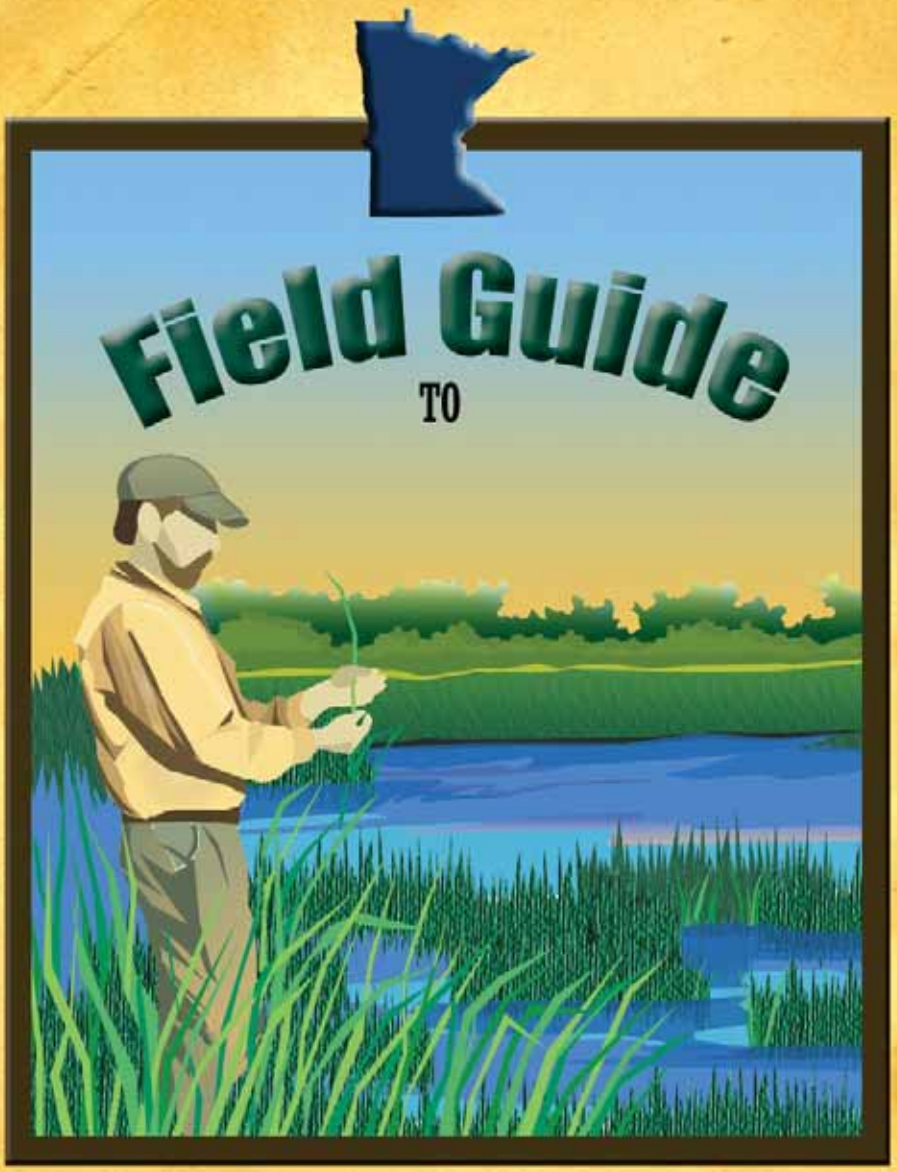

Wetland & Buffer Plant Seedlings

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Dedicated to Bob Jacobson – his thirst for knowledge and ability to challenge each of us to learn and grow

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Bonestroo

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Introduction

Historically, wetlands have been maligned and their function on the landscape misunderstood. Wide-scale drainage of wetlands occurred throughout much of the 19th and 20th centuries, the pace of which accelerated as new technologies developed. In southern Minnesota, more than 80% of wetlands on the landscape prior to Euroamerican settlement have been drained.

Today, we better understand the vital and multiple roles wetlands play on the landscape and in contributing to quality of life in Minnesota. Among the most biologically productive natural systems on earth, wetlands provide benefits to water quality, groundwater, wildlife, and recreation.

While wetland losses still occur, the rate of loss has been substantially stemmed through passage of the Clean Water Act. In recent years, the Minnesota Wetland Conservation Act provided an added and important safety net at the state level for isolated, depressional wetlands. For many reasons, Minnesota is recognized as a leader in wetland conservation as well as restoration.

Wetland mitigation banking related to regulatory efforts, and other programs such as the Wetland Reserve Program, have become important tools for minimizing wetland loss and attempting to restore wetland functions and values.

Although efforts to replicate prairie through restoration began in the 1930s and have steadily improved through substantial research and practical experience, wetland research has lagged in determining similar best practices for establishing quality native vegetation in wetland restorations.

Historically, wetland restorations often focused on restoring water levels (hydrology), with the hope that appropriate wetland vegetation types would re-colonize a particular site. We now

know restoring water levels in drained wetlands and planting seed, tubers, and plugs of desirable plants greatly increases the chance desirable native vegetation will develop.

Restoring native wetland vegetation is not always an easy task. Because wetlands tend to be dynamic systems, conditions are not consistently favorable for establishing plantings. As a result, it is important to identify native and weed seedlings early in the process to proactively identify problems and help guide appropriate maintenance activities to improve the success of wetland restoration efforts.

This guide is intended to help natural resource professionals, students, and average persons identify plants, their seeds, and seedlings common to restored wetlands and adjacent upland buffers in Minnesota. It includes drawings, photographs, and written descriptions specific to seedlings. Comparisons are also provided for seedlings of plants that might be easily confused with one another.

Although efforts were made to include images and descriptions that help with field identification, some species and groups of plants pose special challenges in identification at the seedling stage, and sometimes even as adult plants. This is particularly true of wetland grasses, sedges and rushes, which are often difficult to differentiate by species and sometimes by plant family.

Identifying young wetland plants takes practice, especially for easily confused species. However, it is an attainable goal. Practice makes permanent in this case.

The majority of this guide is comprised of pages on native grasses, sedges, and rushes and flowers. Also included is a section with nonnative weeds common to both buffer and wetland plantings.

On the following page, you'll also find a brief summary of the Floristic Quality Assessment (Rapid FQAI). This method will become an important tool for wetland professionals in Minnesota, and will have some bearing on evaluating restored wetland sites and mitigation efforts. Likewise, the Board of Water & Soil Resources *Minnesota Wetland Restoration Guide* is a valuable reference. This document can be viewed and downloaded at: http://www.bwsr.state.mn.us/restoration guide.html

This easy-to-read and understand guide was developed to be carried in the field in a pocket or vehicle glove compartment. We hope you find this guide to be useful in your natural resource endeavors.

Monitoring vegetation of restored wetlands

Monitoring the vegetation component of a wetland restoration provides important feedback about whether things are progressing appropriately, if additional work is required, and how quickly intervention should occur. It is also an important regulatory component for wetland mitigation and wetland banking sites.

For most plantings, taking the time to learn field identification of 20-30 plants and their seedlings will go a long way toward making you an expert. Identifying plant seedlings does take some time, but need not be intimidating.

Monitoring can vary in the amount of effort and field plant identification required. Intense field data gathering yields detailed information, but can take substantial time. These types of studies are most often undertaken by researchers.

A basic seeding evaluation can be carried out with a few simple tools, some basic plant identification skills, and a bit of patience. The steps for a less intense method of evaluating seedings that still yields some good information to base management on is included in the *Prairie Seedling & Seeding Evaluation Guide*. This guide

is available as a free pdf download from the internet at: http://www.bonestroo.com

Minnesota wetland regulatory agencies are placing increasing emphasis on monitoring wetland restoration sites to determine if performance standards are being met. The US Army Corps of Engineers recently adopted an official St. Paul District Policy for Wetland Compensatory Mitigation in Minnesota (http://www.mvp.usace.army.mil), and the Board of Water & Soil Resources is revising the state wetland rule (http://www.bwsr.state.mn.us) as of spring 2009. Both outline monitoring requirements for wetland mitigation and banking plans. Additionally, the Minnesota Wetland Restoration Guide, produced by the Board of Water & Soil Resources, describes how to develop and execute plans to meet monitoring requirements, and includes a vegetation monitoring and assessment component.

Floristic Quality Assessment Index (FQAI)

As methods become established and refined, scientifically based wetland assessment techniques are increasingly being used to evaluate the success of wetland restoration efforts, particularly as part of specified performance standards. One such technique for assessing vegetation condition is the Floristic Quality Assessment (FQA).

FQA is a method for assessing a natural community's condition based on the plant species occurring there and their individual affinity with unaltered habitats. This affinity of a particular species is called the Coefficient of Conservatism (C), and is expressed as a numerical rating from 0-10. Species with a high or exclusive affinity to unaltered habitats are assigned a high C-value. Conversely, species with low or no affinity to unaltered habitats are assigned a low C-value.

FQA consists of numerical scores (metrics) derived from the C-values (such as Mean C or the Floristic Quality Index, which is the Mean C multiplied by the square root of the number of native species) for the species occurring at a site. With FQA, higher metric values for a site typically indicate the vegetation is in good condition.

First developed in the late 1970s and refined in the 1990s, FQA has been an effective tool for understanding wetland vegetation condition. With a demonstrated track record of performance, FQA has been increasingly used to measure wetland restoration success.

In 2007, the Minnesota Pollution Control Agency (MPCA) published Floristic Quality Assessment for Minnesota Wetlands (http://www.pca.state.mn.us/publications/wetlandassessment-guide.html), which includes the C-values for the state's wetland flora. The C-values for the featured species in this guide have been included to facilitate using FQA for vegetation monitoring in restored wetlands. For readers who would like to learn more, please refer to the FQA publication for a more comprehensive background and instruction of the method.

As of spring 2009, the MPCA is leading a multi-agency effort to establish standard sampling procedures and scientifically based assessment criteria for using FQA in Minnesota. This project will provide an important tool and improved ability to assess vegetation condition in restoration sites, and lead toward greater use of FQA as a scientifically based performance standard in mitigation and banking plans.

What's on each plant page?

The pages in this guide include information with both the wetland professional and amateur native plant enthusiast in mind. As a result, each plant description page includes information to help each of these user groups. Each page includes photos of seed and seedling(s) as well as a line drawing of a mature plant. Below is a brief summary of the written information included with each page.

Common name - a generally accepted non-scientific name for a particular plant. Some plants may have several common names, depending on the region and the background of the person describing the plant.

Scientific name – also referred to as the Latin name of a plant. There may be several scientific name synonyms for a particular plant. We have included frequently applied scientific names for each plant and included a list of synonyms in the back of the guide to try and help with sorting out the many name changes that have taken place the last few decades.

Habitat: Wetland, Edge, and/or Upland – based on the general habitat affinity of a particular plant species.

R3 Indicator Status: A code assigned to plant species to indicate the likelihood (% probability) that a particular plant will occur in a wetland. Region 3 (R3) includes seven states in the upper Midwest. The list was developed by the U.S. Fish & Wildlife Service and National and Regional Interagency Review Panels.

MN C Value: Also referred to as Coefficient of Conservatism, this number reflects the relative affinity for a particular plant species to high quality/unique habitats scored on a 0-10 basis, where 10 indicates an affinity of a particular plant species to a high quality/unique habitat and 0 indicates no affinity (think weedy plant).

Flowers: Typical month(s) for blooming

Seedling Description:

With a focus on describing features common to seedlings for a particular species that can be observed in the field. This section may also include information describing features of more mature plants of a species.

Look Alikes

This section is primarily focused on giving some basic clues on how to differentiate between plants common to wetland restorations that have similar characteristics.

Grasses, Sedges, & Rushes

American Slough Grass

Beckmannia syzigachne

Seed

Science Museum of Minnesota

Seedling

Habitat: Wetland

R3 Indicator Status: OBL

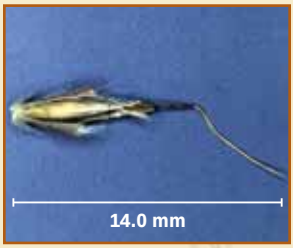
MN C-Value: 4

Flowers: July-September

Seedling Description: Slough grass is an annual and therefore has seedlings that develop quickly. Seedlings have flat leaves that are rough to the touch with large ligules where the leaf blade meets the stem. As seedlings grow, leaf sheaths can more readily be seen to overlap along the length of the stem. Plants may develop several stems from a single base, with elongated compound panicles of short, crowded spikes that overlap.

Look Alikes: Because slough grass is an annual and grows quickly, it may be confused with some of the weedier grasses such as foxtail, barnyard grass (both of which have wide, often red, stem bases), or the tame hay grass, timothy. Nonnative, weedy grasses tend to form thick canopies, whereas slough grass tends to be more upright, and less likely to form a thick canopy.

Adult Plant



Science Museum of Minnesota

Seed

Iowa DNR

Seedling

Habitat: Edge/Upland

R3 Indicator Status: FAC

MN C-Value: 4

Flowers: June-August

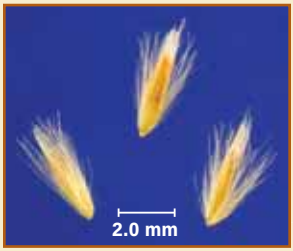
Seedling Description: Seedlings are upright and rigid. Leaves are long, narrow (2-4 mm on plants under one foot tall), and often form a graceful arch from the main stem. Ligule is thin and short, with fine hairs. Seedlings can range from hairy to smooth, and may or may not have a waxy bloom. Leaf and stem base color can also vary substantially and are therefore not the most reliable field indicators.

Look Alikes: Big bluestem is perhaps most easily confused with switchgrass and sideoats grama. Big bluestem has an obvious ligule, and seedlings typically have hairs extending well up the leaf blade while switchgrass often only has a patch of hairs at the base of each leaf. Sideoats has stiff hairs that protrude distinctively outward from leaf margins, while big bluestem is often more densely hairy, with hairs in areas other than the leaf margin. Indian grass seedling leaves taper to a narrow base and develop a stout, keeled midrib on each leaf that is easily recognized by touch.

Adult Plant

Bluejoint

Calamagrostis canadensis



Steve Hurst- USDA-NRCS

Seed

Iowa DNR

Seedlings

Habitat: Wetland/Edge

R3 Indicator Status: OBL

MN C-Value: 4

Flowers: June

Seedling Description: Seedlings tend to have fine, narrow leaves that are smooth. Seedlings often have a blue-green cast. As seedlings become more developed, this color becomes easier to notice that the leaf sheaths. Leaves eventually become 4-8 millimeters wide and rough on the top and bottom surfaces, while the stem is smooth. Seedlings tend to develop relatively slow.

Look Alikes: Perhaps most similar in appearance to prairie cordgrass when seedlings are small. Prairie cordgrass tends to be more stiff and wiry. As plants grow, bluejoint remains more "fine-featured" than cordgrass, which develops much longer leaves with sharp teeth on the margins (capable of cutting persons that run their skin across the edge from leaf tip to base).

Adult Plant

Seed

Science Museum of Minnesota

Seedlings

Habitat: Wetland

R3 Indicator Status: OBL

MN C-Value: 4

Flowers: June

Seedling Description: Seedlings of bottlebrush sedge become easier to identify after reaching approximately four or more inches in height. The relatively wide leaf of bottlebrush sedge and its m-shaped cross section are characteristic. Leaves form a bushy-looking basal rosette in immature plants.

Look Alikes: Other sedges common to restoration plantings that are similar in growth characteristics include porcupine sedge *C. hystericina* and common hop sedge *C. lupulina*. Most other sedges tend to stand more upright even as young plants, and typically have narrower leaves (e.g., tussock sedge and lakebank sedge). Bottlebrush sedge may also be confused with dark green bulrush, which also forms something resembling a basal rosette.

Adult Plant

Canada Wildrye

Elymus canadensis

Science Museum of Minnesota

Seed

Iowa DNR

Seedling

Habitat: Edge/Upland

R3 Indicator Status: FAC

MN C-Value: 3

Flowers: June-July

Seedling Description: Canada wildrye seedlings have thin, smooth, dark green leaves that often feel waxy. The auricles at the leaf base usually wrap around the stem and will occasionally overlap. Leaf widths range from 3-12 mm. The first leaves emerging after germination are often twisted on axis from bottom to top. The ligule is a thin membrane.

Look Alikes: Canada wildrye seedlings are perhaps more commonly confused with seedlings of cover crops, weedy grasses, or pasture grasses such as orchard grass and timothy than with other native grasses typically included in prairie plantings. Canada wildrye seedlings appear more erect with leaves held higher on the stems than the pasture grasses mentioned above. The leaves of Canada wildrye are wider than most other native grasses. Other wildrye, and brome seedlings can be confused with Canada wildrye as they also exhibit twisting of the leaf blade. June grass also has this trait, but is smaller, with much narrower leaves.

Inflorescense

Seed

Steve Hurst- USDA-NRCS

Seedlings

Habitat: Wetland

R3 Indicator Status: OBL

MN C-Value: 4

Flowers: June-July

Seedling Description: Dark green bulrush seedlings form a basal rosette. Leaves quickly develop an m-shaped cross-section and are a bright green color. As seedlings mature, successive leaves become wider and eventually reach as great as 3/4 inch in width. The sheaths of leaves are brownish or green (not red).

Look Alikes: Because the m-shaped leaves are similar to several species of sedges common to wetland restorations, dark green bulrush may be confused with bottlebrush sedge, hop sedge, or similarly wide-leaved wetland sedges. As dark green bulrush matures and flowers, it may reach 4-5 feet and overtop similar-looking sedge species, which generally do not exceed two feet in height. Wool grass has leaves that are v-shaped in cross section.

Adult Plant

Fowl Bluegrass

Poa palustris

Seed

Steve Hurst- USDA-NRCS

Seedling

Habitat: Edge

R3 Indicator Status: FACW

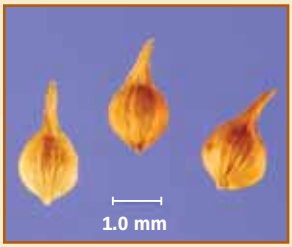
MN C-Value: 5

Flowers: June

Seedling Description: Germinating in less than one week in many situations, fowl bluegrass is quick to establish but can be difficult to identify as a small seedling. However, the characteristic boat-shaped leaf tip becomes evident fairly early in development. Holding the leaf blade with the tip pointing out as well as up and a little to the side reveals this characteristic. Leaf bases are typically purplish, and stems have a tendency to recline toward the ground.

Look Alikes: Fowl bluegrass germinates quickly (7-10 days under good conditions), and often more uniformly than many of the other native sedges, grasses, and rushes common to wetland restoration seed mixes, which can be helpful in identification. Some species of rushes can be confused (such as wool grass) with fowl bluegrass when very small, but tend to germinate more slowly and often less uniformly.

Adult Plant



Seed

Steve Hurst- USDA-NRCS

Seedlings

Seedlings

Habitat: Wetland/Edge

R3 Indicator Status: OBL

MN C-Value: 3

Flowers: June

Seedling Description: Fox sedge forms somewhat loose, fountain-like clumps. Leaves are flat or nearly so, and 2-5 mm wide. The leaf sheath on the side of the stem opposite the leaf blade is sparsely red-dotted. The inflorescence of this plant typically becomes yellow-green as it matures. Fox sedge is generally fast-developing compared to most other sedge species. It may flower in the first, or more likely the second year after seeding.

Look Alikes: Several sedge species common to restoration plantings have similar growth form, including awl-fruited sedge *C. stipata*, crowfoot fox sedge *C. crus-corvi*, and lance-fruited oval sedge *C. scoparia*. These are most easily differentiated when the plants flower/produce fruit.

Adult Plant

Fringed Brome

Bromus ciliatus

Seed

Steve Hurst- USDA-NRCS

Seedling

Habitat: Wetland/Edge

R3 Indicator Status: FACW

MN C-Value: 6

Flowers: June-July

Seedling Description: Seedlings of fringed brome tends to have leaves that twist in a helical fashion. As seedlings develop, characteristic pubescence at the nodes becomes more noticeable, as do the short, ragged ligules where the leaf meets the stem. As plants continue to develop, an m-shaped wrinkle develops across the leaf blade, usually about two thirds of distance from the stem.

Look Alikes: In wetland restorations, fringed brome is perhaps most easily confused with Virginia wildrye which has rough upper and lower leaf surfaces. May also be confused with woodland brome (B. purgans), prairie brome (B. kalmii), or the nonnative smooth brome (B. inermis), although none of these three are typically found in wet habitats.

Adult Plant

Seed

Jose Hernandez- USDA-NRCS

Seedlings

Habitat: Wetland

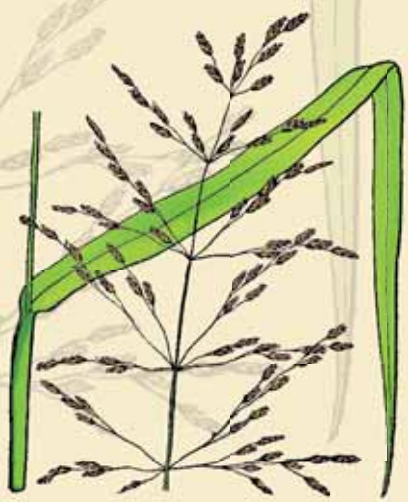
R3 Indicator Status: OBL

MN C-Value: 6

Flowers: June-July

Seedling Description: Giant manna grass tends to develop stout, upright stems with shiny, yellow-green foliage. New leaves emerge folded from an oval-shaped stem. Leaf sheaths are frequently closed. When mature, manna grass stems are stout, often several to a plant, and at five feet in height, overtops most other wetland grasses.

Look Alikes: May be confused with species of cutgrass (Leersia spp.), which also have light green foliage, but are much more "grabby" due to abundant spinules. Rice cutgrass has flat leaves compared to the leaves of giant manna grass that are slightly folded along the midvein.



Adult Plant

Indian Grass

Sorghastrum nutans

Seed

Steve Hurst – USDA-NRCS

Seedling

Habitat: Upland

R3 Indicator Status: FACU

MN C-Value: 5

Flowers: July-August

Seedling Description: Ligule is a thin membrane with fine hairs often present. The "rifle sight" ligule characteristic of mature plants is indistinct or absent in seedlings. Leaf base narrows near the stem with leaves of young plants ranging from 2-5mm (5-10 mm for mature plants). Leaf develops strong, keeled midrib. Base of main stem may or may not be hairy.

Look Alikes: Indian grass is easily confused with big bluestem. However, Indian grass develops a more pronounced, keeled midrib on each leaf and a leaf that tapers at the base. Both can vary widely in color, hairiness, and amount of waxy bloom. Switchgrass does not have an obvious ligule and only has a triangular patch of hairs at the base of each leaf. Sideoats has stiff hairs that protrude distinctively outward from leaf margins.

Adult Plant

Lakebank Sedge

Seed

Science Museum of Minnesota

Seedling

Habitat: Wetland

R3 Indicator Status: OBL

MN C-Value: 5

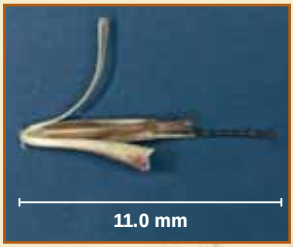
Flowers: June

Seedling Description: Once seedlings start getting over about four inches tall, the characteristic m-shaped cross section becomes more evident in leaves, as do prominent teeth on the leaf margins. The red bases and feather-like (pinnate) pattern of fibers along the lower stem are not evident in small plants. Stems tend to be rigid and upright, sometimes developing a bluish-green cast as plants mature.

Look Alikes: Leaves of lakebank sedge are wider than those of most other bunch-forming sedges used in wetland restoration (8-15 mm in larger, mature plants). Sedges pose special challenges for identification, sometimes even when in fruit. Utilizing an original seeding list in a process of elimination may be helpful.

Inflorescence

Schizachyrium scoparium



Seed

Seedling

Habitat: Upland

R3 Indicator Status: FACU

MN C-Value: 5

Flowers: July-September

Seedling Description: Seedlings are upright with fine leaves ranging in width from about 1.5-3 mm (3-7 mm on mature plants). Ligule is a short membrane (<1mm) with hairs on the outside edges. Plants can range from hairy to smooth, blue-green to green, and may have a heavy waxy coating (particularly genotypes from sandy soils/arid regions). Stem is semi-flattened with a bulbous base that is often reddish. Little bluestem begins forming multiple-stem bunches earlier than many other native grasses.

Look Alikes: The flattened stem and narrow leaves set little bluestem apart from other native grasses. It may be mistaken for barnyard grass and some species of foxtail, both of which are common weeds with flattened stems. However, these weedy species often exceed several feet in height within six weeks of germination, as compared to a height measured in inches for little bluestem over a similar time period.

Inflorescence

Science Museum of Minnesota

Seed

Seedlings

Habitat: Edge/Upland

R3 Indicator Status: FACW

MN C-Value: 5

Flowers: July-August

Seedling Description: Leaves are just over 1 mm wide when plants are approximately 10 cm tall. Seedling leaves are stiff and pointed upward, about 30-45 degrees from the main stem. Leaves are smooth, with the exception of the leaf margin, which is detectably rough when rubbed from tip to base. As plants develop, leaves become long, arching and gradually taper to a narrow point.

Look Alikes: Porcupine grass and prairie dropseed both have long, arching leaves that narrow to a sharp point. Prairie cordgrass leaves have a strong midrib, are over 5 mm wide, and have sharply serrated edges. Porcupine grass has leaves 2-5 mm wide. Prairie dropseed leaves are even narrower with edges rolled inward on the upper surface.

Inflorescence

Sporobolus heterolepis

Seed

Seedlings

Habitat: Upland

R3 Indicator Status: FACU

MN C-Value: 9

Flowers: July-August

Seedling Description: Seedlings lack hairs and develop slowly. Leaves are very fine (0.5-2 mm wide). On young plants, the leaves are flat and held stiffly outward on a wiry, upright stem. Leaves are concentrated at the base of the stem forming graceful arches, with leaf edges rolled inward toward the top-center of the leaf. Fine hairs on the main stem of seedlings are visible with a magnifying hand lens.

Look Alikes: Prairie dropseed seedlings are short, fine, and difficult to spot in the field. The stiff, upright posture of seedlings with just a few rigid leaves held outward are characteristic. Prairie dropseed might be confused with porcupine grass, which has wider leaves and is more robust. Prairie cordgrass is also more robust, with a strong leaf midrib and very sharp, serrated leaf margin. Its leaves exceed 5 mm in width.

Inflorescence

Seed

Steve Hurst – USDA-NRCS

Spinules

Patrick J. Alexander – USDA-NRCS

Seedling

Habitat: Wetland

R3 Indicator Status: OBL

MN C-Value: 3

Flowers: June

Seedling Description: Seedlings are stout, with broad, yellow-green leaves. New leaves emerge rolled. Although relatively smooth as small seedlings, rice cutgrass develops clear spinules (miniature spines) on the leaf margins. These make the leaves feel rough and "grabby" when rubbed by hand or walked through. These spinules are visible in larger plants with minimal magnification. Similar to the leaf margins, the leaf sheaths are also rough. As plants develop, stems tend to sprawl across the ground and have the ability to root from the stem nodes.

Look Alikes: The wide and flat leaves, together with the roughness of leaf margins and leaf sheaths of rice cutgrass, make it relatively easy to distinguish from other wetland grasses.

Adult Plant

Schoenoplectus fluviatilis

Seed

Carole Ritchie – USDA-NRCS

Seedling

Seedlings

Habitat: Wetland

R3 Indicator Status: OBL

MN C-Value: 4

Flowers: June-July

Seedling Description: Plants are relatively slow-developing, as seedlings may take three years to reach flowering. Leaves of seedlings are held stiffly upward at about 45 to 60 degree angles. The m-shaped leaf cross section and sharply triangular stem become evident as the seedlings mature.

Look Alikes: Several sedge species and dark green bulrush have leaves with m-shaped cross sections and may be confused with river bulrush. However, river bulrush is typically taller and more tolerant of growing in standing water, forming many-stemmed mats. Dark green bulrush leaves are up to 8 mm wide, while river bulrush leaves may reach 16 mm in width.

Inflorescence

Steve Hurst – USDA-NRCS

Iowa DNR

Seed **Seedling**

Habitat: Upland

R3 Indicator Status: UPL

MN C-Value: None Assigned

Flowers: June-July

Seedling Description: Sideoats has fine, light green leaves as small as 2 mm wide in young plants, but up to 7 mm wide in plants reaching reproductive maturity. Leaves have stiff hairs 5-8 mm long that protrude distinctively outward from leaf margins, each having a very small bulbous structure at the base that is visible through a hand lens. Leaves are long, form graceful arches from the stem, and gradually taper to a very fine tip. Ligule is short (usually less than 0.5mm), with a fringe of hairs. New leaves are rolled as they emerge from the stem.

Look Alikes: Sideoats has stiff hairs that protrude distinctively outward from leaf margins, making it one of the easier native grasses to identify as a seedling. Indian grass and big bluestem seedlings can be confused with sideoats, although individual hairs on these plants tend to be thinner and the plants more hairy overall. Big bluestem, Indian grass and switchgrass all have stronger midribs on the leaves, and are perhaps most easily confused with sideoats.

Inflorescence

Softstem Bulrush

Schoenoplectus tabernaemontani

Seed

Science Museum of Minnesota

Seedling

Habitat: Wetland

R3 Indicator Status: OBL

MN C-Value: 4

Flowers: June-July

Seedling Description: Small seedlings are similar to other rushes. As softstem bulrush seedlings mature, successive leaves originate from the base of the plant and are round in cross-section. The chambered stems are easily crushed between thumb and forefinger.

Look Alikes: Small seedlings are similar in appearance to and difficult to distinguish from other rushes. Hardstem bulrush has a stem that is more difficult to crush between thumb and forefinger than softstem bulrush. River and three-square bulrush have triangular stems. Woolgrass and dark green bulrush develop a large number of basal leaves. Other rushes such as Torrey's and Canada rush are shorter in stature, seldom exceeding two feet.

Adult Plant

Seed

Steve Hurst – USDA-NRCS

Seedlings

Habitat: Edge/Upland

R3 Indicator Status: FAC

MN C-Value: 2

Flowers: June-July

Seedling Description: Switchgrass seedlings are stiffly upright. Seedling leaf widths generally range from 3-5 mm, with mature plants having leaves 5-15 mm wide. As seedlings grow, they develop a triangular patch of hairs at the base of each leaf, and a densely hairy ligule.

Look Alikes: Switchgrass is perhaps most easily confused with big bluestem, Indian grass, and sideoats. Unlike switchgrass, big bluestem and Indian grass have an obvious ligule. Big bluestem seedlings typically have hairs extending well up the leaf blade, while switchgrass has a triangular patch of hairs at the base of each leaf. Sideoats has stiff hairs that protrude distinctively outward from leaf margins. Indian grass seedlings are sometimes difficult to discern from big bluestem, but develop a stouter, keeled midrib on each leaf. The round stem of switch-grass contrasts with the flattened stem of little bluestem.

Inflorescence

Tussock Sedge

Carex stricta

Seed

Steve Hurst – USDA-NRCS

Seedling

Habitat: Wetland

R3 Indicator Status: OBL

MN C-Value: 5

Flowers: June

Seedling Description: The characteristic m-shaped cross section becomes more evident in leaves as the plant matures, as do the teeth on the leaf margins. As seedlings become more developed, stem bases develop ladder-like (fibrillose) fibers caused by splitting of the leafy sheaths. Leaf width increases along with plant size, eventually reaching 3-8 mm. Stems tend to be stiff and upright, and sometimes develop a bluish-green color as plants mature.

Look Alikes: Other sedges common to restoration plantings tend to have wider leaves and/or less upright stems. Lakebank sedge also has stiff, upright growth character and is bunch forming, but has wider leaves and feather-like fibers at leaf bases rather than ladder-like fibers.

Adult Plant

Seed

Steve Hurst – USDA-NRCS

Seedling

Habitat: Edge

R3 Indicator Status: FACW

MN C-Value: 4

Flowers: June-July

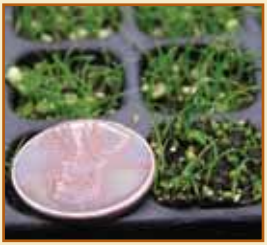
Seedling Description: Leaves of young plants are about 4 mm wide, reaching 10 mm as the plant matures. Both the upper and lower leaf surfaces are somewhat rough to the touch. This species shows substantial variation in physical characteristics across its geographic range. Stems have reddish color at base.

Look Alikes: Canada wildrye is similar, however, its leaves are not rough on both sides. Canada wildrye may only have one, or no rough leaf surfaces. The auricles of Canada wildrye are generally larger than those of Virginia wildrye, and may clasp the stem.

Inflorescence

Scirpus cyperinus

Seed



Seedlings

Seedlings

Habitat: Wetland

R3 Indicator Status: OBL

MN C-Value: 3

Flowers: June-July

Seedling Description: Woolgrass seedlings are difficult to identify when small. As seedlings develop, they form basal rosettes of leaves that are v-shaped in cross section. Woolgrass tends to germinate well, but develops slowly and may take three years to reach flowering. Leaf sheaths are brownish or green.

Look Alikes: Dark green bulrush forms similar-looking basal rosettes, but its leaves have an m-shaped cross section compared to the v-shaped cross section of woolgrass leaves.

Adult Plant

Forbs

American Vetch

Vicia americana

Seed

Steve Hurst – USDA-NRCS

Seedling

Habitat: Edge/Upland

R3 Indicator Status: NI

MN C-Value: None Assigned

Flowers: May-July

Seedling Description: First true leaf of seedlings is typically a single leaflet, the next few leaves that form have two leaflets. Leaves continue to gain an increasing number of leaflets per leaf on a smooth, zigzag stem until reaching 8-16 leaflets per leaf as the plant matures. The rachis of leaves on mature plants terminates with tendrils that grab adjacent features and plants for support. Leaf stipules are sharply serrate.

Look Alikes: American vetch has a relatively unique leaf shape compared to other commonly planted native flowers. It is perhaps most easily confused with nonnative vetches sometimes included in conservation and roadside plantings, especially hairy vetch *V. villosa*.

Adult Plant

Seed

Seedling

Seedlings

Habitat: Upland

R3 Indicator Status: FACU

MN C-Value: 3

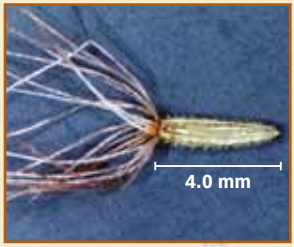
Flowers: June-July

Seedling Description: The first true leaves are about 2 cm long and have a rounded elliptical shape. Leaves have readily visible white hairs concentrated on the outer third of the leaf blade, along the outer leaf margin, and on the stem of the youngest leaves. These hairs cover the entire surface of later leaves. Leaves form a basal rosette and lack teeth. A prominent mid-vein develops, as well as two other obvious veins that follow the leaf margin and recurve toward the rounded or sharp leaf tip.

Look Alikes: Because it grows so rapidly, black-eyed susan is usually quite conspicuous within a few months of planting. Pale purple coneflower has stiff, sandpapery leaves that are held upright compared to the low, soft, spreading leaves of black-eyed susan. Wild quinine forms a basal rosette of more rigid leaves and matures much more slowly than black-eyed susan.

Adult Plant

Liatris pycnostachya



Science Museum of Minnesota

Iowa DNR

Seed **Seedling**

Habitat: Edge/Upland

R3 Indicator Status: FAC

MN C-Value: 7

Flowers: June-August

Seedling Description: Seed leaves and the first true leaf have the appearance of a sword. Leaves are narrow and long, and often appear slightly bent along the flat axis of the leaf. Leaves may have a slightly wavy edge. The distinctive central vein often has a pale appearance. Successive leaves emerge from ground level or below and develop into a basal rosette of flat, thinly fleshy leaves. The first few true leaves of young prairie blazingstar *L. pycnostachya* are about 1.5-2 mm wide, while leaves of rough blazingstar *L. aspera* and meadow blazingstar *L. ligulistylis* seedlings are wider (3-5 mm). Leaves of seedling marsh blazingstar *L. spicata* often exceed 5 mm in width.

Look Alikes: Blueflag iris is much more robust, with new leaves that emerge in the fold of previous leaves. Perhaps the greatest problem in identifying blazingstar seedlings is spotting them at all, as they tend to be very inconspicuous.

Adult Plant

Steve Hurst – USDA-NRCS

Seed

Iowa DNR

Seedling

Habitat: Upland

R3 Indicator Status: OBL

MN C-Value: 5/4

Flowers: May-June

Seedling Description: Sword-like leaves develop from a flattened stem base, with each new leaf becoming successively longer. In cross-section, each leaf is somewhat swollen at the center and folded at the midrib, forming a slot from which later leaves emerge. The leaf margin appears somewhat translucent. Seed hull remains attached to the seedling through development of at least the first few true leaves and may be visible above ground.

Look Alikes: Blueflag iris is most readily confused with wet meadow/ wetland species such as cattail Typha spp., which has a round stem base; and sweetflag Acorus calamus which has a similar leaf, but is not folded over at the midrib. Sweetflag also has a prominent, citrus-like aroma. Blazingstar species have a similar leaf shape, but seedlings are smaller and new leaves do not emerge from the fold of previous leaves.

Adult Plant

Blue Vervain

Verbena hastata

Seed

Steve Hurst – USDA-NRCS

Seedlings

Seedling

Habitat: Edge

R3 Indicator Status: FACW

MN C-Value: 6

Flowers: July-August

Seedling Description: Seedlings have hairy, narrowly oblong leaves held opposite each other. Even small seedlings have sharp, forward-pointing teeth. As the plant continues to develop, the square stem becomes more evident.

Look Alikes: May be confused with spotted joe-pye weed when young. As seedlings mature, joe-pye weed develops whorls of 4-5 leaves on a round stem, while blue vervain has leaves opposite each other on a square stem. Blue vervain seedlings could also be confused with the nonnative weed, stinging nettle, which has stiff, long hairs and a much more angular square stem. Stinging nettle also has the undesirable quality of causing itching, thanks to a liquid injected into the skin through plant hairs if brushed up against too hard.

Adult Plant

Science Museum of Minnesota

Iowa DNR

Seed | Seedling | Seedlings

Habitat: Wetland/Edge

R3 Indicator Status: FACW

MN C-Value: 4

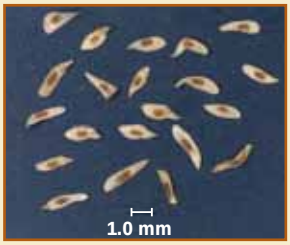
Flowers: July-October

Seedling Description: Seedling leaves are round in shape with stems as long as the leaves. The first true leaves develop with a few rounded teeth. Successive leaves have an increasing number of teeth and become coarsely hairy. As the plant matures, leaves form opposite and grow together (perfoliate) around the hairy stem.

Look Alikes: Boneset seedlings may be confused with spotted joe-pye weed, which is less hairy and develops whorls of 4-5 leaves around the stem rather than two leaves opposite on the stem fusing together. Blue vervain has opposite, somewhat hairy leaves with stems (rather than clasping each other and the stem).

Adult Plant

Gentiana andrewsii



Seed

Seedling

Habitat: Edge

R3 Indicator Status: FACW

MN C-Value: 6

Flowers: August-October

Seedling Description: Bottle gentian seedlings develop slowly and tend to be susceptible to damping off, a condition where seedling stems are attacked near the soil surface by one of several pathogens. Seedlings form basal rosettes of fleshy green and shiny leaves. Leaves of the youngest plants are nearly round and crowd each other in a tight rosette. As the plant matures, leaves become more elongate with a sharper point and a stronger mid-vein. Leaves have a slight upward fold. Seeing the small and slowly developing seedlings is often the greater challenge in identification.

Look Alikes: The waxy, thinly fleshy feel and shiny appearance of the leaves of bottle gentian make it fairly easy to distinguish from other plants. Cream gentian may be confused with bottle gentian, but generally occupies upland prairie, savanna, and woodland habitats in our region. Cardinal flower and great blue lobelia also have waxy, fleshy leaves that form basal rosettes, but have teeth and tend to develop faster than bottle gentian.

Adult Plant

Steve Hurst – USDA-NRCS

Seed

Seedling

Seedling

Habitat: Wetland

R3 Indicator Status: OBL

MN C-Value: 5

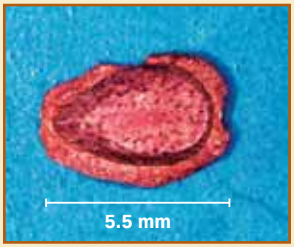
Flowers: June-July

Seedling Description: Seedlings develop quickly after germination in most circumstances. Plants are fleshy, with a main stem and arching leaves when small. As the seedlings mature, they develop linear, bright-green leaves that are strongly keeled. Leaves of the mature plant are triangular with flat edges in cross-section.

Look Alikes: Seedlings of bur reed may be confused with other emergent plants when small. Identification becomes easier when the leaves take on their characteristic triangular cross-section shape. More mature plants may be confused with sweet flag, although in cross-section, bur-reed leaves are flattened triangular, while those of sweet flag are flattened diamond-shaped. Sweet flag foliage is also highly aromatic.

Adult Plant

Asclepias tuberosa



Seed

Seedling

Habitat: Upland

R3 Indicator Status: UPL

MN C-Value: None assigned

Flowers: June-August

Seedling Description: Butterfly milkweed has oblong seed leaves with long stems. True leaves are bluntly rounded at the tip, about 4-5 times as long as they are wide, and opposite one another on the seedling stem with leaf pairs perpendicularly offset. Plants develop coarse hairs on the stem and leaves, as well as longer leaves with a triangular to somewhat heart-shaped base that clasps the stem as the plant matures.

Look Alikes: Butterfly milkweed has distinctive seedling leaves, with long leaf stems and oblong leaf shape. Other upland milkweed species such as common and Sullivant's milkweed have narrower, longer leaves as seedlings that are sharply pointed and sometimes 8-10 times as long as they are wide. Unlike other milkweed species, butterfly milkweed does not develop a milky, latex sap.

Adult Plant

Science Museum of Minnesota

Alexis Knispel- University of Manitoba

Seed **Seedling**

Habitat: Wetland/Edge/Upland

R3 Indicator Status: FACW

MN C-Value: 3

Flowers: May-July

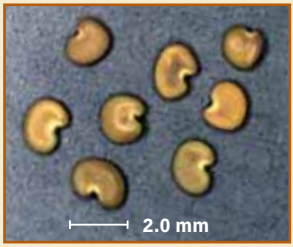
Seedling Description: Seedling leaves are oval to elliptic in shape and held close to the ground. The first true leaves have rounded bases with a general shape similar to a red maple or grape leaf. Leaf veins (3 – 5) radiate out from a central point near the base of the leaf. As the plant grows, successive leaves develop 3-5 prominent lobes with coarse teeth. Although difficult to see without magnification, leaves have fine hairs on both top and bottom surfaces. As seedlings mature, Canada anemone begins spreading by rhizomes. Depending on the amount of available root space and competitiveness of surrounding plants, Canada anemone may form a compact mat or with stems more widely spaced.

Look Alikes: Canada anemone seedlings look much like those of its upland cousins, tall anemone *A. virginiana* and long-headed thimbleweed *A. cylindrica*. Neither tall anemone nor thimbleweed is tolerant of standing water or saturated soils.

Adult Plant

Canada Milkvetch

Astragalus canadensis



Science Museum of Minnesota

Iowa DNR

Seed **Seedling**

Habitat: Upland

R3 Indicator Status: FAC

MN C-Value: 5

Flowers: June-July

Seedling Description: Canada milkvetch seedlings are smooth and develop a fleshy and striated stem. The first few true leaves usually only have one leaflet; then develop three, five, and eventually 15-35 leaflet pairs per leaf. The first leaflets are nearly round, while later leaves become more narrow and oblong, with stipules at the base of each leaf stem. Leaflets are folded upward along the midrib. Leaflet margins seen through a hand lens reveal long, cream-colored hairs that lie flat and point toward the leaflet tip.

Look Alikes: Illinois bundleflower has very small (1.5-3 mm), narrow leaflets that occur on a twice pinnately compound stem, giving it a fern-like appearance. Partridge pea has more leaflets, develops more quickly, and is somewhat reactive to touch (folds up). The invasive nonnative crown vetch is easily confused with Canada milkvetch when young. Canada milkvetch may form multiple but upright stems, while crown vetch quickly begins to develop recumbent stems that form a clonal patch.

Adult Plant

Seed

Science Museum of Minnesota

Seedling

Seedling

Habitat: Wetland

R3 Indicator Status: OBL

MN C-Value: 3

Flowers: June-August

Seedling Description: Seedlings generally germinate and begin development in saturated soil conditions to a few inches of water. The first leaves of arrowhead seedlings are narrow with nearly parallel sides, tapering to a blunt point. After the first three or four true leaves, the plant begin forming what looks like a rosette of splayed out triangular-shaped leaves, seedlings become increasingly easier to identify. Typical arrowhead leaf shape develops later.

Look Alikes: The basal whorl of triangular-shaped leaves is relatively characteristic for seedlings. As plants develop further, the arrowhead leaf shape makes positive identification easy. Water plantain develops very narrow, linear leaves. Pickerel plant leaves are triangular, with a pointed (rather than blunt) tip.

Adult Plant

Culver's Root

Veronicastrum virginicum

Science Museum of Minnesota

Seed

Iowa DNR

Seedling

Habitat: Edge/Upland

R3 Indicator Status: FAC

MN C-Value: 6

Flowers: June-July

Seedling Description: Plants develop slowly, sometimes taking several years to reach the point where they can flower. Young plants have narrowly elliptic, finely to sharply toothed leaves that are opposite one another on an often dark-colored, hairy stem. As plants continue to develop, new leaf sets are in whorls of 3 at first, and eventually 5-6. Leaves are hairy or smooth underneath.

Look Alikes: Culver's root is perhaps most easily confused with hoary vervain as a seedling, the latter being more coarsely toothed (and not toothed all the way to the leaf base).
Butterfly milkweed has a similarly hairy stem, but lacks teeth on the leaves. After Culver's root plants begin forming whorls of leaves, they are easier to distinguish from other prairie seedlings.

Adult Plant

Steve Hurst – USDA-NRCS

Iowa DNR

Seed **Seedling**

Habitat: Edge

R3 Indicator Status: FACW

MN C-Value: 4

Flowers: June-August

Seedling Description: Coarse leaves have stiff, short hairs and a relatively short, winged leaf stem. Early leaves are somewhat round in a basal rosette. Later leaves develop a more prominent point, are opposite on the stem, and eventually clasp each other across the stem (forming the distinctive cup).

Look Alikes: Cup plant seedlings are perhaps most easily confused with those of wild goldenglow *Rudbeckia laciniata*, which develops deep lobes after getting a few (smooth or fuzzy) true leaves. Cup plant has thicker, more rigid and coarse leaves.

Adult Plant

Boltonia asteroides

Seed

Seedling

Habitat: Upland

R3 Indicator Status: FACW

MN C-Value: 4

Flowers: July-October

Seedling Description: Seedling leaves are oval to rounded, with the first true leaves forming a fountain-like basal rosette of diamond-shaped leaves with rounded edges. As the plant matures, leaves become more lance-shaped and narrow, appearing stalkless to slightly clasping on the stem. The leaf margins are rough to the touch. Stems are smooth and stout. As the plant develops and flowers, it has a shrubby, crowded appearance with a remarkable number of blooms.

Look Alikes: Several aster species common to wetland edges are similar as seedlings, and difficult to distinguish from false aster. Look for the smooth stems and characteristic leaf shape of false aster as seedlings develop.

Adult Plant

Tracey Slotta – USDA-NRCS

Seed | Seedling | Seedlings

Habitat: Wetland/Edge

R3 Indicator Status: FACW

MN C-Value: 5

Flowers: July-September

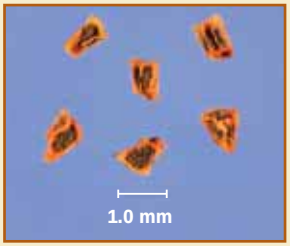
Seedling Description: Even as small seedlings, flat-topped aster leaves have the open, net-like vein pattern on leaves also found in more mature plants. Seedlings have stems and leaves with short, but dense hairs (mostly at the outer edges). Lance-shaped leaves develop alternately along the stem.

Look Alikes: Spotted joe-pye weed, boneset, and blue vervain have opposite leaf arrangement on the stem. Red-stemmed aster develops clasping leaves. The hairy stem and outer leaf edges combined with the alternate leaf arrangement help distinguish flat-topped aster from other wetland asters

Adult Plant

Foxglove Beardtongue

Penstemon digitalis



Seed

Steve Hurst – USDA-NRCS

Seedling

Habitat: Upland

R3 Indicator Status: FAC

MN C-Value: None assigned

Flowers: May-July

Seedling Description: The first leaves are born in clusters (6-8 leaves in young seedlings) that form a basal rosette. Seedlings have oval- to elliptic-shaped leaves about 2 cm wide and 4 cm long. Leaves taper to a narrow point where the leaf attaches to the leaf stalk. Leaves are opposite on the stem. Seedlings are very smooth and waxy to the touch, with leaf margins that lack teeth. A depressed, whitish-colored midvein is often visible. Leaves typically turn a burgundy to rich red-brown color in fall.

Look Alikes: Smooth blue aster and large-flowered beardtongue have fleshy light green leaves with a waxy cast. Smooth blue aster leaves are alternate on the stem. Large-flowered beardtongue leaves are shorter and more rounded.

Infloresence

Science Museum of Minnesota

Seed

Iowa DNR

Seedling

Seedling

Habitat: Edge/Upland

R3 Indicator Status: FAC

MN C-Value: 6

Flowers: May-June

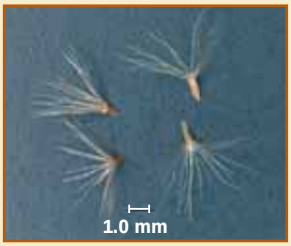
Seedling Description: Seed leaves are short and ribbon-like with sharp points. The first true leaves are round with sharp to somewhat rounded, shallow teeth along a slightly irregular leaf edge. Subsequent leaves progress to having deeper lobes until 3 deep lobes appear on each leaf. Juvenile and adult plants eventually have leaflet stems and 1-3 sets of 3 leaflets per leaf. Leaves are smooth.

Look Alikes: Leaves of alumroot seedlings have a similar appearance, but are finely hairy and deeply toothed. Prairie cinquefoil seedlings have coarse and sharp teeth. Both alumroot and cinquefoil have veins that radiate from one spot at the base of the leaf when plants are young. However, cinquefoil seedlings lose this characteristic after a few true leaves are formed, and develop readily visible brownish hairs on the stem. This species can also be confused with heartleaf alexander *Zizia aptera*.

Adult Plant

Grass-Leaved Goldenrod

Euthamia graminifolia



Seed

Science Museum of Minnesota

Seedlings

Habitat: Edge/Upland

R3 Indicator Status: FACW

MN C-Value: 4

Flowers: June-September

Seedling Description: Leaves of seedlings have a grainy and rubber-like appearance and lack hairs. As seedlings continue to develop, leaves become more linear and grass-like with three veins visible without magnification. As plants mature, they spread by rhizomes. A single plant can occupy a large area with many stems.

Look Alikes: Lanceleaf aster and Riddell's goldenrod have smooth, nearly linear leaves, but widen near the end. Some upland asters also have linear leaves, but typically do not occur in the same habitat as grass-leaved goldenrod.

Adult Plant

Science Museum of Minnesota

Iowa DNR

Seed

Seedling

Habitat: Wetland/Edge

R3 Indicator Status: FACW

MN C-Value: 5

Flowers: June-August

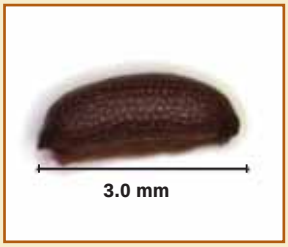
Seedling Description: Leaves form a basal rosette of thinly fleshy, green to purple-red leaves that are easily crushed. Leaf margins are wavy-toothed. The short, wide, leaf stem tapers from the base of the leaf. Because there are two varieties of this species in the Upper Midwest, leaves may have fine hairs or be smooth.

Look Alikes: Great blue lobelia may be confused with ragworts *Senecio spp.*, which have flat leaf bases and narrow, unwinged leaf stems. Culver's root leaves can look similar, but have sharply toothed margins on the outer half of the leaf and do not form basal rosettes. Alumroot is palmately veined, with leaf veins radiating out from one spot at the leaf base. Cardinal flower has a similar leaf shape when young. Cardinal flower leaves tend to be thicker and waxier.

Adult Plant

Great St. Johnswort

Hypericum ascyron



Science Museum of Minnesota

Seed Seedling

Habitat: Edge/Upland

R3 Indicator Status: FAC

MN C-Value: 6

Flowers: June-September

Seedling Description: Leaves of seedlings are oppositely arranged and are elliptic in shape. As seedlings mature, leaves reach about 4 cm in length. Leaves lack teeth and are attached directly to the stem. Lacking a leaf stalk, leaves sometimes clasp the stem. Stems are yellow-green and smooth. Leaves are darker yellow-green than leaf midveins, lateral veins, and stem. Leaves tend to turn yellow- to orange-brown color in fall.

Look Alikes: Riddell's goldenrod and panicled aster have more linear leaves, held opposite on stems. Monkeyflower and obedient plant leaves have teeth.

Adult Plant

Hoary Vervain

Science Museum of Minnesota

Iowa DNR

Seed **Seedling**

Habitat: Upland

R3 Indicator Status: UPL

MN C-Value: None asssigned

Flowers: June-July

Seedling Description:
Seedlings develop leaves on opposite sides of the stem. The leaf shape is variable and rounded to elliptic with sharp, crowded teeth of various sizes on the outer two thirds of the leaf. Plants are hairy, with the leaf bottoms being more densely hairy than the upper surface.

Look Alikes: Culver's root is similar, but has finer, more evenly sized small teeth to the leaf base, narrower leaves, and eventually develops whorled sets of 3-6 leaves.

Adult Plant

Vernonia fasciculata

Seed

Seedling

Habitat: Wetland/Edge

R3 Indicator Status: FACW

MN C-Value: 5

Flowers: July-August

Seedling Description: Seedling leaves are spatula-shaped. The first true leaves are elliptic in shape with a prominent light green to whitish mid-vein and several lateral veins extending periodically outward. Leaves have slightly in-rolled leaf margins and shallow, forward-pointing teeth that are at times difficult to notice. As seedlings mature, leaves become increasingly longer than wide with coarsely saw-toothed leaves. The midvein on the underside of the leaf also becomes more prominent as the plant matures.

Look Alikes: Seedlings of ironweed are fairly easy to confuse with other members of the composite family, including goldenrods and asters. Positive identification becomes easier as seedlings mature and the characteristics mentioned above become more prominent.

Adult Plant

Science Museum of Minnesota

Iowa DNR

Seed **Seedling**

Habitat: Wetland/Edge

R3 Indicator Status: OBL

MN C-Value: 4

Flowers: July-September

Seedling Description: Seed leaves are oblong with long stems. Often appearing crowded on the plant, true leaves are lanceolate in shape with short leaf stems Leaves on seedlings vary from softly fuzzy to smooth. Seedlings develop a milky sap just a few weeks after germination, about the time they are approximately 10 cm tall.

Look Alikes: Common milkweed has a somewhat similar leaf shape and can be distinguished from marsh milkweed by the more oblong rather than lanceolate leaf of marsh milkweed, which is wider at the base and narrows to a sharper point.

Adult Plant

Monkey Flower

Mimulus ringens

Science Museum of Minnesota

Seed | Seedlings | Seedlings

Habitat: Wetland/Edge

R3 Indicator Status: OBL

MN C-Value: 5

Flowers: June-September

Seedling Description: Seedlings are slow to develop and may take three years to flower from seed. Seedlings are also very small, making them difficult to spot. Smooth leaves become lance-shaped to somewhat linear with sharp, forward-pointing teeth. Leave bases clasp the square stem, which is sometimes winged.

Look Alikes: May be confused with turtlehead, and skullcaps *Scutellaria spp*., some species of which have similar leaves. Spotted joe-pye weed and blue vervain have hairy leaves. Obedient plant has smooth leaves with teeth, but its leaves are longer and narrower than those of monkey flower.

Adult Plant

Science Museum of Minnesota

Iowa DNR

Seed **Seedling**

Habitat: Edge/Upland

R3 Indicator Status: FACW

MN C-Value: 3

Flowers: September-November

Seedling Description: Seedlings of New England aster develop characteristics of adult plants early. They lose seedling leaves rather quickly. True leaves and stems on seedlings are similar to those of adults, having stiff hairs on leaf undersides and margins. Toothless lanceolate to spoon-shaped leaves vary somewhat in shape with blunt leaf tips and wide leaf bases that clasp the stem as the plant develops.

Look Alikes: Heath aster looks similar as a seedling, but develops linear leaves compared to the clasping leaves of New England aster. New England aster can also be easily confused with red-stemmed aster, *A. puniceus*, a wet meadow species with similar characteristics. It is relatively common in wetland plantings. It develops pointed leaves that often have shallow, distantly spaced teeth.

Adult Plant

Physostegia virginiana

Seed

Seedling

Juvenile

Habitat: Edge

R3 Indicator Status: FACW

MN C-Value: 6

Flowers: June-September

Seedling Description: Seedling leaves are oblong in shape. True leaves develop in a basal rosette with successive leaves increasing in size. Basal leaves eventually reach a proportion of having leaf blades about 4-5 times as long as wide, with leaf stems nearly equal to the blade length. Leaves have a spongy appearance when viewed up close, and are even more so when viewed with a hand lens. Leaf midveins may be light green to reddish. Seedling leaf margins may be smooth or with fine, shallow teeth.

Look Alikes: The fleshy leaves have a spongy appearance, red-tinged mid-veins, and habit of forming a basal rosette causing Obedient plant to have an appearance similar to the nonnative weed curly dock. Curly dock generally grows in upland settings (performing poorly in wet, saturated soils), and the leaves lack teeth.

Adult Plant

Oxeye False Sunflower

Science Museum of Minnesota

Seed

Iowa DNR

Seedling

Habitat: Upland

R3 Indicator Status: UPL

MN C-Value: None assigned

Flowers: June-August

Seedling Description: This plant shows substantial variation in leaf shape across its geographic range. Small plants have ovate to rounded diamond-shaped leaves that may be sharply or bluntly toothed, tapering to a slightly winged stem at the leaf base. Leaves are opposite one another on the stem, have impressed veins, and may be smooth to slightly rough to the touch. New leaves tend to have a somewhat puckered appearance, similar to seersucker fabric.

Look Alikes: Can be confused with bergamot when small, however bergamot has a deeper blue-green color and a minty smell when rubbed. Maximillian sunflower has leaves that are narrower, longer, somewhat folded along the mid-vein, have shorter leaf stalks, and are more reliably sharply, but shallowly toothed.

Adult Plant

Symphyotrichum lanceolatum

Science Museum of Minnesota

Seed

Seedling

Habitat: Edge

R3 Indicator Status: FACW

MN C-Value: 5

Flowers: July-November

Seedling Description: Seedlings have oval-shaped leaves with sharp teeth on the outer edge. As seedlings continue to grow, leaves become more elongate in a basal rosette, with sharp teeth concentrated at the outer edge. Leaves are smooth, with exception of tiny hairs along the midvein. As plants mature, branching occurs from points where leaves meet the stem. Leaves do not typically clasp the stem.

Look Alikes: Red-stemmed aster looks similar as a seedling, but has stiff, readily visible hairs concentrated along the leaf stalks and leaves that clasp the stem in mature plants. Panicled aster is perhaps most easily confused with calico aster which is similar in appearance, and more variable in hairiness.

Adult Plant

Science Museum of Minnesota

Iowa DNR

Seed **Seedling**

Habitat: Upland

R3 Indicator Status: FACU-

MN C-Value: 2

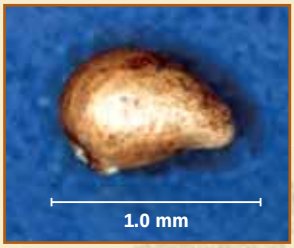
Flowers: June-July

Seedling Description: The seedling leaves of partridge pea are bluntly pyramidal. The first few sets of true leaves have 5 pairs of leaflets, progressing to as many as 18 pairs of leaflets in mature plants. Leaves have no terminal leaflet. As plants grow, they develop a small gland (nectary) on the leaf stem, which appears as a small, green, globular structure about the same width as the leaf stem. Plants have dark green leaves with light green veins, leaf(let) stems, and plant stems. Leaflets fold together each night.

Look Alikes: The lack of a terminal leaflet and presence of a gland on the leaf stem can cause this plant to be confused with senna species Senna marilandica and S. herbecarpa, as well as Illinois bundleflower Desmanthus illinoiensis when young. Senna has fewer but much larger leaflets, and plants are much larger (up to 6 feet tall). Illinois bundleflower has 8-24 leaflets that are generally smaller than those of partridge pea. Leadplant and milkvetch species have terminal leaflets.

Adult Plant

Potentilla arguta



Science Museum of Minnesota

Seed

Iowa DNR

Seedling

Habitat: Upland

R3 Indicator Status: FACU

MN C-Value: 8

Flowers: June-July

Seedling Description: Leaves of seedlings form a basal rosette. Initially, with a few deep, sharp teeth at the end of each leaf, but subsequent leaves have deep teeth that eventually extend around the entire margin of the leaf. Leaf stems have brownish hairs. As the plant matures, the number of leaflets increases to 3 not-so-deeply toothed leaves; and then eventually to 7-11 elliptic, shallowly toothed leaflets. Leaf undersides often appear red-brown in young plants.

Look Alikes: Leaves of alumroot seedlings have a similar appearance, but are not as deeply toothed. Both have veins that radiate from one spot at the base of the leaf when young. However, cinquefoil seedlings lose this characteristic after a few true leaves are formed. Golden alexanders have shallowly toothed and smooth leaves. There are a number of other cinquefoil species (as well as wild strawberry) that look similar to immature prairie cinquefoil, but lack the light brown hairs.

Adult Plant

Science Museum of Minnesota

Seed

Iowa DNR

Seedling

Habitat: Upland

R3 Indicator Status: UPL

MN C-Value: None assigned

Flowers: June-August

Seedling Description: Seedlings quickly develop leaves with 3 leaflets that look very similar to those of mature plants. As the plant matures, the number of leaflets increase and range from 3 to 7, with 5 leaflets being most common. Young plants often have wispy stems and may have leaflets about half the size of adult plants (5-10 mm). Plants may be smooth or appear very finely hairy when viewed through a hand lens.

Look Alikes: White prairie clover is similar, but quickly develops broader leaves with pointed tips. White prairie clover also has more leaflets per leaf after the third or fourth set of true leaves develop. White prairie clover leaflets range from 5-9, with 7 being the most common.

Adult Plant

Red-Stemmed Aster

Symphyotrichum puniceum

Seed

Science Museum of Minnesota

Seedlings

Seedling

Habitat: Wetland/Edge

R3 Indicator Status: OBL

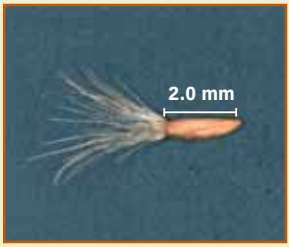
MN C-Value: 6

Flowers: July-September

Seedling Description: Seedlings have leaves with coarse, stiff, whitish hairs, especially toward the outer edges of leaves and on the stems – a characteristic carried through to adult plants. Seedlings may have reddish leaf margins. Leaf stems are wide and become lobed at the base (clasping the stem) as the plants mature.

Look Alikes: Leaves of red-stemmed aster are similar to New England aster, which has a more crowded appearance to leaves and typically green stems. Red-stemmed aster is tolerant of wetter soils than New England aster.

Adult Plant



Science Museum of Minnesota

Seed

Seedling

Habitat: Wetland/Edge

R3 Indicator Status: OBL

MN C-Value: 8

Flowers: July-September

Seedling Description: Seedlings have leaves that are at first elliptic in shape. As the plants mature, the smooth and waxy-feeling leaves become increasingly linear with a pointed tip, and folded along the midrib. When viewed from the side, leaves appear sickle-shaped. New leaves emerge rolled. Leaves have a prominent mid-vein that is light green in color with a secondary set of smaller veins that appear almost net-like. These net-like veins become less evident as the plant matures. Foliage tends to turn burgundy to bright red in the fall. Upper leaves are stalkless and clasp the stem. Riddell's goldenrod has a flat-topped flowering head with a pubescent inflorescence.

Look Alikes: Several species of aster (flat-topped) and false aster are similar to Riddell's goldenrod. The smooth, linear leaves of Riddell's goldenrod help distinguish it from similar species, particularly as seedlings become more developed. Panicled aster is perhaps the easiest to confuse, but is not commonly used in wetland restoration seed mixes.

Adult Plant

Round-headed Bushclover

Lespedeza capitata

Seed

Seedling

Habitat: Upland

R3 Indicator Status: FACU

MN C-Value: 3

Flowers: June-August

Seedling Description: The first true leaf that develops has a single leaflet and is round in shape. Subsequent sets of leaves have 3 leaflets that are usually elliptic in shape, but can be variable. Leaves and stems have fine hairs that lie down on the plant, giving it a silvery-whitish cast, especially on the main stem and along leaf margins.

Look Alikes: White prairie clover and leadplant seedlings have a similar appearance when young. As they grow, white prairie clover and leadplant become more easily distinguished as they have more leaflets (5-9 or more for leadplant). White prairie clover also has smooth stems and leaves.

Adult Plant

Seed

Seedling

Seedling

Habitat: Upland

R3 Indicator Status: FAC

MN C-Value: 4

Flowers: June-August

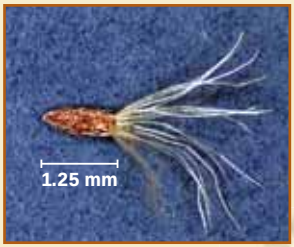
Seedling Description: The seed leaves are robust and persist on the stem past development of the third or fourth true leaf. Seedling stems vary from green to straw colored, are wiry, and often zigzag. The first true leaves have a single leaflet, vary from round to bluntly pointed on the end, and have a rough feeling. Later leaves become more elliptic in shape and are characteristic of the 3-parted leaf of showy tick trefoil.

Look Alikes: Other species of this genus have a similar appearance when they are seedlings. Velvetleaf weed seedlings can also have a similar appearance. However, they have toothed leaf margins, thick stems, develop very quickly, and have a thicker, softer feel to the leaves.

Adult Plant

Sky Blue Aster

Symphyotrichum oolentangiense



Seed

Science Museum of Minnesota

Seedling

Habitat: Upland

R3 Indicator Status: UPL

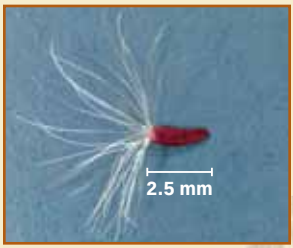
MN C-Value: None assigned

Flowers: July-September

Seedling Description: Seedlings form a basal rosette of heart-shaped leaves. Leaf margins may be smooth or have sharp teeth. Stiff hairs are prominent on the leaf margins and stem. The leaves of young plants have a thin, rough feel. Rosette leaves of young sky blue aster seedlings are approximately 2 cm wide by 3 cm long.

Look Alikes: Seedlings that could be commonly confused with those of sky blue aster include smooth blue aster, which feels fleshy, has few hairs, and lacks a heart-shaped leaf base. Several woodland asters have seedlings with a similar appearance, including heartleaf *A. cordifolius*, short's *A. shortii*, and other similar woodland species.

Adult Plant



Science Museum of Minnesota

Seed

Seedling

Habitat: Edge/Upland

R3 Indicator Status: UPL

MN C-Value: None assigned

Flowers: June-October

Seedling Description: Leaves of seedlings are crowded in a basal rosette and can vary substantially in shape. They have a waxy blue-green coating and a net-like vein pattern that becomes more prominent as the plant matures. Leaves are toothed, sometimes have a reddish to purple cast along the veins, and usually have a wide leaf base. They also have fine hairs that are visible with a hand lens.

Look Alikes: Sky blue aster seedlings are similar, but typically have a more obvious leaf stem as well as a rough feel and a heart-shaped leaf base. The leaf shape and bluish-green waxy coating of smooth blue aster leaves make it relatively easy to identify, even as a seedling.

Adult Plant

Helenium autumnale

Seed

Steve Hurst – USDA-NRCS

Seedlings

Juvenile

Habitat: Edge

R3 Indicator Status: FACW

MN C-Value: 4

Flowers: August-October

Seedling Description: Seedlings form basal rosettes of fleshy, smooth (to finely fuzzy) leaves that have a prominent yellow-green central vein and shallow, rounded teeth. As successive leaves form in the rosette, leaves become more linear with teeth concentrated toward the outer third. As the plant grows, the main stem is winged with leaves held alternate of each other.

Look Alikes: Great blue lobelia, cardinal flower, and bottle gentian also form basal rosettes. Bottle gentian leaves are reliably smooth, while those of cardinal flower and great blue lobelia may be finely hairy, similar to sneezeweed.

Adult Plant

Science Museum of Minnesota

Iowa DNR

Seed **Seedling**

Habitat: Upland

R3 Indicator Status: FACU

MN C-Value: 6

Flowers: June-July

Seedling Description: The fleshy, bluish-green leaves may lack hairs or have fine hairs most concentrated at the base. Stems are often silvery to reddish-purple in color, particularly along the veins. Leaves of young plants are concentrated at the base, moderately folded in a v-shape, and clasp the stem with a long sheath. Of the three most common species in our area, Ohio spiderwort *T. ohiensis* is the tallest and most robust, reaching 1 meter in height. Western spiderwort *T. occidentalis* and bracted spiderwort *T. bracteata* are generally under one half meter (about 1.5 feet) in height.

Look Alikes: Spiderwort plants are distinctive with linear leaves that feel similar to rubber bands. Seedlings are hard to spot in restorations when small, but easy to distinguish once they reach the subadult stage. Ohio spiderwort, *T. ohiensis* shown.

Adult Plant

Spotted Joe-pye Weed

Eupatoriadelphus maculatus

Seed

Science Museum of Minnesota

Seedling

Habitat: Wetland/Edge

R3 Indicator Status: OBL

MN C-Value: 4

Flowers: July-September

Seedling Description: Seedling leaves are narrowly elliptic with the successive true leaves forming opposite of each other. The first true leaves have only a few teeth, rounded bases, and leaf stalks about one-fourth as long as the leaf itself. Leaves of young plants have one prominent mid-vein, and two relatively distinct veins on either side. The leaves have coarse, but sharp teeth that point toward the tip. Hairs are visible on leaf margins and leaf surface, and are especially prominent on new leaves as they emerge and expand. As the plant matures, purple spots become more evident on the stem and leaves develop in whorls of four or five.

Look Alikes: Boneset and blue vervain also have opposite leaves that are hairy. As spotted joe-pye weed matures, leaves develop in whorls of 4-5.

Adult Plant

Seed

Seedling

Habitat: Upland

R3 Indicator Status: FACU

MN C-Value: 4

Flowers: June-August

Seedling Description: The first leaves are rounded to pointed oblong-lanceolate with a wide base, forming a small basal rosette. Subsequent leaves have longer leaf stems and leaf blades with an elliptic shape. Leaf margins may have sharp or rounded, shallow teeth, or may lack teeth. New leaves emerge somewhat inrolled along the leaf margins and long axis of the leaf. Because there are two varieties in the Upper Midwest, leaves may vary from stiffly rigid to softly hairy, or nearly smooth.

Look Alikes: Stiff goldenrod basal leaves can be confused with those of compass plant, which are reliably stiff and sand papery. Stiff goldenrod leaves can vary from rigid and coarse, to fuzzy, to nearly smooth. Compass plant leaves have a sharper point at the end than stiff goldenrod leaves. Showy goldenrod has a similar leaf, but has a wider leaf stem and teeth only on the outermost half of the leaf blade, not the entire leaf blade margin. This species is difficult to distinguish from other goldenrods and asters when very small.

Adult Plant

Sweetflag

Acorus americanus

Seed

Steve Hurst – USDA-NRCS

Seedling

Seedlings

Habitat: Wetland

R3 Indicator Status: OBL

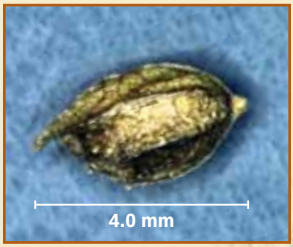
MN C-Value: 7

Flowers: June-July

Seedling Description: Even as seedlings, crushed leaves give off a characteristic citrusy, aromatic odor that smells much like citronella. Also known as calamus, sweet flag has sword-like, light green leaves that are narrowly diamond-shaped in cross section. As the plant matures, it develops successive leaves in an expanding bunch. Mid-veins and secondary veins are prominent throughout the length of leaves. Seed hulls are often borne on the tip of the first leaf, giving an opportunity to identify very small seedlings by looking closely at the seed.

Look Alikes: This plant is similar in appearance to blueflag iris. However, blueflag iris tends to have darker green leaves and does not have the citrus-like odor when its leaves are crushed. Iris leaves also have a sharp fold that new leaves emerge from inside of.

Adult Plant



Science Museum of Minnesota

Iowa DNR

Seed **Seedling**

Habitat: Wetland/Edge

R3 Indicator Status: FACW

MN C-Value: 4

Flowers: May-June

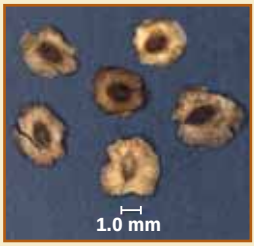
Seedling Description: Leaves of young plants are initially round-shaped. Subsequent leaves have lobes that resemble the distinctly 3-lobed leaves of adult plants. Leaves are smooth on top and sometimes finely hairy underneath with a thinly fleshy feel. The stems of small plants are wiry and often purple-blue in color. Plants often develop a waxy coating on the green to purplish stems, giving them a whitish cast.

Look Alikes: Tall meadow rue is perhaps most easily confused with seedlings of prairie larkspur, a dry prairie species not commonly included in prairie plantings. Prairie larkspur seedlings also have a 3-lobed leaf. However the lobes are deeper, and leaf tips more sharply pointed in prairie larkspur.

Adult Plant

Turtlehead

Chelone glabra



Science Museum of Minnesota

Seed | Seedlings | Seedlings

Habitat: Wetland/Edge

R3 Indicator Status: OBL

MN C-Value: 7

Flowers: July-September

Seedling Description: Seedlings have somewhat rounded leaves that become linear to lance-ovate in shape as seedlings mature. Leaves have very short stems, or lack them altogether. Smooth leaves are opposite on stem, with sharp teeth that point toward the leaf tip. Leaf veins are typically prominent, including a central vein and several lateral veins. Stems are four-angled and may have a waxy, whitish cast (glaucous bloom).

Look Alikes: May be confused with skullcaps (Scutellaria spp.), which have similar leaves to turtlehead seedlings. As turtlehead matures, leaves become longer and narrower than those of skullcap. Skullcap is seldom planted in restorations as seed due to availability/cost. Spotted joe-pye weed and blue vervain have hairy leaves. Swamp milkweed has milky sap. Monkeyflower has similar leaves, but more crowded teeth and a more net-like vein pattern on leaves.

Adult Plant

Science Museum of Minnesota

Iowa DNR

Seed **Seedlings** **Seedlings**

Habitat: Edge/Upland

R3 Indicator Status: FACW

MN C-Value: 6

Flowers: June-August

Seedling Description: Seedlings usually have deep green foliage, and are often reddish-purple tinged. Leaves are lanceolate to narrow and opposite each other on a square stem. Leaf margins are smooth and leaves appear crowded on seedlings. Spearmint-like smell of foliage is evident when rubbed between fingers. Because this plant develops slowly, it tends to be one of the harder seedlings to spot in prairie plantings.

Look Alikes: Even as a seedling, the minty smell of foliage distinguishes this plant from others that have a similar appearance. Bergamot, which has a more pungent minty smell reminiscent of Earl Grey tea, is larger, and matures from seed well ahead of mountain mint in most settings.

Adult Plant

Water Hemlock

Cicuta maculata

Steve Hurst – USDA-NRCS

Seed

Iowa DNR

Seedling

Habitat: Wetland

R3 Indicator Status: OBL

MN C-Value: 5

Flowers: June-August

Seedling Description: Seedling leaves are needle-shaped and, when bruised, give off a distinct mouse-like odor. First true leaves are compound with 3-toothed leaflets. As the plants mature, leaves become progressively larger and more finely dissected. Mature poison hemlock plants have distinctly purple-spotted, hollow stems that lack hairs.

Look Alikes: May be confused with poison hemlock, which is leafier and tends to grow in tall, dense stands. Poison hemlock stems have purple spots and streaks. Water hemlock tends to grow as scattered stems in wetter soils. Both of these attractive plants are highly poisonous.

DANGER: Roots and stem are extremely poisonous to humans and livestock. They contain cicutoxin, which causes paralysis of the nervous system in as little as 15 minutes. One ingested root is sufficient to kill a cow or horse.

Adult Plant

Seed

Steve Hurst – USDA-NRCS

Seedling

Habitat: Wetland

R3 Indicator Status: OBL

MN C-Value: 4

Flowers: June-July

Seedling Description: Seeds may germinate in shallow water or open mud flats. Seedlings have small, fine, linear leaves. As seedlings continue to grow they develop upright, elliptic leaves, eventually becoming broad, flat blades that may be rounded or tapered at the base. Seedlings develop relatively quickly in favorable settings.

Look Alikes: Similar emergent and wetland edge species include arrowhead and pickerel plant. Arrowhead seedlings have short, broad, and thick, strap-like leaves with rounded tips. Pickerel plant develops leaves as a seedling that are similar to those of arrowhead, but with a much sharper leaf tip. Water plantain leaves are much narrower than those of either arrowhead or pickerel plant as a seedling.

Adult Plant

White Prairie Clover

Dalea candida

Seed

Science Museum of Minnesota

Agrecol Corporation

Seedling

Habitat: Upland

R3 Indicator Status: UPL

MN C-Value: None assigned

Flowers: June-August

Seedling Description: Seedlings first develop leaves with 3 wide, rounded leaflets, increasing to 5 leaflets per leaf. There are 5-9 leaflets on mature plants, with 7 leaflets most common. Leaves of juvenile plants are typically 5-8 times long as they are wide, and look similar to those of mature plants. Leaves are smooth and flat to somewhat folded along the midrib. Young plants have wiry stems that range in color from light green to straw or light brown. Seedlings have leaflets about half the size of those found on adult plants.

Look Alikes: The first few true leaves of white prairie clover seedlings have an appearance similar to those of Canada milkvetch. However, after about the third set of true leaves, the leaflets of white prairie clover become characteristically narrow. Both leadplant and Canada milkvetch develop more leaflets per leaf than the 5-9 characteristic of white prairie clover. Purple prairie clover has smaller, narrower leaflets and plants may be very finely hairy.

Adult Plant

Science Museum of Minnesota

Iowa DNR

Seed

Seedlings

Habitat: Upland

R3 Indicator Status: FACU

MN C-Value: 3

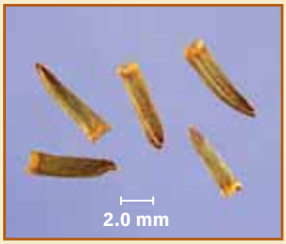
Flowers: June-July

Seedling Description: Even as a seedling, all plant parts have a pleasant, minty aroma similar to that of Earl Grey tea. The aroma is easily detected by gently rubbing foliage. Stems, leaf stems, and leaf bases often have a pinkish- to purplish-green color, and are generally about one-fourth to one-third the length of the leaf blade. Paired opposite each other on a square stem, leaves are light to dark green, and are slightly rounded-triangular to heart-shaped. Leaves often have sharp to rounded teeth, but are sometimes without. Plants can vary from smooth to finely hairy.

Look Alikes: Bergamot seedlings might be confused in general appearance with oxeye false sunflower or common evening primrose. Neither of these species has a minty aroma.

Adult Plant

Rudbeckia laciniata



Seed

Steve Hurst – USDA-NRCS

Seedling

Habitat: Edge

R3 Indicator Status: FACW

MN C-Value: 4

Flowers: June-August

Seedling Description: The first true leaves of wild goldenglow seedlings are nearly round, with stalks almost as long as the leaf blades, and a few coarse teeth toward the outermost edges. As seedlings mature, leaves become increasingly dissected and the veins of the leaves often have a light green to whitish color. Leaves are borne alternately on a stem that is often slightly ribbed. There are two varieties of wild goldenglow in our region, one of which has smooth and somewhat waxy foliage (giving it a whitish cast), while the other is typically softly pubescent.

Look Alikes: Wild goldenglow seedlings could be confused with those of cup plant. However, cup plant leaves are thicker, more firm, and coarser to the touch than wild goldenglow seedlings. Also, goldenglow leaves become increasingly dissected as the plant matures, whereas cup plant leaves remain entire, become stalkless, and eventually clasp the square stem.

Adult Plant

Seed

Seedlings

Habitat: Upland

R3 Indicator Status: UPL

MN C-Value: None assigned

Flowers: June-August

Seedling Description: Seedlings vary from softly to somewhat coarsely hairy (seedling leaves are usually fairly soft to touch, as opposed to stiff and rigid). The first true leaves are oval to elliptic in shape, lack teeth, have leaf stems about as long as the leaf blade, and are often slightly folded along the mid-vein. Subsequent leaves gain an increasing number of sharp teeth, then develop 3-5 deep lobes characteristic of adult plants.

Look Alikes: Can be confused with seedlings of a number of other species, including purple coneflower which quickly develops larger, coarser leaves; thin-leaved coneflower *Rudbeckia triloba* has thinner leaves, wide leaf stems and longer, coarser hairs; wild goldenglow, *Rudbeckia laciniata* eventually develops deep lobes with coarser teeth; sweet coneflower, *Rudbeckia subtomentosa* has fuzzier leaves, and eventually has up to 3 lobes.

Adult Plant

Weeds

Barnyard Grass

Echinochloa crusgalli

Seed

MN Dept. of Agriculture

Seedling

Habitat: Edge/Upland

R3 Indicator Status: FACW

MN C-Value: 0

Flowers: June-August

Distinguishing Characteristics:
Barnyard grass seedlings and adult plants have a pronounced flattened stem and hairless leaf blades and sheaths. The base of the stem is usually red and sometimes bulbous in appearance. When the leaf blade is bent over parallel to the stem, no ligule is visible. Barnyard grass has no claw-like appendages encompassing the stem (auricles) at the base of the leaf blade.

Adult Plant

Seed

Seedling

Habitat: Edge/Upland

R3 Indicator Status: UPL

MN C-Value: 0

Flowers: June-August

Distinguishing Characteristics: Cupgrass seed is cream colored, flattened, and large compared to most other grass seeds. The first true leaves are wide at the base. Leaves are covered with short, fine, dense hair, making the leaves appear and feel fuzzy. Leaf blades are hairy on the entire leaf surface, and have a distinguishing crinkle or wave on one margin. No hairs are present on sheath margins.

Inflorescence

Giant Foxtail

Setaria faberi

Seed

MN Dept. of Agriculture

Seedling

Habitat: Edge/Upland

R3 Indicator Status: FACU

MN C-Value: 0

Flowers: June-August

Distinguishing Characteristics: Although similar in appearance to green foxtail, giant foxtail is a much larger and robust plant that can reach 7 feet in height. Leaf blades are rough to the touch and tend to be flattened. The upper leaf surface has long, bulbous-based soft hairs. The lower leaf surface lacks hairs.

Adult Plant

MN Dept. of Agriculture

Seed

MN Dept. of Agriculture

Seedling

Habitat: Edge/Upland

R3 Indicator Status: UPL

MN C-Value: 0

Flowers: June-August

Distinguishing Characteristics: The stem of green foxtail is not flattened. The upper leaf surface is rough, while the lower leaf surface is less so, or smooth. The leaf sheath margins are hairy with the sheaths being sometimes hairy. The leaf blade has little or no hair. Hairs are visible on the ligule when the leaf blade is bent over parallel to the stem.

Adult Plant

Elytrigia repens

Seed

Seedling

Habitat: Edge/Upland

R3 Indicator Status: FACU

MN C-Value: 0

Flowers: June-August

Distinguishing Characteristics: Very prominent hairless auricles encircling the stem are present at the base of the leaf. The sheath is hairy on seedlings but is not hairy on mature plants. Leaves are finely ribbed on the upper and lower surfaces. The upper blade surface and margins are typically rough or slightly hairy, and the lower surface is smooth. Smooth brome may be confused with quackgrass, but it lacks the prominent claw-like appendages (auricles) that clasp the stem at the top of the sheath in quackgrass.

Inflorescence

Reed Canary Grass

MN Dept. of Agriculture

Seed

The Ohio State University

Seedling

Habitat: Wetland/Edge

R3 Indicator Status: FACW

MN C-Value: 0

Flowers: June-August

Distinguishing Characteristics:

Ligule is prominent and membranous, and the stem is hollow. Small clasping auricles are present at the base of the leaf. The leaves are flat, hairless and smooth, with the exception of somewhat rough edges. Leaf blades of mature plants are approximately 4 - 14 inches long and ¼ - ¾ of an inch wide. The wide leaf blade narrows abruptly at its base.

Adult Plant

Smooth Brome

Bromus inermis

A. Blaschka – USDA-NRCS

Seed

The Ohio State University

Seedling

Habitat: Upland

R3 Indicator Status: UPL

MN C-Value: 0

Flowers: June-August

Distinguishing Characteristics: Ligule is membranous and short with the leaf blade and sheath hairless or sparsely hairy. Leaf blades are narrow, long and erect. Auricles are inconspicuous to absent and the sheath is united.

As plants mature, a “W” mark develops across the width of each leaf blade, about half to two-thirds of the way up the leaf. Smooth brome can be confused with quackgrass Elytrigia repens. However, quackgrass has prominent claw-like appendages (auricles) that clasp the stem at the top of the sheath and smooth brome does not.

Adult Plant

Seed

MN Dept. of Agriculture

Seedling

Habitat: Edge/Upland

R3 Indicator Status: FAC

MN C-Value: 0

Flowers: June-August

Distinguishing Characteristics: The sheath is hairless and the stem is flattened. Long hairs are present only at the base of the leaf blade. The base of the leaf sheath for this species is often reddish/purple.

Adult Plant

Absinthe Sage

Artemisia absinthium

USDA-NRCS Plants Database

Seed

Seedling

Juvenile

Habitat: Edge/Upland

R3 Indicator Status: UPL

MN C-Value: 0

Flowers: June-August

Distinguishing Characteristics: The first leaves of absinthe sage following germination are about 3-4 mm in length and 1-2 mm in width, with a spatulate shape. Subsequent leaves gain increasingly deeper lobes with sharp points. Even the leaves of young plants have a bright green to silvery cast to them. Seed is very fine, spread readily by hay, wind water and animals, and is viable for 3-4 years.

Perhaps most conspicuous is the pungent odor similar to that of black walnut husks. This is in contrast to the native prairie sage, which gives off a more pleasant odor similar to the sage used in traditional Thanksgiving Day dressings.

Adult Plant

Seed

Seedling

Juvenile

Habitat: Edge

R3 Indicator Status: FAC

MN C-Value: 0

Flowers: June-August

Distinguishing Characteristics: Seed leaves (cotyledons) are large, thick, and waxy; and are lanceolate in appearance. True leaves have three prominent lobes. Seedlings consist of a slender, straight, whitish-green stem 1 to 3 inches tall. Two strap-shaped green leaves cap this stem, each about 1¼ inches long and ¼ inch wide. Mature plants can be distinguished from spiny clotbur by broader cockleburs, more ovoid leaves on long leaf stalks (petioles), and lack of spines.

This is a native species that may be prominent during the "weedy" early stages of prairie restoration.

Adult Plant

Bull Thistle

Cirsium vulgare

Seed

MN Dept. of Agriculture

Seedling

MN Dept. of Agriculture

Juvenile

Habitat: Edge/Upland

R3 Indicator Status: FACU

MN C-Value: 0

Flowers: June-August

Distinguishing Characteristics: Seed leaves (cotyledons) are round to spatulate in shape, are smooth and fleshy, and have short stalks. The first true leaves are oval to spatulate with spines, have a rough bumpy surface, and can have a downy appearance on the upper surfaces. Seedlings form rosettes, while adult leaves become more deeply lobed.

The upper leaf surface is dark green and covered with sharp hairs, making it prickly to the touch. The lower surface is light green and covered with soft, wooly hairs. At the tip of each leaf lobe is a long spine. Smaller spines are irregularly distributed along other parts of the leaf edge.

Inflorescence

Seed

Seedling

Basal Leaves

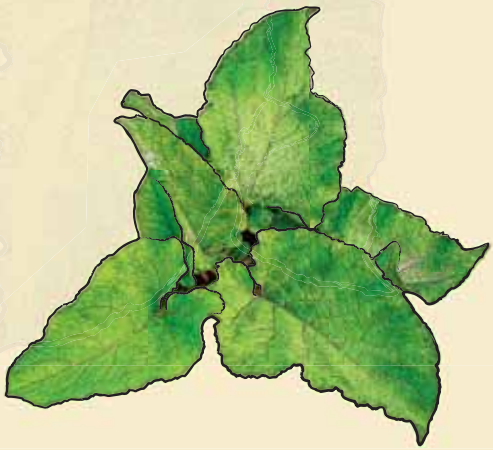
Habitat: Edge/Upland

R3 Indicator Status: UPL

MN C-Value: 0

Flowers: June-August

Distinguishing Characteristics: Seed leaves (cotyledons) are spoon-shaped and have a waxy surface. First true leaves are egg-shaped, flocked with short hairs, puckered between the veins, and have a widened base. Plant forms a rosette with leaves becoming broadly heart-shaped, 6-18 inches long and 4-14 inches wide, with hollow petioles and wavy, toothed margins. The undersides of these leaves are loosely hairy and light green. Leaves borne along the main stem of maturing plants are much smaller than other leaves, alternate, and egg-shaped. For the adventurous, chewing the leaves reveals a bitter taste.



Basal Leaves

Canada Thistle

Cirsium arvense

Seed

MN Dept. of Agriculture

Seedling

Province of British Columbia

Juvenile

Habitat: Edge/Upland

R3 Indicator Status: FACU

MN C-Value: 0

Flowers: June-August

Distinguishing Characteristics:

Seed leaves (cotyledons) are oblong to broadly oval in shape, dull green, and thick. Joined at the base, the seed leaves form a small cup. True leaves are at first egg-shaped with bristly hairs on the upper and lower surfaces. Seedlings form small rosettes with the first true leaves paired at right angles to seed leaves. Later leaves are wavy-edged, somewhat hairy underneath, and irregularly lobed with spiny edges. Plants appear compressed to the ground early, with clasping leaves more widely spaced along the main stem as plants mature.

Inflorescence

Seed

Seedling

Juvenile

Habitat: Upland

R3 Indicator Status: FACU

MN C-Value: 0

Flowers: June-August

Distinguishing Characteristics: Seed leaves (cotyledons) are small and oval to spatulate in shape with purple spots on undersides. First true leaves are opposite to seed leaves, five-lobed, and have a lacy appearance.

This is a native species that may be prominent during the "weedy" early stages of prairie restoration. There is also a native perennial ragweed species, *Ambrosia psilostachya*, that occurs in similar habitats. It is considered to be part of the normal flora of dry prairies.

Adult Plant

Curly Dock

Rumex crispus

Seed

Seedling

Juvenile

MN Dept. of Agriculture

MN Dept. of Agriculture

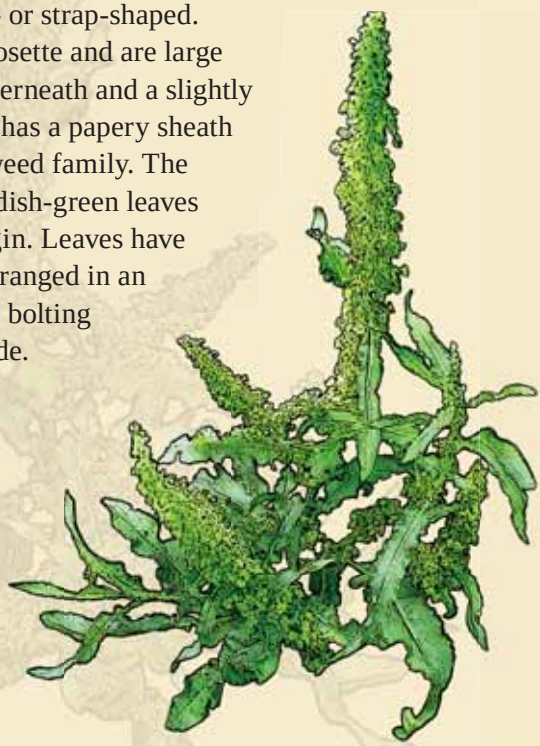
Habitat: Edge/Upland

R3 Indicator Status: FAC

MN C-Value: 0

Flowers: June-August

Distinguishing Characteristics: Seed leaves (cotyledons) are opposite and diamond- or strap-shaped. True leaves form a basal rosette and are large with a prominent vein underneath and a slightly pointed tip. The leaf base has a papery sheath characteristic of the knotweed family. The fleshy, bluish-green to reddish-green leaves have a curly or wavy margin. Leaves have short leaf stems and are arranged in an alternate fashion along the bolting stem, with one leaf per node.



Adult Plant

Seed

MN Dept. of Agriculture

Seedling

MN Dept. of Agriculture

Juvenile

Habitat: Edge/Upland

R3 Indicator Status: FAC

MN C-Value: 0

Flowers: June-August

Distinguishing Characteristics: Seed leaves (cotyledons) are large, round to oblong, and thick. The stem below the seed leaves is often purple. First true leaves are not lobed. They are lanceolate in shape, with toothed margins. Subsequent leaves are increasingly large and deeply 3-lobed (less commonly 5-lobed), opposite each other on the stem, and have a rough surface.

This is a native species that may be prominent during the "weedy" early stages of prairie restoration.

Adult Plant

Lambsquarter

Chenopodium album

Seed

Seedling

Juvenile

Habitat: Edge/Upland

R3 Indicator Status: FAC-

MN C-Value: 0

Flowers: June-August

Distinguishing Characteristics:

Seed leaves appear small and linear in shape, and have nearly parallel sides. First true leaves are opposite and ovate in shape with smooth edges. Seed leaves and early true leaves are dull blue-green above and often purple below. True leaves will begin to appear whitened above with a red-violet appearance on the underside as plants mature.

Adult Stem

Leafy Spurge

Seed

Seedling

Stem and Leaves

Habitat: Upland

R3 Indicator Status: UPL

MN C-Value: 0

Flowers: June-August

Distinguishing Characteristics: Seed leaves (cotyledons) are elliptical in shape and hairless. True leaves are also elliptical, hairless, and are arranged in spirals alternate of each other around the stem. A white milky latex that can cause skin irritation seeps from the plant when it is cut or torn. Leafy spurge can be confused with the native flowering spurge Euphorbia corollata, which is common to dry prairies and only rarely included in prairie restoration seed mixes.

Adult Plant

Nodding Thistle

Cardruus nutans

Seed

MN Dept. of Agriculture

Seedling

MN Dept. of Agriculture

Rosette

Habitat: Upland

R3 Indicator Status: UPL

MN C-Value: 0

Flowers: June-August

Distinguishing Characteristics:
Seed leaves are rectangular to oblong in appearance, and approximately three times as long as they are wide. Seed leaves have little or no stalk and have distinctive white veins on their upper surface. Young leaves are essentially without hairs and immediately form a dense rosette. Seedlings have waxy, pale green-colored leaves with shallowly lobed margins containing irregular prickles.

Inflorescence

Seed

Seedling

Stem and Leaves

Habitat: Edge/Upland

R3 Indicator Status: FACU

MN C-Value: 0

Flowers: June-August

Distinguishing Characteristics: Seed leaves (cotyledons) are linear in appearance and hairless. First true leaves are alternate, strongly egg-shaped (ovate), and have a deep notch or indentation at the tip. The leafstalks or petioles of the true leaves are purple. As the seedlings mature, the stem becomes very rough and hairy. Other pigweed species have a generally similar appearance to seedlings.

Adult Plant

Perennial Sow-thistle

Sonchus arvensis

MN Dept. of Agriculture

Seed

The Ohio State University

Seedling

MN Dept. of Agriculture

Juvenile

Habitat: Edge/Upland

R3 Indicator Status: FAC

MN C-Value: 0

Flowers: June-August

Distinguishing Characteristics: All leaves, including seedling leaves, have a milky sap. Seed leaves (cotyledons) are round to oval in shape with slight indentations at the tips. Although they tend to wither, the seed leaves usually remain until true leaves develop. First few true leaves are alternate, elliptical to oval in shape, narrower at the base than at the tips, and have toothed edges with soft prickles. Plants form a basal rosette. Leaf margins become wavy to lobed, and contain spiny teeth that point backwards. Lower surfaces of mature leaves often have a powdery white to purplish film.

Adult Plant

Steve Hurst – USDA-NRCS

Seed

The Ohio State University

Seedling

The Ohio State University

Basal Leaves

Habitat: Wetland/Edge

R3 Indicator Status: FACW

MN C-Value: 0

Flowers: June-August

Distinguishing Characteristics: Seed leaves are narrow, lanceolate, and have long leaf stalks (petioles). First true leaves have two or more leaflet divisions (pinnately compound), hairless, and often purple at the base. Plants form basal rosettes of finely divided, fern-like leaves during the first year. Mature plants have distinctly purple-spotted stems without hairs.

Adult Plant

WARNING: although rarely eaten, plant is poisonous to cattle, hogs, poultry, horses, goats, and sheep that consume it.

Purple Loosestrife

Lythrum salicaria

MN Dept. of Agriculture

Seed

Oregon State University-
Larry Burrell & Jed Colquhoun

Seedling

Habitat: Wetland/Edge

R3 Indicator Status: OBL

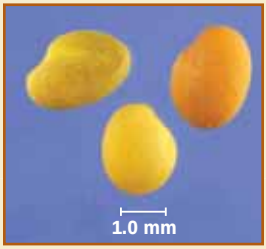
MN C-Value: None assigned

Flowers: July - September

Distinguishing Characteristics: Purple loosestrife is an aggressive nonnative plant brought to the U.S. from Europe in the early 1800's. It has the potential to readily colonize a wide variety of wetland and wetland edge settings.

Look for downy, triangular leaves, with smooth edges that are wider at the base, where they meet a square stem. Leaves are opposite each other in pairs which alternate down the stalk at 90 degree angles, and rarely in groups of three. Purple loosestrife is taller and more robust than the native winged loosestrife *Lythrum alatum* that is also found in wetlands in Minnesota and has a purple flower. Winged loosestrife generally does not exceed two feet in height and as the common name implies, has a winged stem.

Adult Plant



Seed

Seedling

Leaf Structure

Steve Hurst – USDA-NRCS

Habitat: Upland

R3 Indicator Status: FACU

MN C-Value: 0

Flowers: June-August

Distinguishing Characteristics: Seed leaves (cotyledons) are very small, twice as long as they are wide, and pale green in color. First true leaf is heart-shaped and wavy around the edges. The second and subsequent leaves become compound, are alternate, and have three leaflets per leaf (trifoliate). Sweet clover seedlings lack hair on the lower leaflet surfaces and have an acrid, bitter taste.

Yellow Sweet Clover Inflorescence

Teasel

Dipsacus laciniata and *D. sylvestris*

Seed

Seedling

P. laciniata Leaf

Habitat: Edge/Upland

R3 Indicator Status: NI

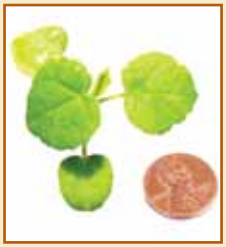
MN C-Value: 0

Flowers: June-August

Distinguishing Characteristics:
Seed leaves (cotyledons) are oval to round in shape and occur on short leaf stalks (petioles). First true leaves are also round to oval in shape, and have rounded or scalloped teeth. The plant forms a basal rosette with leaves ranging from somewhat ovoid in young plants, to large and oblong leaves that are quite hairy in older rosettes. Leaves have a puckered surface, reminiscent of seersucker fabric, and persist overwinter from the first to second year of the plant's lifecycle.

Adult Plant

Seed



Seedling

Heart-shaped Leaf

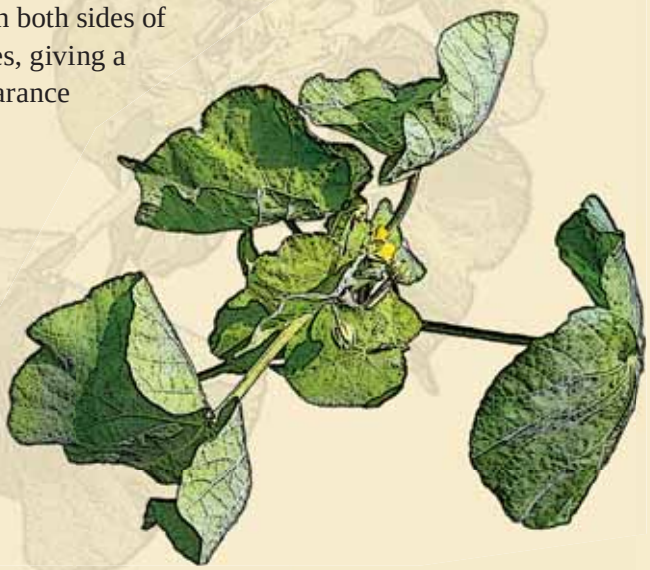
Habitat: Edge/Upland

R3 Indicator Status: FACU

MN C-Value: 0

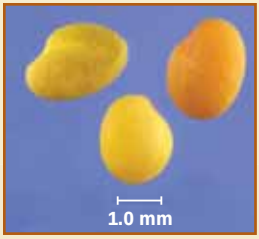
Flowers: June-August

Distinguishing Characteristics: Seed leaves have one rounded and one heart-shaped seed leaf (cotyledons). These seed leaves are about as long as they are wide and have a velvety appearance. The stem below the cotyledons is densely covered with soft hairs. The first true-leaves are alternate, heart-shaped, and have serrated margins. Short hairs are present on both sides of the true leaves, giving a velvety appearance to the leaves.



Adult Plant

Pastinaca sativa



Steve Hurst – USDA-NRCS

Seed

The Ohio State University

Seedling

The Ohio State University

Basal Leaves

Habitat: Upland

R3 Indicator Status: UPL

MN C-Value: 0

Flowers: June-August

Distinguishing Characteristics: Seed leaves (cotyledons) are linear in shape. True leaves are small, ovate, and attached to the stem by long leaf stalks (petioles). A basal floret containing compound true leaves is formed during the first year of growth. Although biennial, this plant is reported to be monocarpic, meaning it has the ability to live until seed is produced if successful reproduction is delayed by mowing or other similar disturbances. This plant is sometimes confused with the native species Alexanders, which has fleshy, waxier feeling leaves.

Adult Plant

Appendix

List of Synonyms for Common and Scientific Names

Having trouble finding a plant you're looking for? Below is a list of some of the more frequently used synonyms for plants known by more than one common and/or scientific name.

Common name (synonym)	***Scientific name*** *(synonym)*
Butterfly milkweed (pleurisy root)	***Asclepias tuberosa***
Common arrowhead (duck potato)	***Sagittaria latifolia***
Flat-topped aster	***Aster umbellatus*** ***(Doellingeria umbellatus)***
Giant manna gras (reed manna grass)	***Glyceria striata*** ***(Glyceria maxima)***
Grass-leaved goldenrod	***Euthamia graminifolia*** ***(Solidago graminifolia)***
Great St. Johnswort	***Hypericum ascyron*** ***(Hypericum pyrimidatum)***
Little bluestem	***Schizachyrium scoparium*** ***(Andropogon scoparius)***
Marsh milkweed (swamp milkweed)	***Asclepias incarnata***
New England aster	***Aster novae-angliae*** ***(Symphyotrichum novae-angliae)***
Partridge pea	***Chamaecrista fasciculat*** ***(Cassia fasciculata)***
Panicled aster	***Aster simplex*** ***(Symphyotrichum lanceolatum)*** ***(Aster lanceolatus)***

Common name (synonym)	*Scientific name (synonym)*
Purple prairie clover	*Dalea purpurea (Petalostemon purpureum)*
Quackgrass	*Elytrigia repens (Agropyron repens)*
Red-stemmed aster (purple-stemmed aster)	*Aster puniceus (Symphyotrichum puniceum)*
Riddell's goldenrod	*Solidago riddelli (Oligoneuron riddellii)*
River bulrush	*Scirpus fluviatilis (Schoenoplectus fluviatilis)*
Sky blue aster	*Aster oolentangiensis (Symphyotrichum oolentangiense) (Aster azureus)*
Smooth blue aster	*Aster laevis (Symphyotrichum laevis)*
Softstem bulrush	*Scirpus validus (Schoenoplectus tabernaemontani)*
Spotted Joe-pye weed	*Eupatorium maculatum (Eupatoriadelphus maculatus)*
Stiff goldenrod	*Solidago rigida (Oligoneuron rigidum)*
Yellow coneflower (gray-headed coneflower)	*Ratibida pinnata*

Glossary of Technical Terms

We have made an effort to avoid using technical botanical terms in this guide. Despite our good intentions, some botanical terms were included.

Acute – Sharp-pointed.

Annual – A plant that completes its life cycle in one year or less.

Aromatic – With fragrant smell; sometimes only if broken or crushed.

Axil – The area or angle formed between the base of an organ and the structure from which it originated, such as between the leaf base and the stem.

Basal – Pertaining to the base of the plant or some organ of the plant.

Biennial – A plant that requires two years to complete a life cycle; the first year typically forming a basal rosette, the second year forming an inflorescence.

Bipinnate – Twice pinnately compound.

Bract – A reduced leaf or scale, typically below a flower stalk or group of flowers. It also can refer to small leaves on a stem.

Bristly – With stiff hairs.

Clasping – Tending to encircle or invest, as in the base of a leaf that forms partly around the stem to which it is attached.

Coarse – Rough.

Compound – Leaves that are divided into distinct leaflets.

Cordate – Heart-shaped.

Cotyledon – A seed leaf; the first leaf (or leaves) to appear during the development of a seedling.

Cultivar – A cultivated variety of a particular species of plant, usually selected or manipulated for specific traits.

Elliptic – A circular shape widest about the middle.

Entire – Leaf margins without teeth; even though the margin may have hairs.

Fruit – Structure that bears the seeds.

Glabrous – Smooth, in the sense of not possessing hairs.

Glaucous – Covered by a white or pale, often waxy, bloom.

Hirsute – With stiff, usually straight, hairs.

Inflorescence – The flowering part of a plant or arrangement of flowers on a stalk.

Lanceolate – Lance-shaped, broadest below the middle, long-tapering above the middle, several times longer than wide.

Leaflet – One of the discriminate segments of the compound leaf of a dicotyledonous plant. Leaflets may resemble leaves, but differ principally in that buds are not found in the axils of leaflets, and that leaflets all lie in the same plane.

Ligule – For plants in the grass family this is an extension, often membranous, of the summit of the leaf sheath.

Linear – Very long and narrow, with nearly or quite parallel margins.

Lobe – Any segment or division, particularly if blunt.

Midnerve, Midrib, Midvein – The central or principal vein of a leaf, bract, sepal or petal.

Nerve – Same as a vein.

Node – The point along a stem which gives rise to leaves, branches, or inflorescences.

Oblong – Several times longer than wide with nearly, or parallel sides.

Oval – Broadly elliptical.

Ovate – Egg-shaped.

Palmate – Radiately lobed or divided, with individual segments originating at a common point or nearly so.

Parallel-veined – A feature where veins are parallel to each other and the midrib, or nearly so.

Pedicel – The stalk of a single flower in a cluster.

Pendulous – Drooping.

Perennial – A plant that lives for more than two years.

Perfoliate – Condition where the stem appears to pass through the leaf.

Petiole – A leafstalk.

Pinnate – Leaf structure that is compound or deeply divided, the principal divisions arranged along each side of a common axis.

Pubescent – Hairy.

Pungent – Very sharp; acrid taste or smell.

Recurved – Directed backward or downward.

Reflexed – Abruptly turned or bent downward.

Rhizomatous – Bearing rhizomes.

Rhizome – An underground stem, typically horizontal.

Serrate – With sharp, typically forward-pointing teeth.

Sessile – Without a stalk.

Stipule – An appendage or bract situated at either side of a leaf axil.

Tomentose – Dense, matted hairs.

Translucent – Between opaque and transparent; allows some light to pass through.

Vegetative – Plants or plant parts not involved in flowering or seed/fruit production.

Vein – A wire-like bundle of tissue in a leaf or other plant part. Same as nerve.

Weed – A plant growing in an undesired location. Relevant to prairie restorations, this typically refers to nonnative, invasive species that can potentially crowd out native plants/seedlings.

Plant Species Index

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The process of restoring wetlands is becoming increasingly important for restoring water quality, reducing flooding, improving wildlife habitat and to meet regulatory requirements. Understanding how the vegetation is establishing within restored wetlands and adjacent upland buffers is vitally important during the early phases of a restoration effort.

The ***Wetland & Buffer Plant Seedlings Guide*** is intended to be an easy to use resource for wetland professionals and native plant enthusiasts alike. It includes images and descriptions for over 50 native wetland and buffer plants of Minnesota, including pictures of seed and seedlings. It also includes information for over two dozen common weeds.

We hope you find this guide useful during your natural resource endeavors and that the pages of your copy become well-worn.