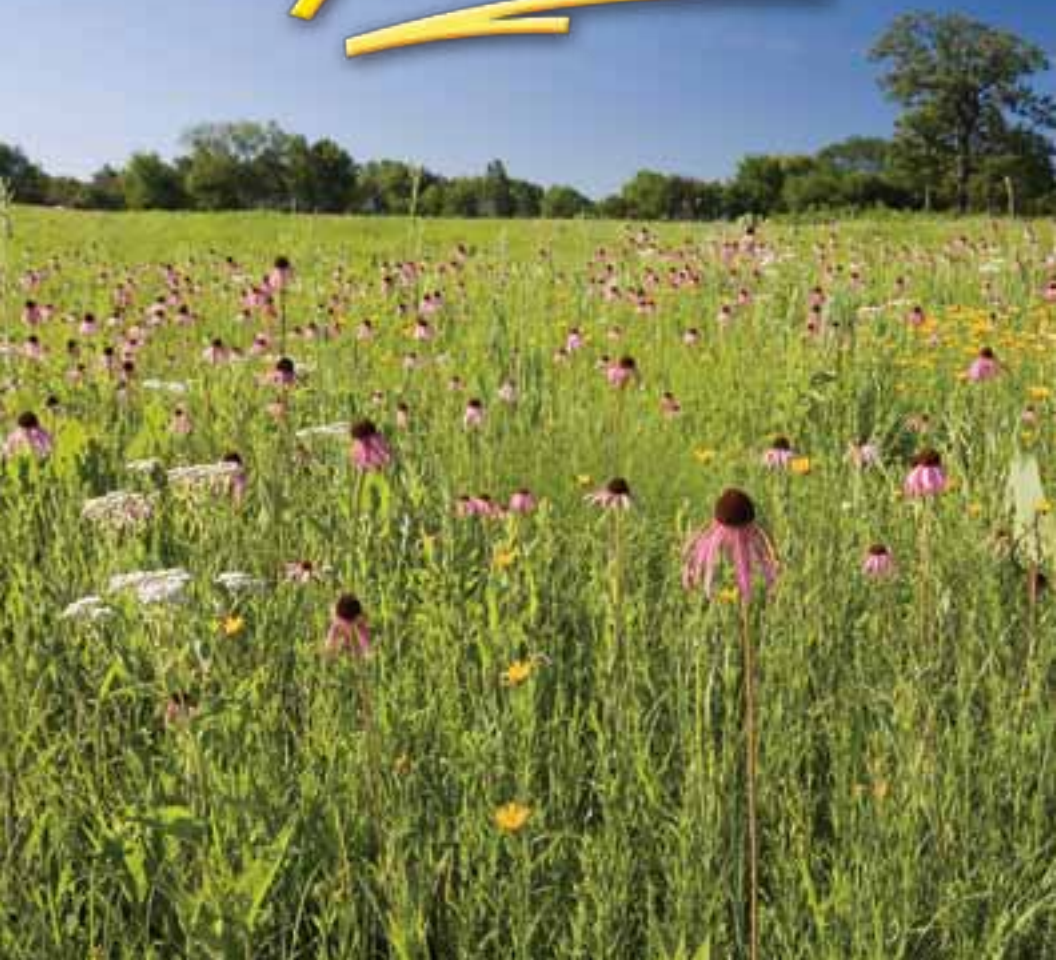


PRAIRIE SEEDLING  
*And*  
Seeding Evaluation

*Guide*



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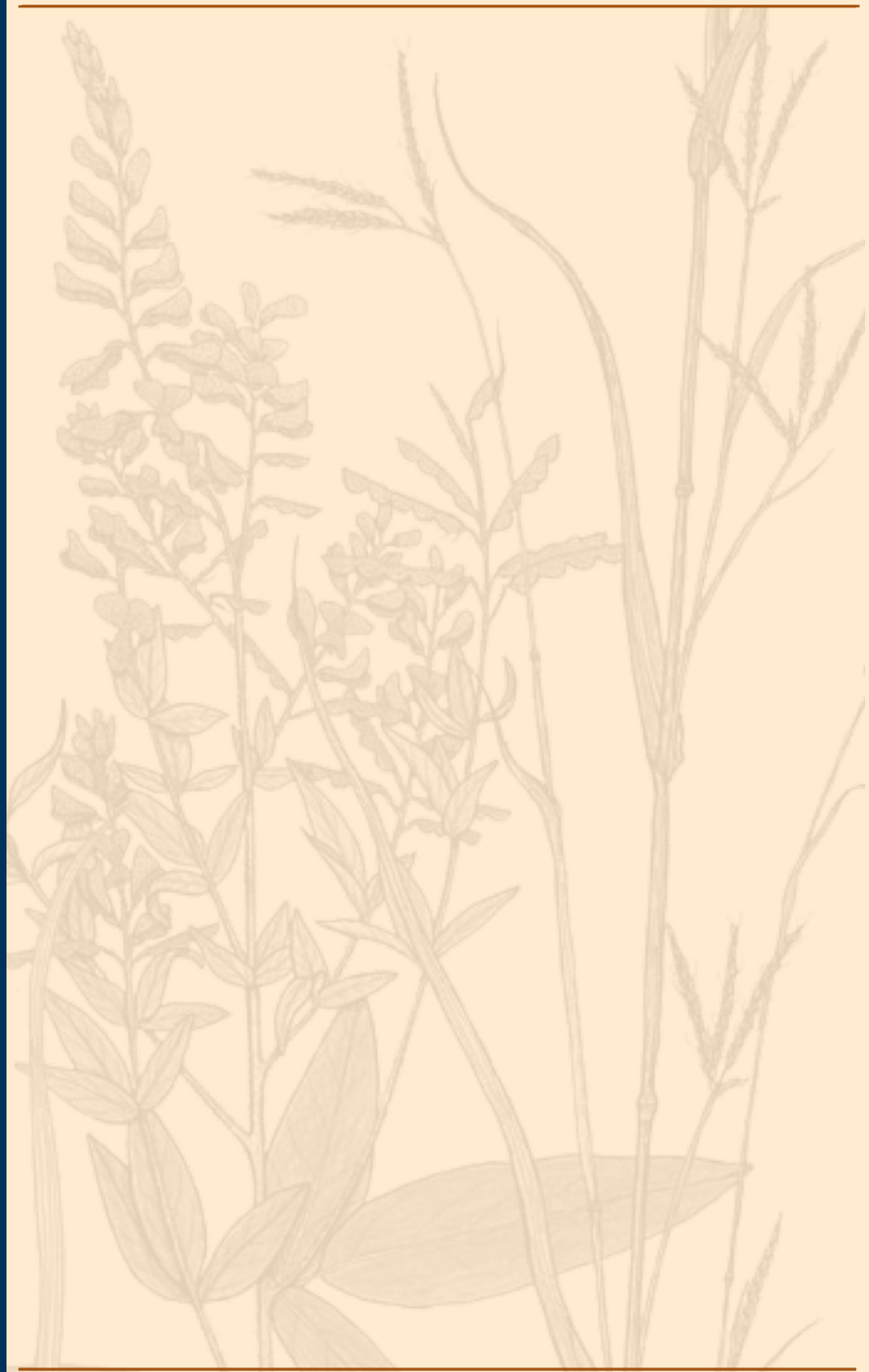
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# Prairie Seedling Guide







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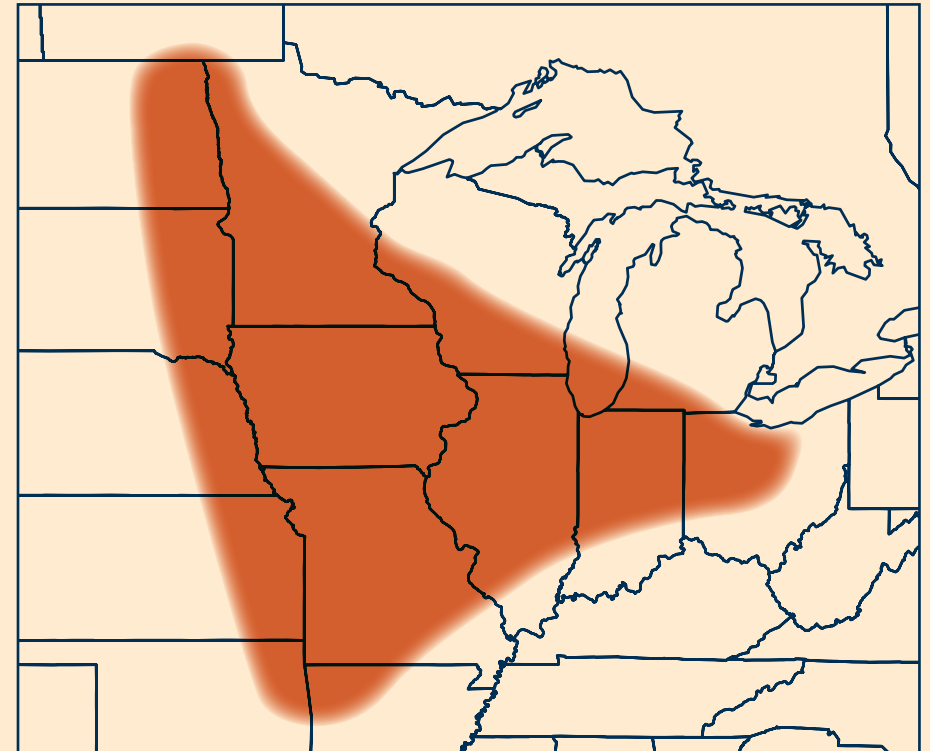
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## Introduction

Prairie seedlings began in the Upper Midwest in the 1930s. Since the 1970s, the number and acres of prairie plantings has greatly increased through their use in conservation and habitat plantings, roadside revegetation, outdoor classrooms, conservation development, alternative stormwater treatment, and other purposes.

Properly identifying prairie seedlings during the first year or two after seeding is an important part of determining whether a prairie planting has been successful. Although identification of prairie seedlings does take some practice, it is an easily attainable goal.



*The orange area shows where the prairie plants and weeds discussed in this guide are commonly found in the Upper Midwest region of North America.*

---

This Prairie Seedling & Seeding Evaluation Guide is designed to be a resource to help you reach that goal. The guide features color photos and field descriptions for seedlings of native grasses and forbs, and common agricultural weeds, as well as their seeds. We've also included a section that recommends a method for assessing a prairie seeding during the first few years after planting.

Our goal was to create an easy to read and understand guide that can be carried in the field in a pocket or vehicle glove compartment. We hope you find this to be a useful resource in your endeavors.

---

# Prairie Seedlings

## *Species Descriptions*

### Grasses



# Big Bluestem

*Andropogon gerardii*

## Habitat:

Wet-mesic to dry prairie

## Flowers:

July - August



Science Museum of Minnesota



Iowa DNR

Seed

Seedling

## 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

# Canada Wildrye

*Elymus canadensis*

## Habitat:

Wet-mesic to dry-mesic prairie

## Flowers:

June - July



Illinois Natural History Society



Iowa DNR

Seed

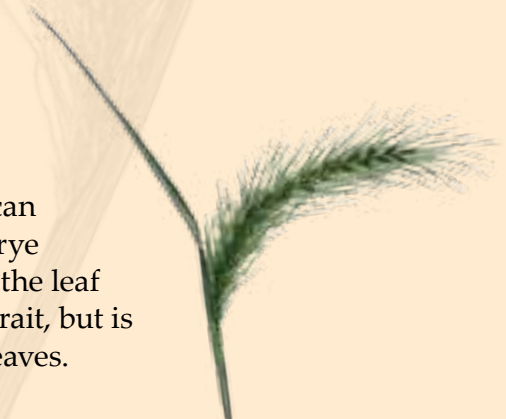
Seedling

## 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.



Inflorescence

# Indian Grass

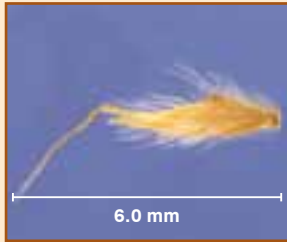
*Sorghastrum nutans*

## Habitat:

Wet-mesic to dry-mesic prairie

## Flowers:

July - August



Seed



Seedling

## 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 2-5 mm wide (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

# June Grass

*Koeleria macrantha*

## Habitat:

Dry-mesic to dry prairie

## Flowers:

June - July



Seed



Seedling

## Seedling description:

Thin, dark green leaves are very finely hairy on the leaf margin and stem base. The fine hairs are most easily seen with hand lens magnification. Leaves are 1-3 mm wide, twisting on axis from bottom to top. Leaf bases have a thin ligule with an irregular margin.

## Look alikes:

The short stature and narrow leaves of June grass make it easy to differentiate from other native grasses. Members of the *Elymus* and *Bromus* genus also exhibit twisting of the leaf blade on axis from bottom to top, but have wider leaves and are larger in stature. The very fine leaves may also be confused with weedy species of brome, such as downy chess grass (*Bromus tectorum*), which has leaves 2-4 mm wide.



Inflorescence

# Little Bluestem

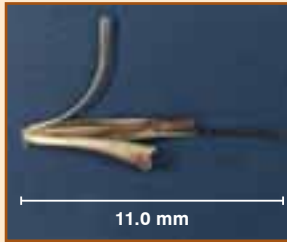
*Schizachyrium scoparium*

## Habitat:

Mesic to dry prairie

## Flowers:

July - September



Seed



Seedling

## 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 (<1 mm) 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, compared to a height measured in inches for little bluestem over a similar time period.



Inflorescence

# Porcupine Grass

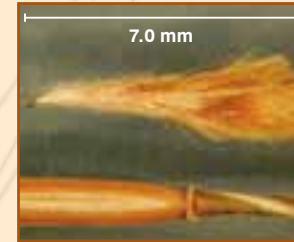
*Stipa spartea*

## Habitat:

Mesic to dry prairie

## Flowers:

June - July



Seed



Seedling

## Seedling description:

Leaves are 1-3 mm wide in younger plants; 3-5 mm as the plant matures. Seedling leaves sometimes twist from bottom to top. Leaf margins are detectably rough when rubbed from tip to base, even in small plants. Leaves are long and gradually taper to a narrow tip. Leaves become rigid and more arching as plant develops. Short hairs may be present at the ligule, which is a thin membrane.

## Look alikes:

Porcupine grass is perhaps most similar in appearance to prairie dropseed. However, prairie dropseed has narrower leaves, develops more slowly, and its leaves are concentrated near the base of the stem.



Inflorescence



# Prairie Cordgrass

*Spartina pectinata*

## Habitat:

Wet-mesic to mesic prairie

## Flowers:

July - August



Seed



Seedling

## 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 more than 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

# Prairie Dropseed

*Sporobolus heterolepis*

## Habitat:

Wet-mesic to dry prairie

## Flowers:

July - August



Seed



Seedling

## 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. As the plant matures, the 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

# Sideoats Grama

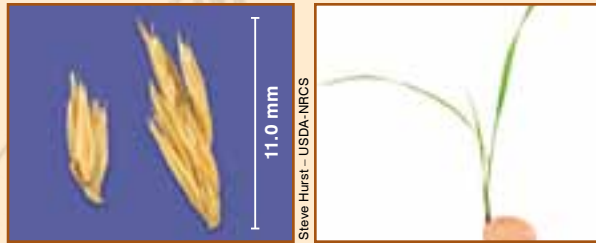
*Bouteloua curtipendula*

## Habitat:

Dry to mesic prairie

## Flowers:

June - July



Seed

Seedling

## 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 0.5 mm), 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

# Switchgrass

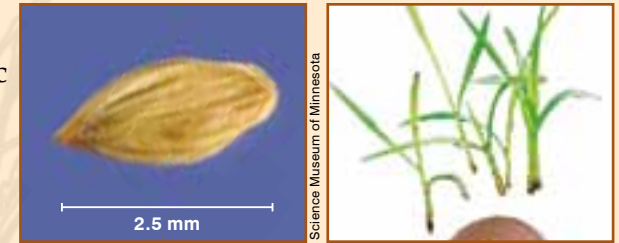
*Panicum virgatum*

## Habitat:

Wet-mesic to dry-mesic prairie, on a wide variety of soil types

## Flowers:

July - August



Seed

Seedling

## 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 switchgrass contrasts with the flattened stem of little bluestem.



Inflorescence

# Tall Dropseed

*Sporobolus asper*

## Habitat:

Dry to mesic prairie

## Flowers:

July - August



Seed

Seedling

## Seedling description:

Leaves are held stiffly upright from the stem and are 1-2 mm wide in young plants. Leaf margins are finely serrated, making them feel rough to the touch when rubbed from tip to base. Hairs are present at the leaf base and where the ball of the leaf wraps around the stem. The ligule is a fine, thin, membrane.

## Look alike:

Tall dropseed may be confused with prairie dropseed and porcupine grass. Prairie dropseed has leaf margins that are rolled upward and inward. Porcupine grass develops leaves that are wider (3-5 mm at maturity) and longer than those of tall dropseed.



Inflorescence

# Virginia Wildrye

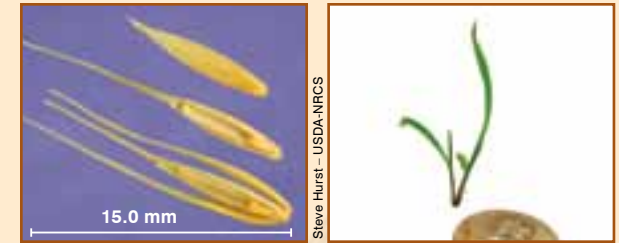
*Elymus virginicus*

## Habitat:

Mesic to wet prairie

## Flowers:

June - July



Seed

Seedling

## 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.

## Look alike:

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

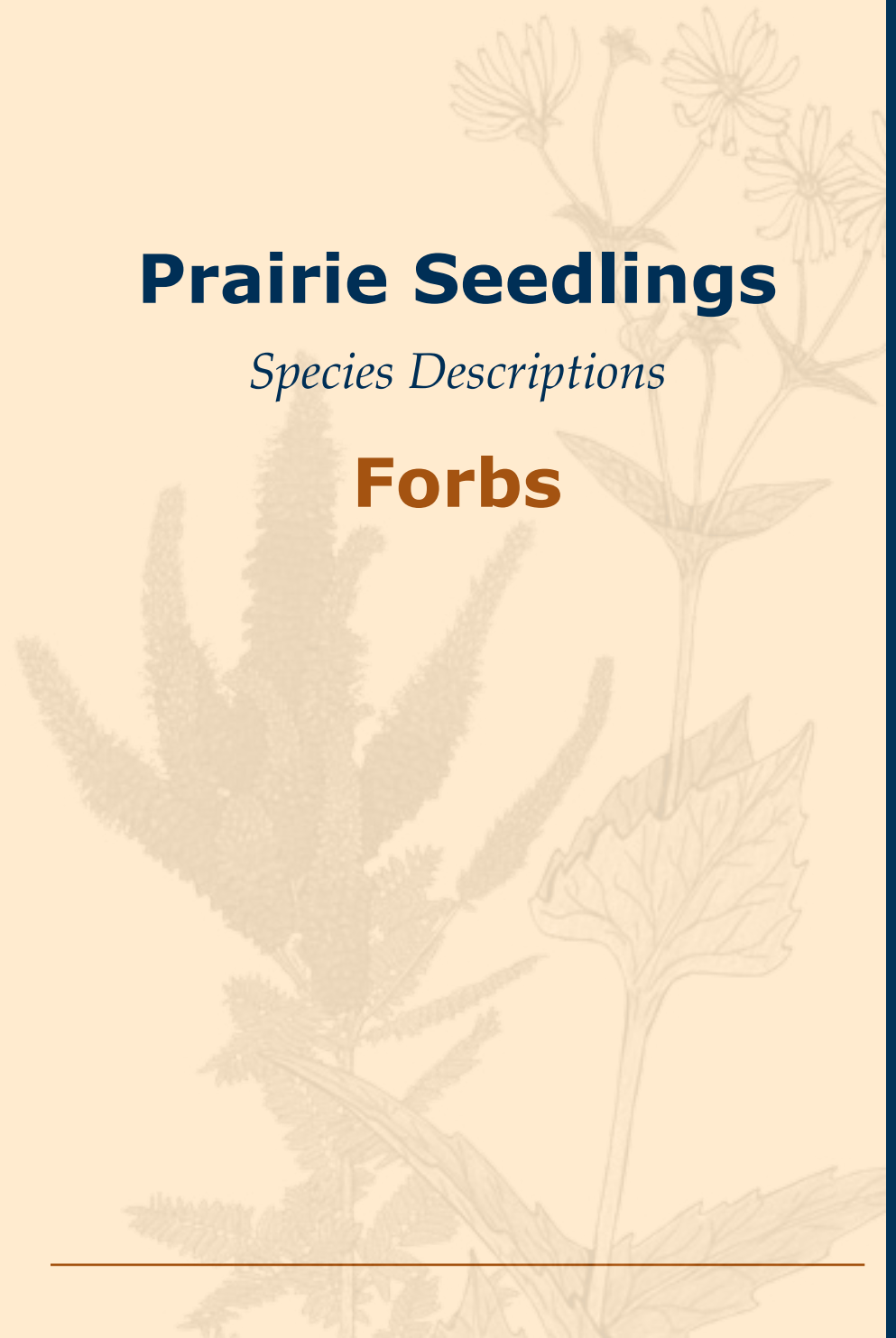


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# Prairie Seedlings

*Species Descriptions*

## Forbs



# Alumroot

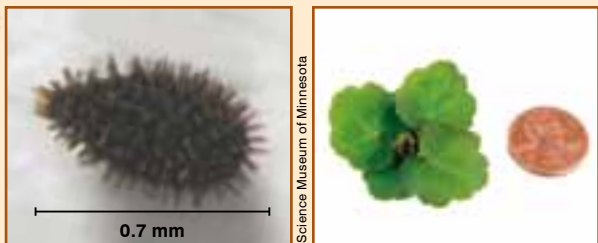
*Heuchera richardsonii*

## Habitat:

Mesic to dry prairie

## Flowers:

May - June



Seed

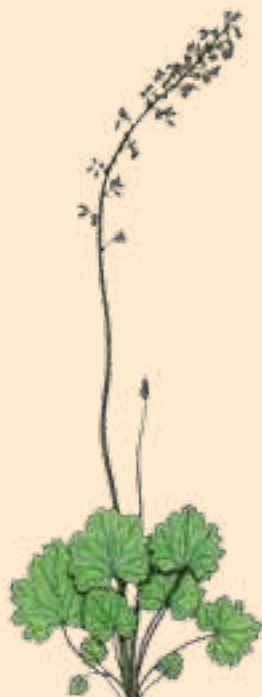
Seedling

## Seedling description:

Plants develop very slowly, sometimes taking 2-5 or more years to develop into robust adult plants in the wild. Seedlings form basal rosettes of small (~1-2 cm) leaves that are shallowly lobed. The tips of these lobes are rounded to sharply pointed, with fine hairs on the leaf margins. Five prominent veins radiate from a central point at the base of each leaf.

## Look alikes:

Tall cinquefoil, golden alexanders, and ragwort species might be confused with alumroot when small. However, cinquefoil and golden alexanders have long leaf stems. All three lack lobes and have one central vein per leaf. Another identifying characteristic is alumroot has a hairy appearance while golden alexander appearance is smooth.



Adult Plant

# Aster, Heath

*Aster ericoides*

## Habitat:

Mesic to dry prairie

## Flowers:

July - September



Seed

Seedling

## Seedling description:

The first few leaves form a basal rosette, are long, linear to oblong, and lack teeth on the margins. The central vein on each leaf is impressed. A hand lens reveals that leaves have fine hairs on both the upper and lower surfaces, with longer, stiffer hairs found on the leaf margins. Most leaves of young plants are about three times as long as they are wide. As the plant develops through the growing season, it tends to lose its lower leaves.

## Look alikes:

Numerous prairie species, particularly asters, form basal rosettes when young. Most other asters have leaf stems, and spoon- or spatula-shaped leaf blades. Heath aster is perhaps most easily confused when young with New England aster. The latter develops a clasping leaf as it matures from the seedling stage to subadult. Heath aster develops more consistently linear leaves as it matures.



Inflorescence

# Aster, New England

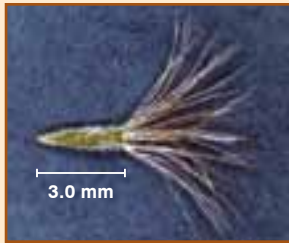
*Aster novae-angliae*

## Habitat:

Wet-mesic to mesic prairie

## Flowers:

September - November



Seed



Seedling

Science Museum of Minnesota

Iowa DNR

## 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 rarely included in prairie plantings. It develops pointed leaves that often have shallow, distantly spaced teeth.



Adult Plant

# Aster, Sky Blue

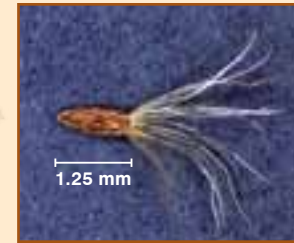
*Aster oolentangiensis*

## Habitat:

Mesic to dry prairie

## Flowers:

July - September



Seed



Seedling

Science Museum of Minnesota

## 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



# Aster, Smooth Blue

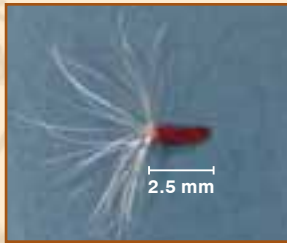
*Aster laevis*

## Habitat:

Mesic to dry prairie

## Flowers:

July - October



Seed



Seedling

## 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

# Black-eyed Susan

*Rudbeckia hirta*

## Habitat:

Mesic to dry prairie

## Flowers:

June - July



Seed



Seedling

## 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

# Blazingstar

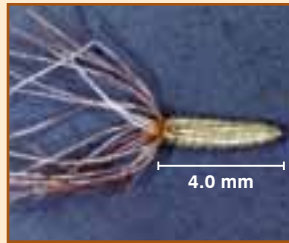
*Liatris spp.*

## Habitat:

Wet-mesic to dry prairie

## Flowers:

June - August



Seed



Seedling

## Seedling description:

Seed leaves and the first true leaf have the appearance of a sword and hilt. 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 Rough Blazingstar

# Blueflag Iris

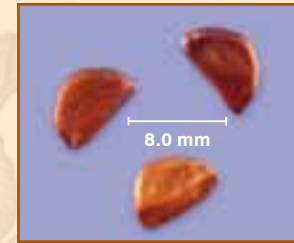
*Iris spp.*

## Habitat:

Wet meadow to wet-mesic prairie

## Flowers:

May - June



Seed



Seedling

## 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.

## 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



# Butterfly Milkweed

*Asclepias tuberosa*

## Habitat:

Mesic to dry prairie

## Flowering:

June - August



Seed



Seedling

Science Museum of Minnesota

Iowa DNR

## 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

# Canada Milkvetch

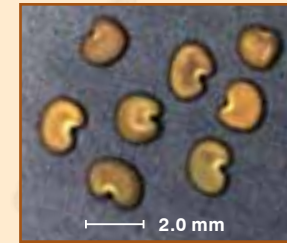
*Astragalus canadensis*

## Habitat:

Mesic to dry-mesic prairie

## Flowers:

June - July



Seed



Seedling

Science Museum of Minnesota

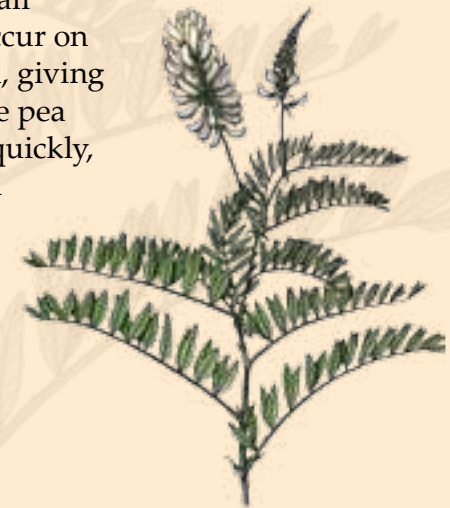
Iowa DNR

## 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

# Common Evening Primrose

*Oenothera biennis*

## Habitat:

Mesic to dry prairie

## Flowers:

June - August



Seed



Seedling

## Seedling description:

Young plants form a basal rosette of ovate to lanceolate leaves. Leaf stems may be short, tapering from the leaf blade, or lack a leaf stem altogether. Leaf margins vary from slightly wavy to smooth. Plants may vary from smooth to grayish fuzzy.

## Look alikes:

Of plants that form basal rosettes, great blue lobelia is perhaps most similar. It has fleshier, shorter leaves that lack a grayish appearance. Great blue lobelia leaves typically have teeth on leaf margins that are more readily evident than those of evening primrose.



Adult Plant

# Compass Plant

*Silphium laciniatum*

## Habitat:

Mesic to dry prairie

## Flowers:

June - August



Seed



Seedling

## Seedling description:

Seed leaves are large and persist until two or three true leaves develop. The first true leaves are narrowly elliptic, not toothed, and rigid with a coarse, sandpapery feel. Leaves gently taper to a coarsely hairy leaf stem that is often under 2 cm long on early leaves. Later stems are about as long as the leaf blade. As the plant matures over several years, new leaves become strongly toothed at first, then eventually deeply lobed and up to one half meter (~1.5 feet) wide.

## Look alikes:

Rigid goldenrod basal leaves can be confused with those of young compass plant. Compass plant leaves are consistently rigid, and more sandpapery feeling than stiff goldenrod leaves, which can vary from fuzzy to stiff and coarsely hairy.



Adult Plant



# Cream-colored False Indigo

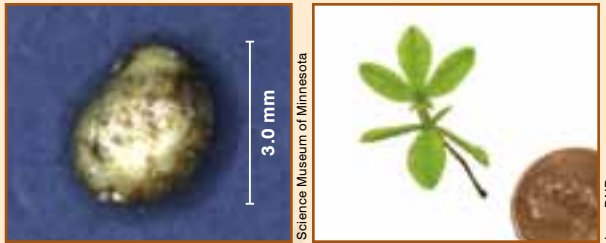
*Baptisia bracteata*

## Habitat:

Mesic to dry-mesic prairie

## Flowers:

June - July



Seed

Seedling

## Seedling description:

Seedling leaves are fleshy and persist on the stem well after the first true leaves develop. True leaves are similar to those of a mature plant: three-parted, elliptic, smooth, and thinly fleshy with a prominent mid-vein. The leaflets have a small indentation at the end, and a net-like pattern visible in the leaves when backlit. After dying back in the fall, leaves turn a medium-dark, flat brown color, making plants more visible.

## Look alike:

White wild indigo is somewhat similar in appearance as a seedling, although it has thicker, fleshier leaves that are wider and shorter than those of cream-colored false indigo. In the fall, white wild indigo turns a charcoal color compared to grayish-chocolate for cream-colored false indigo.



Adult Plant

# Culver's Root

*Veronicastrum virginicum*

## Habitat:

Wet-mesic to mesic prairie

## Flowers:

June - July



Seed

Seedling

## 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 alike:

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

# Cup Plant

*Silphium perfoliatum*

## Habitat:

Wet-mesic to mesic prairie

## Flowers:

June - August



Seed

Seedling

## 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

# Golden Alexanders

*Zizia aurea*

## Habitat:

Wet-mesic to mesic prairie

## Flowers:

May - June



Seed

Seedling

## 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



# Great Blue Lobelia

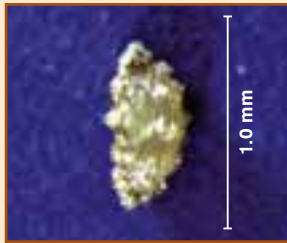
*Lobelia siphilitica*

## Habitat:

Wet-mesic to mesic prairie

## Flowers:

June - August



Seed



Seedling

## Seedling description:

Seedlings 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 alike:

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.



Adult Plant

# Hoary Vervain

*Verbena stricta*

## Habitat:

Mesic to dry prairie

## Flowers:

June - July



Seed



Seedling

## 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 alike:

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

# Leadplant

*Amorpha canescens*

## Habitat:

Mesic to dry prairie

## Flowers:

July - August



Seed



Seedling

Steve Hurst - USDA-NRCS

Agricel Corporation

## Seedling description:

Seedling leaves/leaflets are smooth and rounded. The first true leaf has 3 rounded leaflets with a thin, wispy stem. Subsequent leaves have increased numbers of leaflets, eventually reaching 13-20 paired leaflets. Leadplant seedlings do not develop woody stem or characteristic dusty appearance to foliage for several months under the best of growing conditions, and may take several years to do so under heavy competition or shade.

## Look alikes:

Canada milkvetch seedlings quickly develop a stem that is fleshier and thicker than leadplant, with more leaflet pairs (15-35) per leaf as the plant gets larger. Canada milkvetch also has narrower, more pointed leaflets and stipules at the base of each leaf stem. 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 than leadplant, and is somewhat reactive to touch with leaves partially folding up.



Adult Plant

# Marsh Milkweed

*Asclepias incarnata*

## Habitat:

Wet meadow to wet-mesic prairie

## Flowers:

July - September



Seed



Seedling

Science Museum of Minnesota

Iowa DNR

## 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



# Oxeye False Sunflower

*Heliopsis helianthoides*

## Habitat:

Mesic to dry-mesic prairie

## Flowers:

June - August



Seed



Seedling

## 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 sharp-, but shallowly toothed.



Adult Plant

# Pale Purple Coneflower

*Echinacea pallida*

## Habitat:

Mesic to dry prairie

## Flowers:

June - July



Seed



Seedling

## Seedling description:

Pale purple coneflower has robust round to oblong seed leaves. True leaves are long and rigid with stiff hairs that are particularly evident at the leaf margins. The leaf blade gradually tapers to a long, narrow leaf stem. The leaf has 3 prominent veins. As additional true leaves develop, they form a basal rosette and express variations in width among individual leaves. Leaf tips vary from slightly rounded to sharply pointed.

## Look alikes:

Black-eyed susan seedlings appear similar in many respects. However they have a widened leaf base compared to the thin stem of pale purple coneflower leaves that gradually taper from the blade. Black-eyed susan leaves have softer, more abundant hairs and less rigid leaves. Compass plant seedlings have one prominent central vein while pale purple coneflower often has three conspicuous veins.



Adult Plant

# Partridge Pea

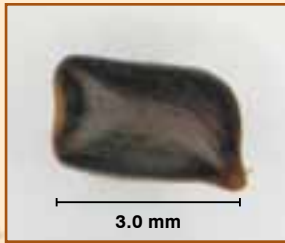
*Chamaecrista fasciculata*

## Habitat:

Mesic to dry-mesic prairie

## Flowers:

June - July



Seed



Seedling

Science Museum of Minnesota

Iowa DNR

## 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) at the base of 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. herbearpa*, as well as Illinois bundleflower *Desmanthus illinoensis* 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

# Prairie Cinquefoil

*Potentilla arguta*

## Habitat:

Mesic to dry prairie

## Flowers:

June - July



Seed



Seedling

Science Museum of Minnesota

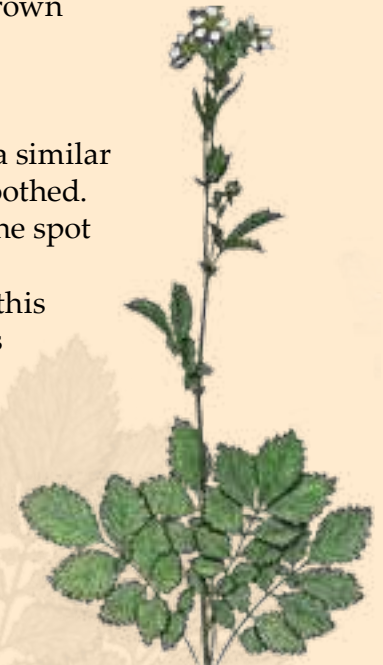
Iowa DNR

## Seedling description:

Leaves of seedlings form a basal rosette. Initially, leaves have 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 has 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



# Prairie Coreopsis

*Coreopsis palmata*

## Habitat:

Mesic to dry prairie

## Flowers:

June - July



Seed



Seedling

## Seedling description:

Seedlings develop long, narrow leaves that lack a leaf stem. Leaves are arranged opposite one another on a thin, wispy stem. Leaf pairs are typically widely separated on the stem. Leaves are mostly smooth, with fine hairs on leaf margins and stem nodes. Plants do not develop the signature narrow, deeply 3-lobed leaves until the third or fourth set of true leaves. First year plants tend to have weak lower stems and either lean on other plants or lean severely.

## Look alikes:

Prairie coreopsis seedlings can be confused with a number of planted prairie species, as well as plants that volunteer into a prairie planting. Prairie phlox is similar, but typically has thicker, more leathery leaves that are deep green. Some species of milkweeds also have similar leaves, but feature oblong-shaped seed leaves and develop a milky-looking sap.



Adult Plant

# Prairie Phlox

*Phlox pilosa*

## Habitat:

Mesic to dry-mesic prairie

## Flowers:

June - August



Seed



Seedling

## Seedling description:

Seed leaves are bluntly heart-shaped with the bottom of the hearts pointed toward the main stem. Leaves are opposite on the stem, mostly elliptic in shape, and meet at a somewhat swollen node along a typically dark stem. As seedlings, plants have fine hairs that are especially evident on the leaf margins through a hand lens. Leaves appear crowded on young plants. As the plant matures, leaves develop a sharp point and have their widest point in the lower fourth of the leaf.

## Look alikes:

Virginia mountain is easily distinguished by its minty smell, which can be easily detected by lightly rubbing the leaves between your fingers. Butterfly milkweed has longer seed leaf stems and longer hairs on the stem and leaves than prairie phlox. Prairie coreopsis has very thin, linear leaves and no hairs.



Adult Plant



# Purple Coneflower

*Echinacea purpurea*

## Habitat:

Mesic to dry-mesic prairie

## Flowers:

June - August



Seed



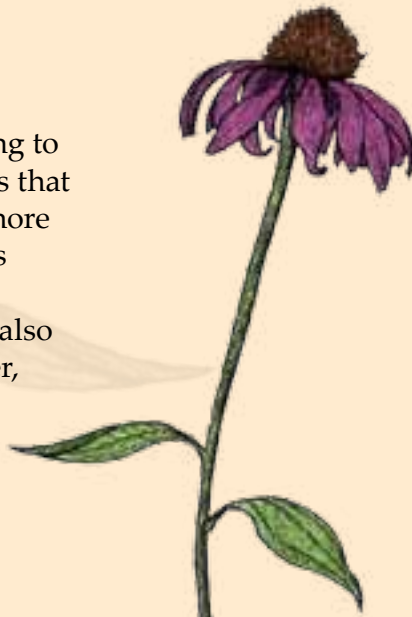
Seedling

## Seedling description:

Seed leaves are robust, fleshy, and spatula-shaped. True leaves have increasingly long stems that are variously winged as the plant matures. The leaf is often rolled upward at the base of the leaf blade. Leaves may be coarsely hairy, or less commonly smooth. Leaf margins are typically coarsely toothed, but sometimes not. The leaf shape can vary from broad with a semi-rounded leaf tip, to less commonly a somewhat narrow leaf with a pointed tip.

## Look alikes:

Perhaps the easiest prairie seedling to confuse with purple coneflower is that of cup plant, which has thicker, more rigid leaves and a leaf stem that is wider and winged to the base in seedlings. Black-eyed susan may also be mistaken for purple coneflower, however it does not have teeth on the leaf margins and its leaves are typically less rigid and more softly hairy than those of purple coneflower.



Inflorescence

# Purple Prairie Clover

*Dalea purpurea*

## Habitat:

Mesic to dry prairie

## Flowers:

June - August



Seed



Seedling

## 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

# Rattlesnake Master

*Eryngium yuccifolium*

## Habitat:

Mesic to dry-mesic prairie

## Flowers:

June - August



Seed



Seedling

## Seedling description:

Seed leaves are strap-like. True leaves of seedlings are rolled at the base when they emerge. Telltale thickened hairs protrude from the leaf margin that typically point straight out or gradually toward the leaf tip, and are usually widely spaced. As plants mature, the basal leaves become more strongly ridged, making them feel a bit like reinforced cellophane packing tape.

Subadult and mature plants develop a waxy bloom on the leaves, giving them a silvery-white shade.

## Look alike:

Because of the distinctive hairs found on the leaf margin, other species of commonly planted prairie species are not easily confused with rattlesnake master.



Adult Plant

# Roundheaded Bushclover

*Lespedeza capitata*

## Habitat:

Mesic to dry prairie

## Flowers:

June - August



Seed



Seedling

## 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 alike:

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



# Showy Goldenrod

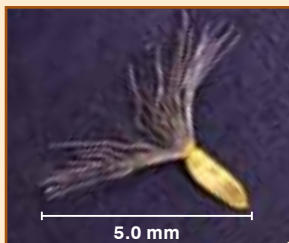
*Solidago Speciosa*

## Habitat:

Mesic to dry-mesic prairie

## Flowers:

June - August



Seed



Seedling

## Seedling description:

Round seed leaves give rise to elliptical leaves without teeth, but have hairy leaf margins. These form a basal rosette. New leaves emerge rolled lengthwise in small plants with later leaves having inrolled edges as they emerge. Larger leaves are somewhat diamond-shaped to elliptic, tapering gradually at the base to a leaf stalk as long as the leaf blade. Seedlings have prominent hairs on leaf margins. Juvenile and adult plant leaves are finely hairy, but appear nearly smooth to the naked eye. Leaves often have wavy margins, and rounded teeth that are somewhat widely spaced.

## Look alikes:

Seedlings of stiff goldenrod can be confused with those of showy goldenrod, particularly because of the variability among the two varieties of stiff goldenrod in the upper Midwest. Showy goldenrod has a wider leaf base with coarse teeth along the outer half of the leaf blade. Stiff goldenrod develops a thin leaf stem with either smooth leaf margins or, more commonly shallow, rounded teeth.



Adult Plant

# Showy Tick Trefoil

*Desmodium canadense*

## Habitat:

Mesic to dry-mesic prairie

## Flowers:

June - August



Seed



Seedling

## 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:

The single leaflets of young showy tick trefoil plants are distinctive. Other species of the *Desmodium* 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.



Inflorescence



# Spiderwort

*Tradescantia* spp.

## Habitat:

Mesic to dry prairie

## Flowers:

June - July



Seed



Seedling

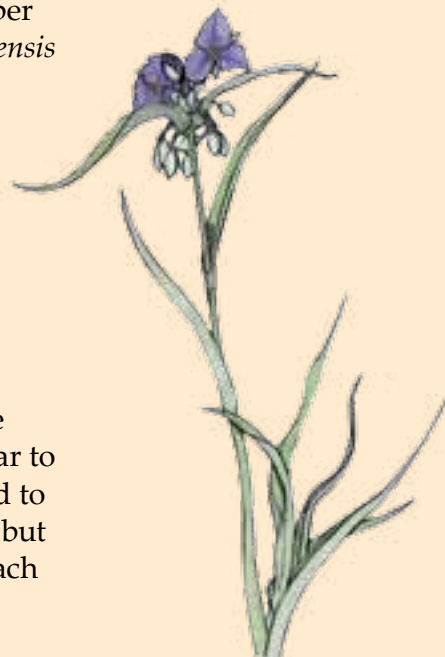
## Seedling description:

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 the upper Midwest, Ohio spiderwort *T. ohioensis* 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. ohioensis* shown



Adult Plant

# Stiff Goldenrod

*Solidago rigida*

## Habitat:

Mesic to dry prairie

## Flowers:

June - August



Seed



Seedling

## 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

# Tall Meadow Rue

*Thalictrum dasycarpum*

## Habitat:

Wet-mesic to mesic prairie

## Flowers:

May - June



Seed

Seedling

## 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 they are deeper, and more sharply pointed in prairie larkspur.



Adult Plant

# Tuberous Indian Plantain

*Cacalia plantaginea*

## Habitat:

Wet-mesic to dry-mesic prairie

## Flowers:

July - August



Seed

Seedling

## Seedling description:

Seed leaves have a spoon shape. True leaves have long stems, and are smooth and fleshy. The leaf blade is football-shaped, about 3 times as long as it is wide, and has 3-5 prominent nerves that part from the leaf base and reconverge as they approach the leaf tip.

## Look alikes:

Small tuberous Indian plantain plants are perhaps most easily confused with the nonnative common plantain *Plantago major* and the native American plantain *P. rugelli*, both typically found in weedy settings. The leaf stems of Indian plantain are longer and leaf blades narrower than the *Plantago* species. Indian plantain is more thickly fleshy. Common and American plantain may also have shallow teeth on the sometimes wavy leaf margins, whereas Indian plantain has no teeth.



Adult Plant



# Virginia Mountain Mint

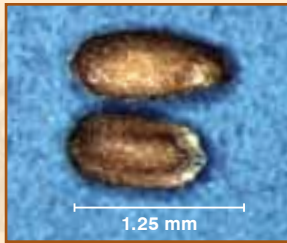
*Pycnanthemum virginianum*

## Habitat:

Wet-mesic to dry-mesic prairie

## Flowers:

June - August



Seed



Seedling

## 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 more difficult 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

# White Prairie Clover

*Dalea candida*

## Habitat:

Mesic to dry prairie

## Flowers:

June - August



Seed



Seedling

## 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



# White Wild Indigo

*Baptisia lactea*

## Habitat:

Wet-mesic to dry-mesic prairie

## Flowers:

June - July



Seed



Seedling

## Seedling description:

Seed leaves for white wild indigo are fleshy and persist on the stem after the first true leaves develop. Similar to those of a mature plant, leaves are smooth, fleshy and have a prominent mid-vein on the underside of the leaf. The leaflets often have a small indentation at the end and a net-like vein pattern visible in the leaves when held up to light. After dying back in the fall, leaves turn a dark and then light charcoal color, making plants more visible.

## Look alikes:

As a seedling, cream-colored false indigo is somewhat similar in appearance to white wild indigo, although it has thinner leaves that are narrower and longer than those of white wild indigo. In the fall, cream-colored false indigo turns a grayish-brown color compared to a charcoal color of white wild indigo.



Adult Plant

# Wild Bergamot

*Monarda fistulosa*

## Habitat:

Mesic to dry-mesic prairie

## Flowers:

June - July



Seed



Seedling

## 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

# Wild Quinine

*Parthenium integrifolium*

## Habitat:

Wet-mesic to dry prairie

## Flowers:

June - August



Seed

Seedling

## Seedling description:

Coarse and rigid leaves initially form a basal rosette. Leaf stems are narrow with stiff hairs and are usually longer than the leaf blade itself. Leaf margins may be coarsely toothed or smooth, with teeth pointing to the tip of the leaf and seldom occurring in the lower third of the leaf blade. The leaf has a prominent central vein, usually pale in color. The leaf base tapers to a slightly winged stem.

## Look alikes:

Purple coneflower and cup plant seedlings have a similar appearance and stiff, coarse leaves. Purple coneflower has thinner leaves that are not toothed in smaller plants. Cup plant leaves are more round-shaped or triangular, with a more conspicuously winged stem than those of wild quinine. Yellow coneflower has leaves that are more heart-shaped with a leaf base that does not taper. Wild quinine plants also develop more slowly than these other species, sometimes taking 3 to 5 years from seed to reach a size where flowering is possible.



Adult Plant

# Yellow Coneflower

*Ratibida pinnata*

## Habitat:

Mesic to dry-mesic prairie

## Flowers:

June - August



Seed

Seedling

## 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.



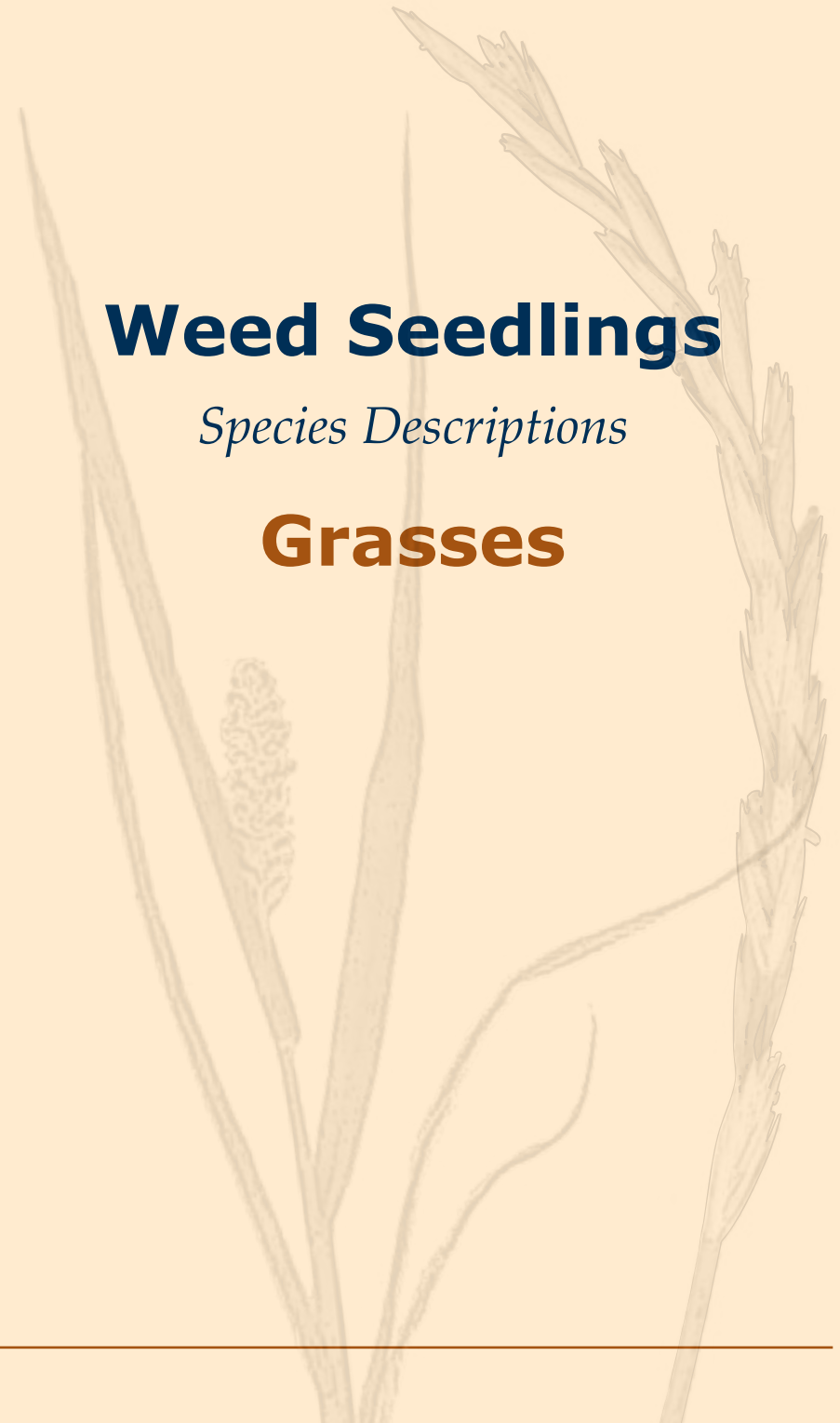
Adult Plant

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# Weed Seedlings

*Species Descriptions*

## Grasses





# Barnyard Grass

*Echinochloa crusgalli*

## Habitat:

Mesic to wet-mesic

## Flowering:

June - August



Seed



Seedling

## 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

# Cupgrass, Woolly

*Eriochloa villosa*

## Habitat:

Mesic to wet-mesic

## Flowering:

June - August



Seed



Seedling

## 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*

## Habitat:

Dry to wet-mesic

## Flowering:

June - August



Seed



Seedling

## Distinguishing characteristics:

Although similar in appearance to green foxtail, giant foxtail is a much larger and more robust plant that can reach 7 feet in height. Seedling stems are flat and do not roll easily in fingers. Leaf blades are rough to the touch. The upper leaf surface has long, bulbous-based soft hairs. The lower leaf surface lacks hairs.



Adult Plant

# Green Foxtail

*Setaria viridis*

## Habitat:

Dry to wet-mesic

## Flowering:

June - August



Seed



Seedling

## 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. Seedling stems are flat and do not roll easily in fingers. 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

# Quackgrass

*Elytrigia repens*

## Habitat:

Mesic to wet-mesic

## Flowering:

June - August



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The Ohio State University

Seed

Seedling

## 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

*Phalaris arundinacea*

## Habitat:

Mesic to wet-mesic

## Flowering:

June - August



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The Ohio State University

Seed

Seedling

## 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  $\frac{1}{4}$  -  $\frac{3}{4}$  of an inch wide. The wide leaf blade narrows abruptly at its base.



Adult Plant



# Smooth Brome

*Bromus inermis*

## Habitat:

Mesic to wet-mesic

## Flowering:

June - August



Seed



Seedling

A. Blaschka - USDA-NRCS

The Ohio State University

## 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

# Yellow Foxtail

*Setaria glauca*

## Habitat:

Mesic to wet-mesic

## Flowering:

June - August



Seed



Seedling

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## 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

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# Weed Seedlings

*Species Descriptions*

## Forbs



# Absinthe Sage

*Artemisia absinthium*



USDA-NRCS Plants Database



Seed

Seedling

Juvenile

## Habitat:

Dry-mesic to wet-mesic

## Flowering:

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

# Beach Clotbur

*Xanthium strumarium*



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Seed

Seedling

Juvenile

## Habitat:

Mesic to wet-mesic

## Flowering:

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



Seedling



Juvenile

## Habitat:

Mesic to wet-mesic

## Flowering:

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

# Burdock

*Arctium minus*



Seed



Seedling



Basal leaves

## Habitat:

Mesic to wet-mesic

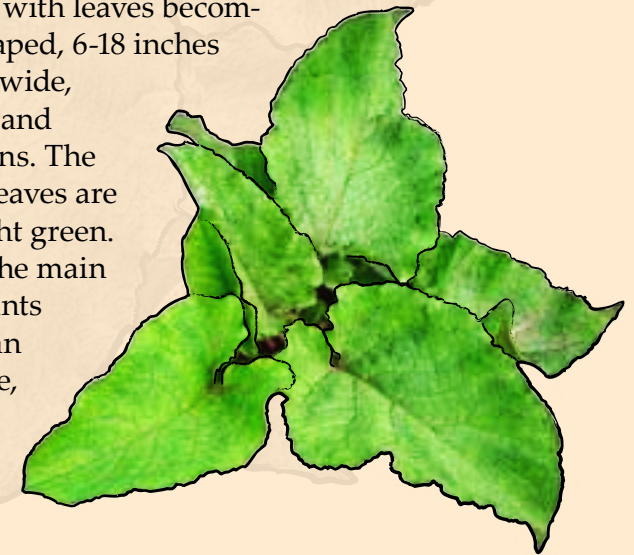
## Flowering:

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



Seedling



Juvenile

## Habitat:

Mesic to wet-mesic

## Flowering:

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

# Common Ragweed

*Ambrosia artemisiifolia*



Seed



Seedling



Juvenile

## Habitat:

Mesic to wet-mesic

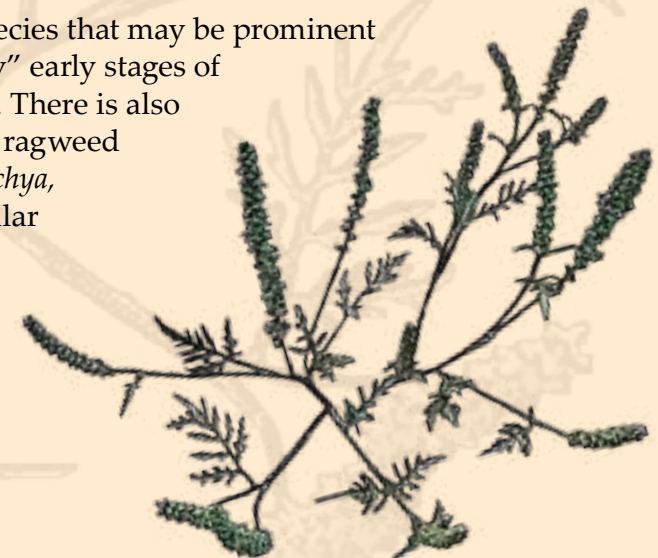
## Flowering:

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, *A. psilostachya*, that occurs in similar habitats. It is considered to be part of the normal flora of dry prairies.





# Curly Dock

*Rumex crispus*



Seed



Seedling



Juvenile

## Habitat:

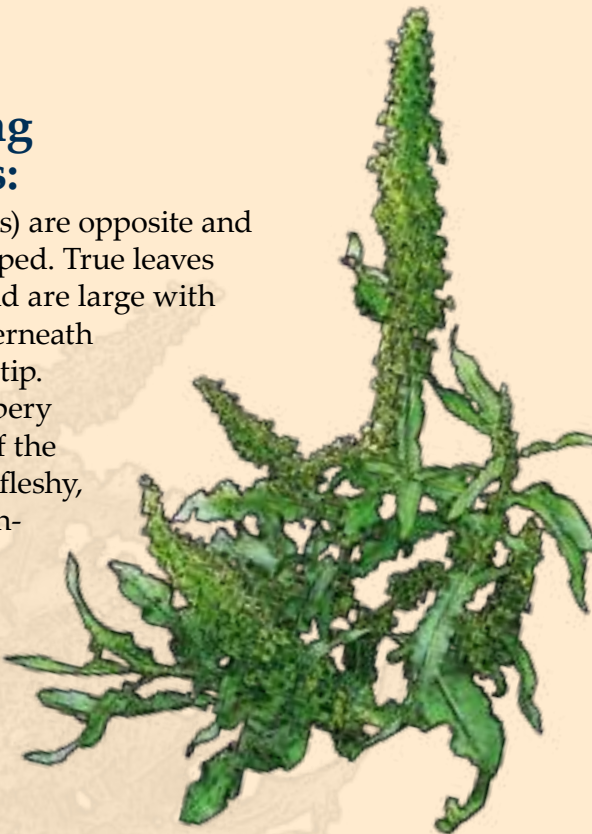
Mesic to wet-mesic

## Flowering:

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

# Giant Ragweed

*Ambrosia trifida*



Seed



Seedling



Juvenile

## Habitat:

Mesic to wet-mesic

## Flowering:

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:

Mesic to wet-mesic

## Flowering:

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

*Euphorbia esula*



Seed

Seedling

Stem and Leaves

## Habitat:

Mesic to wet-mesic

## Flowering:

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

*Carduus nutans*



Seed

Seedling

Rosette

## Habitat:

Mesic to wet-mesic

## Flowering:

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

# Pigweed, Redroot

*Amaranthus retroflexus*



Seed

Seedling

Juvenile

## Habitat:

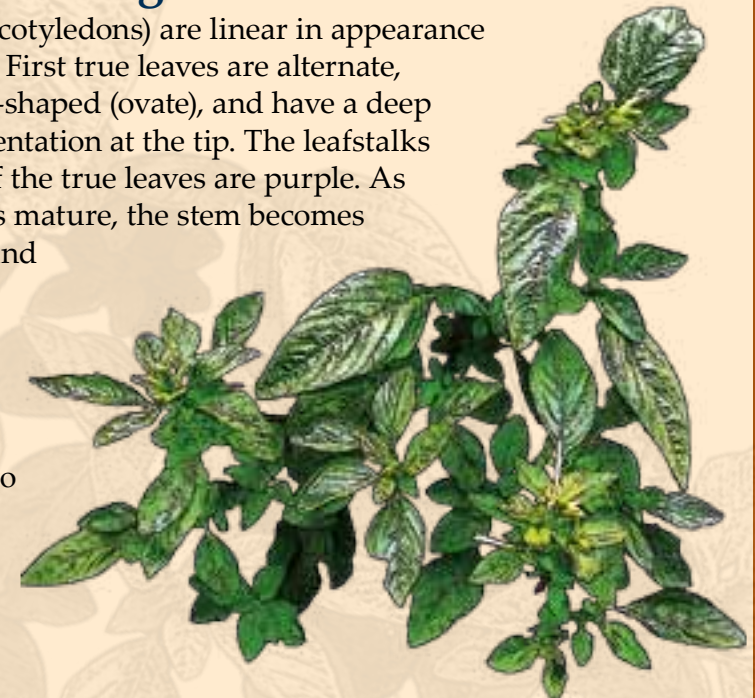
Mesic to wet-mesic

## Flowering:

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*



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Seed



The Ohio State University

Seedling



MN Dept. of Agriculture

Juvenile

## Habitat:

Mesic to wet-mesic

## Flowering:

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

# Poison Hemlock

*Conium maculatum*



Iowa DNR

Seed



The Ohio State University

Seedling



The Ohio State University

Basal Leaves

## Habitat:

Mesic to wet-mesic

## Flowering:

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.



# Sweet Clover (Yellow & White)

*Melilotus officinalis* and *Melilotus alba*



Steve Hurst - USDA-NRCS

Seed



Seedling



Leaf Structure

## Habitat:

Mesic to wet-mesic

## Flowering:

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 *Dipsacus sylvestris*



MN Dept. of Agriculture

Seed



Seedling



*P. laciniata* Leaf

## Habitat:

Mesic to wet-mesic

## Flowering:

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

# Velvetleaf

*Abutilon theophrasti*



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Seed



MN Dept. of Agriculture

Seedling



MN Dept. of Agriculture

Heart-shaped Leaf

## Habitat:

Mesic to wet-mesic

## Flowering:

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

# Wild Parsnip

*Pastinaca sativa*



Steve Hurst - USDA-NRCS

Seed



The Ohio State University

Seedling



The Ohio State University

Basal leaves

## Habitat:

Mesic to wet-mesic

## Flowering:

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.

**WARNING:** This plant contains photoactive chemicals in the green leaves, stems and seed. When these chemicals come in contact with human skin and are exposed to ultraviolet light from the sun, they can cause skin irritation and, in more severe cases, chemical burns.



Adult Plant

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# Prairie Seeding Evaluation

*A Simple Method  
for Evaluating a Prairie Seeding*





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## Getting Started

Evaluating a prairie seeding provides important feedback about whether things are progressing appropriately, if additional work is required, and how quickly intervention should occur.

A basic prairie seeding evaluation can be carried out by nearly anyone with a few simple tools, some basic plant identification skills, and a bit of patience. For most prairie plantings, taking the time to learn field identification of 20-30 prairie plants and their seedlings will go a long way toward making you an expert. Identifying prairie plant seedlings does take some time, but need not be intimidating.

*This section of the guide:*

- Identifies what to expect as a prairie planting develops
- Recommends a simple method for field evaluation
- Provides thoughts on circumstances commonly encountered as prairie plantings develop

## Some Basics About Establishing Prairie Plantings

There are many variations on how to plant prairie, and the details can be confusing. Despite this, the process can be boiled down to a few simple ideas. Keep these in mind and great results will come from your efforts.

### **Never underestimate the value of good site preparation.**

Observe your site ahead of planting time. Note existing vegetation, potential weed problems, current and future disturbances, herbicide carryover potential, soil problems and other issues. Understanding and addressing these before your first seed hits the soil will make things go much more smoothly.

**Start with quality seed.** Where possible, purchase seed tested for purity and germination. Purity denotes the weed seed content and the amount of non-seed (inert) material in a seed lot. Germination indicates the percentage of seed that will readily sprout. Purchase your native seed on a Pure Live Seed (PLS) basis, calculated by multiplying the purity by percent germination. Seed tests should be done within 6 months of planting. A high PLS content (>50) usually indicates high quality seed.

**Pay close attention to the source of your seed.** Purchase seed from a reputable vendor who specializes in native seed for species of your area, and offers native seed whose original wild type population is in the same geographic area as your site. Often referred to as “local ecotype,” it means seed will be the best suited for your local conditions. For any prairie planting, be sure to plant seed that is adapted to your region.

**Plant shallow and achieve good seed-to-soil contact.** A general rule of thumb is to plant seeds no deeper than three times their seed width. Planting most prairie seed at a depth of about ¼ inch will give great results. Observing some seed on the surface after planting is a good indicator that you’re on the right track. Establish good seed-to-soil contact with a native seed drill or cultipacking for a firm seedbed. Spreading seed on bare soil in the winter is also an effective way to achieve good seed-to-soil contact. Repeated freeze-thaw cycles work the seed into the soil. Whatever seeding method is used, the common ingredients to success are to plant shallow and establish good seed-to-soil contact.

**Planting dates and seeding diversity.** The old rule of thumb was to plant native grasses late in May and early June. Unfortunately, many of us don’t have the luxury of choosing a planting date. Weather, seed availability, or construction timelines can force prairie seeding to occur at almost any season of the year nowadays. Likewise, restorationists have also learned that some species of native grasses and forbs tend to establish better in different seasons of planting. By planting a diverse mix of grasses

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and forbs, you will buffer your planting against problems of seasonal timing and weaknesses that might be characteristic of one or a few species. Simply put, diversity provides stability.

**Maintenance – the (not-so) secret ingredient of success.**

Maintain your new seeding for at least one full growing season after planting. Mowing is often the most practical way to suppress weeds during grow-in. Herbicides can be helpful but should be considered with forethought and a clear understanding of implications for the prairie plants you are trying to establish. Hand weeding is labor intensive but can be very effective, especially on small sites. The value of monitoring, early detection, and timely intervention can't be understated. It can greatly reduce the time from seeding to successful prairie planting.

**Be patient and talk to your neighbors.** Before you plant, share your plans with neighbors. After planting, let them know how things are coming along. If you have problem weeds in your prairie planting, be proactive and let them know that you're on top of things. Encourage patience in yourself and others; it will make your life easier.

## What to Expect

Most species of prairie plants are long-lived, but develop slowly. With the exception of a few species of annual or biennial prairie plant species frequently included in prairie plantings, many prairie plants take 3-5 or more years to reach a point where they will flower. Patience is often the most important part of establishing a prairie planting.

The next few pages summarize what might be expected the first few years after a prairie is planted.

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## Year 1

The majority of the tallest and most obvious vegetation in the first year will likely be cover crop and/or weeds. Depending on the site, weeds may be abundant in the soil seed bank. For construction sites, weeds may be present as seeds or roots/rhizomes in topsoil as it is moved from one location to another.

Agricultural weeds common to prairie plantings include ragweed, foxtail, witchgrass and others. If unmanaged, these weeds may reach 4-8 feet in height, or more. Perennial nonnative weeds such as Canada thistle may be evident, but often do not flower/produce seed the first year.



Weed pressure is common in the first year of most prairie plantings. (Photo: IA DNR)

At the end of the first growing season, most prairie grasses and flowers will likely still be less than two feet tall. Exceptions to this include annual prairie plants such as partridge pea. Timely mowing/management can speed development of prairie plantings, resulting in some prairie plants flowering in the first year that might not otherwise be obvious for 2-3 years.

Bare ground is often abundant in this phase of a prairie planting as native plants slowly grow and expand outward. In the first year, native grasses will likely be most evident in the mid-September to late-October time frame, as many warm season native grasses have vibrant golden or wine hues compared to the often drab grays and tans of nonnative grasses and weeds.



A prairie planting in Iowa at 6 weeks (top) and 9 weeks (bottom). Both have significant areas of bare ground. (Photo: IA DNR)

## Years 2-3

In growing seasons two and three, short-lived and quick-to-establish prairie species become more prominent. This includes biennial natives such as black-eyed susan and cool season grasses such as Canada wildrye. Depending on how heavily it is seeded, black-eyed susan may form extensive, eye-catching patches.

Longer-lived species such as Indian grass, big bluestem, oxeye false sunflower, yellow cone-flower, hoary vervain and bergamot will become increasingly evident in year two and three as most individuals begin to produce flowers/seed. These species represent the vanguard of transition to dominance by longer-lived perennial prairie plants.

Annual weeds prominent during the first growing season should be less

evident during years two and three. However, invasive, perennial weed species such as Canada thistle, leafy spurge, and crown vetch will become more evident in this period if they are present at the site. These species may mature to the point that they are capable of flowering/ producing seed as early as their first growing season, but become very evident in subsequent years. Depending on the amount of weed growth and the rate of prairie species development, bare ground may still be common during year two.



Second year seeding in Iowa; this site was machine broadcast seeded. (Photo: IA DNR)



## Years 3-5

This time period typically represents a shift in composition for most prairie seedings. Dominance by cool season native grasses and short-lived flowers in the first few years gives way to longer-lived, more competitive species. Bare ground becomes less common between prairie plants, usually representing less than half of the ground surface area.



A prairie planting in the third year after seeding shows abundant Canada wildrye, bergamot, oxeye sunflower and yellow coneflower. (Photo: IA DNR)

Native grasses such as big bluestem, Indian grass and little bluestem, as well as flowers such as oxeye false sunflower, purple prairie clover, yellow coneflower, bergamot, golden alexanders, and hoary vervain will become more evident as patches of color. Black-eyed susans may be present, but are less prominent in years 3-5 than in year two.

Prairie flowers and grasses that are long-lived and slow to mature may still only be evident as basal leaves at this point. Some of these include prairie dropseed grass and forbs such as compass plant, wild indigo, blazingstar, rattlesnake master, leadplant, prairie phlox, and wild quinine.

Annual and biennial prairie plants such as partridge pea and black-eyed susan may persist in some areas that are developing slowly or lack cover by perennial prairie plants.

## Years 5-10

Warm season native grasses such as Indian grass, big bluestem, and little bluestem will be quite prominent and may dominate the site during this stage. Longer-lived prairie flowers mentioned above will begin to flower and complement prairie forbs that began blooming during years 2-5.



This prairie planting is in its fifth year, and showing more signs of maturity. (Photo: IA DNR)

In some plantings where native grasses become over dominant, middle-successional flowers and cool season grass species common in years 2-5 may be crowded out, particularly where multiple late spring controlled burns are conducted.



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## *A Simple Method for Field Evaluation*

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## **Why Evaluate a Prairie Planting?**

There are many different methods for evaluating vegetation. These vary from time-intensive efforts with rigorous scientific methods to less formal field walks that are more subjective in nature.

Although most land managers, construction inspectors, prairie enthusiasts, and others do not have the time or resources to conduct extensive field sampling, it is still possible to conduct a basic quantitative planting evaluation. One such method is described below.

## **When to Evaluate a Prairie Seeding**

During the summer of the first growing season for a prairie planting, native grasses and flowers tend to be small and struggling to make a living under faster growing weeds. Identification of prairie seedlings is still possible during this period. However, expect that it will take a little more time than an evaluation in the fall of the first full growing season, or the second growing season.

Mid-September to late October tends to be a good time for an initial seeding evaluation in most areas of the Upper Midwest because many warm season native grasses have vibrant golden and wine colored hues compared to the often drab grays and tans of nonnative grasses and weeds. Likewise, young prairie seedlings can often be observed actively growing outside the normal growing season of adult plants of the same species as they race to stake their claim in the new plant community.

Sampling the second growing season involves identifying plants that are one growing season old, as well as any new seedlings from seed that held-over in the soil and germinated the second spring. Evaluation in the second growing season makes identifying seedlings easier, but delays early detection of potential problem areas. Such a delay may increase management time and cost.



## Getting Started

Before heading out into the field to evaluate a prairie planting, gathering some basic tools and equipment will help make your job easier. We recommend you take the following items along in the field:

- Sampling frame  
(see specifics on the following page)
- Seedling field guide
- Seeding list for area to be evaluated
- Ruler with millimeters and inches  
(or a penny for scale)
- Magnifying glass or hand lens
- Small digging implement  
(knife, screwdriver, multi-tool, keys, etc.)
- Tape measure (if set sampling distances/transects are used)
- Pencil/pen and field data form  
(a blank form is included at the back of this guide)



Sampling Frame



Magnifying Lupe  
and Ruler

### *Some other things you might find handy:*

- Camera
- Vinyl pin/ribbon flagging  
(to mark evaluation locations, weed areas, etc.)
- Double-fronted pants
- Patience and a sense of humor

A sampling frame can be made of a variety of materials. We recommend using a sampling frame of a known size—a one-square-foot frame is a handy size.

Despite this, sometimes one has to use what's handy. For instance, a wire coat hanger can easily be bent into a square, used in the field, and some simple calculations made later to determine its proportion to that of one square foot.

For those who have five or ten minutes and a few simple items at hand, below are a few ideas on creating a simple sampling frame. These can be constructed quickly and inexpensively, don't take up much room, and are easy to carry in the field.

- A 42.5-inch section of  $\frac{3}{16}$ " diameter flexible tubing or plastic-covered cable can be formed into a circle and joined with a small piece of  $\frac{1}{4}$ " outside diameter tubing.
- A square PVC frame can be constructed with 4 one-foot lengths of  $\frac{1}{2}$ " PVC pipe and 4 90-degree elbows.

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## Field Sampling

Although there are many different methods of sampling plant communities, there is a trade off between the amount of time spent and the quality/type of information that it produces. For most prairie plantings, having a reasonably accurate assessment is valuable. Using the method outlined below may take as little as 1-2 hours per planting for those reasonably familiar with prairie seedlings, and perhaps 2-3 for those still getting used to identifying young plants.

We recommend conducting sampling using a transect method. Take a minimum of ten samples for each 10-40 acres of planted area. If time allows, take 20 samples per area as it results in greater reliability for the information. However, completing more than 20 samples per planting only provides incremental improvement in reliability of information and may not be justified, especially if time is a factor.

For sites that show relatively uniform development, 10 samples along one transect is often adequate to get a good snapshot of progress. For sites that show substantial differences in development between different portions of the planting, consider sampling problem areas separately.

Importantly, avoid sampling in areas such as end rows and double-seeded areas, as this can lead to inaccurate results. You should start your sampling transect some 20-50 feet from any edge. We also recommend sampling diagonal or perpendicular to the direction of drilling if an area was machine planted. This prevents sampling down rows on sites that have been drilled.

So, let's get started...

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## Step 1

Determine a general path for sampling (transect) within a representative portion of the prairie planting. Do your best to include variations in topography, soil moisture regimes, and soil types. Estimate the length of your transect (sampling path) in feet.

For example, a square 40-acre prairie restoration is one-quarter mile on a side (1,320 feet). In this case, a transect of about 1,000 feet should be adequate to cover the site. The estimate of transect length does not need to be exact, so don't worry if you don't know the exact dimensions of the prairie planting.

## Step 2

After estimating the length of your planned sampling path in feet, divide by the total number of samples that will be taken. This will determine the number of steps between samples. Using our example from Step 1 of a 1,000-foot transect, dividing that by our goal of sampling in 20 locations results in a distance between sampling points of about 50 feet.



Sampling wetland vegetation along a transect (measuring tape in picture) using a PVC frame.



Then, divide this number by the length in feet of walking stride for the average adult (usually 3 feet) to gain the number of steps between sampling points. In this case 50 divided by 3 equals about 17 steps.

### Step 3

Begin sampling. Enter the planting and select a location to begin away from edges (avoid double-seeding and end row effects might influence sampling). Place the sampling frame on the ground at your first sampling point. As a minimum, we recommend collecting information on the number of native grass and forb individuals seen in the sampling frame. Identifying which species of native plant(s) you run across can also provide valuable information about success.

After collecting information from the first plot, sample successive plots along a general line (transect) with the same number of steps (determined in Step 2 above) between plots. The line you sample along can be determined by compass, by moving toward a fixed distant object, or some similar method.

For long and narrow sites, the path you sample along may necessarily need to zigzag. In these types of situations, don't forget to sample in a manner that provides a representative view of the entire planting, or sample individual areas of concern separately.

Included below is a sample data sheet to help give you a starting point for a field data collection system. This data sheet was adapted from a 1991 Wisconsin Natural Resources Conservation Service publication.

Prairie Seeding Evaluation Form

Evaluated by: \_\_\_\_\_ Date: \_\_\_\_\_ Location: \_\_\_\_\_

Acres: \_\_\_\_\_ Transect #: \_\_\_\_\_

Category: \_\_\_\_\_

Plot	Native Grass	Native Forb	Total Native	Weed	Unk.	Comments
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
TOTAL						
AVG.						

Adapted from NRCS publication WI-1

Noting species of problem weeds in a seeding evaluation can also provide timely information to adaptively manage weeds such as Canada thistle, potentially saving resources and angst down the road.

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## What if I Run Into a Plant I Can't Identify?

With somewhere around 1,300 plant species in each of the states in the Upper Midwest, there will certainly be instances where you see a plant you can't identify. Don't worry. It happens to everyone, even professional botanists. There are a couple of things you can try in the field to help with identification, as well as options for finding outside help to later put a name to the face of the suspect in question.

If the unidentified plant is a grass seedling a week or two old, it is often possible to gently dig up the entire plant and look at the seed, which will still be attached at the base of the plant. A hand lens or magnifying glass will often reveal enough detail on the seed hull to make positive identification possible.

This will not work for broad-leaved plants since the seed hull emerges from the ground with the seed leaves, and is then shed on the soil surface.

Another indirect clue for identifying weed seedlings is to look for any standing stems from the year before. Often there aren't any, but you may get lucky. Also, in areas planted with a drill, native grasses tend to be relatively easy to spot in drill rows.

If the plant can't be identified in the field, there are several options for getting help to identify unknown plants. One option is to take several photos of the plant from different angles with something



Foxtail seed hull still attached at base of seedling.

in the picture for scale. Taking digital photos is especially helpful since they can be shared readily through email or other electronic means.

Another option is to remove part of the plant top and place it in a plastic bag in a refrigerator. Plants stored this way will often persist for several weeks. Resources for identifying unknown plants from photos and or cut tops include local conservation agency staff, prairie restorationists, internet sites such as the U.S. National Plants Database, and others.

## How Many Prairie Plants Should There Be?

Each site has unique soil, climate, and other conditions that can affect the rate of prairie plant establishment. Timely and appropriate management in the first few years can also speed up establishment. Conversely, a lack of management usually slows the rate of development, especially on sites prone to weed problems and erosion.

Despite differences between sites, there are some basic establishment expectations that can be applied to prairie plantings. For most sites, depending on expectations and the purpose of a planting, having 0.25 to 1.0 native seedling per square foot from the seeded mix at the end of the first growing season is adequate. An exception to this would be sites prone to erosion. Here, the seedling density should approach 4-6 seedlings per square foot, unless cover crops or other circumstances minimize the risk of erosion. These native seedling densities are consistent with values published by the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS), including the Wisconsin NRCS Technical Note – Agronomy WI-1 (1991), and the Iowa NRCS publication “Native Prairie: establishment & management of native prairie” (2006).



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## What if the Native Plant Density Falls Short of Goals?

There can be several reasons for native plant density to fall short of the desired level. If you sampled during the first growing season, low prairie seedling density might result from such varied factors as unusually dry (or wet) weather, unseasonable temperatures, dormancy of seed or others.

At such a point, it would be worth discussing your project with someone regularly involved in prairie plantings in your area. They may be able to provide insight on similar circumstances they are encountering at other nearby sites and offer an explanation for what you are noticing. In some instances, it is not unusual for prairie seed to patiently lie dormant in the soil for one year or more until climatic conditions enable their germination or establishment.

As previously mentioned, identifying prairie seedlings and conducting a basic assessment of prairie planting progress is an attainable goal, even for the novice. Patience is among the most valuable tools in identifying seedlings, and for establishing prairie plantings.

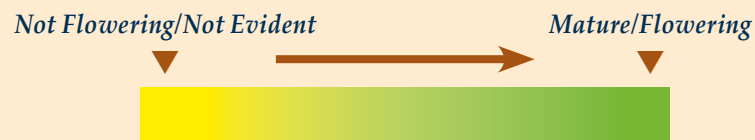


## Appendix

## Common Establishment Periods for Prairie Species in this Guide

Common Name/Scientific Name	Year				
	1	2	3 to 5	5 to 10	10+
<b>Grasses</b>					
Big bluestem <i>Andropogon gerardii</i>	[Color gradient from yellow to green]				
Canada wildrye <i>Elymus canadensis</i>	[Color gradient from yellow to green]				
Indian grass <i>Sorghastrum nutans</i>	[Color gradient from yellow to green]				
June grass <i>Koeleria macrantha</i>	[Color gradient from yellow to green]				
Little bluestem <i>Schizachyrium scoparium</i>	[Color gradient from yellow to green]				
Porcupine grass <i>Stipa spartea</i>	[Color gradient from yellow to green]				
Prairie dropseed <i>Sporobolus heterolepis</i>	[Color gradient from yellow to green]				
Sideoats grama <i>Bouteloua curtipendula</i>	[Color gradient from yellow to green]				
Switch grass <i>Panicum virgatum</i>	[Color gradient from yellow to green]				
Tall dropseed <i>Sporobolus asper</i>	[Color gradient from yellow to green]				
Virginia wildrye <i>Elymus virginicus</i>	[Color gradient from yellow to green]				

### Establishment Key



	Year				
	1	2	3 to 5	5 to 10	10+
<b>Forbs</b>					
Alumroot <i>Heuchera richardsonii</i>	[Color gradient from yellow to green]				
Black-eyed susan <i>Rudbeckia hirta</i>	[Color gradient from yellow to green]				
Blazingstar <i>Liatris spp.</i>	[Color gradient from yellow to green]				
Blueflag iris <i>Iris spp.</i>	[Color gradient from yellow to green]				
Butterfly milkweed <i>Asclepias tuberosa</i>	[Color gradient from yellow to green]				
Canada milkvetch <i>Astragalus canadensis</i>	[Color gradient from yellow to green]				
Canada tick trefoil <i>Desmodium canadense</i>	[Color gradient from yellow to green]				
Compass plant <i>Silphium laciniatum</i>	[Color gradient from yellow to green]				
Cream-colored false indigo <i>Baptisia bracteata</i>	[Color gradient from yellow to green]				
Culver's root <i>Veronicastrum virginicum</i>	[Color gradient from yellow to green]				
Cup plant <i>Silphium perfoliatum</i>	[Color gradient from yellow to green]				
Evening primrose <i>Oenothera biennis</i>	[Color gradient from yellow to green]				
Golden alexanders <i>Zizia aurea</i>	[Color gradient from yellow to green]				
Great blue lobelia <i>Lobelia siphilitica</i>	[Color gradient from yellow to green]				
Heath aster <i>Aster ericoides</i>	[Color gradient from yellow to green]				

	Year	1	2	3 to 5	5 to 10	10+
Hoary vervain <i>Verbena stricta</i>		[Green bar]				
Leadplant <i>Amorpha canescens</i>		[Green bar]				
Marsh milkweed <i>Asclepias incarnata</i>		[Green bar]				
New England aster <i>Aster novae-angliae</i>		[Green bar]				
Oxeye false sunflower <i>Heliopsis helianthoides</i>		[Green bar]				
Pale purple coneflower <i>Echinacea pallida</i>		[Green bar]				
Partridge pea <i>Chamaecrista fasciculata</i>		[Green bar]				
Prairie cinquefoil <i>Potentilla arguta</i>		[Green bar]				
Prairie coreopsis <i>Coreopsis palmata</i>		[Green bar]				
Prairie phlox <i>Phlox pilosa</i>		[Green bar]				
Purple coneflower <i>Echinacea purpurea</i>		[Green bar]				
Purple prairie clover <i>Dalea purpurea</i>		[Green bar]				
Rattlesnake master <i>Eryngium yuccifolium</i>		[Green bar]				
Round-headed bushclover <i>Lespedeza capitata</i>		[Green bar]				
Showy goldenrod <i>Solidago speciosa</i>		[Green bar]				
Sky blue aster <i>Aster oolentangiensis</i>		[Green bar]				

	Year	1	2	3 to 5	5 to 10	10+
Smooth blue aster <i>Aster laevis</i>		[Green bar]				
Spiderwort <i>Tradescantia spp.</i>		[Green bar]				
Stiff goldenrod <i>Solidago rigida</i>		[Green bar]				
Tall meadow rue <i>Thalictrum dasycarpum</i>		[Green bar]				
Tuberous Indian plantain <i>Cacalia plantagineum</i>		[Green bar]				
Virginia mountain mint <i>Pycnanthemum virginianum</i>		[Green bar]				
White prairie clover <i>Dalea candida</i>		[Green bar]				
White wild indigo <i>Baptisia alba</i>		[Green bar]				
Wild bergamot <i>Monarda fistulosa</i>		[Green bar]				
Wild quinine <i>Parthenium integrifolium</i>		[Green bar]				
Yellow coneflower <i>Ratibida pinnata</i>		[Green bar]				



## 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)	<i>Asclepias tuberosa</i>
Cream-colored false indigo	<i>Baptisia bracteata</i> ( <i>Baptisia leucophaea</i> )
Little bluestem	<i>Schizachyrium scoparium</i> ( <i>Andropogon scoparius</i> )
Marsh milkweed (swamp milkweed)	<i>Asclepias incarnata</i>
Partridge pea	<i>Chamaecrista fasciculata</i> ( <i>Cassia fasciculata</i> )
Prairie Indian plantain (tuberous Indian plantain)	<i>Cacalia plantaginea</i> ( <i>Arnoglossum plantagineum</i> ) ( <i>Cacalia tuberosa</i> )
Pale purple coneflower	<i>Echinacea pallida</i> ( <i>Echinacea angustifolia</i> )
Purple prairie clover	<i>Dalea purpurea</i> ( <i>Petalostemon purpureum</i> )
Quackgrass	<i>Elytrigia repens</i> ( <i>Agropyron repens</i> )
Sky blue aster	<i>Aster oolentangiensis</i> ( <i>Aster azureus</i> )
White prairie clover	<i>Dalea candida</i> ( <i>Petalostmeon candidum</i> )
White wild indigo	<i>Baptisia alba</i> ( <i>Baptisia lactea</i> )
Yellow coneflower (gray-headed coneflower)	<i>Ratibida pinnata</i>

## 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.

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**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 logo features a wooden sign with the text "PRAIRIE SEEDLING" in an arch at the top, "And Seeding Evaluation" in the middle, and "Guide" in a large, stylized yellow font at the bottom.

## PRAIRIE SEEDLING And Seeding Evaluation Guide

An important part of conservation efforts, prairie plantings provide wildlife habitat, improve water quality, and provide aesthetically pleasing open spaces.

Thanks to their beauty, versatility, and hardy character, prairie plants are increasingly used in home and corporate landscaping, rain gardens, and other similar settings.

This practical and easy-to-understand field guide is the only guide with seedling-specific descriptions and handy tips on differentiating seedlings of similar plants.

The guide includes pictures and drawings of seeds, seedlings, and mature plants of more than 50 tallgrass prairie grasses and flowers, as well as over 25 commonly encountered weeds.

It also includes a common sense method that will help you tell how well a prairie planting is coming along during the first few critical years.

If you are thinking about planting a prairie, or have planted prairie and want to evaluate how things are going, the Prairie Seedling & Seeding Evaluation Guide is a must-have reference.