath that turn brown to red in the fall and persist through winter. **Buds:** Clustered at branch tips, yellow-brown and smooth.

**Bark:** Two-tone, light-gray bark with large, thin scales that become furrowed into plates and exfoliates. **Twigs:** Gray to yellow-brown. **Fruit:** ¾-1¼" long, egg-shaped acorns that are 1/3 or more enclosed by a deep cup of many distinct scales, which becomes light brown. Usually, there are 2 fruits on a long, slender stalk that mature the first year. **Root:** Shallow, fibrous roots. **Soil:** Tolerates most soils, though it prefers alluvial flats and requires acidic soil. [7, 8, 22, 36, 44]

### Normal Water Level

This species prefers upland moist to wet/saturated conditions that dry out toward the end of the growing season. [21, 37, 44]

### Flooding/Fluctuation Tolerances

**Frequency:** Moderate. **Depth:** 60". **Duration:** Long – 15 days (decreasing 12"/day for 4 days and gradually decreasing to 0" at 15 days). Seedlings cannot tolerate more than 9" of inundation over 12 hours. This species will tolerate seasonally and irregular inundation and flooding with a moderate tolerance to duration. It will tolerate depth increases. [1, 8, 22, 37, 44]

### Sensitivities or Other Tolerances

**Exposure:** Full to partial sun. **Salt:** High, especially for soil salt and lower for spray. **Nutrient:** Moderate. **Siltation:** Moderate. **Insect:** Infrequent. **Other:** Swamp white oak is often susceptible to severe iron chlorosis, and it requires acid soils. It is not damaged often by wind and ice, and it is resistant to drought, heat, soil compaction and mine spoils. It has a moderate-to-low tolerance to general disturbance and stress. [1, 8, 10, 22, 25, 37, 44]

### Design Considerations

This species has recently been used in many urban conditions, including street trees, due to its ability to withstand many stresses. It is also used as a buffer slope and

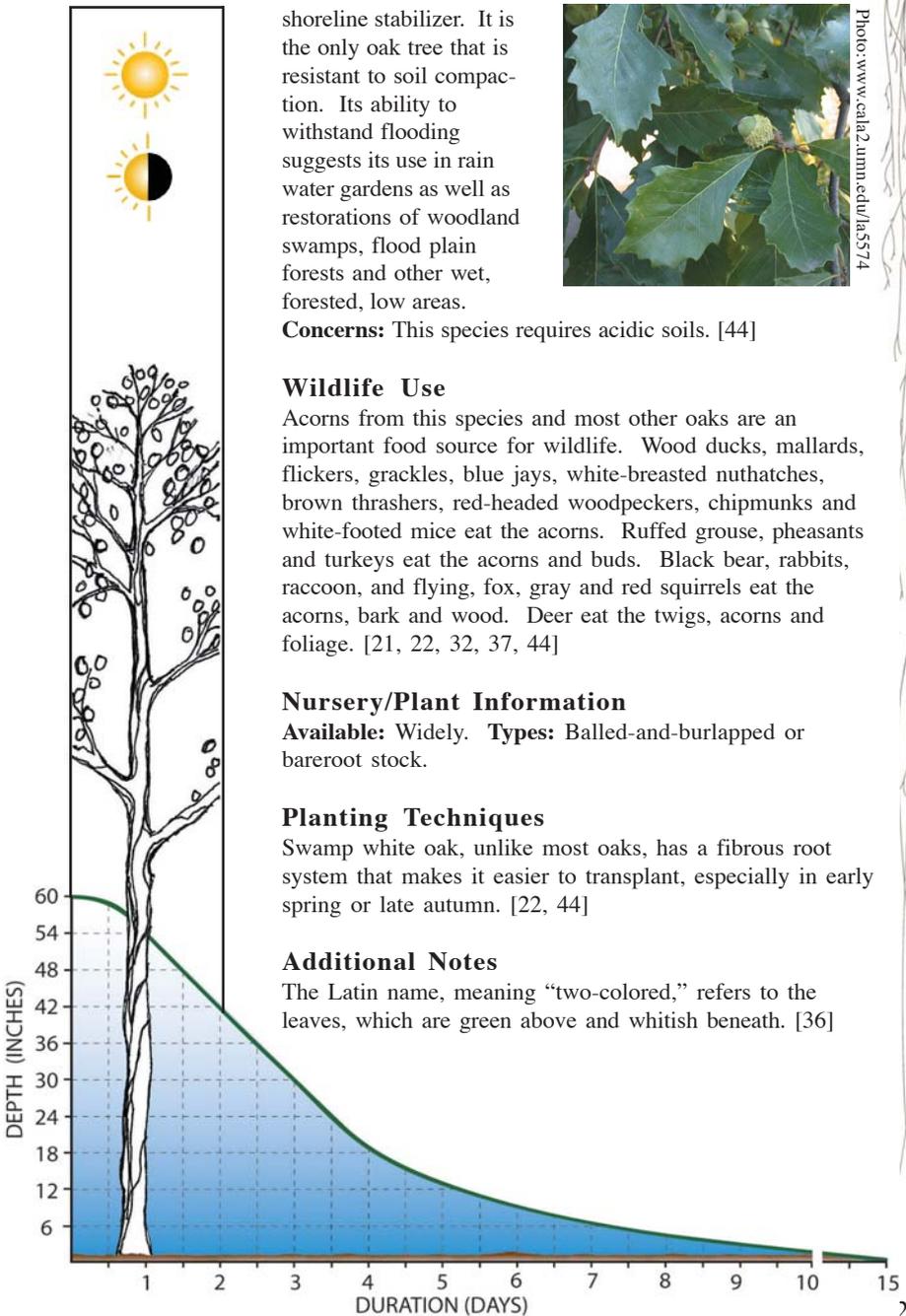
**Indicator Status:** FACW+

shoreline stabilizer. It is the only oak tree that is resistant to soil compaction. Its ability to withstand flooding suggests its use in rain water gardens as well as restorations of woodland swamps, flood plain forests and other wet, forested, low areas.

**Concerns:** This species requires acidic soils. [44]



Photo: www.cala2.unm.edu/la574



### Wildlife Use

Acorns from this species and most other oaks are an important food source for wildlife. Wood ducks, mallards, flickers, grackles, blue jays, white-breasted nuthatches, brown thrashers, red-headed woodpeckers, chipmunks and white-footed mice eat the acorns. Ruffed grouse, pheasants and turkeys eat the acorns and buds. Black bear, rabbits, raccoon, and flying, fox, gray and red squirrels eat the acorns, bark and wood. Deer eat the twigs, acorns and foliage. [21, 22, 32, 37, 44]

### Nursery/Plant Information

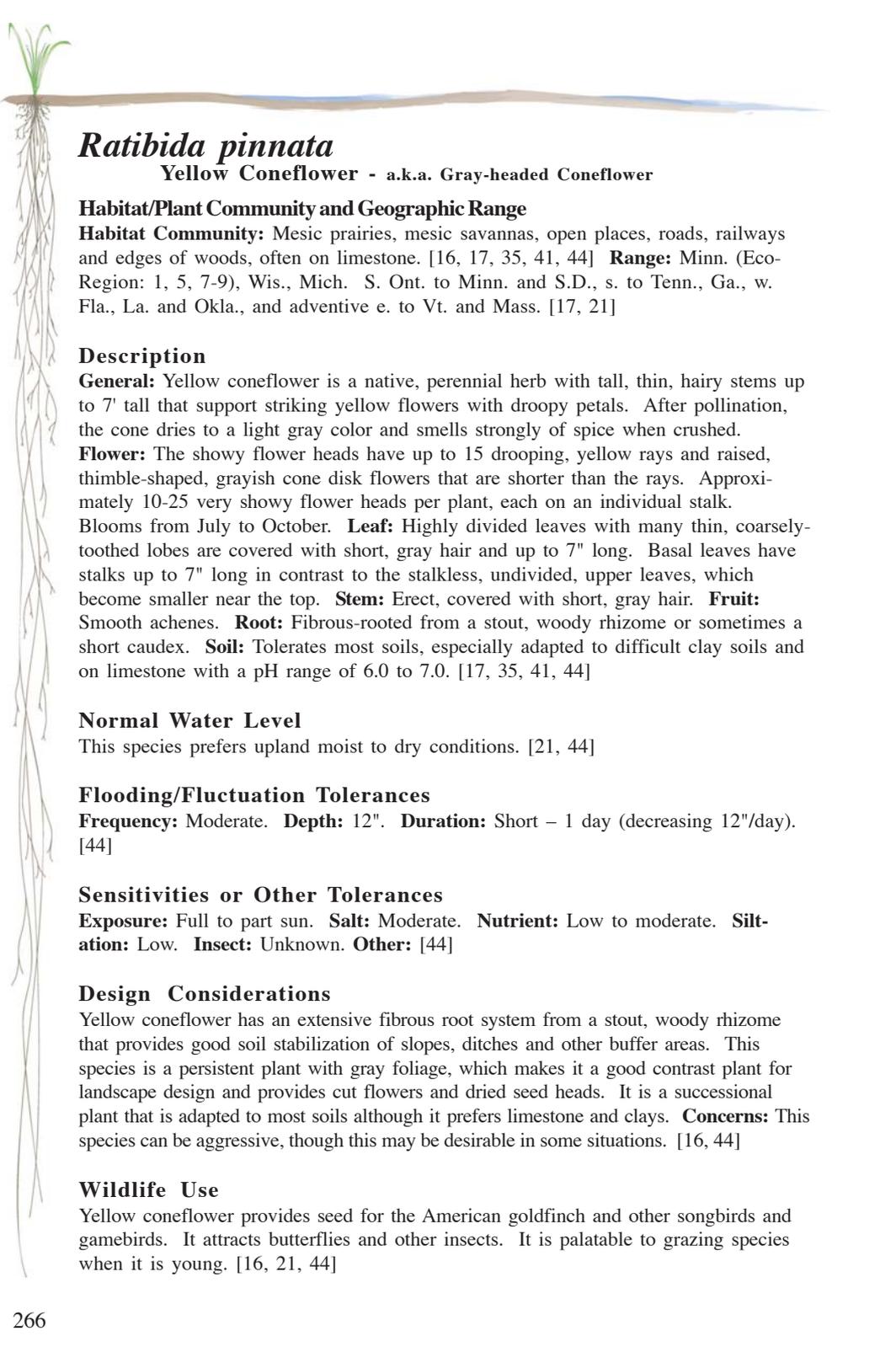
**Available:** Widely. **Types:** Balled-and-burlapped or bareroot stock.

### Planting Techniques

Swamp white oak, unlike most oaks, has a fibrous root system that makes it easier to transplant, especially in early spring or late autumn. [22, 44]

### Additional Notes

The Latin name, meaning "two-colored," refers to the leaves, which are green above and whitish beneath. [36]



## *Ratibida pinnata*

**Yellow Coneflower** - a.k.a. Gray-headed Coneflower

### **Habitat/Plant Community and Geographic Range**

**Habitat Community:** Mesic prairies, mesic savannas, open places, roads, railways and edges of woods, often on limestone. [16, 17, 35, 41, 44] **Range:** Minn. (Eco-Region: 1, 5, 7-9), Wis., Mich. S. Ont. to Minn. and S.D., s. to Tenn., Ga., w. Fla., La. and Okla., and adventive e. to Vt. and Mass. [17, 21]

### **Description**

**General:** Yellow coneflower is a native, perennial herb with tall, thin, hairy stems up to 7' tall that support striking yellow flowers with droopy petals. After pollination, the cone dries to a light gray color and smells strongly of spice when crushed.

**Flower:** The showy flower heads have up to 15 drooping, yellow rays and raised, thimble-shaped, grayish cone disk flowers that are shorter than the rays. Approximately 10-25 very showy flower heads per plant, each on an individual stalk. Blooms from July to October.

**Leaf:** Highly divided leaves with many thin, coarsely-toothed lobes are covered with short, gray hair and up to 7" long. Basal leaves have stalks up to 7" long in contrast to the stalkless, undivided, upper leaves, which become smaller near the top. **Stem:** Erect, covered with short, gray hair. **Fruit:** Smooth achenes.

**Root:** Fibrous-rooted from a stout, woody rhizome or sometimes a short caudex. **Soil:** Tolerates most soils, especially adapted to difficult clay soils and on limestone with a pH range of 6.0 to 7.0. [17, 35, 41, 44]

### **Normal Water Level**

This species prefers upland moist to dry conditions. [21, 44]

### **Flooding/Fluctuation Tolerances**

**Frequency:** Moderate. **Depth:** 12". **Duration:** Short – 1 day (decreasing 12"/day). [44]

### **Sensitivities or Other Tolerances**

**Exposure:** Full to part sun. **Salt:** Moderate. **Nutrient:** Low to moderate. **Siltation:** Low. **Insect:** Unknown. **Other:** [44]

### **Design Considerations**

Yellow coneflower has an extensive fibrous root system from a stout, woody rhizome that provides good soil stabilization of slopes, ditches and other buffer areas. This species is a persistent plant with gray foliage, which makes it a good contrast plant for landscape design and provides cut flowers and dried seed heads. It is a successional plant that is adapted to most soils although it prefers limestone and clays. **Concerns:** This species can be aggressive, though this may be desirable in some situations. [16, 44]

### **Wildlife Use**

Yellow coneflower provides seed for the American goldfinch and other songbirds and gamebirds. It attracts butterflies and other insects. It is palatable to grazing species when it is young. [16, 21, 44]

Indicator Status: UPL

### Nursery/Plant Information

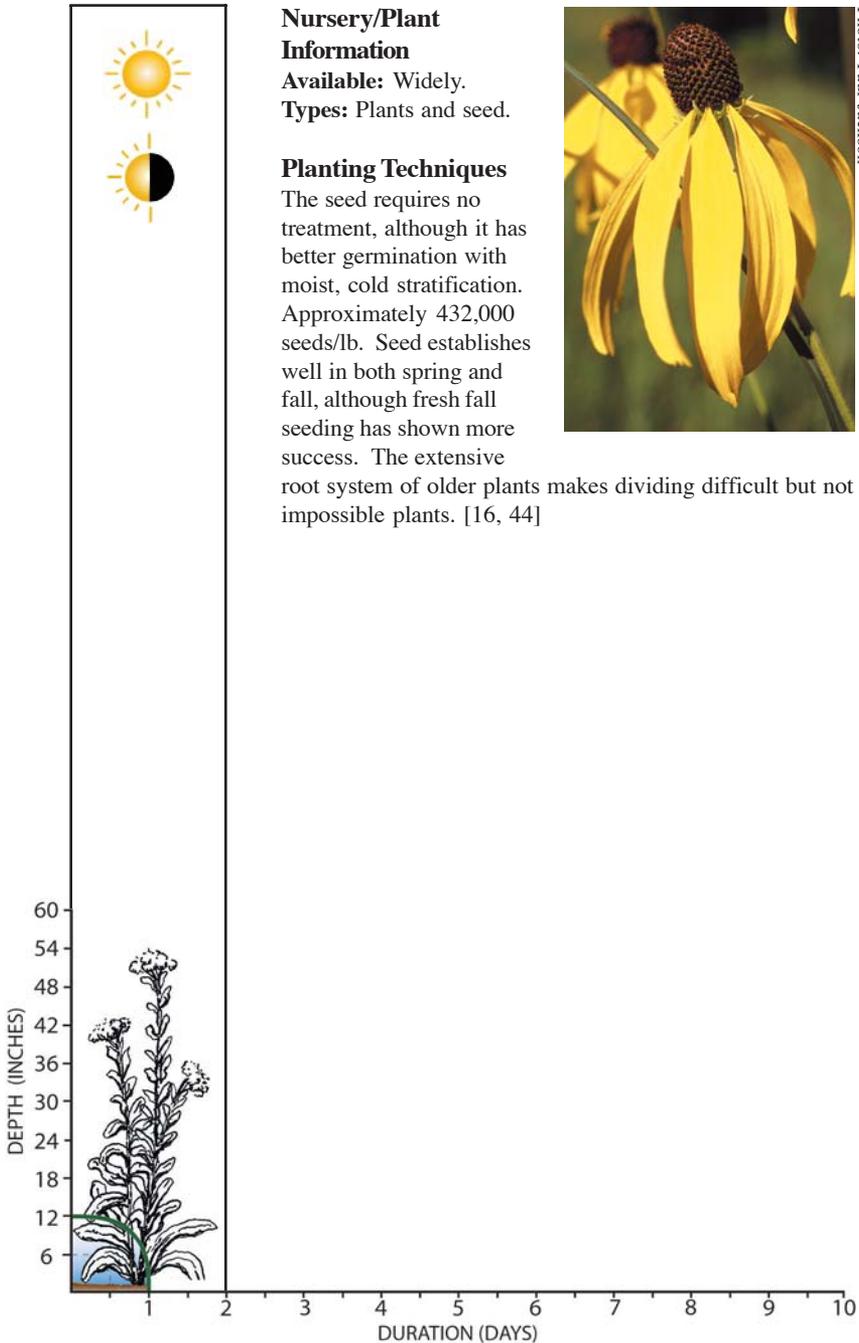
**Available:** Widely.  
**Types:** Plants and seed.

### Planting Techniques

The seed requires no treatment, although it has better germination with moist, cold stratification. Approximately 432,000 seeds/lb. Seed establishes well in both spring and fall, although fresh fall seeding has shown more success. The extensive root system of older plants makes dividing difficult but not impossible plants. [16, 44]



Photo: Paul Jackson





## *Rudbeckia subtomentosa*

**Brown-eyed-Susan** - a.k.a. Sweet Black Eyed Susan, Sweet Coneflower

### **Habitat/Plant Community and Geographic Range**

**Habitat/Community:** Peat or wet sands, stream banks, drainage ditches, prairies, wet open woods and thickets. [16, 17] **Range:** Se. Minn. (Eco-Region: 6-8), sw. Wis., Mich. Mich. to Wis., s. to w. Tenn., La. and Okla. [17]

### **Description**

**General:** Native, perennial herb with very attractive, yellow flower heads in profusion atop deep green, glossy leaves. Typically 24-36" tall and grows in bunches.

**Flower:** Disk flowers are dark purple or brown, 5/16-5/8" wide, with yellow ray flowers numbering 12-21, no more than 1/2" long. Blooms July to September.

**Leaf:** Alternate, entire leaves are firm, densely short-haired, especially beneath, ovate with petioles serrate, generally some of the larger ones deeply trilobed. **Stem:** 24-78" long, densely short-haired above. **Fruit:** Quadrangular achenes that are glabrous and partly enfolded in the bracts. **Root:** Stout rhizomes. **Soil:** Prefers peat or wet sands although it will tolerate heavy soils. [17]

### **Normal Water Level**

This species prefers upland mesic conditions.

### **Flooding/Fluctuation Tolerances**

**Frequency:** High. **Depth:** 18". **Duration:** Medium short – 3 days (decreasing 6"/day).

### **Sensitivities or Other Tolerances**

**Exposure:** Full to part sun. **Salt:** Unknown. **Nutrient:** Unknown.

**Siltation:** Unknown. **Insect:** Infrequent.

### **Design Considerations**

Brown-eyed-Susans are well suited for many restorations of stream banks, ditches, prairies and other sites with peat, heavy or sandy soil. It is a beautiful plant for landscape designs and rain water gardens. It provides cut and dried flowers. [16]

### **Wildlife Use**

Birds and butterflies use this plant for food and habitat. Provides excellent ground cover.

### **Nursery/Plant Information**

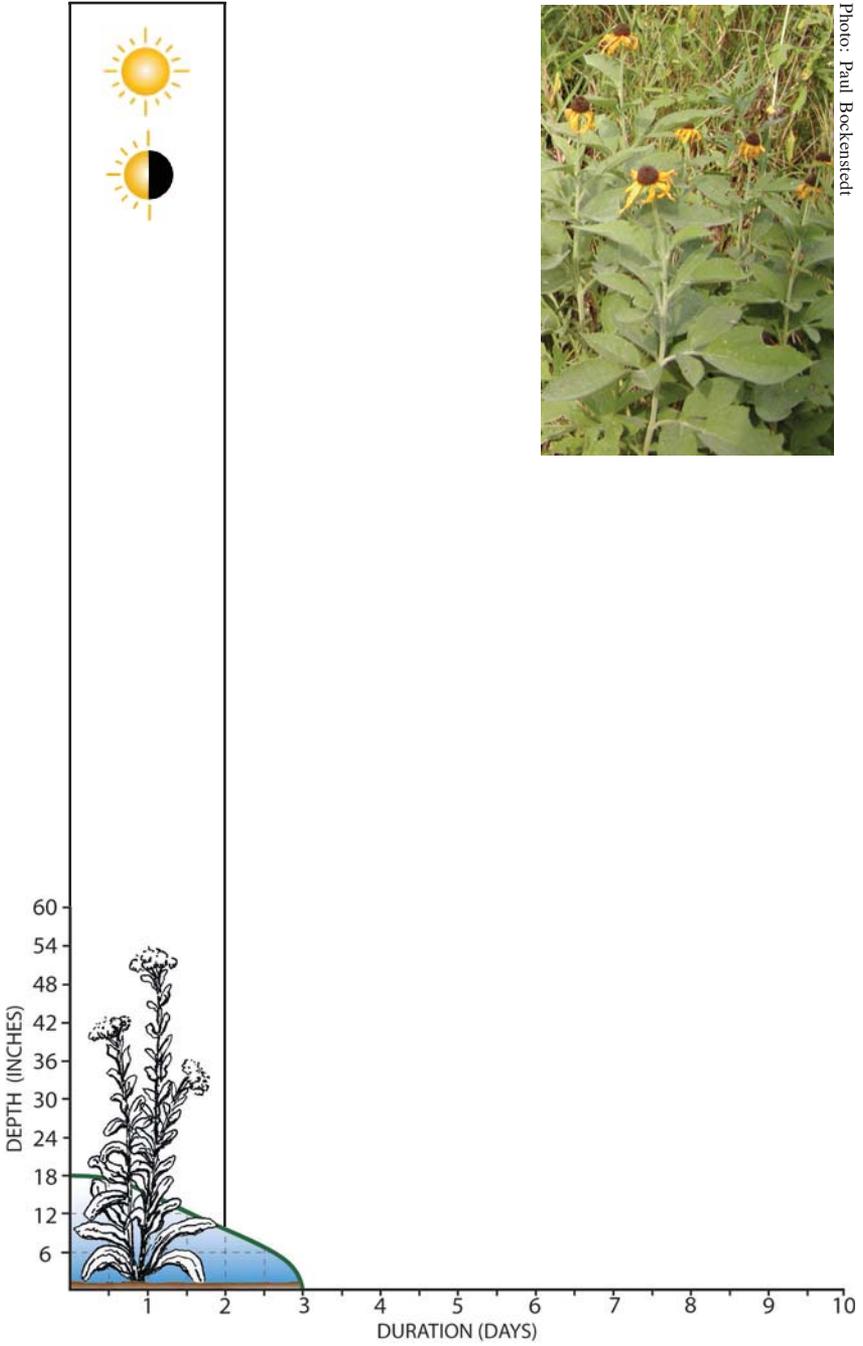
**Available:** Widely. **Types:** Seeds and plants.

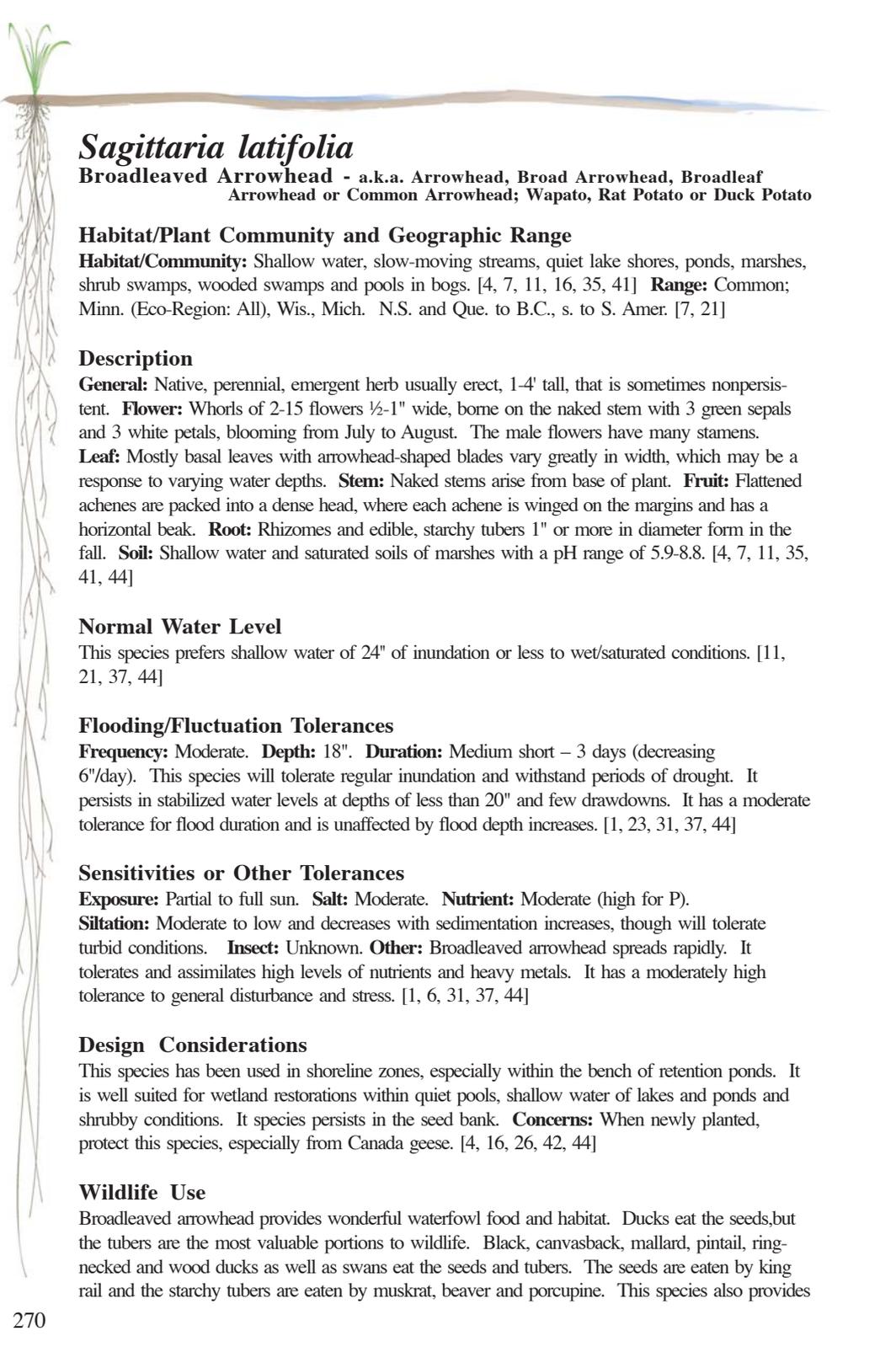
### **Planting Techniques**

The seeds benefit from moist, cold stratification. Approximately 736,000 seeds/lb. [16]

**Indicator Status: FACU+**

Photo: Paul Bockenstedt





## *Sagittaria latifolia*

**Broadleaved Arrowhead** - a.k.a. Arrowhead, Broad Arrowhead, Broadleaf Arrowhead or Common Arrowhead; Wapato, Rat Potato or Duck Potato

### Habitat/Plant Community and Geographic Range

**Habitat/Community:** Shallow water, slow-moving streams, quiet lake shores, ponds, marshes, shrub swamps, wooded swamps and pools in bogs. [4, 7, 11, 16, 35, 41] **Range:** Common; Minn. (Eco-Region: All), Wis., Mich. N.S. and Que. to B.C., s. to S. Amer. [7, 21]

### Description

**General:** Native, perennial, emergent herb usually erect, 1-4' tall, that is sometimes nonpersistent. **Flower:** Whorls of 2-15 flowers ½-1" wide, borne on the naked stem with 3 green sepals and 3 white petals, blooming from July to August. The male flowers have many stamens. **Leaf:** Mostly basal leaves with arrowhead-shaped blades vary greatly in width, which may be a response to varying water depths. **Stem:** Naked stems arise from base of plant. **Fruit:** Flattened achenes are packed into a dense head, where each achene is winged on the margins and has a horizontal beak. **Root:** Rhizomes and edible, starchy tubers 1" or more in diameter form in the fall. **Soil:** Shallow water and saturated soils of marshes with a pH range of 5.9-8.8. [4, 7, 11, 35, 41, 44]

### Normal Water Level

This species prefers shallow water of 24" of inundation or less to wet/saturated conditions. [11, 21, 37, 44]

### Flooding/Fluctuation Tolerances

**Frequency:** Moderate. **Depth:** 18". **Duration:** Medium short – 3 days (decreasing 6"/day). This species will tolerate regular inundation and withstand periods of drought. It persists in stabilized water levels at depths of less than 20" and few drawdowns. It has a moderate tolerance for flood duration and is unaffected by flood depth increases. [1, 23, 31, 37, 44]

### Sensitivities or Other Tolerances

**Exposure:** Partial to full sun. **Salt:** Moderate. **Nutrient:** Moderate (high for P). **Siltation:** Moderate to low and decreases with sedimentation increases, though will tolerate turbid conditions. **Insect:** Unknown. **Other:** Broadleaved arrowhead spreads rapidly. It tolerates and assimilates high levels of nutrients and heavy metals. It has a moderately high tolerance to general disturbance and stress. [1, 6, 31, 37, 44]

### Design Considerations

This species has been used in shoreline zones, especially within the bench of retention ponds. It is well suited for wetland restorations within quiet pools, shallow water of lakes and ponds and shrubby conditions. It species persists in the seed bank. **Concerns:** When newly planted, protect this species, especially from Canada geese. [4, 16, 26, 42, 44]

### Wildlife Use

Broadleaved arrowhead provides wonderful waterfowl food and habitat. Ducks eat the seeds, but the tubers are the most valuable portions to wildlife. Black, canvasback, mallard, pintail, ring-necked and wood ducks as well as swans eat the seeds and tubers. The seeds are eaten by king rail and the starchy tubers are eaten by muskrat, beaver and porcupine. This species also provides

## Indicator Status: OBL



habitat for insects, reptiles, amphibians and gamefish, especially channel catfish, white bass, shiners and shad. Black terns may also use the leaves for nesting material. [4, 11, 21, 32, 35, 37, 41, 44]

### Nursery/Plant Information

**Available:** Widely. **Types:** Seed, tubers, rootstock and transplants.



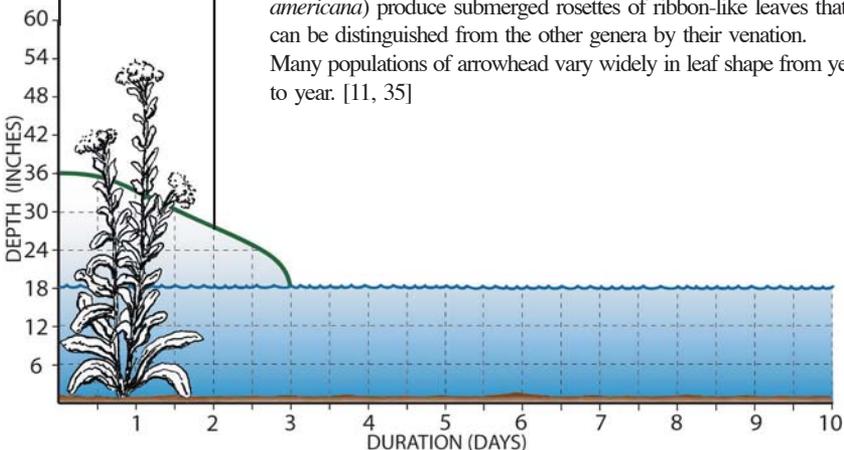
Photo: Dan Shaw

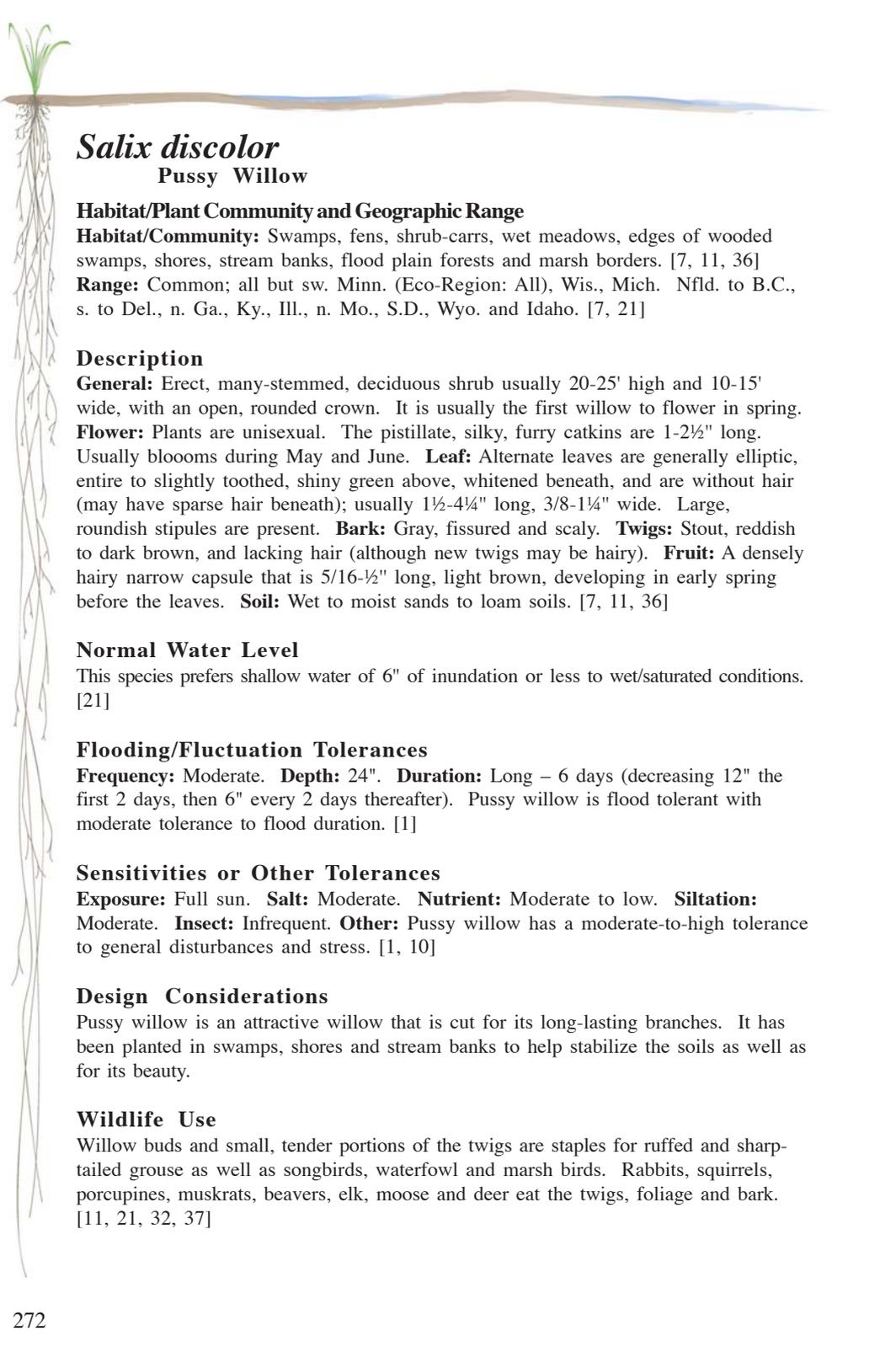
### Planting Techniques

Broad arrowhead can be seeded with fresh seed in the fall. The seed floats and may dominate one side of the shallow water body if it is wind prone. Seed requires moist, cold stratification and can be fall planted the second year with bottom heat in saturated soil. Recommended seeding rate is 0.12-0.19 lb/acre, with about 940,000 seeds/lb. Tubers establish easily and are commonly used. Plant in saturated soils in the spring in 6" or less of water, approximately 2'-6' apart and protect from predation. Drawdowns will help establish this species, then maintain a constant water level. The tubers require a 6- to 8-week cold treatment. Transplants may be planted in 6"-2' of water, although not submerged. [4, 16, 26, 31, 37, 42, 44]

### Additional Notes

Arrowheads (*Sagittaria* spp.) like the burreeds (*Sparganium* spp.), pickerelweed (*Pontederia cordata*), and wild celery (*Vallisneria americana*) produce submerged rosettes of ribbon-like leaves that can be distinguished from the other genera by their venation. Many populations of arrowhead vary widely in leaf shape from year to year. [11, 35]





## *Salix discolor*

### Pussy Willow

#### Habitat/Plant Community and Geographic Range

**Habitat/Community:** Swamps, fens, shrub-carrs, wet meadows, edges of wooded swamps, shores, stream banks, flood plain forests and marsh borders. [7, 11, 36]

**Range:** Common; all but sw. Minn. (Eco-Region: All), Wis., Mich. Nfld. to B.C., s. to Del., n. Ga., Ky., Ill., n. Mo., S.D., Wyo. and Idaho. [7, 21]

#### Description

**General:** Erect, many-stemmed, deciduous shrub usually 20-25' high and 10-15' wide, with an open, rounded crown. It is usually the first willow to flower in spring.

**Flower:** Plants are unisexual. The pistillate, silky, furry catkins are 1-2½" long.

Usually blooms during May and June. **Leaf:** Alternate leaves are generally elliptic, entire to slightly toothed, shiny green above, whitened beneath, and are without hair (may have sparse hair beneath); usually 1½-4¼" long, 3/8-1¼" wide. Large, roundish stipules are present. **Bark:** Gray, fissured and scaly. **Twigs:** Stout, reddish

to dark brown, and lacking hair (although new twigs may be hairy). **Fruit:** A densely hairy narrow capsule that is 5/16-½" long, light brown, developing in early spring before the leaves. **Soil:** Wet to moist sands to loam soils. [7, 11, 36]

#### Normal Water Level

This species prefers shallow water of 6" of inundation or less to wet/saturated conditions. [21]

#### Flooding/Fluctuation Tolerances

**Frequency:** Moderate. **Depth:** 24". **Duration:** Long – 6 days (decreasing 12" the first 2 days, then 6" every 2 days thereafter). Pussy willow is flood tolerant with moderate tolerance to flood duration. [1]

#### Sensitivities or Other Tolerances

**Exposure:** Full sun. **Salt:** Moderate. **Nutrient:** Moderate to low. **Siltation:** Moderate. **Insect:** Infrequent. **Other:** Pussy willow has a moderate-to-high tolerance to general disturbances and stress. [1, 10]

#### Design Considerations

Pussy willow is an attractive willow that is cut for its long-lasting branches. It has been planted in swamps, shores and stream banks to help stabilize the soils as well as for its beauty.

#### Wildlife Use

Willow buds and small, tender portions of the twigs are staples for ruffed and sharp-tailed grouse as well as songbirds, waterfowl and marsh birds. Rabbits, squirrels, porcupines, muskrats, beavers, elk, moose and deer eat the twigs, foliage and bark. [11, 21, 32, 37]

**Indicator Status: FACW**

**Nursery/Plant Information**

**Available:** Limited.  
**Types:** Bareroot stock.

**Planting Techniques**

This species transplants easily in the spring and grows from cuttings.

**Additional Notes**

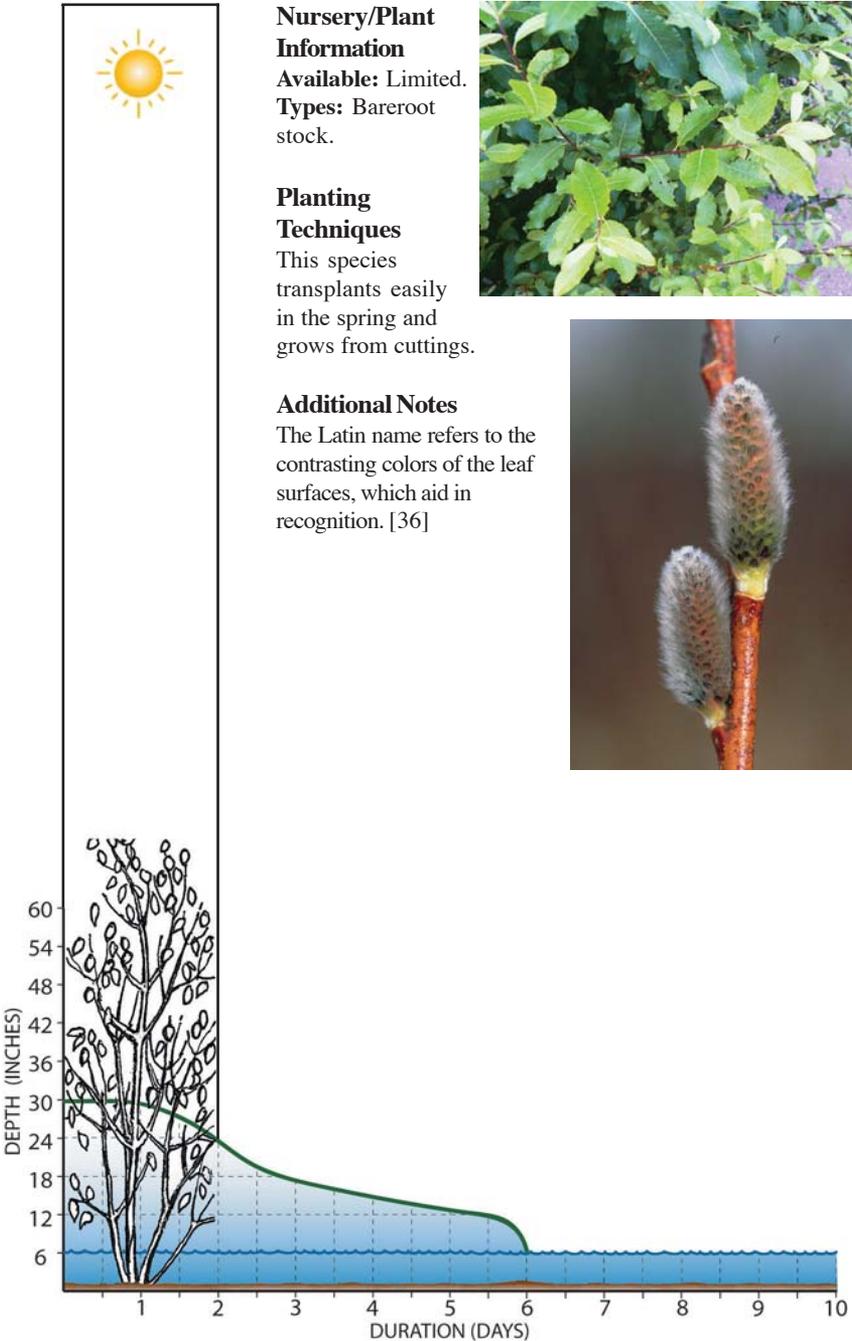
The Latin name refers to the contrasting colors of the leaf surfaces, which aid in recognition. [36]

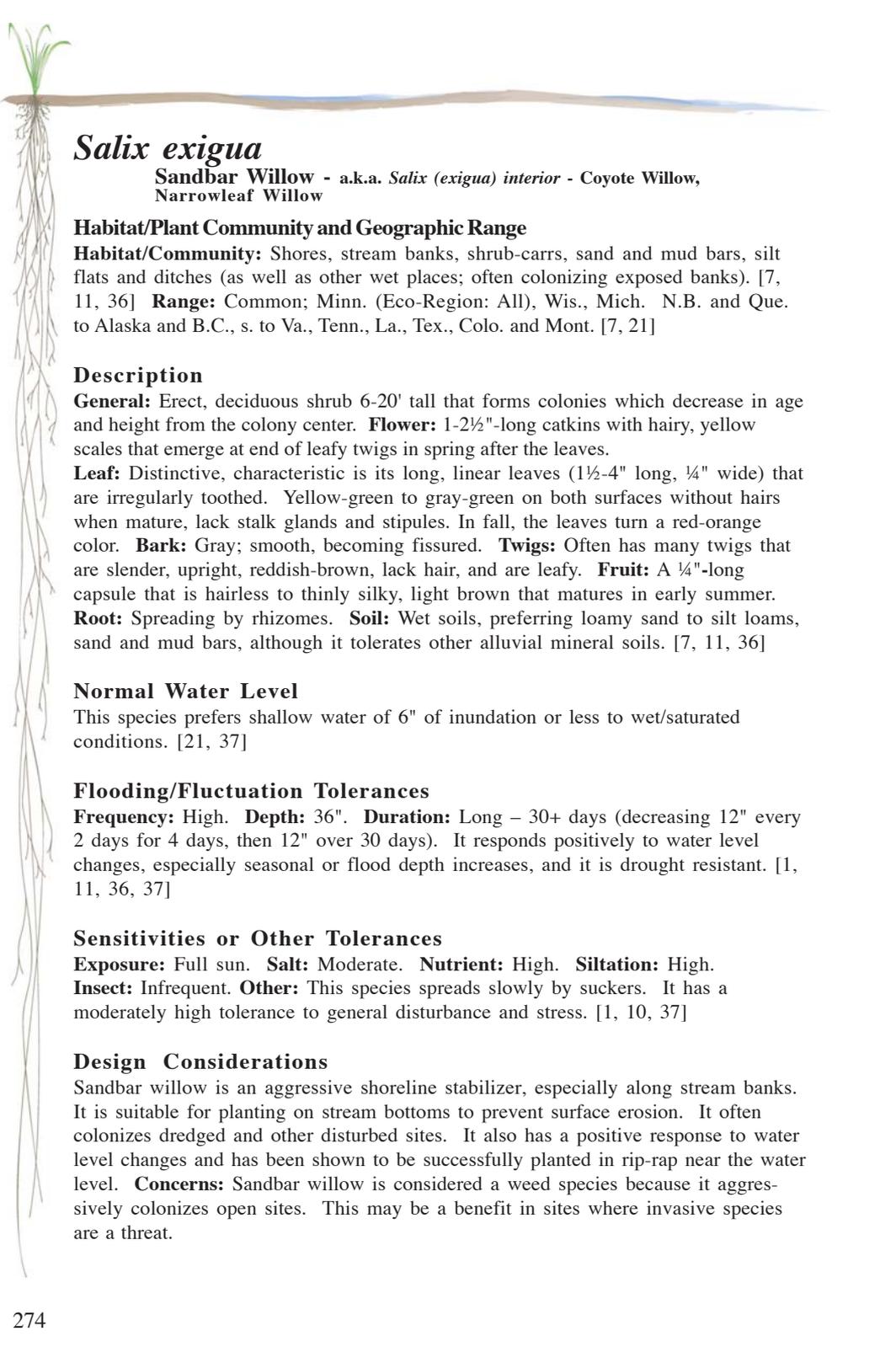


Photo: Rusty Schmidt



Photo: Jeff Shaw





## *Salix exigua*

**Sandbar Willow** - a.k.a. *Salix (exigua) interior* - Coyote Willow, Narrowleaf Willow

### **Habitat/Plant Community and Geographic Range**

**Habitat/Community:** Shores, stream banks, shrub-carrs, sand and mud bars, silt flats and ditches (as well as other wet places; often colonizing exposed banks). [7, 11, 36] **Range:** Common; Minn. (Eco-Region: All), Wis., Mich. N.B. and Que. to Alaska and B.C., s. to Va., Tenn., La., Tex., Colo. and Mont. [7, 21]

### **Description**

**General:** Erect, deciduous shrub 6-20' tall that forms colonies which decrease in age and height from the colony center. **Flower:** 1-2½"-long catkins with hairy, yellow scales that emerge at end of leafy twigs in spring after the leaves.

**Leaf:** Distinctive, characteristic is its long, linear leaves (1½-4" long, ¼" wide) that are irregularly toothed. Yellow-green to gray-green on both surfaces without hairs when mature, lack stalk glands and stipules. In fall, the leaves turn a red-orange color. **Bark:** Gray; smooth, becoming fissured. **Twigs:** Often has many twigs that are slender, upright, reddish-brown, lack hair, and are leafy. **Fruit:** A ¼"-long capsule that is hairless to thinly silky, light brown that matures in early summer.

**Root:** Spreading by rhizomes. **Soil:** Wet soils, preferring loamy sand to silt loams, sand and mud bars, although it tolerates other alluvial mineral soils. [7, 11, 36]

### **Normal Water Level**

This species prefers shallow water of 6" of inundation or less to wet/saturated conditions. [21, 37]

### **Flooding/Fluctuation Tolerances**

**Frequency:** High. **Depth:** 36". **Duration:** Long – 30+ days (decreasing 12" every 2 days for 4 days, then 12" over 30 days). It responds positively to water level changes, especially seasonal or flood depth increases, and it is drought resistant. [1, 11, 36, 37]

### **Sensitivities or Other Tolerances**

**Exposure:** Full sun. **Salt:** Moderate. **Nutrient:** High. **Siltation:** High. **Insect:** Infrequent. **Other:** This species spreads slowly by suckers. It has a moderately high tolerance to general disturbance and stress. [1, 10, 37]

### **Design Considerations**

Sandbar willow is an aggressive shoreline stabilizer, especially along stream banks. It is suitable for planting on stream bottoms to prevent surface erosion. It often colonizes dredged and other disturbed sites. It also has a positive response to water level changes and has been shown to be successfully planted in rip-rap near the water level. **Concerns:** Sandbar willow is considered a weed species because it aggressively colonizes open sites. This may be a benefit in sites where invasive species are a threat.

**Indicator Status: OBL**

### Wildlife Use

Willows buds and small, tender portions of the twigs are staples for ruffed and sharp-tailed grouse as well as songbirds, waterfowl and marsh birds.

Rabbits, squirrels, porcupine, muskrats, beaver, elk, moose and deer eat the twigs, foliage and bark. [21, 32, 37]



Photo: Rusty Schmidt

### Nursery/Plant Information

**Available:** Widely.

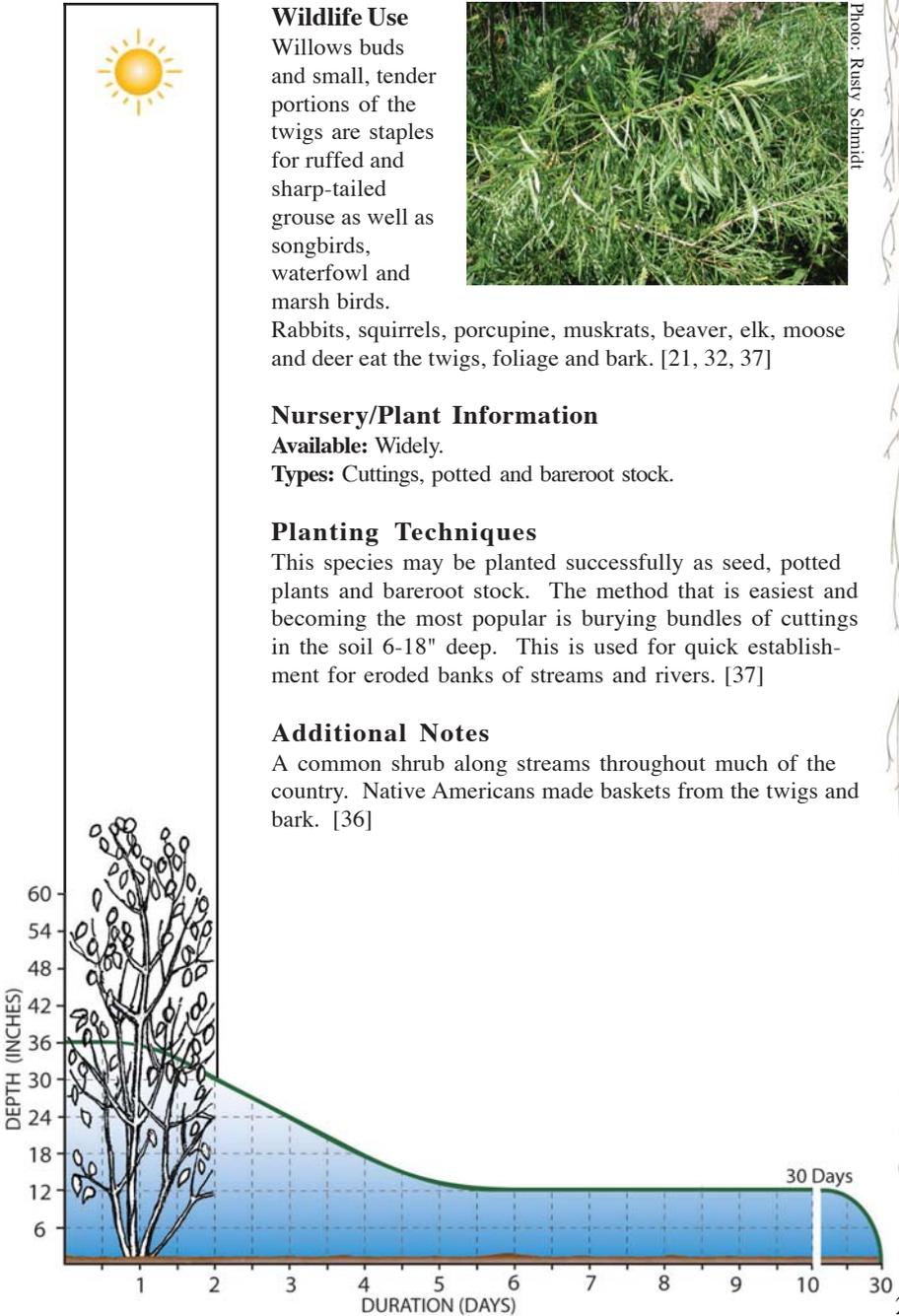
**Types:** Cuttings, potted and bareroot stock.

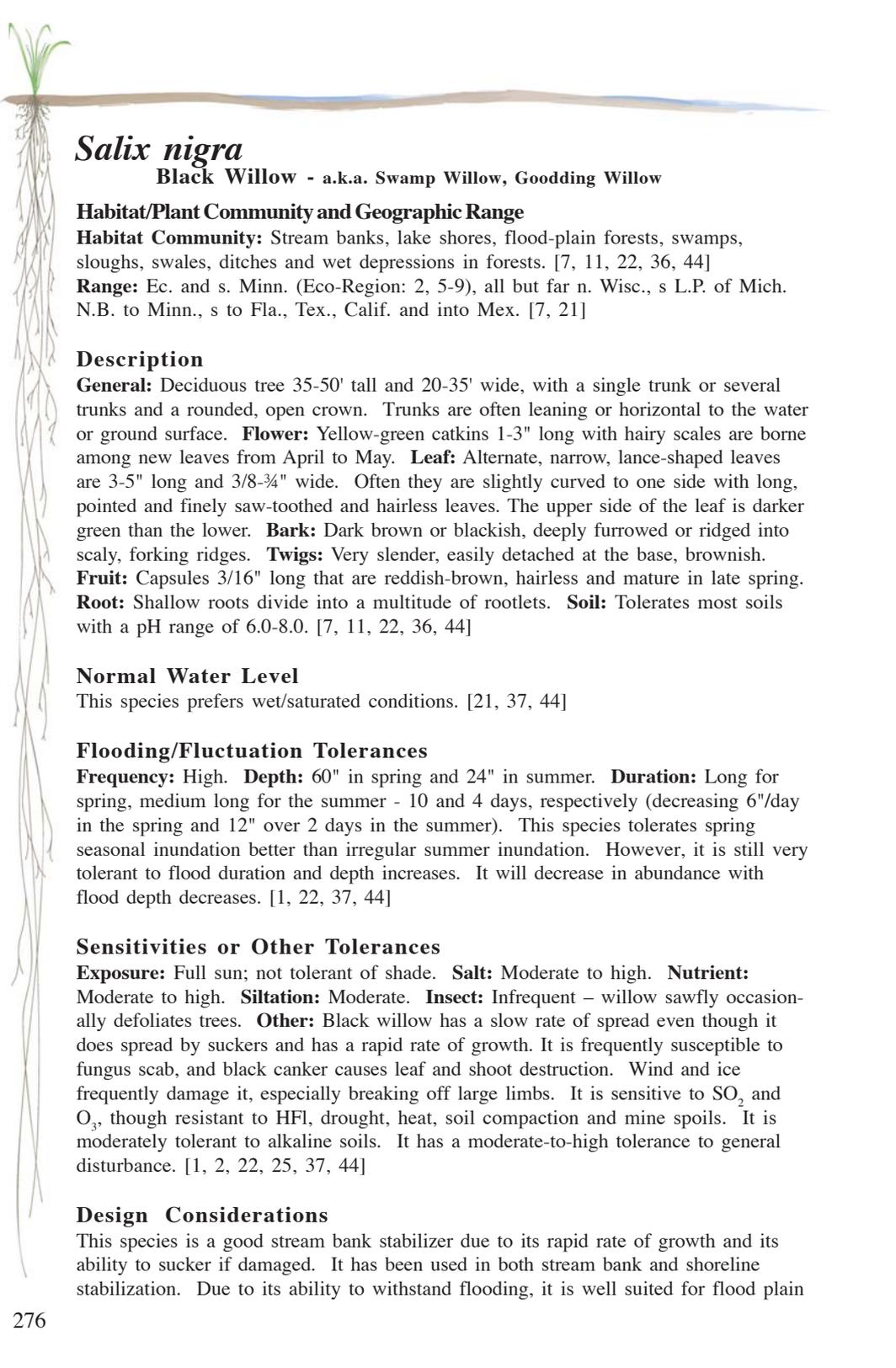
### Planting Techniques

This species may be planted successfully as seed, potted plants and bareroot stock. The method that is easiest and becoming the most popular is burying bundles of cuttings in the soil 6-18" deep. This is used for quick establishment for eroded banks of streams and rivers. [37]

### Additional Notes

A common shrub along streams throughout much of the country. Native Americans made baskets from the twigs and bark. [36]





## *Salix nigra*

**Black Willow** - a.k.a. Swamp Willow, Gooding Willow

### **Habitat/Plant Community and Geographic Range**

**Habitat Community:** Stream banks, lake shores, flood-plain forests, swamps, sloughs, swales, ditches and wet depressions in forests. [7, 11, 22, 36, 44]

**Range:** Ec. and s. Minn. (Eco-Region: 2, 5-9), all but far n. Wisc., s L.P. of Mich. N.B. to Minn., s to Fla., Tex., Calif. and into Mex. [7, 21]

### **Description**

**General:** Deciduous tree 35-50' tall and 20-35' wide, with a single trunk or several trunks and a rounded, open crown. Trunks are often leaning or horizontal to the water or ground surface. **Flower:** Yellow-green catkins 1-3" long with hairy scales are borne among new leaves from April to May. **Leaf:** Alternate, narrow, lance-shaped leaves are 3-5" long and 3/8-3/4" wide. Often they are slightly curved to one side with long, pointed and finely saw-toothed and hairless leaves. The upper side of the leaf is darker green than the lower. **Bark:** Dark brown or blackish, deeply furrowed or ridged into scaly, forking ridges. **Twigs:** Very slender, easily detached at the base, brownish. **Fruit:** Capsules 3/16" long that are reddish-brown, hairless and mature in late spring. **Root:** Shallow roots divide into a multitude of rootlets. **Soil:** Tolerates most soils with a pH range of 6.0-8.0. [7, 11, 22, 36, 44]

### **Normal Water Level**

This species prefers wet/saturated conditions. [21, 37, 44]

### **Flooding/Fluctuation Tolerances**

**Frequency:** High. **Depth:** 60" in spring and 24" in summer. **Duration:** Long for spring, medium long for the summer - 10 and 4 days, respectively (decreasing 6"/day in the spring and 12" over 2 days in the summer). This species tolerates spring seasonal inundation better than irregular summer inundation. However, it is still very tolerant to flood duration and depth increases. It will decrease in abundance with flood depth decreases. [1, 22, 37, 44]

### **Sensitivities or Other Tolerances**

**Exposure:** Full sun; not tolerant of shade. **Salt:** Moderate to high. **Nutrient:** Moderate to high. **Siltation:** Moderate. **Insect:** Infrequent – willow sawfly occasionally defoliates trees. **Other:** Black willow has a slow rate of spread even though it does spread by suckers and has a rapid rate of growth. It is frequently susceptible to fungus scab, and black canker causes leaf and shoot destruction. Wind and ice frequently damage it, especially breaking off large limbs. It is sensitive to SO<sub>2</sub> and O<sub>3</sub>, though resistant to HFI, drought, heat, soil compaction and mine spoils. It is moderately tolerant to alkaline soils. It has a moderate-to-high tolerance to general disturbance. [1, 2, 22, 25, 37, 44]

### **Design Considerations**

This species is a good stream bank stabilizer due to its rapid rate of growth and its ability to sucker if damaged. It has been used in both stream bank and shoreline stabilization. Due to its ability to withstand flooding, it is well suited for flood plain

**Indicator Status: OBL**

restorations, stream bank improvements and ditches. [6, 37, 44]

### **Wildlife Use**

Willow buds and small, tender portions of the twigs are staples for ruffed and sharp-tailed grouse as well as songbirds, waterfowl and marsh birds.

Rabbits, squirrels, porcupine, muskrats, beaver, elk, moose and deer eat the twigs, foliage and bark. It is also a food source for the mourning cloak butterfly. Cavities are used by racoons and woodducks. [6, 21, 22, 32, 37, 44]



Photo: www.calra2.umh.edu/15574

### **Nursery/Plant Information**

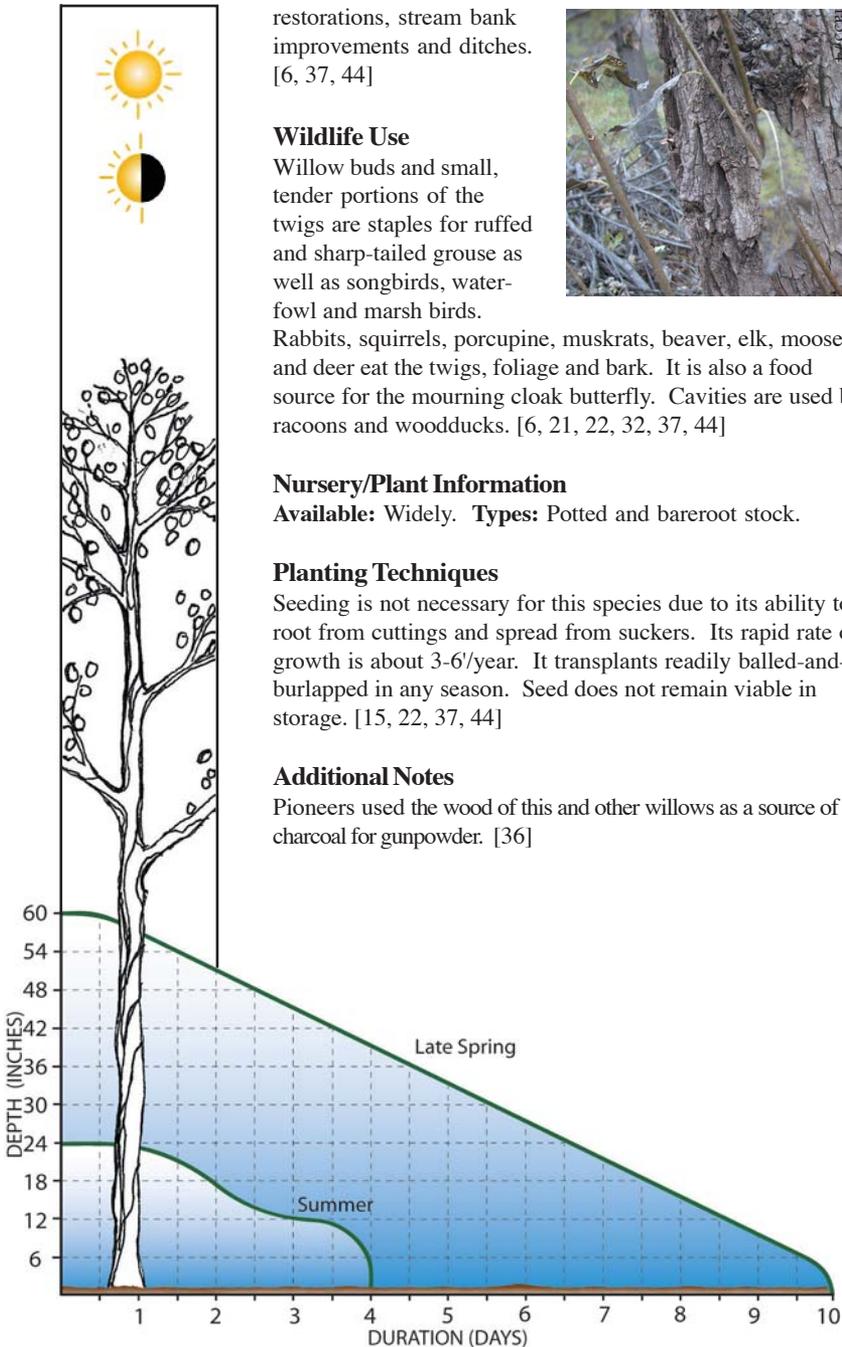
**Available:** Widely. **Types:** Potted and bareroot stock.

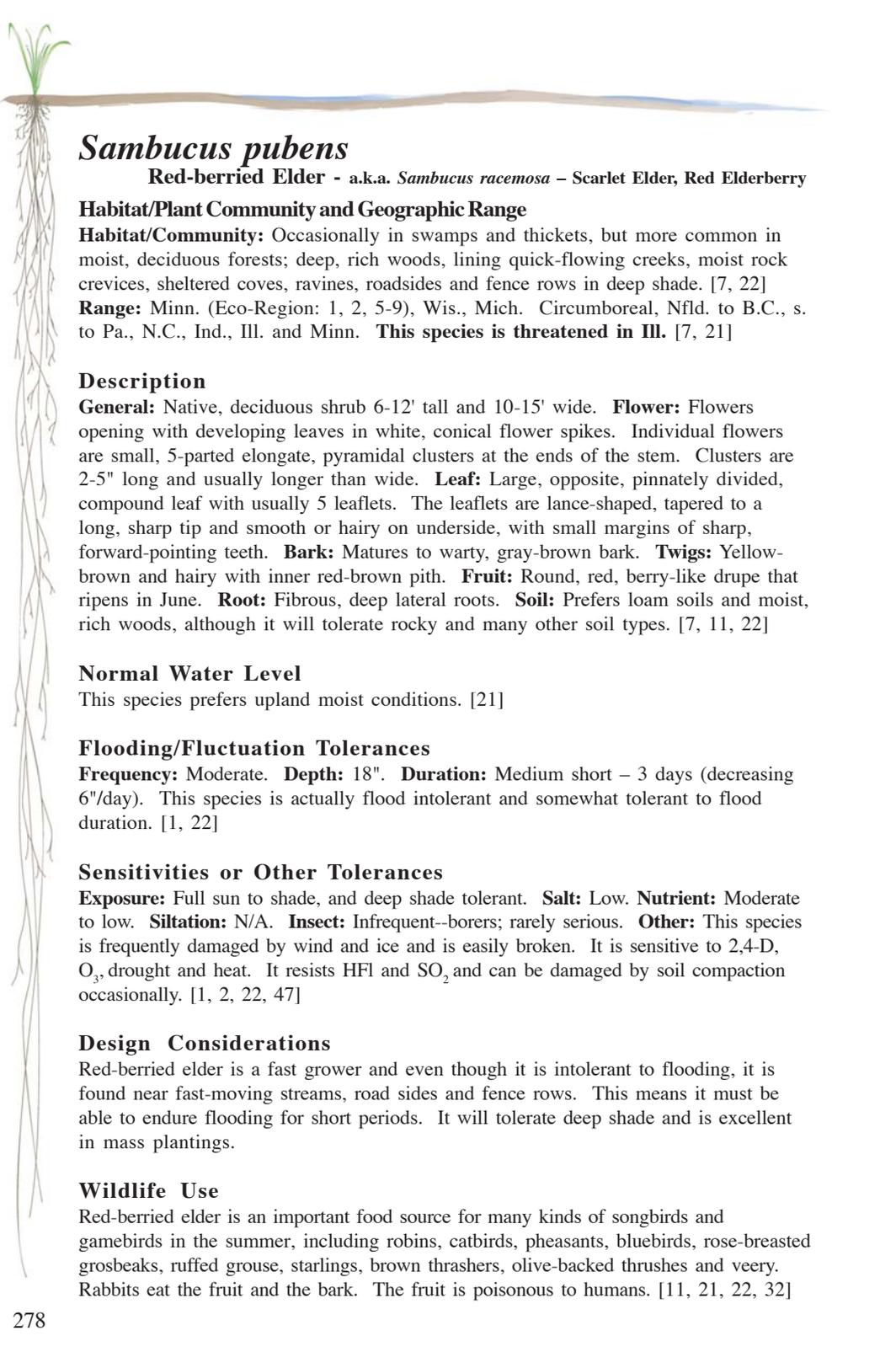
### **Planting Techniques**

Seeding is not necessary for this species due to its ability to root from cuttings and spread from suckers. Its rapid rate of growth is about 3-6'/year. It transplants readily balled-and-burlapped in any season. Seed does not remain viable in storage. [15, 22, 37, 44]

### **Additional Notes**

Pioneers used the wood of this and other willows as a source of charcoal for gunpowder. [36]





# *Sambucus pubens*

Red-berried Elder - a.k.a. *Sambucus racemosa* – Scarlet Elder, Red Elderberry

## Habitat/Plant Community and Geographic Range

**Habitat/Community:** Occasionally in swamps and thickets, but more common in moist, deciduous forests; deep, rich woods, lining quick-flowing creeks, moist rock crevices, sheltered coves, ravines, roadsides and fence rows in deep shade. [7, 22]

**Range:** Minn. (Eco-Region: 1, 2, 5-9), Wis., Mich. Circumboreal, Nfld. to B.C., s. to Pa., N.C., Ind., Ill. and Minn. **This species is threatened in Ill.** [7, 21]

## Description

**General:** Native, deciduous shrub 6-12' tall and 10-15' wide. **Flower:** Flowers opening with developing leaves in white, conical flower spikes. Individual flowers are small, 5-parted elongate, pyramidal clusters at the ends of the stem. Clusters are 2-5" long and usually longer than wide. **Leaf:** Large, opposite, pinnately divided, compound leaf with usually 5 leaflets. The leaflets are lance-shaped, tapered to a long, sharp tip and smooth or hairy on underside, with small margins of sharp, forward-pointing teeth. **Bark:** Matures to warty, gray-brown bark. **Twigs:** Yellow-brown and hairy with inner red-brown pith. **Fruit:** Round, red, berry-like drupe that ripens in June. **Root:** Fibrous, deep lateral roots. **Soil:** Prefers loam soils and moist, rich woods, although it will tolerate rocky and many other soil types. [7, 11, 22]

## Normal Water Level

This species prefers upland moist conditions. [21]

## Flooding/Fluctuation Tolerances

**Frequency:** Moderate. **Depth:** 18". **Duration:** Medium short – 3 days (decreasing 6"/day). This species is actually flood intolerant and somewhat tolerant to flood duration. [1, 22]

## Sensitivities or Other Tolerances

**Exposure:** Full sun to shade, and deep shade tolerant. **Salt:** Low. **Nutrient:** Moderate to low. **Siltation:** N/A. **Insect:** Infrequent-borers; rarely serious. **Other:** This species is frequently damaged by wind and ice and is easily broken. It is sensitive to 2,4-D, O<sub>3</sub>, drought and heat. It resists HFl and SO<sub>2</sub> and can be damaged by soil compaction occasionally. [1, 2, 22, 47]

## Design Considerations

Red-berried elder is a fast grower and even though it is intolerant to flooding, it is found near fast-moving streams, road sides and fence rows. This means it must be able to endure flooding for short periods. It will tolerate deep shade and is excellent in mass plantings.

## Wildlife Use

Red-berried elder is an important food source for many kinds of songbirds and gamebirds in the summer, including robins, catbirds, pheasants, bluebirds, rose-breasted grosbeaks, ruffed grouse, starlings, brown thrashers, olive-backed thrushes and veery. Rabbits eat the fruit and the bark. The fruit is poisonous to humans. [11, 21, 22, 32]

**Indicator Status:** FACU+

**Nursery/Plant Information**

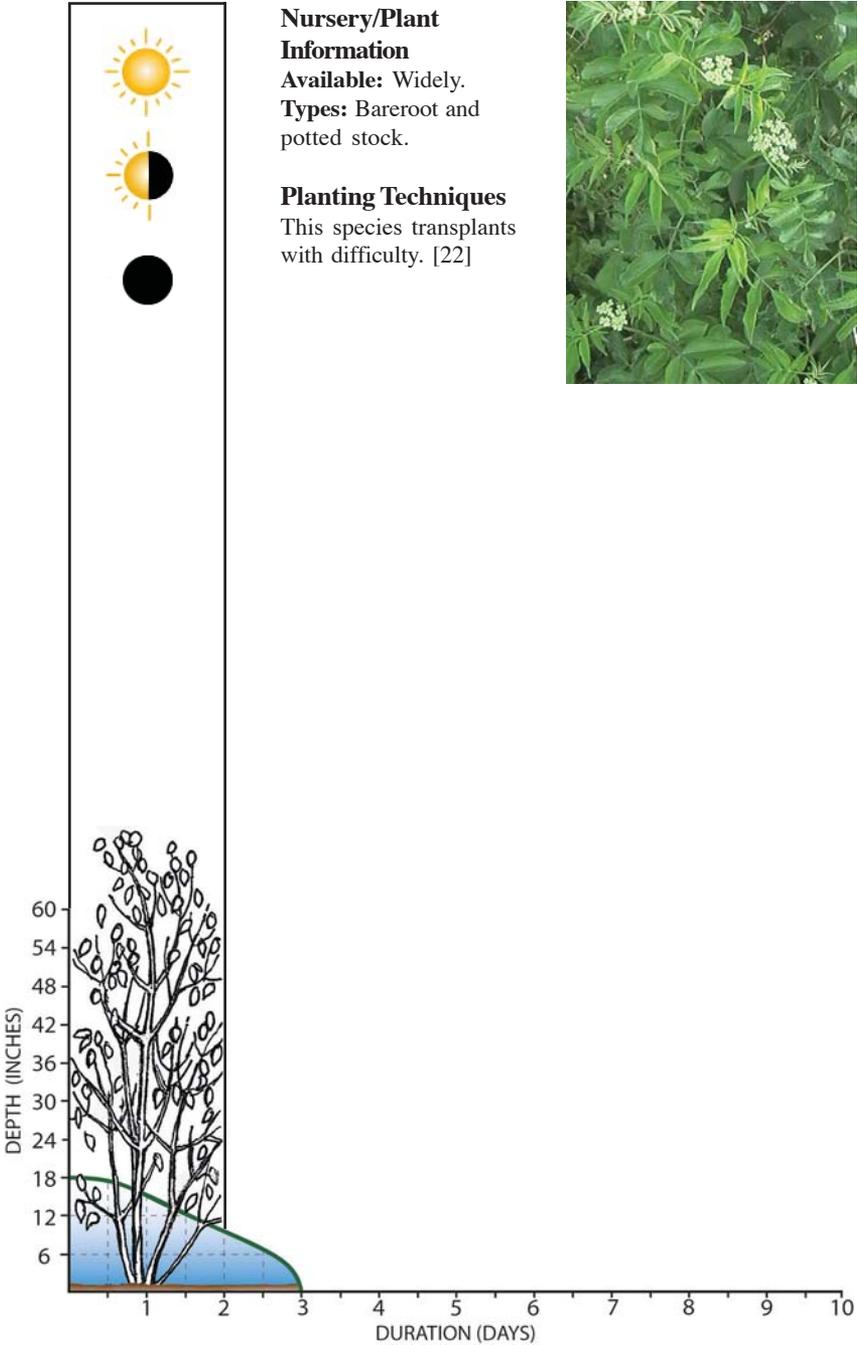
**Available:** Widely.  
**Types:** Bareroot and potted stock.

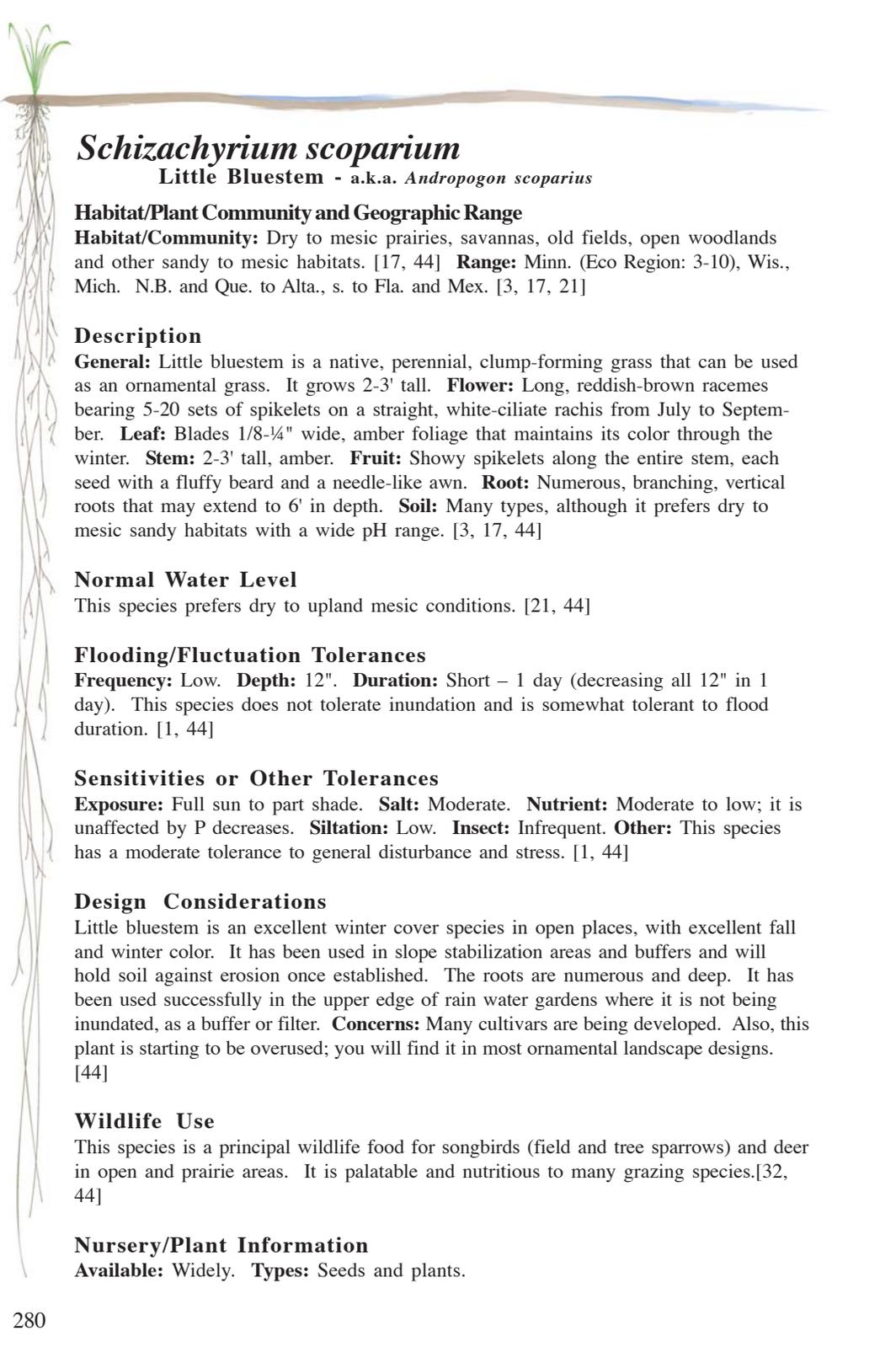
**Planting Techniques**

This species transplants with difficulty. [22]



Photo: Dan Shaw





# *Schizachyrium scoparium*

Little Bluestem - a.k.a. *Andropogon scoparius*

## Habitat/Plant Community and Geographic Range

**Habitat/Community:** Dry to mesic prairies, savannas, old fields, open woodlands and other sandy to mesic habitats. [17, 44] **Range:** Minn. (Eco Region: 3-10), Wis., Mich. N.B. and Que. to Alta., s. to Fla. and Mex. [3, 17, 21]

## Description

**General:** Little bluestem is a native, perennial, clump-forming grass that can be used as an ornamental grass. It grows 2-3' tall. **Flower:** Long, reddish-brown racemes bearing 5-20 sets of spikelets on a straight, white-ciliate rachis from July to September. **Leaf:** Blades 1/8-1/4" wide, amber foliage that maintains its color through the winter. **Stem:** 2-3' tall, amber. **Fruit:** Showy spikelets along the entire stem, each seed with a fluffy beard and a needle-like awn. **Root:** Numerous, branching, vertical roots that may extend to 6' in depth. **Soil:** Many types, although it prefers dry to mesic sandy habitats with a wide pH range. [3, 17, 44]

## Normal Water Level

This species prefers dry to upland mesic conditions. [21, 44]

## Flooding/Fluctuation Tolerances

**Frequency:** Low. **Depth:** 12". **Duration:** Short – 1 day (decreasing all 12" in 1 day). This species does not tolerate inundation and is somewhat tolerant to flood duration. [1, 44]

## Sensitivities or Other Tolerances

**Exposure:** Full sun to part shade. **Salt:** Moderate. **Nutrient:** Moderate to low; it is unaffected by P decreases. **Siltation:** Low. **Insect:** Infrequent. **Other:** This species has a moderate tolerance to general disturbance and stress. [1, 44]

## Design Considerations

Little bluestem is an excellent winter cover species in open places, with excellent fall and winter color. It has been used in slope stabilization areas and buffers and will hold soil against erosion once established. The roots are numerous and deep. It has been used successfully in the upper edge of rain water gardens where it is not being inundated, as a buffer or filter. **Concerns:** Many cultivars are being developed. Also, this plant is starting to be overused; you will find it in most ornamental landscape designs. [44]

## Wildlife Use

This species is a principal wildlife food for songbirds (field and tree sparrows) and deer in open and prairie areas. It is palatable and nutritious to many grazing species.[32, 44]

## Nursery/Plant Information

**Available:** Widely. **Types:** Seeds and plants.

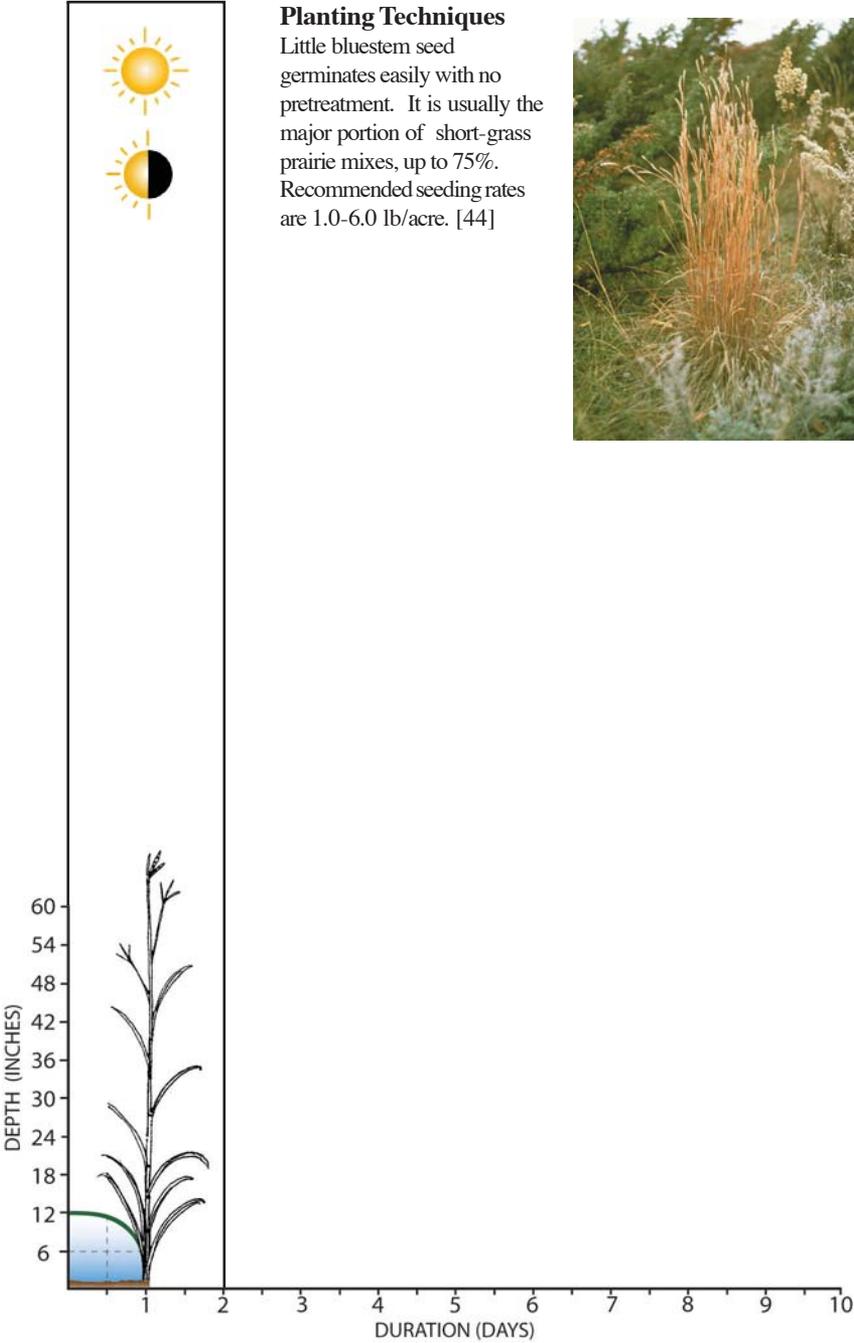
Indicator Status: FACU-

**Planting Techniques**

Little bluestem seed germinates easily with no pretreatment. It is usually the major portion of short-grass prairie mixes, up to 75%. Recommended seeding rates are 1.0-6.0 lb/acre. [44]



Photo: Paul Jackson





## *Scirpus acutus*

**Hardstem Bulrush** - a.k.a. **Hard-stemmed Bulrush or Common Tule**

### **Habitat/Plant Community and Geographic Range:**

**Habitat/Community:** Marshes, calcareous fens, minerotrophic waters, ditches, ponds, streams, lakes and occasionally bog lakes (usually emergent in shallow-to-deep water, sometime where brackish). [4, 7, 11, 16, 24, 44] **Range:** Common; Minn. (Eco-Region: All), n. and e. Wis., Mich. N.S. to B.C., s. to N.C., Tex. and Calif. [7, 21]

### **Description**

**General:** Persistent, native, perennial, emergent herb 3½-9' tall. Often forms large colonies. Hardstem bulrush can form colonial stands or by intermixing with other emergents. Hybrids between hardstem and softstem bulrush (*Scirpus validus*) can occur. **Flower:** A spikelet that is reddish brown; blooms from May to September. The spikelets are oval to cylindrical and are exceeded by a specialized leaf that appears to be a continuation of the stem. **Leaf:** A few sheathing vestigial leaves at the base. **Stem:** 3½-9' tall, cylindrical and dark olive green. The stems are small chambered, so that they are stiff and not easily crushed between the thumb and index finger. **Fruit:** Achenes are not quite 1/8" long, have 6 basal bristles and are covered by whitish-brown scales. The scales have marginal hairs and red dots on the back. **Root:** Stout rhizomes. **Soil:** It prefers sandy to marly substrates with good water circulation in the root zone and a pH range of 6.7-9.1. [4, 7, 11, 24, 44]

### **Normal Water Level**

This species prefers deep-to-shallow water, generally in depths to 5', but it has been found in much deeper depths and can be found in wet/saturated conditions. [11, 21, 37, 44]

### **Flooding/Fluctuation Tolerances**

**Frequency:** High. **Depth:** 24". **Duration:** Medium long – 4 days (decreasing 12" every 2 days). This species can tolerate regular inundation and high flood durations. It resists wave action and water level changes. [1, 37, 44]

### **Sensitivities or Other Tolerances**

**Exposure:** Full sun. **Salt:** Moderate to high. **Nutrient:** Low to moderate. **Siltation:** Low to moderate. **Insect:** N/A. **Other:** It has a higher tolerance of mixosaline and minerotrophic conditions than softstem bulrush (*S. validus*). It has moderate tolerance to general disturbances and stress. [1, 6, 11, 24, 37, 44]

### **Design Considerations**

Hardstem bulrush has been used in many conditions, from lake revegetation to shoreline and vegetated swales due to its ability to resist wave action and water level changes. It is an excellent buffer plant, protects dams, eroding shores, silt movement and creates excellent wildlife habitat. It is used in many wetland restorations and landscape designs. It should be planted to help limit the invasive qualities of cattail. **Concerns:** Protect new plantings from depredation by geese. [6, 16, 44]

### **Wildlife Use**

Bulrush is a wonderful wildlife habitat for waterfowl and other species. Coots, black, canvasback, mallard, pintail, redhead, ring-necked, scaup and teal ducks eat the seeds. Stems

**Indicator Status:** OBL

are utilized when young by Canada and snow geese. Sora and Virginia rails eat the seeds and rootstock. Muskrats eat the rootstock and stems. Especially in central Minn., bulrush provides the primary nesting sites for grebes, black terns and other waterfowl and marsh birds. It provides spawning and nursery habitat for northern pike, bluegills and other fish. [4, 6, 11, 16, 24, 32, 37, 44]

**Nursery/Plant Information**

**Available:** Widely.

**Types:** Achenes, rootstocks, rhizomes and transplants.

**Planting Techniques**

The achenes require moist, cold stratification for 90 days, then warm temperature and light. Fresh achenes may be planted in the fall with drawdowns in the spring. Plant in saturated soils. A recommended seeding rate of 0.06-0.25 lb/acre with approximately 292,800 seeds/lb. Rhizomes planting has had more success, so long as rhizomes are planted 2-5" deep in 4-6" of water and 3' apart. Clustered arrangements are proving more successful due to the slow rate of spread. Transplants can be planted in 6"-2' of water up to 1,000 plants/acre. This species is favored by drawdowns. [16, 24, 42, 44]

**Additional Notes**

Stems of hardstem bulrush are difficult to flatten between the fingers, unlike softstem bulrush (*S. validus*), whose stems are easily compressed. [7]

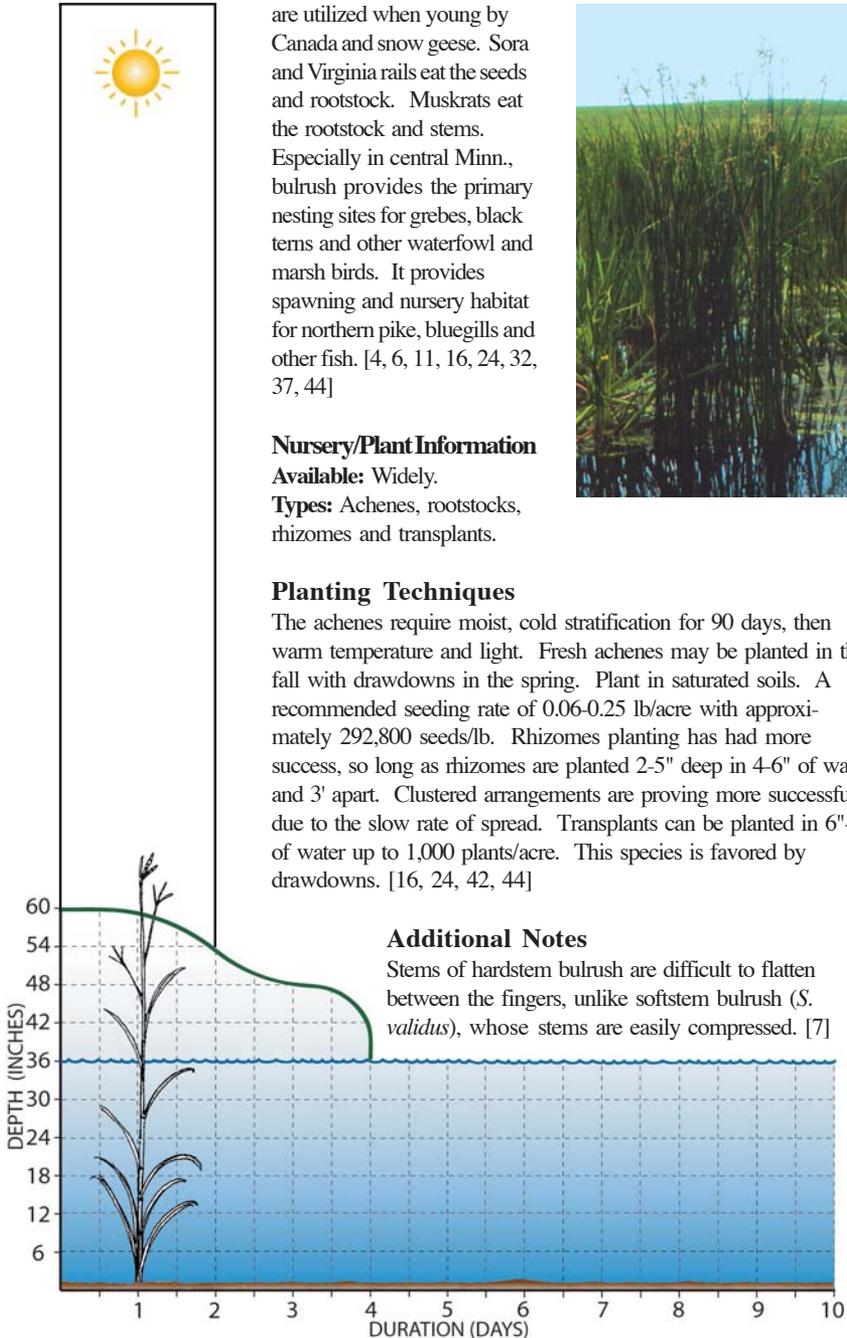


Photo: Jason Husveith



## *Scirpus atrovirens*

**Green Bulrush** - a.k.a. **Black Bulrush, Dark Green Rush**

### **Habitat/Plant Community and Geographic Range**

**Habitat/Community:** Moist woods, shores, ditches, stream banks, swamps, shrub-carrs, alder thickets, sedge meadows, springs and other wet places. It seems to increase with disturbance to peat/muck soils and often invades dredged material sites. [7, 11, 16]

**Range:** Common; Minn. (Eco-Range: All), Wis., Mich. Ont. to Alta. and Wash., s. to Mo., Tex., N.M. and Ariz. [7, 21]

### **Description**

**General:** Green bulrush is a common, short-lived, pioneer, emergent, native perennial with course clump form and nice clusters of small, brown heads that may reach a height of 5'. **Flower:** 2 or more conspicuous, spreading, modified leaves subtend the terminal inflorescence with flat blades. Numerous spikelets on the inflorescence are crowded into a dense, nearly spherical head on rays that angle out in different directions and bloom from June to July. **Leaf:** M-shaped, mint-green leaves are broad (up to  $\frac{3}{4}$ " wide), with sheaths that are brownish or green and not tinged with red. **Stem:** Sturdy, roundly triangular stems, with up to 10 stem leaves growing to 4.5' tall. **Fruit:** Achenes that are tan to nearly white, compressed 3-angled, with a short beak. **Root:** Short rhizomes with strong, fibrous roots. **Soil:** Prefers peat to muck soils and often invades dredged material sites or other poor, saturated soils and seems to increase with disturbance. [7, 11]

### **Normal Water Level**

This species prefers shallow water of 30" of inundation or less to wet/saturated conditions, although it will tolerate periods of drought. [21]

### **Flooding/Fluctuation Tolerances**

**Frequency:** High. **Depth:** 30". **Duration:** Medium short— 3 days (decreasing 12"/day for 2 days then 6" the last day). This plant has moderately low tolerance to flood duration. [1]

### **Sensitivities or Other Tolerances**

**Exposure:** Full to part sun. **Salt:** Moderate. **Nutrient:** Low to moderate. **Siltation:** Moderate. **Insect:** Infrequent. **Other:** This species has a moderately high tolerance to general disturbance and stress. [1]

### **Design Considerations**

Green bulrush is well suited to controlling erosion along shorelines, ditches, stream banks, meadows and thickets. It is a good pioneer species that will vegetate a site quickly with a decorative bunching form. It is a frequent pioneering colonizer of wetland mitigation sites and disturbed areas. **Concerns:** This species can be aggressive and is short lived. This may be desirable to compete with non-native or invasive species. [16]

### **Wildlife Use**

Bulrush provides wildlife habitat for waterfowl and other species. Coots, black, canvas-back, mallard, pintail, redhead, ring-necked, scaup, and teal ducks eat the seeds. Stems are utilized when young by Canada and snow geese. Sora and Virginia rails eat the seeds

**Indicator Status: OBL**

and rootstock. Muskrats eat the rootstock and stems. Bulrush provides spawning and nursery habitat for northern pike, bluegills and other fish. [32, 37]



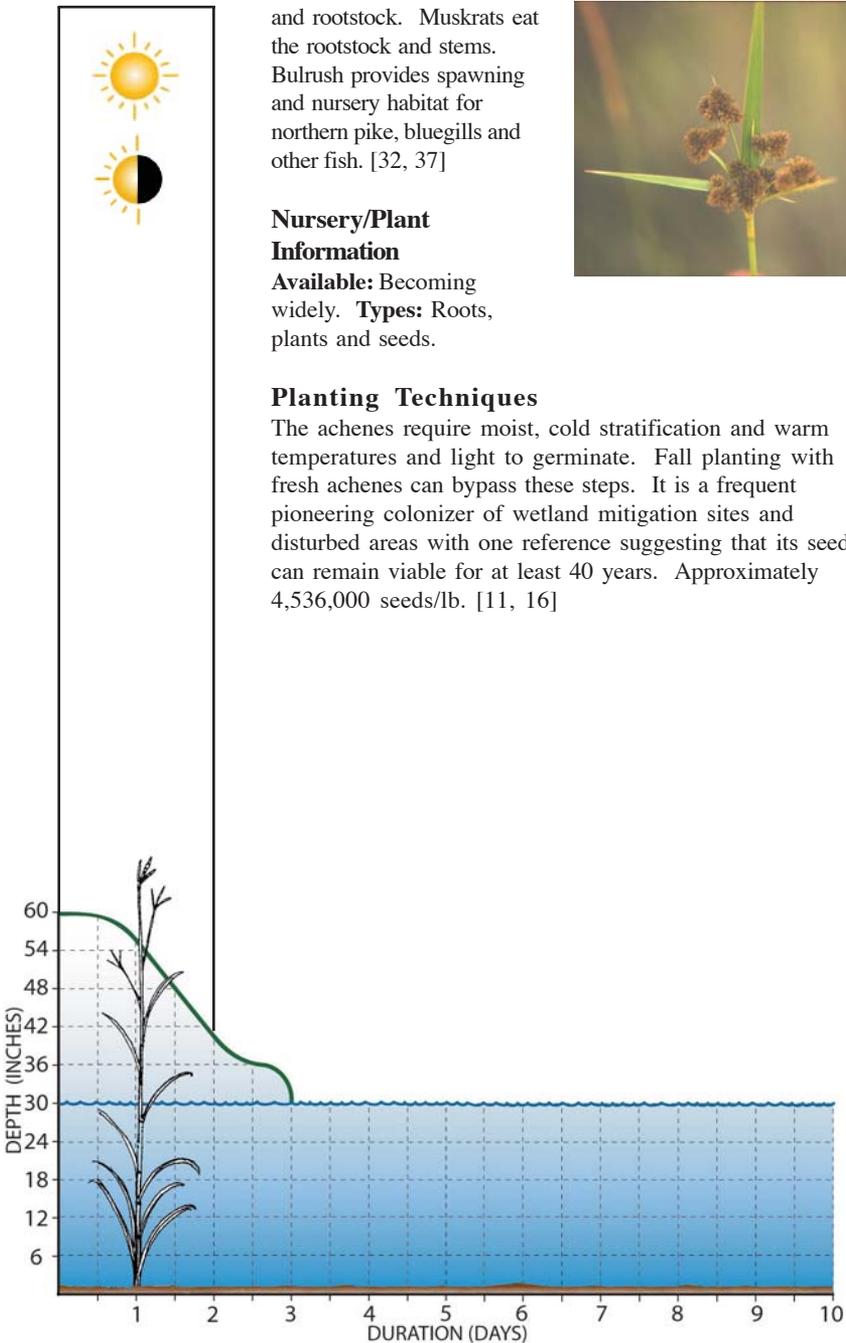
Photo: Jason Husveith

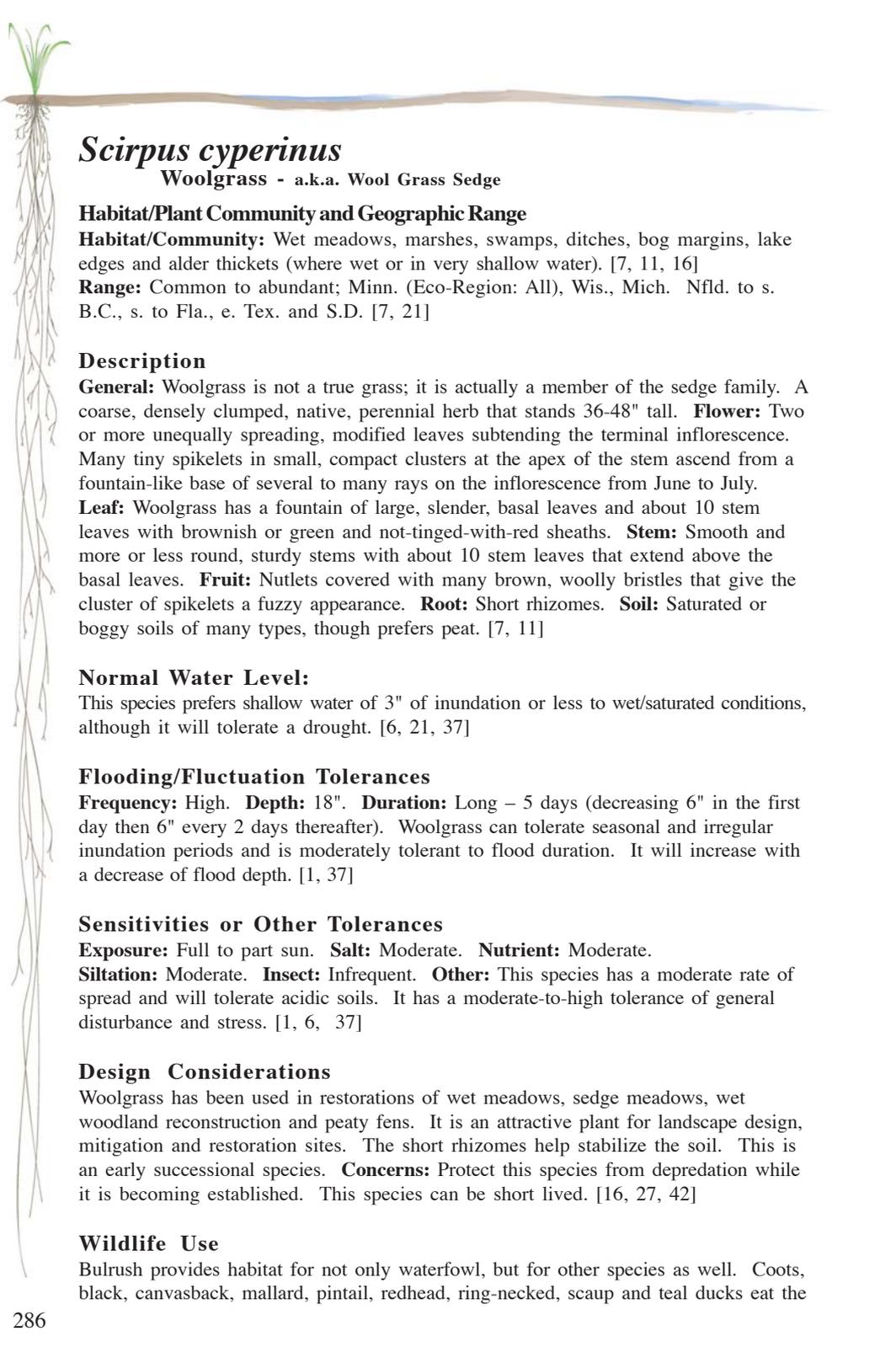
### **Nursery/Plant Information**

**Available:** Becoming widely. **Types:** Roots, plants and seeds.

### **Planting Techniques**

The achenes require moist, cold stratification and warm temperatures and light to germinate. Fall planting with fresh achenes can bypass these steps. It is a frequent pioneering colonizer of wetland mitigation sites and disturbed areas with one reference suggesting that its seeds can remain viable for at least 40 years. Approximately 4,536,000 seeds/lb. [11, 16]





# *Scirpus cyperinus*

Woolgrass - a.k.a. Wool Grass Sedge

## Habitat/Plant Community and Geographic Range

**Habitat/Community:** Wet meadows, marshes, swamps, ditches, bog margins, lake edges and alder thickets (where wet or in very shallow water). [7, 11, 16]

**Range:** Common to abundant; Minn. (Eco-Region: All), Wis., Mich. Nfld. to s. B.C., s. to Fla., e. Tex. and S.D. [7, 21]

## Description

**General:** Woolgrass is not a true grass; it is actually a member of the sedge family. A coarse, densely clumped, native, perennial herb that stands 36-48" tall. **Flower:** Two or more unequally spreading, modified leaves subtending the terminal inflorescence. Many tiny spikelets in small, compact clusters at the apex of the stem ascend from a fountain-like base of several to many rays on the inflorescence from June to July.

**Leaf:** Woolgrass has a fountain of large, slender, basal leaves and about 10 stem leaves with brownish or green and not-tinged-with-red sheaths. **Stem:** Smooth and more or less round, sturdy stems with about 10 stem leaves that extend above the basal leaves. **Fruit:** Nutlets covered with many brown, woolly bristles that give the cluster of spikelets a fuzzy appearance. **Root:** Short rhizomes. **Soil:** Saturated or boggy soils of many types, though prefers peat. [7, 11]

## Normal Water Level:

This species prefers shallow water of 3" of inundation or less to wet/saturated conditions, although it will tolerate a drought. [6, 21, 37]

## Flooding/Fluctuation Tolerances

**Frequency:** High. **Depth:** 18". **Duration:** Long – 5 days (decreasing 6" in the first day then 6" every 2 days thereafter). Woolgrass can tolerate seasonal and irregular inundation periods and is moderately tolerant to flood duration. It will increase with a decrease of flood depth. [1, 37]

## Sensitivities or Other Tolerances

**Exposure:** Full to part sun. **Salt:** Moderate. **Nutrient:** Moderate.

**Sitation:** Moderate. **Insect:** Infrequent. **Other:** This species has a moderate rate of spread and will tolerate acidic soils. It has a moderate-to-high tolerance of general disturbance and stress. [1, 6, 37]

## Design Considerations

Woolgrass has been used in restorations of wet meadows, sedge meadows, wet woodland reconstruction and peaty fens. It is an attractive plant for landscape design, mitigation and restoration sites. The short rhizomes help stabilize the soil. This is an early successional species. **Concerns:** Protect this species from depredation while it is becoming established. This species can be short lived. [16, 27, 42]

## Wildlife Use

Bulrush provides habitat for not only waterfowl, but for other species as well. Coots, black, canvasback, mallard, pintail, redhead, ring-necked, scaup and teal ducks eat the

**Indicator Status:** OBL

seeds. Stems are utilized when young by Canada and snow geese. Sora and Virginia rails eat the seeds and rootstock. Muskrats eat the rootstock and stems. Bulrush provides spawning and nursery habitat for fish and nesting habitats for waterfowl and marsh birds. [32, 37]

**Nursery/Plant Information**

**Available:** Widely.

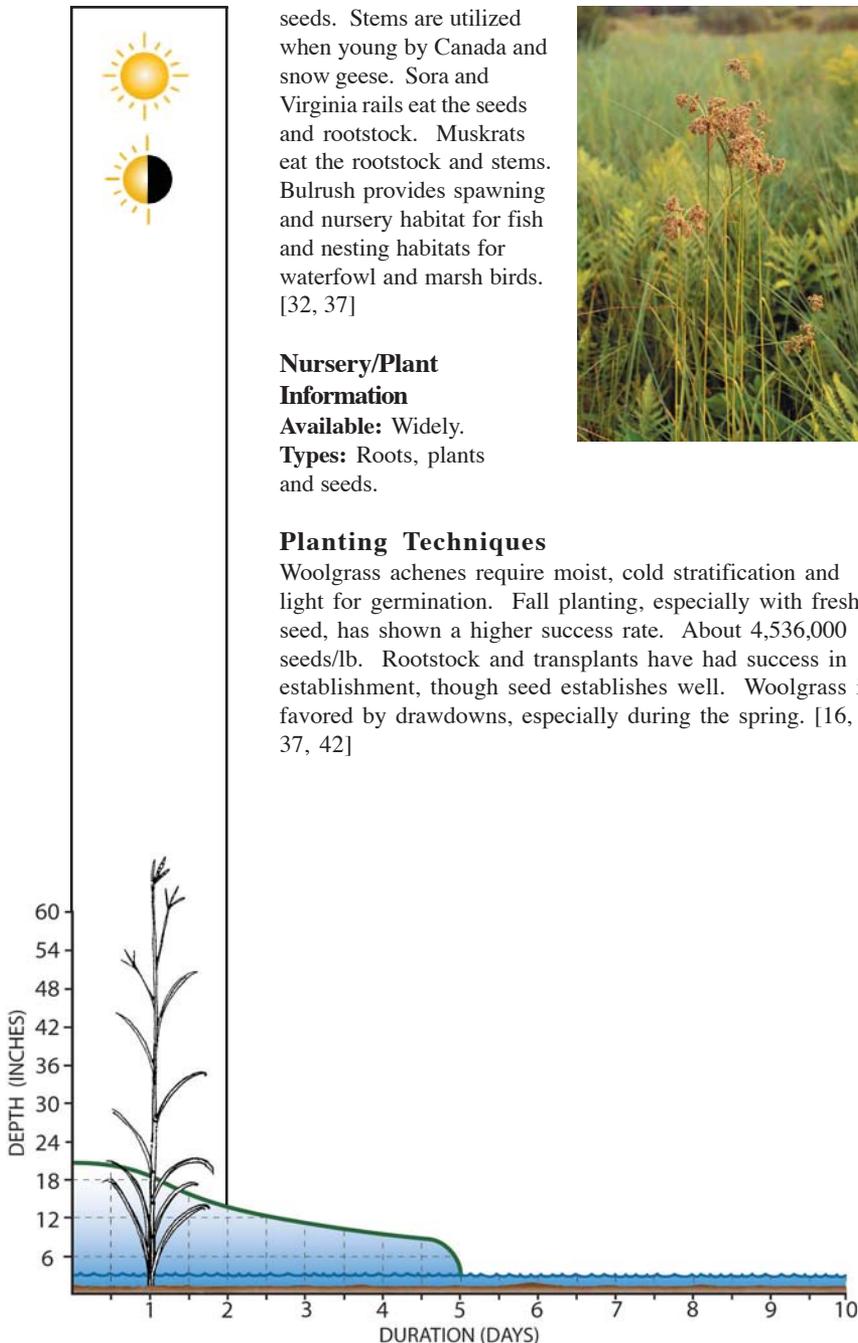
**Types:** Roots, plants and seeds.

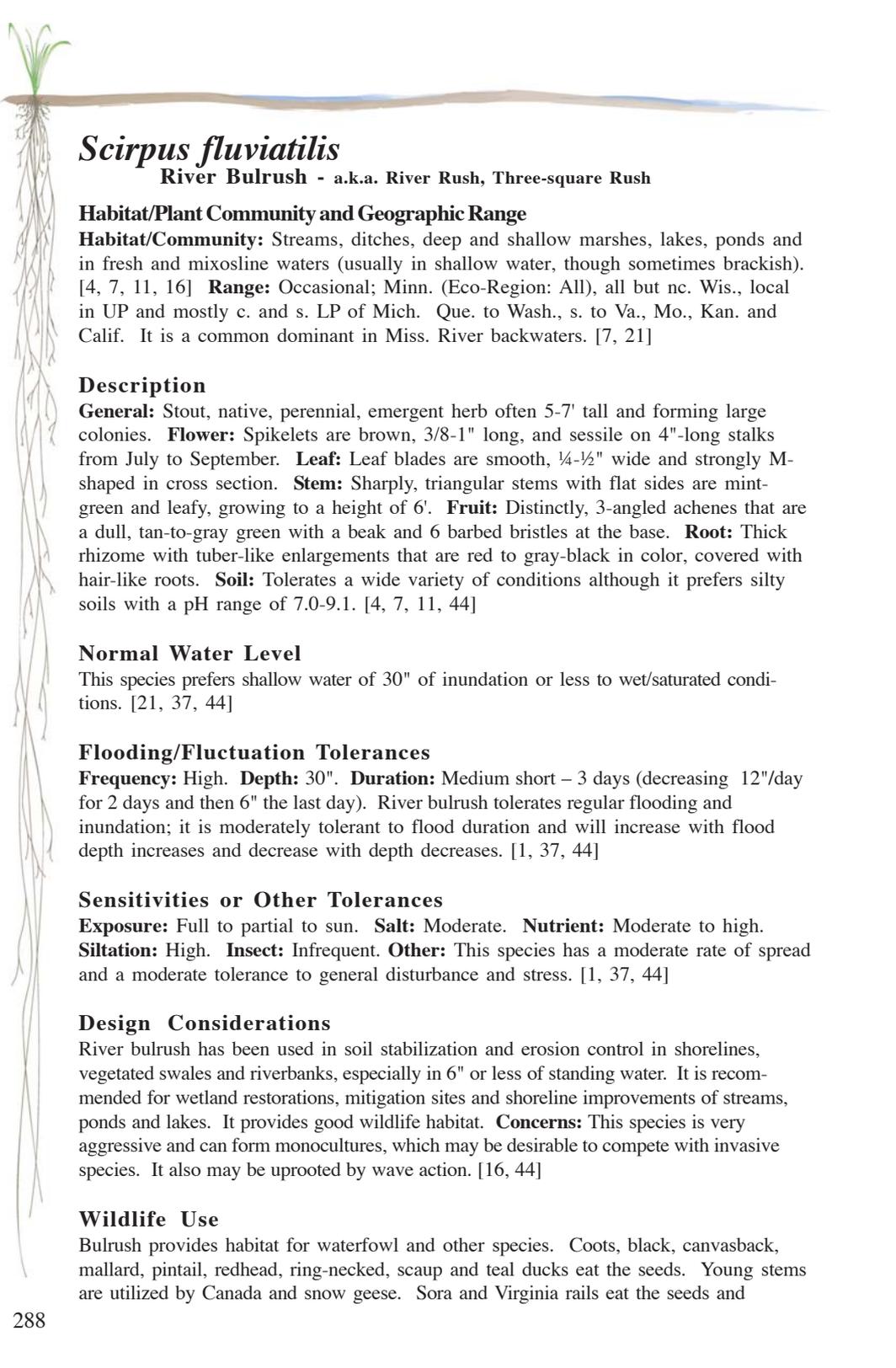
**Planting Techniques**

Woolgrass achenes require moist, cold stratification and light for germination. Fall planting, especially with fresh seed, has shown a higher success rate. About 4,536,000 seeds/lb. Rootstock and transplants have had success in establishment, though seed establishes well. Woolgrass is favored by drawdowns, especially during the spring. [16, 37, 42]



Photo: Paul Jackson





# *Scirpus fluviatilis*

**River Bulrush - a.k.a. River Rush, Three-square Rush**

## **Habitat/Plant Community and Geographic Range**

**Habitat/Community:** Streams, ditches, deep and shallow marshes, lakes, ponds and in fresh and mixosline waters (usually in shallow water, though sometimes brackish). [4, 7, 11, 16] **Range:** Occasional; Minn. (Eco-Region: All), all but nc. Wis., local in UP and mostly c. and s. LP of Mich. Que. to Wash., s. to Va., Mo., Kan. and Calif. It is a common dominant in Miss. River backwaters. [7, 21]

## **Description**

**General:** Stout, native, perennial, emergent herb often 5-7' tall and forming large colonies. **Flower:** Spikelets are brown, 3/8-1" long, and sessile on 4"-long stalks from July to September. **Leaf:** Leaf blades are smooth, 1/4-1/2" wide and strongly M-shaped in cross section. **Stem:** Sharply, triangular stems with flat sides are mint-green and leafy, growing to a height of 6'. **Fruit:** Distinctly, 3-angled achenes that are a dull, tan-to-gray green with a beak and 6 barbed bristles at the base. **Root:** Thick rhizome with tuber-like enlargements that are red to gray-black in color, covered with hair-like roots. **Soil:** Tolerates a wide variety of conditions although it prefers silty soils with a pH range of 7.0-9.1. [4, 7, 11, 44]

## **Normal Water Level**

This species prefers shallow water of 30" of inundation or less to wet/saturated conditions. [21, 37, 44]

## **Flooding/Fluctuation Tolerances**

**Frequency:** High. **Depth:** 30". **Duration:** Medium short – 3 days (decreasing 12"/day for 2 days and then 6" the last day). River bulrush tolerates regular flooding and inundation; it is moderately tolerant to flood duration and will increase with flood depth increases and decrease with depth decreases. [1, 37, 44]

## **Sensitivities or Other Tolerances**

**Exposure:** Full to partial to sun. **Salt:** Moderate. **Nutrient:** Moderate to high. **Siltation:** High. **Insect:** Infrequent. **Other:** This species has a moderate rate of spread and a moderate tolerance to general disturbance and stress. [1, 37, 44]

## **Design Considerations**

River bulrush has been used in soil stabilization and erosion control in shorelines, vegetated swales and riverbanks, especially in 6" or less of standing water. It is recommended for wetland restorations, mitigation sites and shoreline improvements of streams, ponds and lakes. It provides good wildlife habitat. **Concerns:** This species is very aggressive and can form monocultures, which may be desirable to compete with invasive species. It also may be uprooted by wave action. [16, 44]

## **Wildlife Use**

Bulrush provides habitat for waterfowl and other species. Coots, black, canvasback, mallard, pintail, redhead, ring-necked, scaup and teal ducks eat the seeds. Young stems are utilized by Canada and snow geese. Sora and Virginia rails eat the seeds and

## Indicator Status: OBL



rootstock. Muskrats eat the rootstock and stems. Bulrush provides spawning and nursery habitat for bass, bluegills and other fish. It also provides nesting habitat for waterfowl and marshbirds. [4, 32, 37, 44]



Photo: Dan Shaw

### Nursery/Plant Information

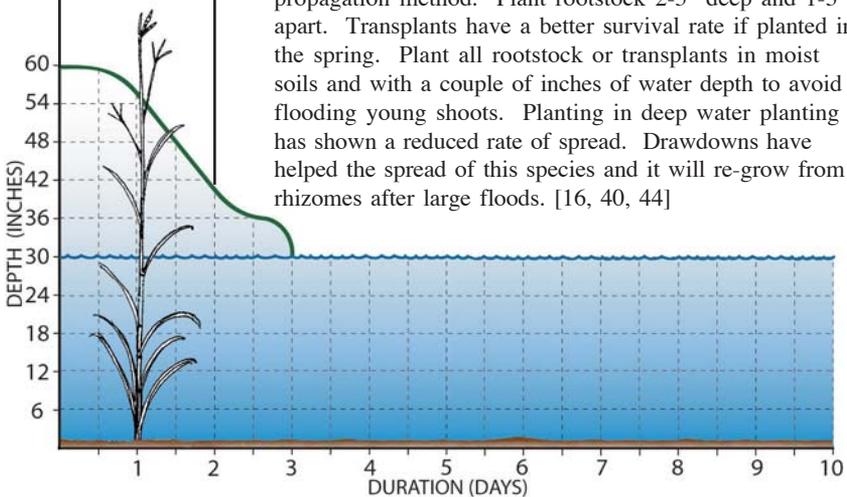
**Available:** Becoming widely. **Types:** Rhizomes, rootstocks, tubers and transplants.

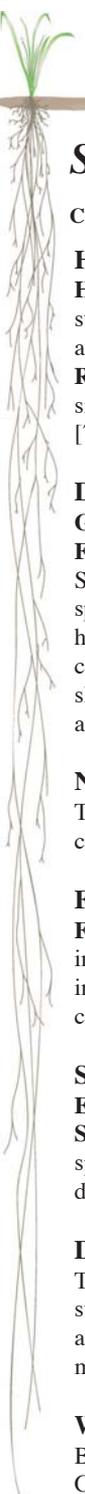


Photo: MINDNR

### Planting Techniques

River bulrush achenes require moist, cold stratification for at least 90 days, then good light for germination. Seed production is erratic. Fresh seed planted in the fall has the highest germination rate. Recommended seeding rate is 0.06-0.125 lb/acre with about 54,000 seeds/lb. This species divides well, and rhizomes, tubers and transplants are the preferred propagation method. Plant rootstock 2-5" deep and 1-3' apart. Transplants have a better survival rate if planted in the spring. Plant all rootstock or transplants in moist soils and with a couple of inches of water depth to avoid flooding young shoots. Planting in deep water planting has shown a reduced rate of spread. Drawdowns have helped the spread of this species and it will re-grow from rhizomes after large floods. [16, 40, 44]





## *Scirpus pungens*

**Three-square Bulrush** - a.k.a. *Scirpus americanus*, *Scirpus (americanus) pungens* - Common Threesquare, True Three-square Bulrush, Chairmaker's Rush, Swordgrass

### **Habitat/Plant Community and Geographic Range**

**Habitat/Community:** Shallow water, wet sandy, gravelly or mucky shores, streambanks, deep and shallow marshes, calcareous fens, wet meadows, ditches, seeps and other wet places. It is frequently found in mixosaline waters. [4, 7, 11, 16, 24]

**Range:** Fairly common; Minn. (Eco-Region: All), nw. and e. Wis., LP and occasional in UP of Mich. S. Can., s. to S. Amer.; Europe, Australia and New Zealand. [7, 21]

### **Description**

**General:** A persistent, perennial, emergent herb that grows 3-5' tall and forms colonies.

**Flower:** 1 to 8 oblong spikelets  $\frac{1}{4}$ - $\frac{3}{4}$ " long, sessile and crowded. Blooms from July to September. A specialized leaf appears to be a continuation of the stem beyond the spikelets.

**Leaf:** One to three leaves that are narrowly linear and are less than half the height of the stems form basal sheaths.

**Stem:** Sharply triangular stems with 2 or 3 concave sides, growing to a height of 5'. **Fruit:** Achenes with bristles. **Root:** Long, slender rhizomes. **Soil:** Likes shallow water in wet sandy, gravelly or mucky shorelines as well as calcareous conditions. [4, 7, 11, 24]

### **Normal Water Level:**

This species prefers shallow water of 30" of inundation or less to wet/saturated conditions and will tolerate slightly salty water. [11, 21, 37]

### **Flooding/Fluctuation Tolerances**

**Frequency:** High. **Depth:** 18". **Duration:** Medium long – 4 days (decreasing 12" in 2 days, then 6" over the next 2 days). This species will tolerate regular or seasonal inundation and flood duration. It will increase and is tolerant to flood depth increases. [1, 37]

### **Sensitivities or Other Tolerances**

**Exposure:** Full to partial sun. **Salt:** Low to high. **Nutrient:** Low to moderate.

**Siltation:** Moderate. **Insect:** Infrequent. **Other:** This species has a rapid rate of spread. It will remove metals quickly. It has a moderate tolerance to general disturbance. [1, 6, 24, 37]

### **Design Considerations**

Three-square bulrush is a good soil stabilizer for shores, stream banks and vegetated swales. It provides good wildlife habitat and has a rapid rate of spread for mitigation and restoration sites. **Concerns:** This species can become aggressive, although that may be desired in some instances. [16, 37]

### **Wildlife Use**

Bulrush provides wildlife habitat not only for waterfowl, but for other species as well. Coots, black, canvasback, mallard, pintail, redhead, ring-necked, scaup and teal ducks eat the seeds. Stems are utilized when young by Canada and snow geese. Sora and

Indicator Status: OBL



Virginia rails eat the seeds and rootstock. Muskrats eat the rootstock and stems. Bulrush provides spawning and nursery habitat for bass, bluegills and other fish. It also provides nesting cover for waterfowl and marsh birds. [4, 6, 11, 24, 32, 37]

### Nursery/Plant Information

**Available:** Becoming widely. **Types:** Root, plants and seeds.

### Planting Techniques

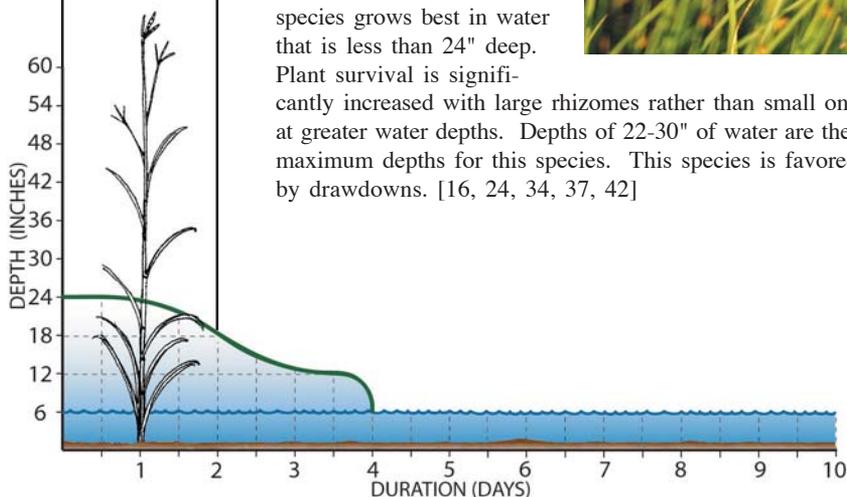
Three-square bulrush requires moist, cold stratification for at least 90 days and then light for germination. Fresh seed planted in the fall can bypass the stratification process. Approximately 220,000 seeds/lb. Transplants can be planted in saturated soil to a depth of 12" of inundation. This species grows best in water that is less than 24" deep. Plant survival is significantly increased with large rhizomes rather than small ones at greater water depths. Depths of 22-30" of water are the maximum depths for this species. This species is favored by drawdowns. [16, 24, 34, 37, 42]



Photo: Rusty Schmidt



Photo: Rusty Schmidt





## *Scirpus validus*

**Soft-stem Bulrush** - a.k.a. *Scirpus tabernaemontani* – Great Bulrush, American Great Bulrush

### **Habitat/Plant Community and Geographic Range**

**Habitat/Community:** Lakes, ponds, deep and shallow marshes, streams, ditches and occasionally bogs (shallow water and shores). [4, 7, 11, 16] **Range:** Common; Minn. (Eco-Region: All), Wis., Mich. Nfld. to s. Alaska, s. to S. Amer. [7, 21]

### **Description**

**General:** A persistent, emergent, perennial herb that is 3-9' tall, sometimes forming large colonies that may be intermixed with other emergent species. **Flower:** Several to many brown, oval spikelets on a specialized leaf that appears to be a continuation of the stem and exceeds the spikelets; blooms from June to September. **Leaf:** A few sheathing vestigial leaves at the base. **Stem:** Cylindrical, light-green stems 3-9' tall may be a little over ½" thick and are large-chambered so they can be crushed easily between the thumb and index finger. **Fruit:** Achenes with 6 basal bristles about equal in length to the achenes and shiny, orange-to-brown scales are often with a conspicuous green midrib. The scales are slightly longer than the achene. **Root:** Spreads by slender rhizomes. **Soil:** Soft-stem bulrush usually prefers mucky substrates with more stagnant conditions than those preferred by hardstem bulrush and a pH range of 6.5-8.5. [4, 7, 11, 44]

### **Normal Water Level**

This species prefers shallow water of 12-48" of inundation although it will tolerate wet/saturated conditions. [21, 37, 44]

### **Flooding/Fluctuation Tolerances**

**Frequency:** High. **Depth:** 24". **Duration:** Long – 42+ days (decreasing 12" every 21 days). This species will tolerate flooding for long periods regularly to seasonally. It is unaffected by flood depth increases, and it increases with depth decreases. [1, 37, 44]

### **Sensitivities or Other Tolerances**

**Exposure:** Full to part sun. **Salt:** Low to moderate. **Nutrient:** Low to moderate. **Siltation:** Moderate. **Insect:** Infrequent. **Other:** This species is sensitive to oxygen depletion, though it will remove pollution quickly. It has a rapid rate of spread and a moderate-to-low tolerance to general disturbance and stress. [1, 6, 37, 44]

### **Design Considerations**

Because it dissipates wave energy, soft-stem bulrush is an excellent soil stabilizer for shores, stream banks and vegetated swales. It is preferred to cattails and provides good habitat reconstruction. It is recommended for lake, pond, stream and wetland restorations and mitigation sites. Seed can be found in the seed bank. **Concerns:** This species is sensitive to oxygen depletion. It is also susceptible to depredation when young or if Canada geese populations are too high. It is an aggressive plant, which may be desirable in certain situations. [16, 19, 26, 44]

### **Wildlife Use**

Bulrush provides wonderful wildlife habitat not only for waterfowl, but for other species as well. Coots, black, canvasback, mallard, pintail, redhead, ring-necked, scaup and teal ducks eat the seeds. Stems are utilized when young by Canada and snow geese. Sora and Virginia rails eat

**Indicator Status: OBL**

the seeds and rootstock. Muskrats eat the rootstock and stems. Especially in central Minnesota, bulrushes provide the primary nesting sites for grebes, black terns and other waterfowl and marsh birds. Bulrush provides spawning and nursery habitat for northern pike, bluegills and other fish. [4, 6, 11, 32, 37, 44]



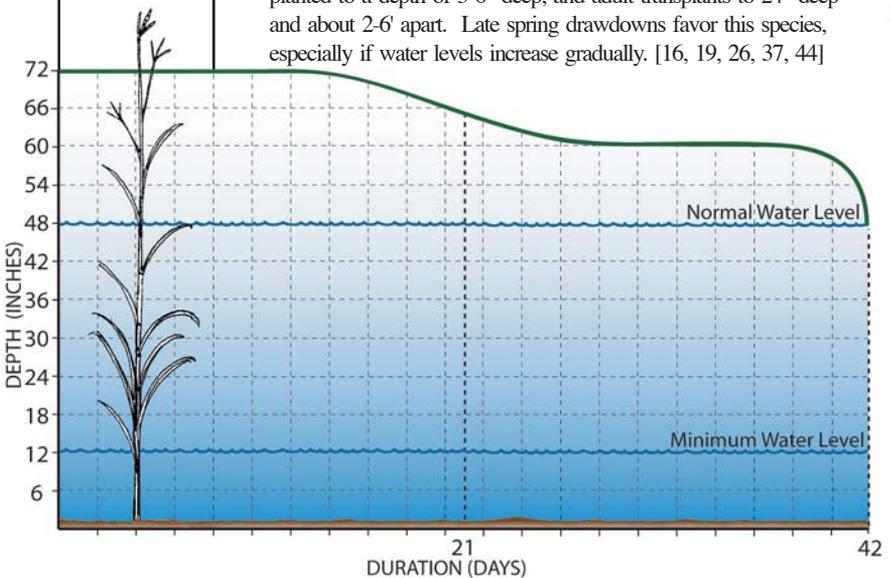
Photo: Dan Shaw

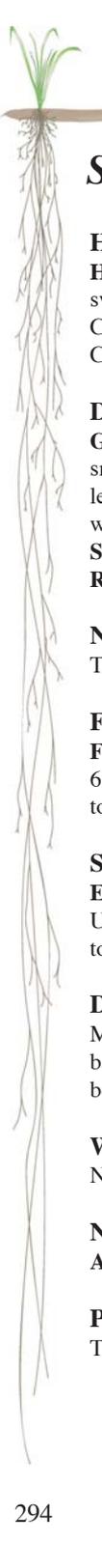
### Nursery/Plant Information

**Available:** Widely. **Types:** Achenes, rhizomes, rootstocks and container plants.

### Planting Techniques

Soft-stem bulrush seeds require moist, cold stratification and high light levels to germinate. The achenes should be stored under water in darkness at 30-38 degrees F. Seed in the fall with fresh seed. Sow on wet mudflats and cover with 1-2" of water during the winter, then follow with a drawdown. Submerged young seedlings do not establish. Recommended seeding rate is 0.06-0.25 lb/acre with about 604,800 seeds/lb. Rootstock and transplants are more successful than seeding. Rootstocks and seedlings should be planted to a depth of 5-6" deep, and adult transplants to 24" deep and about 2-6' apart. Late spring drawdowns favor this species, especially if water levels increase gradually. [16, 19, 26, 37, 44]





## *Scutterlaria lateriflora*

Mad-dog Skullcap - a.k.a. Blue Skullcap

### Habitat/Plant Community and Geographic Range

**Habitat/Community:** Shores, stream banks, sedge and wet meadows, marshes, swamps and shaded wet areas, usually found among sedges. [7, 21, 35] **Range:** Common; Minn. (Eco-Region: All), Wis., Mich. Nfld. to B.C., s. to Ga., Tex. and Calif. [7, 21]

### Description

**General:** Slender, native, perennial herb, usually 1-2' tall. **Flower:** Two-lipped, smaller blue petals and sepals in loose clusters from elongate racemes in the axil leaves. **Leaf:** Opposite, ovate to lance-shaped, smooth leaves are 1-3" long and ½-2" wide. The margins are coarsely toothed with petioles no longer than ¾" long. **Stem:** Solitary, square stems 8-24" long and smooth. **Fruit:** An achene. **Root:** Slender rhizomes. [7, 35]

### Normal Water Level

This species prefers wet/saturated conditions. [21]

### Flooding/Fluctuation Tolerances

**Frequency:** Moderate. **Depth:** 24". **Duration:** Medium short – 3.5 days (decreasing 6" the first half day, then 6"/day thereafter). This species has a moderately low tolerance to flood duration. [1]

### Sensitivities or Other Tolerances

**Exposure:** Full sun to shade. **Salt:** Moderate. **Nutrient:** Moderate. **Siltation:** Unknown. **Insect:** Infrequent. **Other:** This species has a moderate-to-high tolerance to general disturbance and stress. [1]

### Design Considerations

Mad-dog skullcap is used in many mitigation and restoration sites of shores, stream banks and wet meadows within the seed mix for diversity. It self-sows well. It is a beautiful, small landscape plant that could do well in rain water gardens.

### Wildlife Use

No information available.

### Nursery/Plant Information

**Available:** Limited. **Types:** Seed only.

### Planting Techniques

This species self sows easily. [21]

Indicator Status: OBL

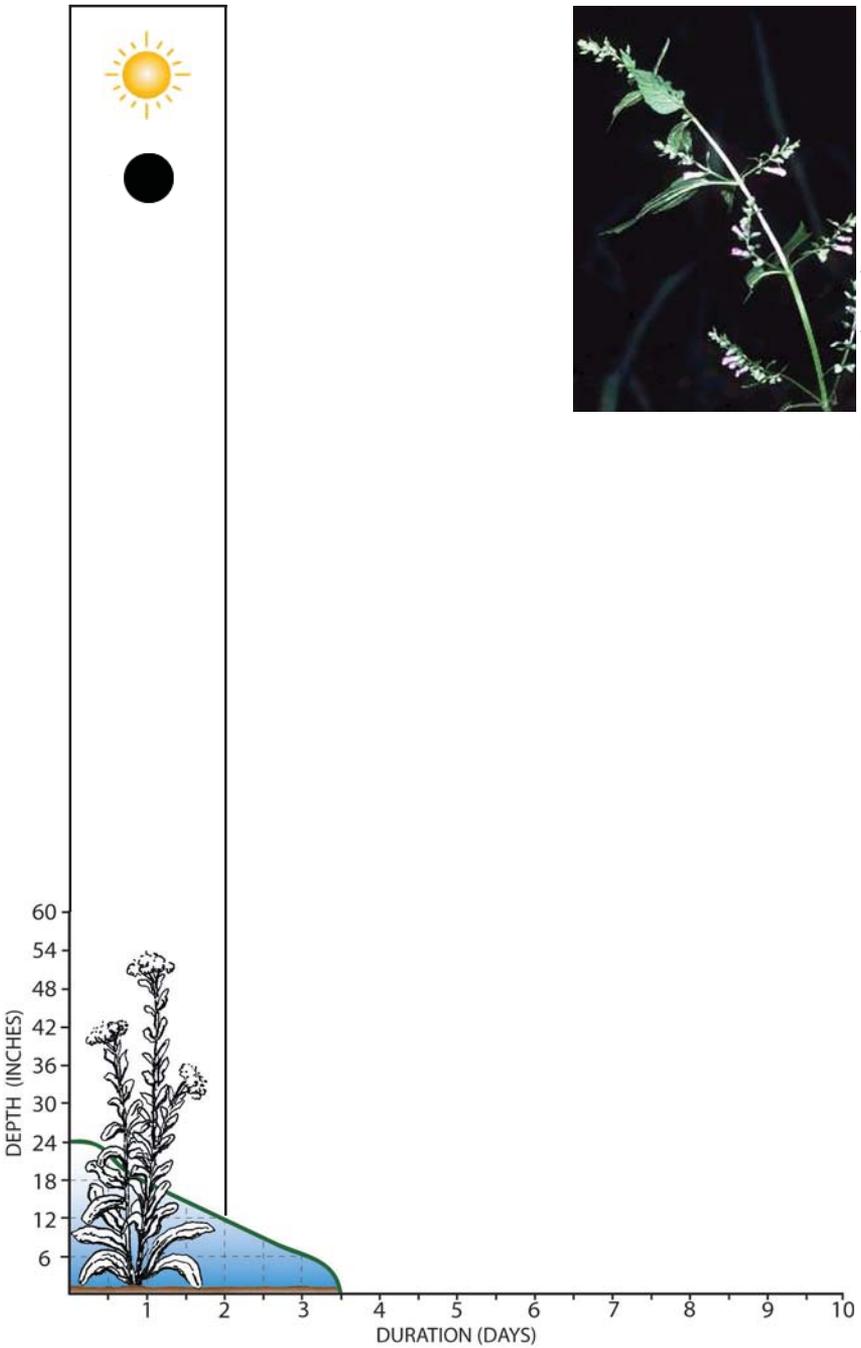


Photo: Robert Mohlenbrock/USDA, NRCS, 1997 - Northeast



# *Silphium laciniatum*

## Compass Plant

### Habitat/Plant Community and Geographic Range

**Habitat/Community:** Mesic prairies and railroads, though sometimes seen in natural sedge meadows and wet prairies. [17, 44] **Range:** Minn. (Eco-Region: All), Wis., Mich. Oregon to Minn. and S.D., s. to Ala. and Tex. Locally introduced along railroads e. to N.Y. [17]

### Description

**General:** Coarse, perennial, native herb to a mature height of up to 10'.

**Flower:** Large, yellow, disk-type heads in a narrow line up the stalk similar to a raceme, blooming from July to September. The flower's ovate bracts exceeding the disk of rays, 17-25 per head and  $\frac{3}{4}$ -2" long. **Leaf:** Alternate, deeply cut-to-lobed lower leaves, which are up to 20" long and then progressively reduced upwards, with the uppermost entire and well under 4" long. The basal leaves tend to align themselves in a north-south direction. **Stem:** Small hairs along the stem. **Fruit:** A winged achene. **Root:** Coarse, taprooted, rough-hairy to 3-6'. **Soil:** Most rich prairie soils with a pH range of 4.5-7.5. [17, 44]

### Normal Water Level

This species prefers upland mesic conditions, though it will tolerate some wet/saturated conditions. [44]

### Flooding/Fluctuation Tolerances

**Frequency:** Low. **Depth:** 12". **Duration:** Short – 1 day (decreasing entire 12" in 1 day). This species will not tolerate artificial inundation situations, though has been found in sedge meadows and wet prairies occasionally. [44]

### Sensitivities or Other Tolerances

**Exposure:** Full sun. **Salt:** Low. **Nutrient:** Low. **Siltation:** Low. **Insect:** Infrequent. [44, 47]

### Design Considerations

This species has been used in buffer and slope stabilization. It has also had success in the restorations of mesic-to-wet prairies and the edges of rainwater gardens. [44]

### Wildlife Use

Compass plant provides seed for songbirds, meadow mice and sharp-tailed grouse. It attracts butterflies and is a food source for the silphium weevil. Deer have been known to graze on the plant. [44]

### Nursery/Plant Information

**Available:** Limited. **Types:** Plants and seeds.

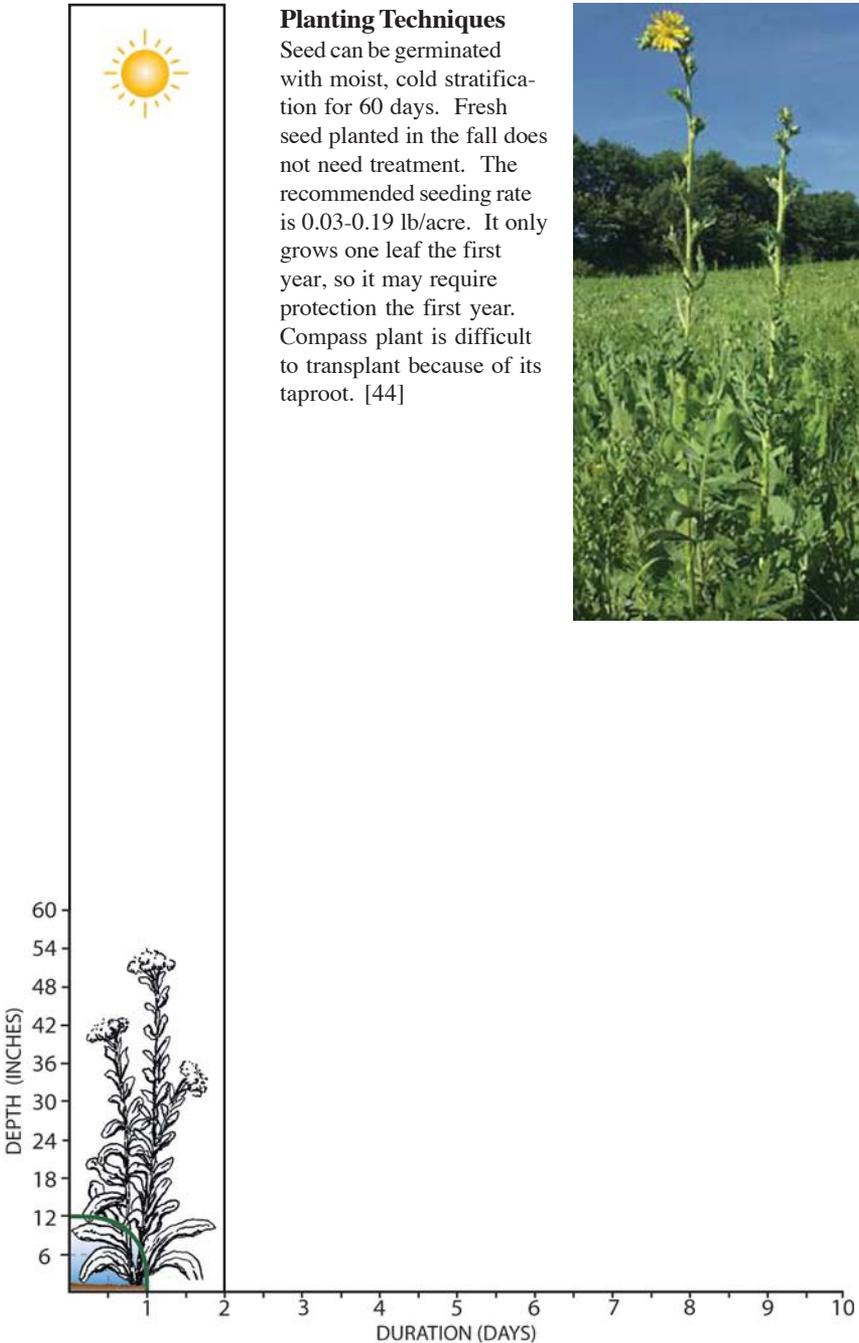
Indicator Status: UPL

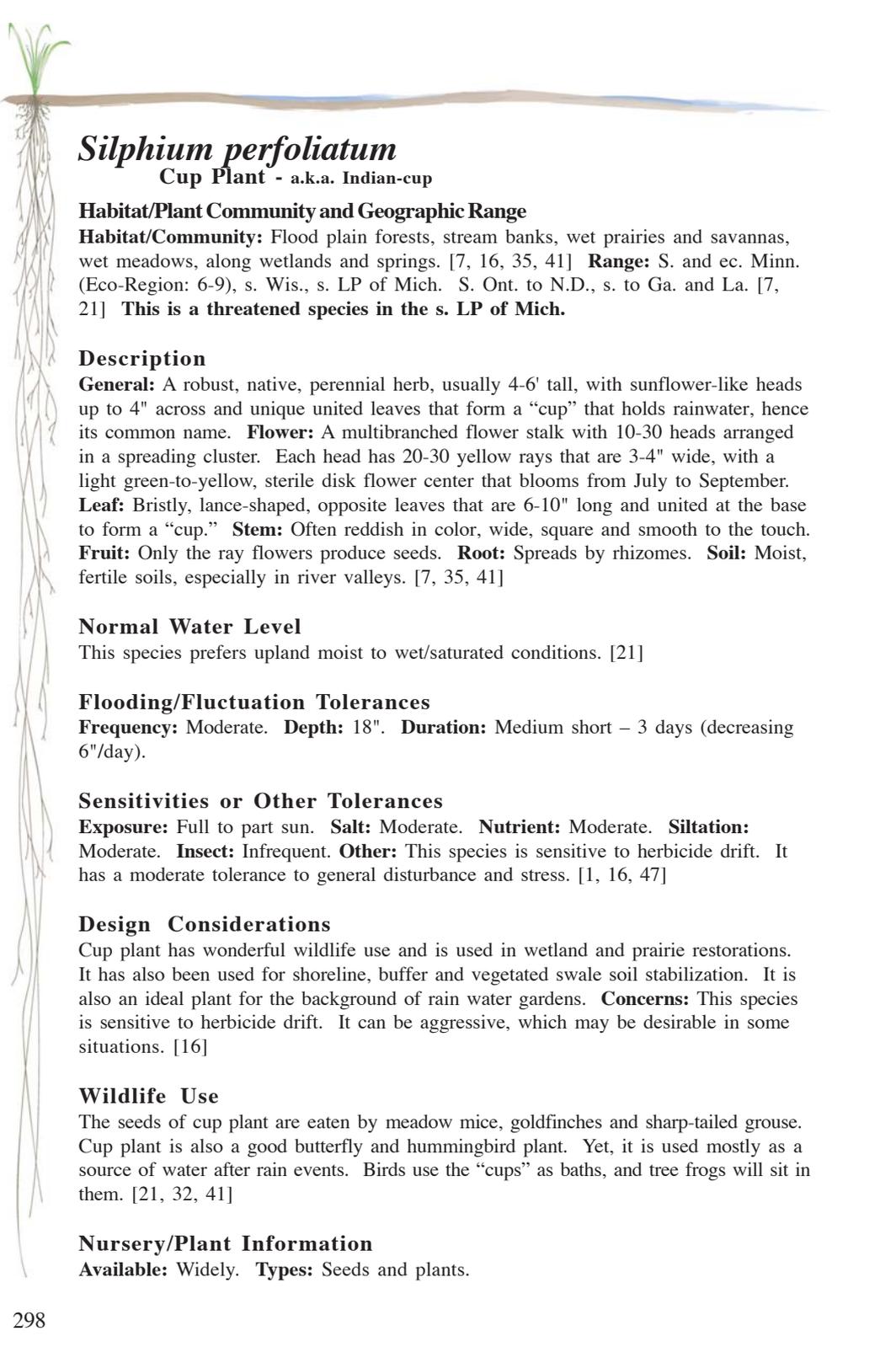
### Planting Techniques

Seed can be germinated with moist, cold stratification for 60 days. Fresh seed planted in the fall does not need treatment. The recommended seeding rate is 0.03-0.19 lb/acre. It only grows one leaf the first year, so it may require protection the first year. Compass plant is difficult to transplant because of its taproot. [44]



Photo: Paul Drobot & Wisconsin State Herbarium





# *Silphium perfoliatum*

Cup Plant - a.k.a. Indian-cup

## Habitat/Plant Community and Geographic Range

**Habitat/Community:** Flood plain forests, stream banks, wet prairies and savannas, wet meadows, along wetlands and springs. [7, 16, 35, 41] **Range:** S. and ec. Minn. (Eco-Region: 6-9), s. Wis., s. LP of Mich. S. Ont. to N.D., s. to Ga. and La. [7, 21] **This is a threatened species in the s. LP of Mich.**

## Description

**General:** A robust, native, perennial herb, usually 4-6' tall, with sunflower-like heads up to 4" across and unique united leaves that form a "cup" that holds rainwater, hence its common name. **Flower:** A multibranching flower stalk with 10-30 heads arranged in a spreading cluster. Each head has 20-30 yellow rays that are 3-4" wide, with a light green-to-yellow, sterile disk flower center that blooms from July to September. **Leaf:** Bristly, lance-shaped, opposite leaves that are 6-10" long and united at the base to form a "cup." **Stem:** Often reddish in color, wide, square and smooth to the touch. **Fruit:** Only the ray flowers produce seeds. **Root:** Spreads by rhizomes. **Soil:** Moist, fertile soils, especially in river valleys. [7, 35, 41]

## Normal Water Level

This species prefers upland moist to wet/saturated conditions. [21]

## Flooding/Fluctuation Tolerances

**Frequency:** Moderate. **Depth:** 18". **Duration:** Medium short – 3 days (decreasing 6"/day).

## Sensitivities or Other Tolerances

**Exposure:** Full to part sun. **Salt:** Moderate. **Nutrient:** Moderate. **Siltation:** Moderate. **Insect:** Infrequent. **Other:** This species is sensitive to herbicide drift. It has a moderate tolerance to general disturbance and stress. [1, 16, 47]

## Design Considerations

Cup plant has wonderful wildlife use and is used in wetland and prairie restorations. It has also been used for shoreline, buffer and vegetated swale soil stabilization. It is also an ideal plant for the background of rain water gardens. **Concerns:** This species is sensitive to herbicide drift. It can be aggressive, which may be desirable in some situations. [16]

## Wildlife Use

The seeds of cup plant are eaten by meadow mice, goldfinches and sharp-tailed grouse. Cup plant is also a good butterfly and hummingbird plant. Yet, it is used mostly as a source of water after rain events. Birds use the "cups" as baths, and tree frogs will sit in them. [21, 32, 41]

## Nursery/Plant Information

**Available:** Widely. **Types:** Seeds and plants.

Indicator Status: FACW-

### Planting Techniques

Cup plant propagates from seed well and produces about 22,400 seeds/lb. [16]

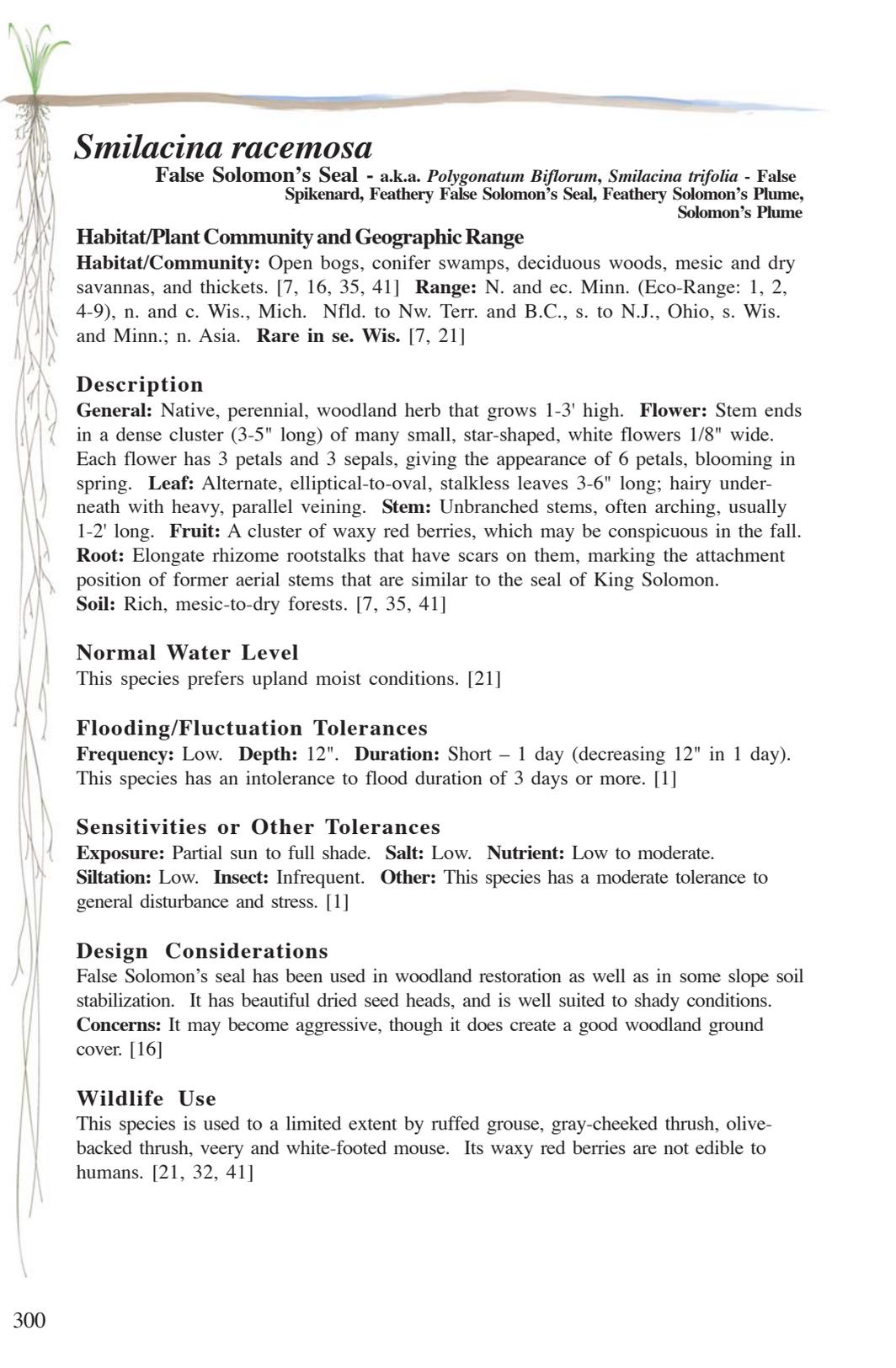


Photo: Dan Shaw



Photo: Dan Shaw





## *Smilacina racemosa*

**False Solomon's Seal** - a.k.a. *Polygonatum Biflorum*, *Smilacina trifolia* - False Spikenard, Feathery False Solomon's Seal, Feathery Solomon's Plume, Solomon's Plume

### **Habitat/Plant Community and Geographic Range**

**Habitat/Community:** Open bogs, conifer swamps, deciduous woods, mesic and dry savannas, and thickets. [7, 16, 35, 41] **Range:** N. and ec. Minn. (Eco-Range: 1, 2, 4-9), n. and c. Wis., Mich. Nfld. to Nw. Terr. and B.C., s. to N.J., Ohio, s. Wis. and Minn.; n. Asia. **Rare in se. Wis.** [7, 21]

### **Description**

**General:** Native, perennial, woodland herb that grows 1-3' high. **Flower:** Stem ends in a dense cluster (3-5" long) of many small, star-shaped, white flowers 1/8" wide. Each flower has 3 petals and 3 sepals, giving the appearance of 6 petals, blooming in spring. **Leaf:** Alternate, elliptical-to-oval, stalkless leaves 3-6" long; hairy underneath with heavy, parallel veining. **Stem:** Unbranched stems, often arching, usually 1-2' long. **Fruit:** A cluster of waxy red berries, which may be conspicuous in the fall. **Root:** Elongate rhizome rootstalks that have scars on them, marking the attachment position of former aerial stems that are similar to the seal of King Solomon. **Soil:** Rich, mesic-to-dry forests. [7, 35, 41]

### **Normal Water Level**

This species prefers upland moist conditions. [21]

### **Flooding/Fluctuation Tolerances**

**Frequency:** Low. **Depth:** 12". **Duration:** Short – 1 day (decreasing 12" in 1 day). This species has an intolerance to flood duration of 3 days or more. [1]

### **Sensitivities or Other Tolerances**

**Exposure:** Partial sun to full shade. **Salt:** Low. **Nutrient:** Low to moderate. **Siltation:** Low. **Insect:** Infrequent. **Other:** This species has a moderate tolerance to general disturbance and stress. [1]

### **Design Considerations**

False Solomon's seal has been used in woodland restoration as well as in some slope soil stabilization. It has beautiful dried seed heads, and is well suited to shady conditions. **Concerns:** It may become aggressive, though it does create a good woodland ground cover. [16]

### **Wildlife Use**

This species is used to a limited extent by ruffed grouse, gray-cheeked thrush, olive-backed thrush, veery and white-footed mouse. Its waxy red berries are not edible to humans. [21, 32, 41]

Indicator Status: FACU

### Nursery/Plant Information

**Available:** Widely.

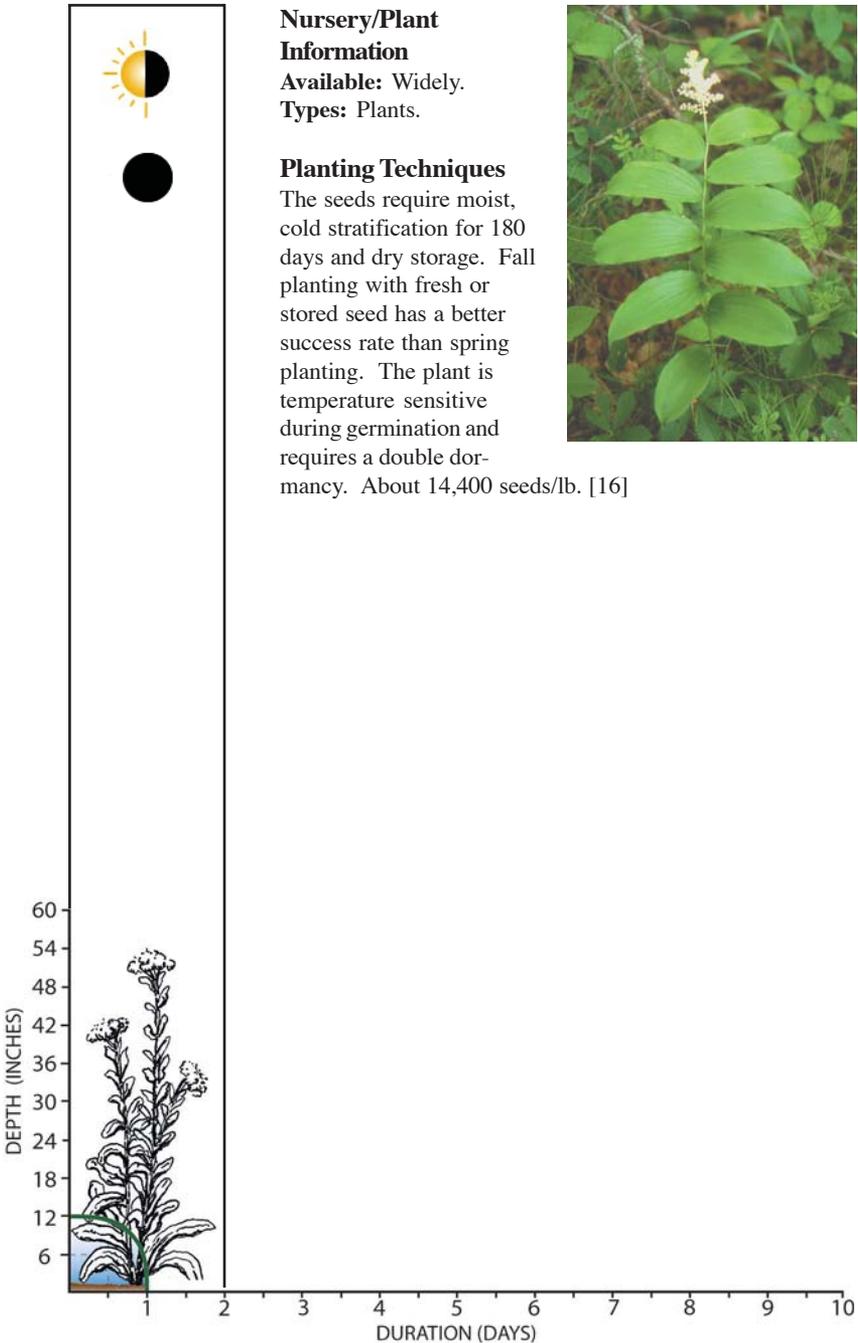
**Types:** Plants.

### Planting Techniques

The seeds require moist, cold stratification for 180 days and dry storage. Fall planting with fresh or stored seed has a better success rate than spring planting. The plant is temperature sensitive during germination and requires a double dormancy. About 14,400 seeds/lb. [16]



Photo: Paul Jackson





## *Solidago flexicaulis*

Zig-zag Goldenrod - a.k.a. Broad-leaved Goldenrod, Woodland Goldenrod

### Habitat/Plant Community and Geographic Range

**Habitat/Community:** Clearings, woods and woodland edges, especially in hardwood forest areas. The only goldenrod to grow in the forest. [16, 17, 35, 44] **Range:** Minn. (Eco-Region: 1, 4-9), Wis., Mich. N.S. and N.B. to N.D., s. to Va., Ky. and Ark., and in the mountains to Ga. [17, 21]

### Description

**General:** Native, woodland, perennial herb that reaches a height of 1-3'. **Flower:** Several round clusters, 1-2" wide, often stalked at the axis of the upper leaf joints. Individual flowers are ¼" wide and have only 3-4 petals. Blooms from August to September. One of the few goldenrods with flower clusters located at each leaf joint rather than spikes near the top of the plant. **Leaf:** Pointed, oval leaves that are coarsely toothed and 1-3" long. The dark green leaves alternate along the stem with short leafstalks. **Stem:** 1 to 3 erect stems that bend back and forth between each leaf attachment, hence the common name, "zig-zag," which is most obvious between the upper leaves. **Fruit:** Short-haired achenes. **Root:** Long rhizomes. **Soil:** Moist, rich woodlands, though it will tolerate dry conditions and calcareous situations. [17, 35, 41]

### Normal Water Level

This species prefers upland moist to dry conditions. [21]

### Flooding/Fluctuation Tolerances

**Frequency:** Low. **Depth:** 12". **Duration:** Short – 1 day (decreasing 12" in 1 day). This species is somewhat tolerant to flood duration. [1]

### Sensitivities or Other Tolerances

**Exposure:** Part sun to full shade. **Salt:** Low. **Nutrient:** Moderate. **Siltation:** Low to moderate. **Insect:** Infrequent. **Other:** This species is moderately tolerant to general disturbance and stress. [1]

### Design Considerations

Zig-zag goldenrod is a good woodland plant for restorations, shady flower gardens, calcareous soils, shady slopes and buffers. It has been used successfully in well-drained, shady rain water gardens. **Concerns:** This plant can be aggressive, and it prefers woodland situations. [16, 41]

### Wildlife Use

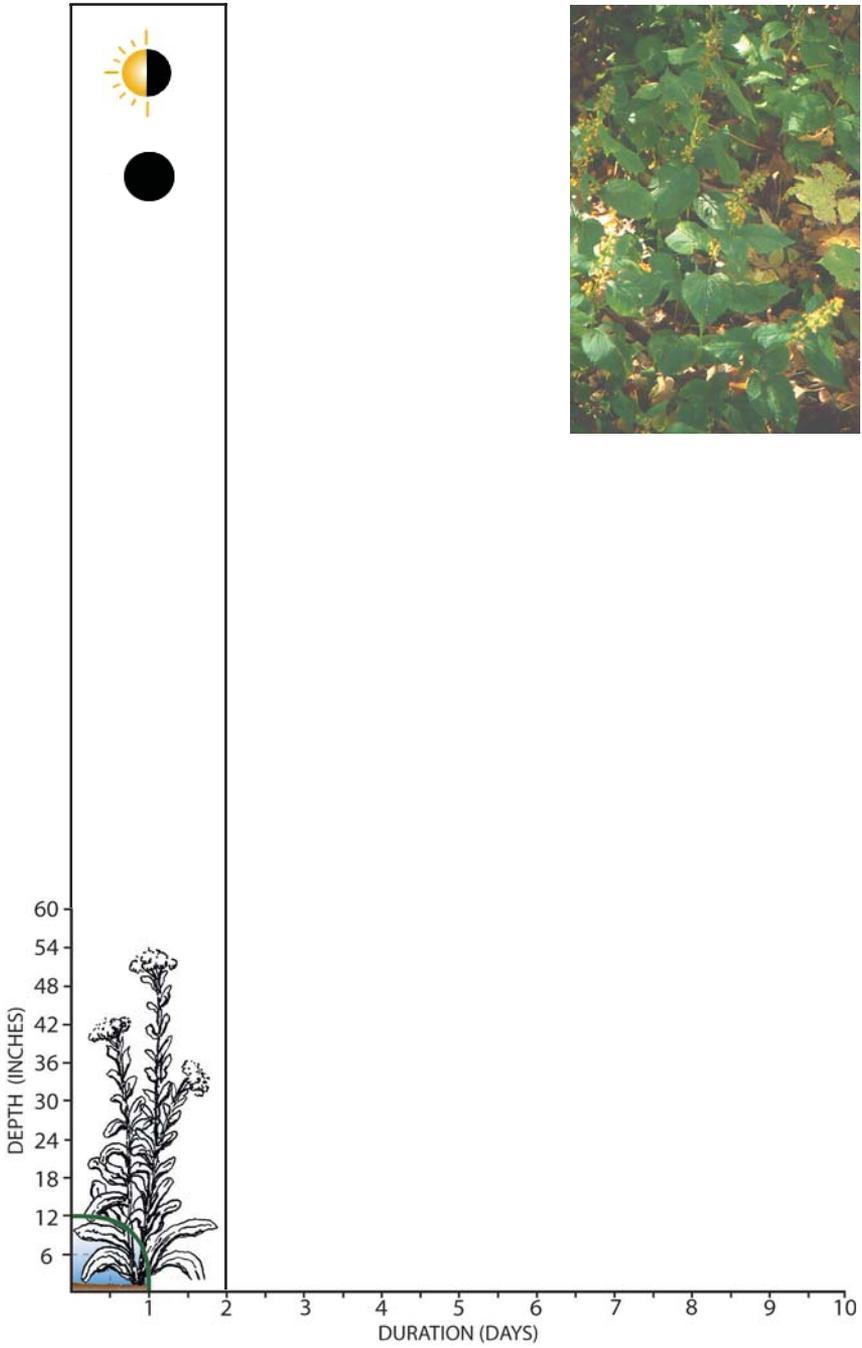
Goldenrod leaves are eaten to a limited extent by ruffed, sharp-tailed and spruce grouse. Goldfinches, juncos, and swamp and tree sparrows eat the seeds. Rabbits eat the foliage and plants. Mice eat the seed heads and foliage. [21, 32]

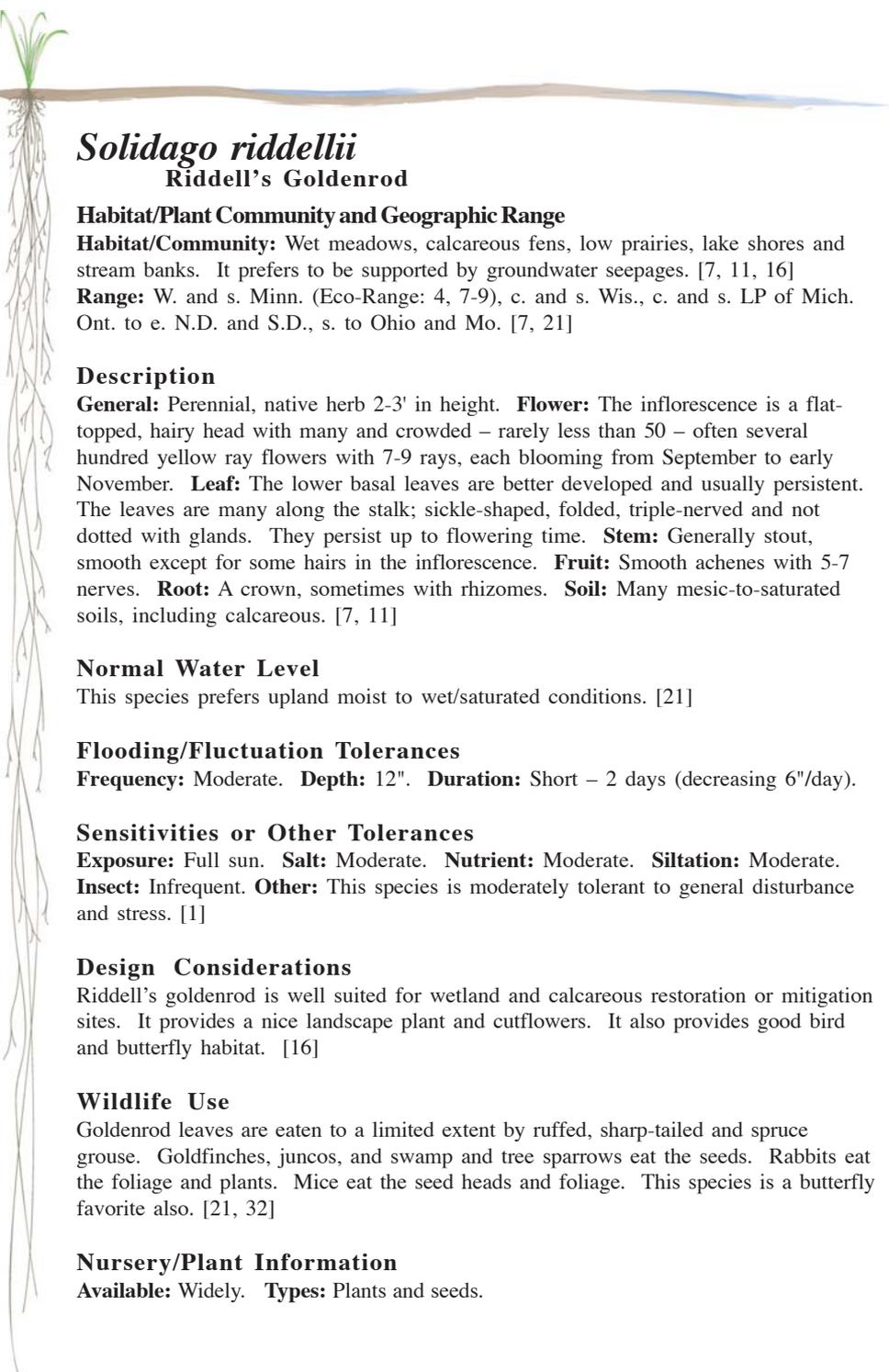
### Nursery/Plant Information

**Available:** Widely. **Types:** Plants and seeds.

Indicator Status: FACU

Photo: Dan Shaw





## *Solidago riddellii* Riddell's Goldenrod

### **Habitat/Plant Community and Geographic Range**

**Habitat/Community:** Wet meadows, calcareous fens, low prairies, lake shores and stream banks. It prefers to be supported by groundwater seepages. [7, 11, 16]

**Range:** W. and s. Minn. (Eco-Range: 4, 7-9), c. and s. Wis., c. and s. LP of Mich. Ont. to e. N.D. and S.D., s. to Ohio and Mo. [7, 21]

### **Description**

**General:** Perennial, native herb 2-3' in height. **Flower:** The inflorescence is a flat-topped, hairy head with many and crowded – rarely less than 50 – often several hundred yellow ray flowers with 7-9 rays, each blooming from September to early November. **Leaf:** The lower basal leaves are better developed and usually persistent. The leaves are many along the stalk; sickle-shaped, folded, triple-nerved and not dotted with glands. They persist up to flowering time. **Stem:** Generally stout, smooth except for some hairs in the inflorescence. **Fruit:** Smooth achenes with 5-7 nerves. **Root:** A crown, sometimes with rhizomes. **Soil:** Many mesic-to-saturated soils, including calcareous. [7, 11]

### **Normal Water Level**

This species prefers upland moist to wet/saturated conditions. [21]

### **Flooding/Fluctuation Tolerances**

**Frequency:** Moderate. **Depth:** 12". **Duration:** Short – 2 days (decreasing 6"/day).

### **Sensitivities or Other Tolerances**

**Exposure:** Full sun. **Salt:** Moderate. **Nutrient:** Moderate. **Siltation:** Moderate.

**Insect:** Infrequent. **Other:** This species is moderately tolerant to general disturbance and stress. [1]

### **Design Considerations**

Riddell's goldenrod is well suited for wetland and calcareous restoration or mitigation sites. It provides a nice landscape plant and cutflowers. It also provides good bird and butterfly habitat. [16]

### **Wildlife Use**

Goldenrod leaves are eaten to a limited extent by ruffed, sharp-tailed and spruce grouse. Goldfinches, juncos, and swamp and tree sparrows eat the seeds. Rabbits eat the foliage and plants. Mice eat the seed heads and foliage. This species is a butterfly favorite also. [21, 32]

### **Nursery/Plant Information**

**Available:** Widely. **Types:** Plants and seeds.

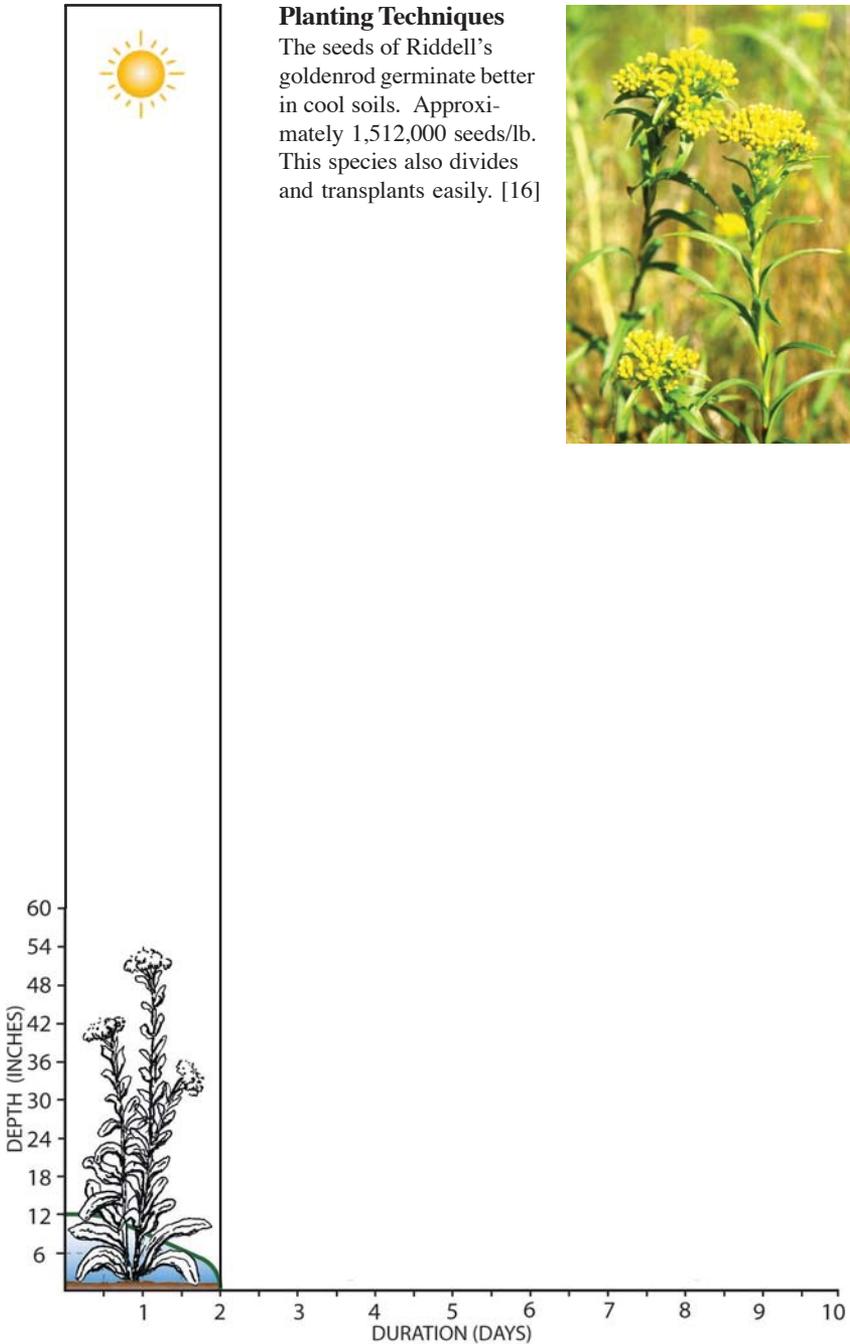
**Indicator Status: OBL**

**Planting Techniques**

The seeds of Riddell's goldenrod germinate better in cool soils. Approximately 1,512,000 seeds/lb. This species also divides and transplants easily. [16]



Photo: Paul Jackson





## *Solidago rigida*

**Stiff Goldenrod** - a.k.a. **Stiff or Hard-leaved Goldenrod**

### **Habitat/Plant Community and Geographic Range**

**Habitat/Community:** Mesic-to-dry open spaces, fields, prairies, savannas and along roadsides, especially in sandy soils. [16, 17, 35, 41] **Range:** Minn. (Eco-Region: All), Wis., Mich. R.I., Conn., w. Mass. and N.Y. to Ga., w. to Alta. and N.M., more common westward. [17, 21]

### **Description**

**General:** Native, perennial herb that stands up to 5' tall and is worthy of growing for its very attractive foliage topped with a broad, flat cluster of yellow flower heads.

**Flower:** Yellow flower heads are in a wide, flat bloom from August. to September. Each flower head has 7-10 ray flowers and 20-30 center disk flowers. **Leaf:** Alternate stem leaves that are oval to oblong. The stalked basal leaves stand erect (hence, the common name) and are rough with short, stiff hairs. The plant's round, fleshy leaves makes it easy to identify. **Stem:** Stiff, hairy, often clumped in 2s and 3s, that branch into flower heads near the top of the plant; 2-4' tall. **Fruit:** 10-20 nerved achenes that are angular. **Root:** Stout, branched caudex. **Soil:** Mesic-to-dry soils, especially sandy. [17, 35, 41, 44]

### **Normal Water Level**

This species prefers upland moist/mesic to dry conditions. [21, 44]

### **Flooding/Fluctuation Tolerances**

**Frequency:** Low to moderate. **Depth:** 12". **Duration:** Short – 2 days (decreasing 6"/day). This species has a minimal flooding tolerance. [44]

### **Sensitivities or Other Tolerances**

**Exposure:** Full to part sun. **Salt:** Moderate. **Nutrient:** Low to moderate. **Siltation:** Low to moderate. **Insect:** Infrequent. **Other:** This species has a moderate tolerance to general disturbance and stress. [1, 44, 47]

### **Design Considerations**

Stiff goldenrod is used in upland buffers and slope stabilization. It does well in well-drained rain water gardens. It provides cutflowers and nectar for butterflies. It self-sows easily. **Concerns:** Because this species self-sows, it can be aggressive. [16, 44]

### **Wildlife Use**

Goldenrod leaves are eaten to a limited extent by ruffed, sharp-tailed and spruce grouse. Goldfinches, juncos, and swamp and tree sparrows eat the seeds. Rabbits eat the foliage and plants. Mice eat the seed heads and foliage. This species also is an excellent source for nectar for butterflies, bees, flower flies and beetles. [21, 32, 41, 44]

### **Nursery/Plant Information**

**Available:** Widely. **Types:** Seed.

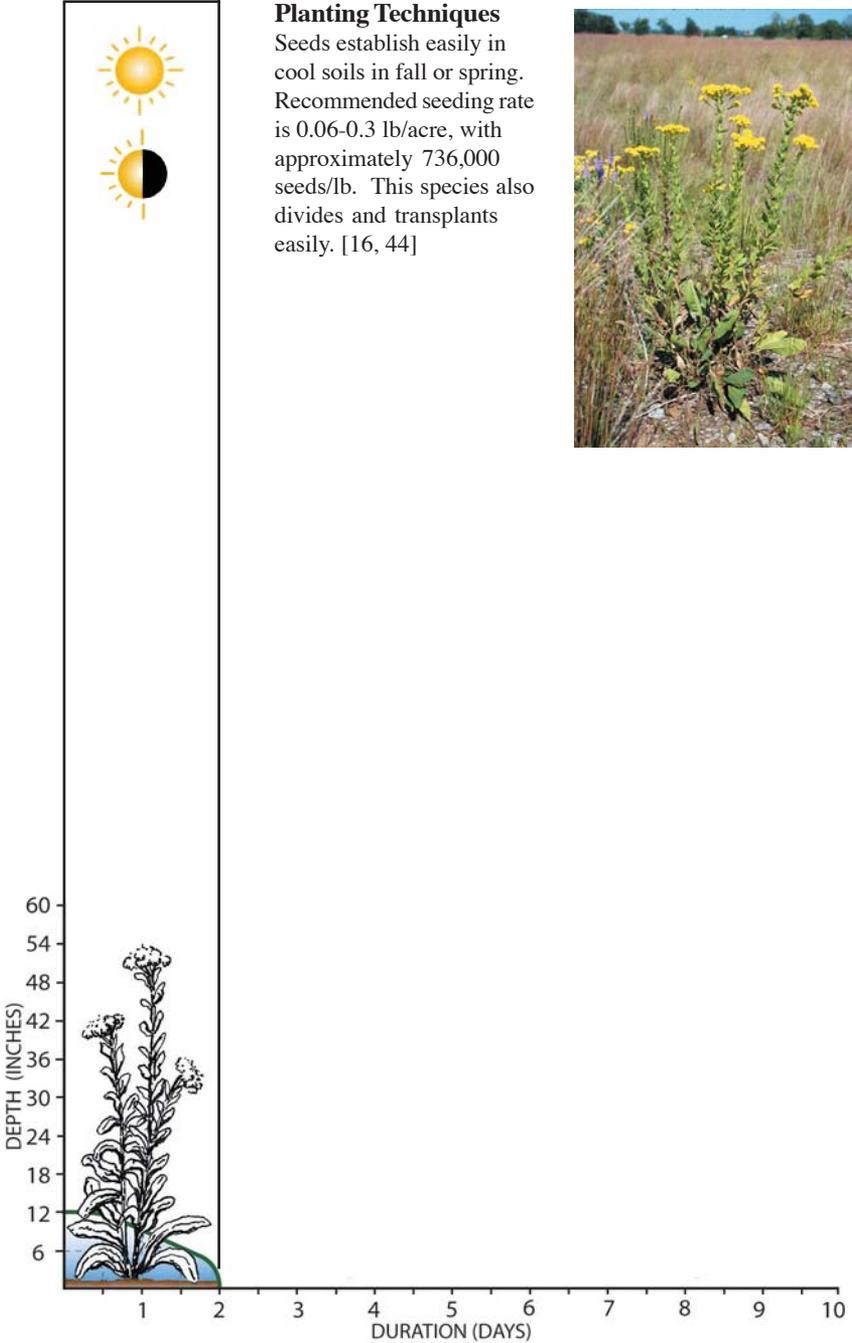
**Indicator Status: FACU-**

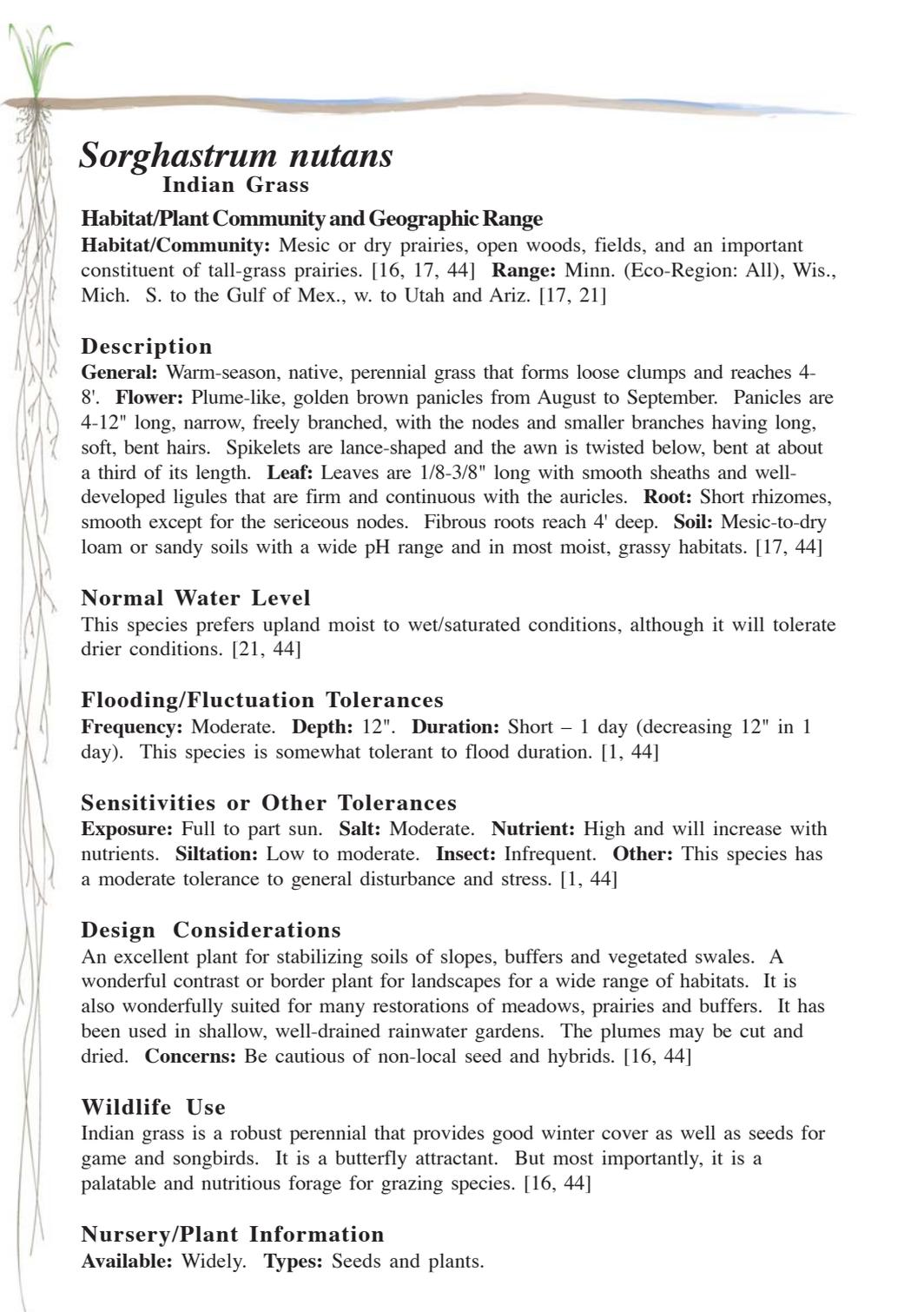
**Planting Techniques**

Seeds establish easily in cool soils in fall or spring. Recommended seeding rate is 0.06-0.3 lb/acre, with approximately 736,000 seeds/lb. This species also divides and transplants easily. [16, 44]



Photo: Paul Jackson





# *Sorghastrum nutans*

## Indian Grass

### Habitat/Plant Community and Geographic Range

**Habitat/Community:** Mesic or dry prairies, open woods, fields, and an important constituent of tall-grass prairies. [16, 17, 44] **Range:** Minn. (Eco-Region: All), Wis., Mich. S. to the Gulf of Mex., w. to Utah and Ariz. [17, 21]

### Description

**General:** Warm-season, native, perennial grass that forms loose clumps and reaches 4-8'. **Flower:** Plume-like, golden brown panicles from August to September. Panicles are 4-12" long, narrow, freely branched, with the nodes and smaller branches having long, soft, bent hairs. Spikelets are lance-shaped and the awn is twisted below, bent at about a third of its length. **Leaf:** Leaves are 1/8-3/8" long with smooth sheaths and well-developed ligules that are firm and continuous with the auricles. **Root:** Short rhizomes, smooth except for the sericeous nodes. Fibrous roots reach 4' deep. **Soil:** Mesic-to-dry loam or sandy soils with a wide pH range and in most moist, grassy habitats. [17, 44]

### Normal Water Level

This species prefers upland moist to wet/saturated conditions, although it will tolerate drier conditions. [21, 44]

### Flooding/Fluctuation Tolerances

**Frequency:** Moderate. **Depth:** 12". **Duration:** Short – 1 day (decreasing 12" in 1 day). This species is somewhat tolerant to flood duration. [1, 44]

### Sensitivities or Other Tolerances

**Exposure:** Full to part sun. **Salt:** Moderate. **Nutrient:** High and will increase with nutrients. **Siltation:** Low to moderate. **Insect:** Infrequent. **Other:** This species has a moderate tolerance to general disturbance and stress. [1, 44]

### Design Considerations

An excellent plant for stabilizing soils of slopes, buffers and vegetated swales. A wonderful contrast or border plant for landscapes for a wide range of habitats. It is also wonderfully suited for many restorations of meadows, prairies and buffers. It has been used in shallow, well-drained rainwater gardens. The plumes may be cut and dried. **Concerns:** Be cautious of non-local seed and hybrids. [16, 44]

### Wildlife Use

Indian grass is a robust perennial that provides good winter cover as well as seeds for game and songbirds. It is a butterfly attractant. But most importantly, it is a palatable and nutritious forage for grazing species. [16, 44]

### Nursery/Plant Information

**Available:** Widely. **Types:** Seeds and plants.

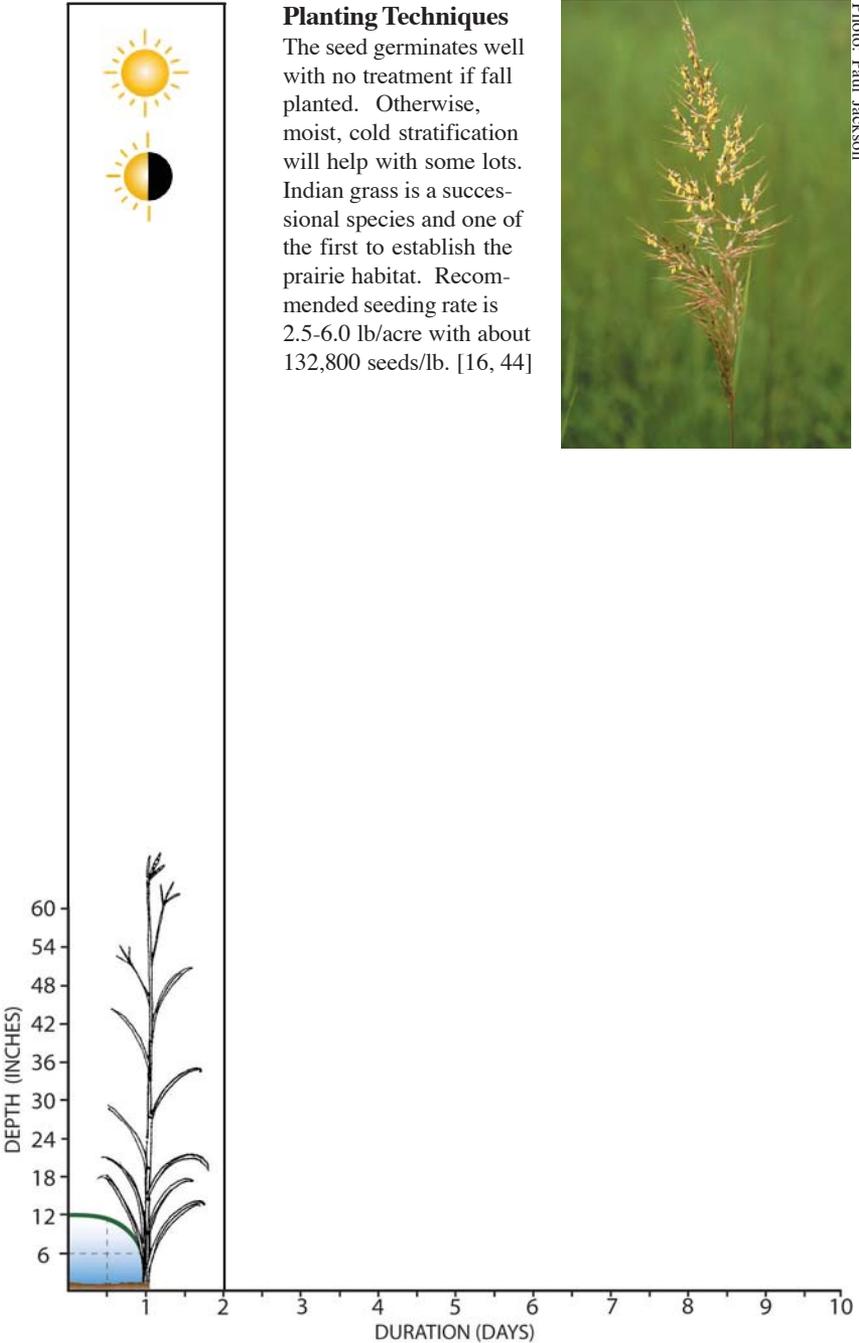
**Indicator Status: FACU+**

### Planting Techniques

The seed germinates well with no treatment if fall planted. Otherwise, moist, cold stratification will help with some lots. Indian grass is a successional species and one of the first to establish the prairie habitat. Recommended seeding rate is 2.5-6.0 lb/acre with about 132,800 seeds/lb. [16, 44]



Photo: Paul Jackson





# *Sparganium eurycarpum*

Giant Burreed - a.k.a. Common Burreed, Broad-fruited Common Bur-reed

## Habitat/Plant Community and Geographic Range

**Habitat/Community:** Marshes, streams, ditches, bogs, ponds and lakes (usually in shallow water; often with cattails). [4, 7, 11, 16, 44] **Range:** Minn. (Eco-Region: All), Wis., Mich. Nfld. to B.C., s. to N.J., Ohio, Ind., Mo., Okla., Ariz. and Calif. [7, 21]

## Description

**General:** A stout, persistent, perennial emergent herb that is up to 4.5' tall.

**Flower:** Unisexual inflorescence that has zigzag branches and are white from June to August. The lower heads consist of the flowers with pistils and are bur-like at maturity, whereas the upper heads consist of flowers with 2 stamens. It can be distinguished from all other burreeds because it has 2 stigmas while other burreeds have just 1.

**Leaf:** Long sword-like, usually erect leaves are ¼-½" wide, and strongly keeled so that they appear to be a flattened-triangular cross section. However, ribbon-like floating and submerged leaves can also be produced. **Stem:** Stout, branched and 15-40" long.

**Fruit:** The mature fruit is about ¼" long and square-topped with a sharp break, where other burreeds are tapered to the base and apex. **Root:** Rhizomes. **Soil:** Shallow water and on wet substrates with a pH range of 6.7-8.8. [4, 7, 11, 44]

## Normal Water Level

This species prefers shallow water of 18" of inundation or less to wet/saturated conditions. Giant burreed is characteristic of silty, fertile waters, especially south of the vegetation tension zone. [21, 11, 37, 44]

## Flooding/Fluctuation Tolerances

**Frequency:** High. **Depth:** 12". **Duration:** Short – 2 days (decreasing 6"/ day).

This species tolerates regular inundation, is moderately tolerant to flood duration, and will decrease with flood depth increases. [1, 37]

## Sensitivities or Other Tolerances

**Exposure:** Full to partial sun. **Salt:** Low to moderate. **Nutrient:** Moderate to high and will increase with both N and P level increases. **Siltation:** Moderate to high.

**Insect:** Unknown. **Other:** This species has a rapid rate of spread. It will remove metal quickly. It has a moderate tolerance to general disturbance and stress. [1, 6, 37, 44]

## Design Considerations

Giant burreed has been used in shorelines of streams, lakes and ponds to provide erosion control. It also provides a wonderful wave buffer. It is used in wetland restorations where cattails would be, hopefully outcompeting the *Typha* spp. It provides good wildlife habitat. **Concerns:** At first glance, giant burreed may resemble cattail (*Typha* spp.) when not in flower; however, the strongly keeled leaves (flattened-triangular in cross section) of giant burreed will distinguish it from the flattened leaves (D-shaped in cross section) of cattail. This species is a competitor of cattail and aggressive enough to plant instead. [11, 16, 44]

Indicator Status: OBL



### Wildlife Use

Waterfowl, especially black, mallard, ring-necked, scaup and wood ducks eat the achenes of this species. Muskrats eat the stems and foliage. The plant also provides cover for nesting ducks and marsh birds. [4, 11, 21, 32, 37, 44]

### Nursery/Plant Information

**Available:** Widely.

**Types:** Corms, rhizomes, rootstock, seedlings and transplants.

### Planting Techniques

Soak the seeds in a bucket of water outside all winter to allow them to freeze, then sow in saturated soils. The seeds will float, so the wind may spread the plants to other locations. Recommended seeding rate is 0.2-0.375 lb/acre with about 9,488 seeds/lb. Corms and rhizomes are more successful than seeding and should be planted in saturated soil to 2" of water depth at 2-6' apart. Potted plants, transplants and seedlings transplant well and can be planted in saturated soils to a depth of 12" of water with similar spacing. One giant burreed corm can produce up to 43 plants the following growing season. [16, 28, 44]

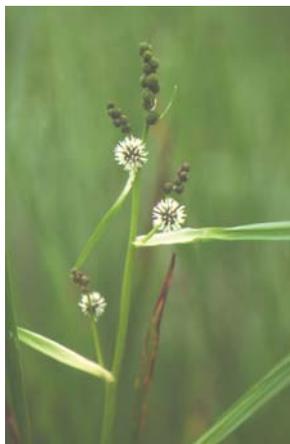
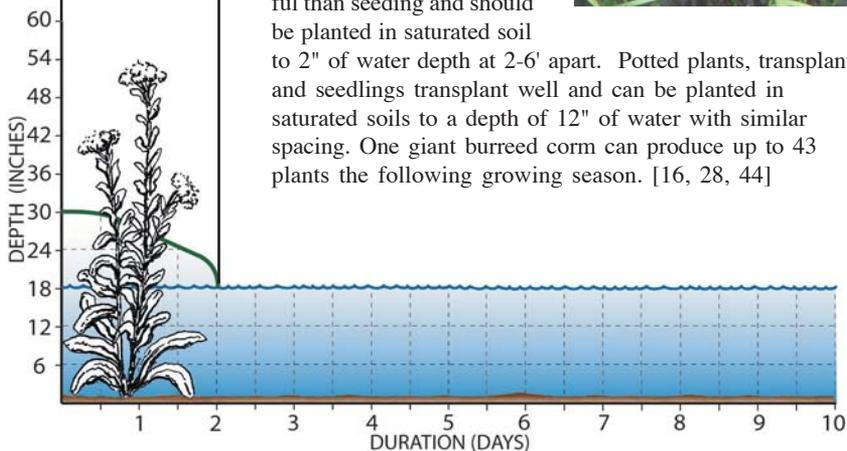


Photo: Jason Hunsveith



Photo: Paul Jackson





# *Spartina pectinata*

Prairie Cord Grass - a.k.a. Cord Grass

## Habitat/Plant Community and Geographic Range

**Habitat/Community:** Shallow-water marshes, wet meadows, sandy and gravelly shores, ditches and low prairies. [7, 11, 16, 44] **Range:** Minn. (Eco-Range: All), especially s. and w. Wis., LP and c. UP of Mich. Nfld. and Que. to Alta., Wash. and Ore., s. to N.C., Ark., Tex. and N.M. [7, 21]

## Description

**General:** Hardy, coarse, densely colonial, native, perennial grass 5-7' tall.

**Flower:** Greenish yellow panicle with many, distinct one-sided spikes from July to August. The spikelets are longer than broad, overlay, and may be ascending or lie flat, resembling a comb. Unequal-size glumes are articulated below the glumes.

**Leaf:** Main blades are shiny, long and flat, 1/8-3/8" wide and up to 3' long with strongly roughened margins. When dry, the leaves may be inrolled. Gracefully arching leaves turn red to light straw yellow in fall. **Stem:** Stout, smooth, erect stems with short ligules that may be monotypic clones up to 30' away. **Root:** A dense mass of stout, scaly rhizomes. **Soil:** Tolerates most moist-to-saturated soils, although it prefers poor, sandy and gravelly soils with a pH range of 4.7-7.8. [7, 11, 44]

## Normal Water Level

This species prefers shallow water of 3" of inundation or less and wet/saturated to moist upland conditions. [21, 37, 44]

## Flooding/Fluctuation Tolerances

**Frequency:** High. **Depth:** 18". **Duration:** Medium long – 4 days (decreasing 6"/day). This species will tolerate seasonal and regular inundation periods, is moderately tolerant to flood duration, and population decreases with flood depth increases. [1, 37, 44]

## Sensitivities or Other Tolerances

**Exposure:** Full to part sun. **Salt:** Low to moderate. **Nutrient:** Moderate to high. **Siltation:** Moderate. **Insect:** Infrequent. **Other:** This species has a moderate rate of spread. It is moderately tolerant to general disturbance and stress. [1, 37, 44]

## Design Considerations

Prairie cord grass is an excellent soil stabilizer of shores, stream banks, slopes, buffers and vegetated swales due to the large rhizomatous mass it creates. It is well suited to restore wetlands, marshes, wet meadows and wet prairies as well as shorelines.

**Concerns:** It is an aggressive plant that can create clones up to 30' away. This may be desirable to compete with non-native and invasive species or to revegetate a site quickly to prevent erosion. [16, 44]

## Wildlife Use

Although prairie cord grass seeds are eaten by several kinds of ducks, they are an important food source for only the black duck. Marsh birds such as the clapper, and

**Indicator Status:** FACW+



sora and Virginia rails also eat the seeds. Early growth provides forage for rodents, deer and Canada geese. It also provides habitat for marsh wrens and muskrats. [32, 37, 44]

**Nursery/Plant Information**

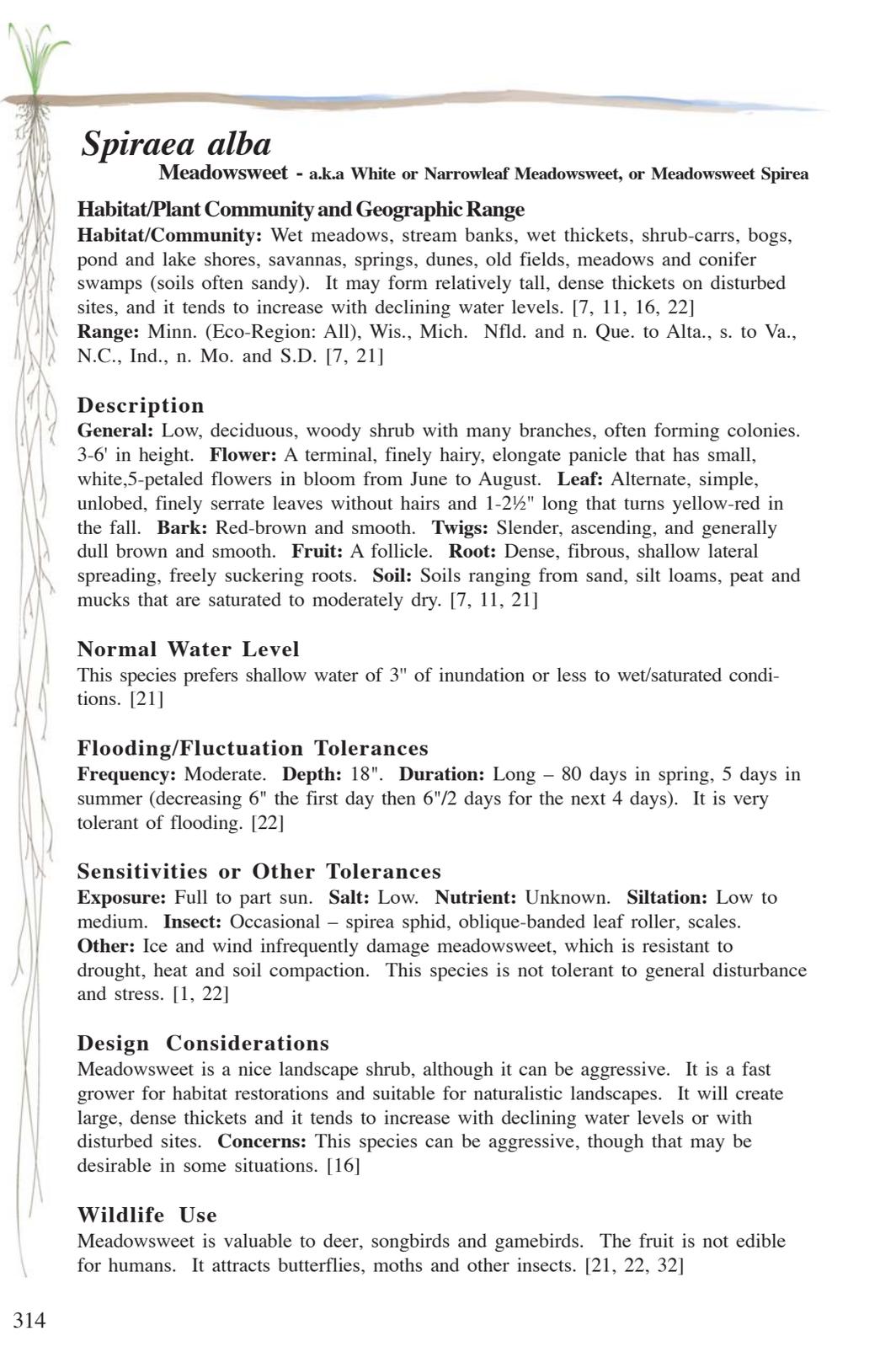
**Available:** Widely.  
**Types:** Plants and seeds.

**Planting Techniques**

The seeds need no treatment other than to be planted in saturated soils. Recommended seeding rate is 0.5-2.0 lb/acre with approximately 2,520,000 seeds/lb. Seed viability can be low, so rhizomes and young plants are used more often. Rhizomes should be planted in spring 5" below the surface and 1-3' apart. The soil should be kept saturated but not flooded during establishment and the stand should be burned annually to stimulate seed production. [16, 44]



Photo: Paul Jackson



## *Spiraea alba*

Meadowsweet - a.k.a White or Narrowleaf Meadowsweet, or Meadowsweet Spirea

### Habitat/Plant Community and Geographic Range

**Habitat/Community:** Wet meadows, stream banks, wet thickets, shrub-carrs, bogs, pond and lake shores, savannas, springs, dunes, old fields, meadows and conifer swamps (soils often sandy). It may form relatively tall, dense thickets on disturbed sites, and it tends to increase with declining water levels. [7, 11, 16, 22]

**Range:** Minn. (Eco-Region: All), Wis., Mich. Nfld. and n. Que. to Alta., s. to Va., N.C., Ind., n. Mo. and S.D. [7, 21]

### Description

**General:** Low, deciduous, woody shrub with many branches, often forming colonies. 3-6' in height. **Flower:** A terminal, finely hairy, elongate panicle that has small, white, 5-petaled flowers in bloom from June to August. **Leaf:** Alternate, simple, unlobed, finely serrate leaves without hairs and 1-2½" long that turns yellow-red in the fall. **Bark:** Red-brown and smooth. **Twigs:** Slender, ascending, and generally dull brown and smooth. **Fruit:** A follicle. **Root:** Dense, fibrous, shallow lateral spreading, freely suckering roots. **Soil:** Soils ranging from sand, silt loams, peat and mucks that are saturated to moderately dry. [7, 11, 21]

### Normal Water Level

This species prefers shallow water of 3" of inundation or less to wet/saturated conditions. [21]

### Flooding/Fluctuation Tolerances

**Frequency:** Moderate. **Depth:** 18". **Duration:** Long – 80 days in spring, 5 days in summer (decreasing 6" the first day then 6"/2 days for the next 4 days). It is very tolerant of flooding. [22]

### Sensitivities or Other Tolerances

**Exposure:** Full to part sun. **Salt:** Low. **Nutrient:** Unknown. **Siltation:** Low to medium. **Insect:** Occasional – spirea spid, oblique-banded leaf roller, scales.

**Other:** Ice and wind infrequently damage meadowsweet, which is resistant to drought, heat and soil compaction. This species is not tolerant to general disturbance and stress. [1, 22]

### Design Considerations

Meadowsweet is a nice landscape shrub, although it can be aggressive. It is a fast grower for habitat restorations and suitable for naturalistic landscapes. It will create large, dense thickets and it tends to increase with declining water levels or with disturbed sites. **Concerns:** This species can be aggressive, though that may be desirable in some situations. [16]

### Wildlife Use

Meadowsweet is valuable to deer, songbirds and gamebirds. The fruit is not edible for humans. It attracts butterflies, moths and other insects. [21, 22, 32]

Indicator Status: FACW+



**Nursery/Plant Information**

**Available:**

Widely.

**Types:** Bareroot and potted plants.

**Planting Techniques**

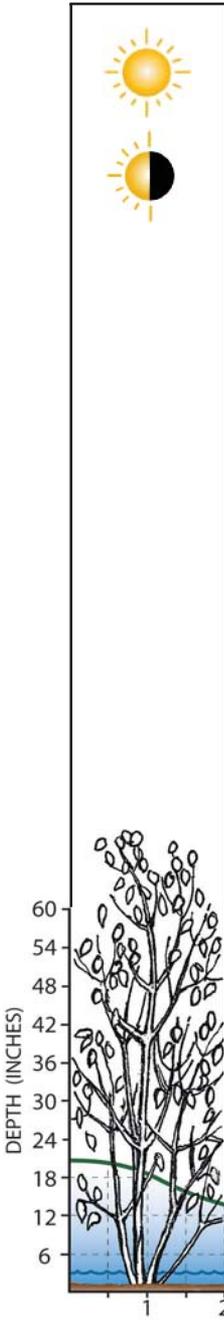
The seeds require dry storage at 70 degrees F. for 180 days, and moist, cold stratification for 90 days. Fall planting gives somewhat better results. Scarifying the seed may also help. Approximately 238,736 seeds/lb. Taking cuttings and division are the easiest ways to propagate this species. Meadowsweet transplants well. [16, 22]



Photo: Paul Jackson



Photo: Paul Jackson





## *Symplocarpus foetidus*

### Skunk Cabbage

#### Habitat/Plant Community and Geographic Range

**Habitat/Community:** Flood plain forests, swamps, stream banks, calcareous fens, shrub swamps, seepages, and moist, wooded slopes. [7, 11, 35, 41] **Range:** E. especially ec. and se. Minn. (Eco-Region: 1, 6-8), Wis., common in LP, local in UP (but common on Isle Royale) of Mich. N.S. to Minn., s. to N.C. and Iowa. [7, 21]

#### General Description

**General:** A native, coarse, perennial herb, which has a skunky odor and grows to 2' tall.

**Flower:** This, our earliest-flowering native plant, has a pointed, brown or purplish spathe, 4-6" high. The spathe encloses a spherical or football-shaped stem, the spadix, on which tiny flowers bloom from March to May. **Leaf:** Exceptionally large basal leaves are 12-24", ovate and heart-shaped at the base, emerging after the flowers. The leaves are bright green and deeply veined, on very short stalks that are often unseen, rising from the base of the flower that also smells of dead flesh when crushed. **Fruit:** Much like a small-stalked and roughened potato. The fruit develops beneath large basal leaves and contains large, acrid seeds in a bland pulp.

**Root:** Thick rhizome. **Soil:** [7, 11, 35, 41]

#### Normal Water Level

This species prefers wet/saturated conditions. [21, 37]

#### Flooding/Fluctuation Tolerances

**Frequency:** Moderate. **Depth:** 12". **Duration:** Medium short – 3 days (decreasing 6" the first day and 3"/day thereafter). It can tolerate seasonal and regular inundation and is moderately tolerant to flood duration. [1, 37]

#### Sensitivities or Other Tolerances

**Exposure:** Full shade. **Salt:** Low. **Nutrient:** Low to moderate. **Siltation:** Moderate.

**Insect:** Infrequent. **Other:** This species has a slow rate of spread. It is moderately tolerant to general disturbance and stress. [1, 37]

#### Design Considerations

This species is well suited for restorations in shaded areas that are wooded, calcareous and ground-water-fed, or where springs and seeps occur. It is a unique plant that plays an important role for insects early in the growing season.

#### Wildlife Use

Skunk cabbage provides seeds for pheasants, wood ducks, ruffed grouse and bobwhite quail. Beaver, muskrats and frogs have also been known to use this plant as habitat or food. The strong odor attracts early flying insects that pollinate the flower. [21, 32, 37, 41]

#### Nursery/Plant Information

**Available:** Limited. **Types:** Seeds and plants.

**Indicator Status: OBL**

**Additional Notes**

Skunk cabbage has a strong, skunk- or garlic-like odor. It is the earliest plant to bloom each spring. [11, 41]



Photo: Dan Shaw

