Gardening with Native Grasses in Cold Climates

Gardening with Native Grasses in Cold Climates

and a Guide to the Butterflies They Support

Diane M. Narem and Mary Hockenberry Meyer

UNIVERSITY OF MINNESOTA LIBRARIES PUBLISHING
MINNEAPOLIS, MN

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Author, Editor, Art Director

Diane M. Narem

Author, Editor

Mary Hockenberry Meyer

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Photos

David Hansen, University of Minnesota
Bryan Reynolds
Karl Foord
The Minnesota Zoo
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Clark, Lynn G., and Richard W. Pohl. 2012. *Agnes Chase's first book of grasses: the structure of grasses explained for beginners*. Smithsonian Institution.

Weaver, J. E. 1958. Summary and Interpretation of Underground Development in Natural Grassland Communities. *Ecological Monographs* 28(1):55-78.

Figures

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Department of Horticultural Science
Suite 305
1970 Folwell Ave
Saint Paul, Minnesota 55108
http://www.horticulture.umn.edu

Acknowledgements

We would like to thank our funding source, the United States Department of Agriculture and the Minnesota Department of Agriculture Specialty Crop Block Grant program. We would like to thank those who have supported our research with native grasses: Robert Dana, Cale Nordmeyer, and Karen Oberhauser. We would also like to thank Emily Teppe for her assistance with the eBook.

Introduction

Grasses, with their lack of colorful flowers, have not always received the attention of other landscaping plants. Some gardeners think of grass as a garden weed. Others picture only a lawn when they hear the word grass. However, if you become familiar with grasses, they open up a whole new world of landscaping choices and design options.

Even without large colorful flowers, grasses have their own, unique aesthetic qualities. Grasses come in a variety of forms, colors, and textures. They give a luminous glow when backlit or during sunrise and sunset. In the wind, they sway and rustle, making the landscape come alive. The foliage of many species changes from various shades of green in the spring to yellow, red, orange, or purple in the fall, adding a seasonal aspect to a planting. Perennial grasses often hold their shapes during the winter, and their frosty forms can add unexpected excitement to a dormant winter garden.

In this eBook, we focus on **native** grasses, a formerly overlooked group of plants. A plant is considered "native" if it is indigenous to a given area, occurring without the aid of or introduction by humans. For this book, we are focusing on grasses native to cold climates of the central United States. We define cold climates as the USDA's climate zones of 3 and 4, which includes Minnesota, North Dakota, South Dakota, and portions of Wisconsin, Iowa, Nebraska and Montana.

Recently, native grasses have become more popular. The appeal of ecologically-friendly gardening has grown, which has led to a higher demand for native plants and an increase in the development and **selection** of native grass **cultivars**. Native grasses are great choices for gardens that provide critical environmental functions, such as pollinator and rain gardens. Today's gardeners realize the importance of sustainability and want their landscapes to fulfill as many ecological functions as possible, in addition to being aesthetically pleasing. As you will learn in this eBook, native grasses have many ecological benefits, so are ideal choices for sustainable gardens.

This eBook is designed to introduce landscapers, garden center employees, and gardeners to native grasses that grow well in **cold climates**. We have written this book so that it is approachable for those without any experience with native grasses, but with enough detail and practical knowledge so that experienced gardeners find it interesting and informative. Chapter 1 covers basic definitions of grasses and grass-like plants (we refer to this group as **graminoids**) and discusses botanical terminology. Chapter 2 discusses the benefits that a homeowner and the surrounding wildlife receive from native grasses. Chapter 3 lists common native grasses and sedges that are frequently sold today, their characteristics, preferred growing conditions, associated **Lepidoptera**, and **cultivars**. Chapter 4 covers planting, maintenance, and growing issues of native grasses. Chapter 5 offers suggestions on how to begin selecting native grasses for a project.

Little bluestem flower by David Hansen.

Chapter 1. Introduction to Grasses

Grasses, sedges, and rushes, commonly referred to as **graminoids**, have unique characteristics that set them apart from other plants. In this chapter, basic biology and morphology are explained. This is vital information to know in order to understand grass design characteristics and site preferences and is critical in plant identification.

Chapter Sections

Prairie cordgrass (Spartina pectinata)

1.1 Parts of the Plant

What is a Grass?

Technically, the word grass refers to species in the **Poaceae** (a.k.a. Graminae) plant family. In this book, we have also included grass-like plants, sedges from the **Cyperaceae** family, and rushes from the **Juncaceae** family.

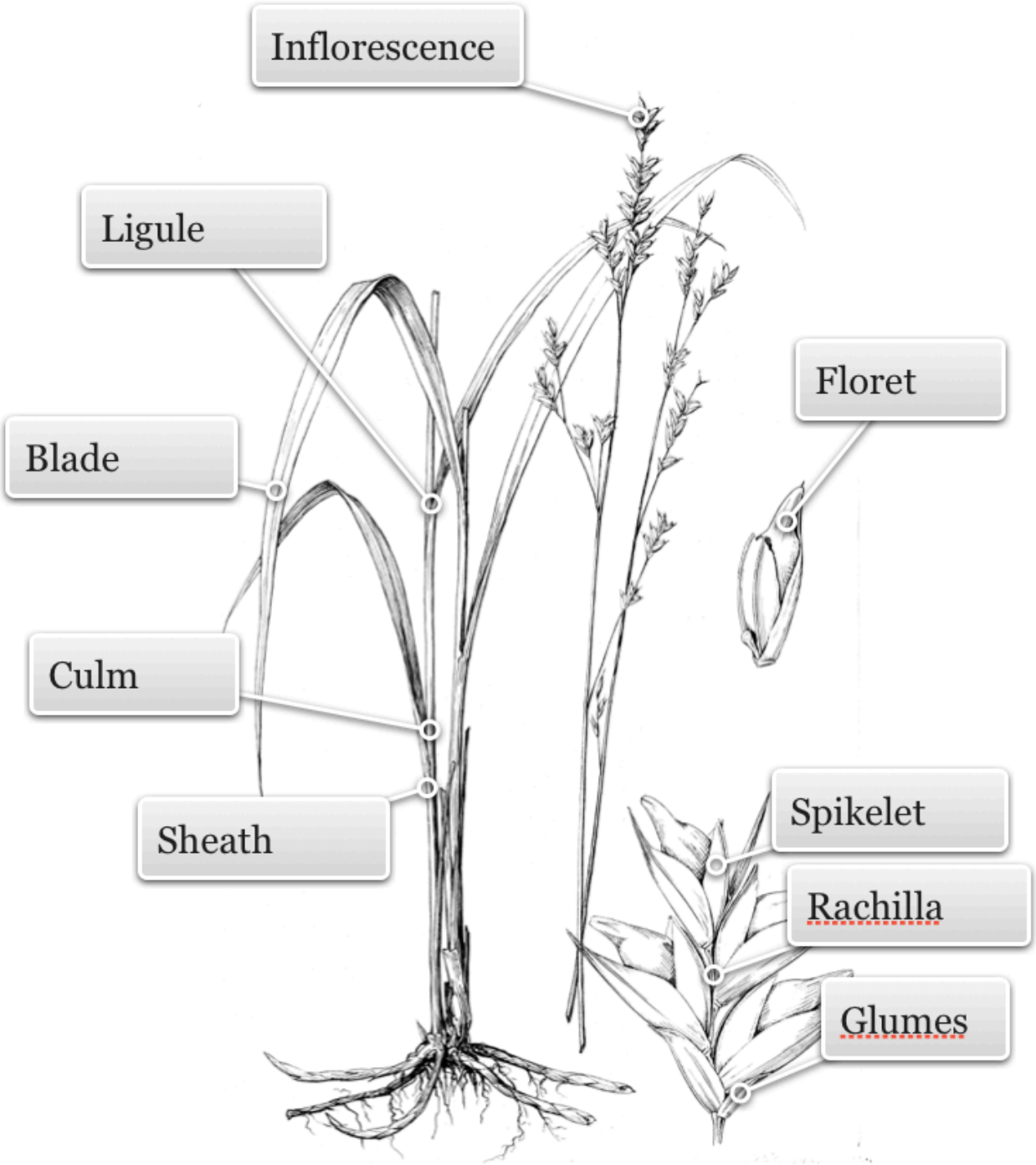
Indiangrass (Sorghastrum nutans)

The Plant

Grasses, sedges, and rushes are in a botanical group referred to as **monocotyledons**, often called monocots for short. The name monocotyledon is derived from the single (mono) embryonic leaf

(cotyledon) contained in the seed of a monocot. Graminoids and other monocots share this characteristic, along with narrow leaves, parallel venation, and fibrous root systems. Use the image on the below to learn the basic anatomy of a graminoid plant.

An interactive or media element has been excluded from this version of the text. You can view it online here:
https://open.lib.umn.edu/nativegrasses/?p=27



Inflorescence – The entire reproductive structure of a grass, sedge, or rush is called the inflorescence.

Ligule – The ligule is where the blade and the sheath meet. The ligule may be hairy, smooth, or have some other identifying characteristic of the species.

Blade – Term used to describe the leaf above the sheath.

Culm – This term refers to the stem of a grass or sedge.

Sheath – The sheath is the bottom of the leaf. It surrounds the culm like a tube. It splits open at the top to turn into the blade.

Floret – The name for a grass flower. This drawing shows a mature floret.

Spikelet – A unit made up of one or more florets, rachilla, and glumes.

Rachilla – The structure on which the florets are borne.

Glumes – Bracts that subtend the floret.

Flowers

Neither grasses, sedges, nor rushes have colorful, large, or showy flowers. All are wind pollinated and so do not need bright petals or nectar to attract animal pollinators. For this reason, the flowers are simplified and usually small in size.

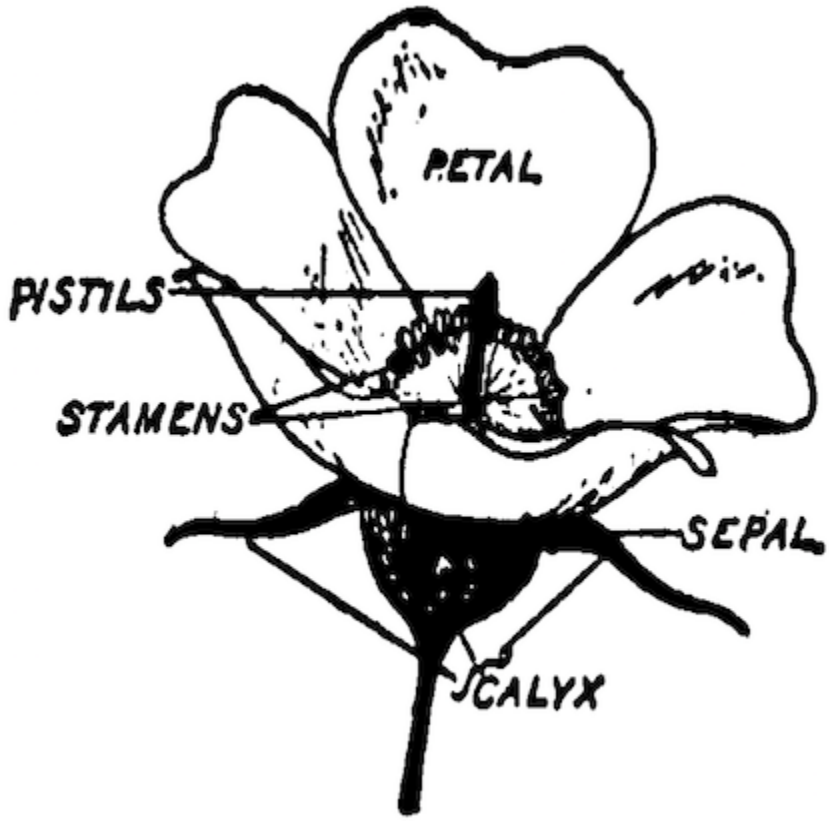


Diagram of a typical complete angiosperm flower.

In grasses, the petals and sepals have been reduced to very small **scales** called **lodicules** that enclose the **ovary**, which contains one **ovule**. From the **ovary** rise two **styles** ending in feathery **stigmas**; adjacent are typically three **anthers** that open to shed pollen held on long, thin **filaments**.

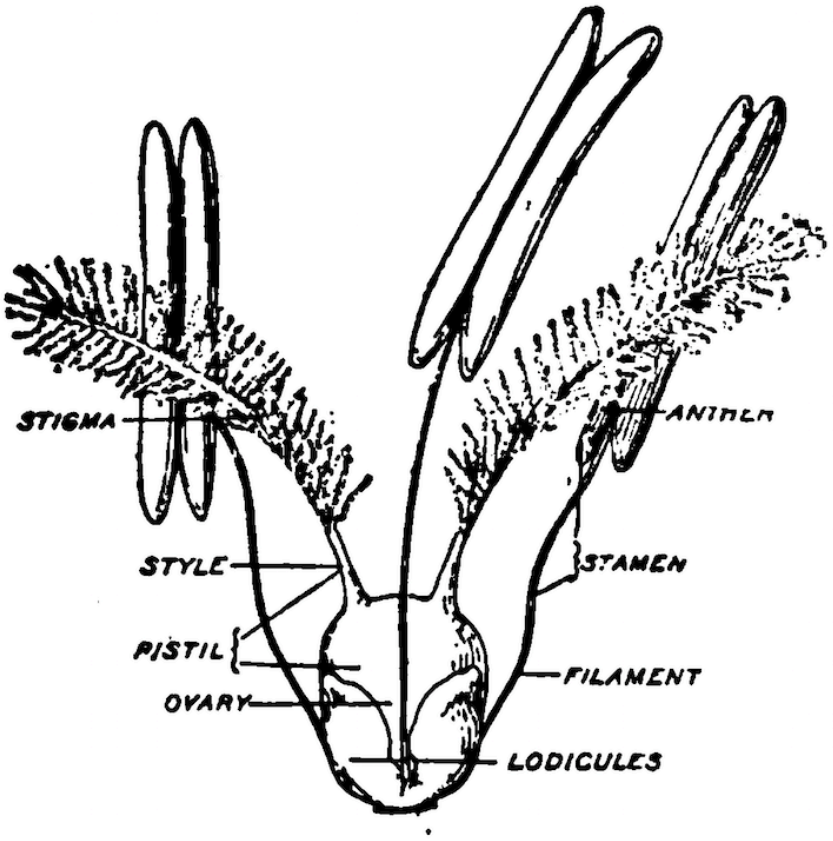


Diagram of a typical grass flower.

The ovary and anthers are usually protected and enclosed by two small papery **bracts** called the **palea** and the **lemma**. Outside the lemma and palea are two more larger, yet still small, papery bracts called **glumes**. When the anthers have ripe pollen, the very small lodicules help to open and close the papery bracts, thus assisting with wind pollination. All of these small parts make up the **floret**, an individual grass flower. A large **seedhead** or grass **inflorescence** usually contains hundreds of florets.

The arrangement of the one or many florets and the branching patterns of these florets determines how grasses are identified, named, and classified. If there is only one floret subtended by the two glumes, the floret is called a one-flowered **spikelet**. If there are two or more florets above the glumes, it's a multi-flowered spikelet. Different **genera** of grasses have specific numbers of florets in a spikelet. The arrangement of spikelets in an inflorescence is also characteristic of specific genera. To see these small flower parts, you need a hand lens or, ideally, a microscope. This is often where many people give up on learning grass identification! However, you can easily learn the differences in the large seedheads that will help you identify many grasses.

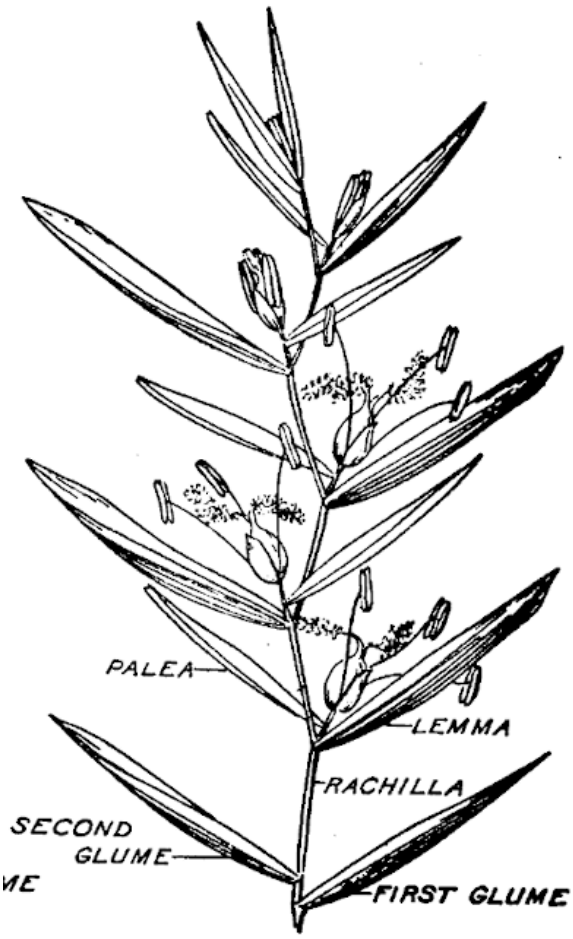


Diagram of a grass spikelet.

Different types of inflorescences. A = panicle, B = raceme, C = spike.

Sedge inflorescences are simpler. However, they are just as small, and, again, the identification may require a hand lens or microscope. Sedges can be comprised of **unisexual** or **bisexual** flowers. Sedge female flowers are each enclosed by a small sack-like structure called a **perigynium**. The shape of the perigynium is often used in sedge identification. Many sedges have female flowers in one section (often lower on the flowering stem), with the male flowers that contain only the pollen in another section, (often on top of the stem). If you look closely at sedge flowers in early spring when they are shedding pollen, you can see the larger, more conspicuous female flowers growing below the male flowers. The flower (male or female) and bract is called a spikelet. Spikelets are attached directly to the axis that forms the inflorescence. Explore the image below to see the inflorescence of a sedge.

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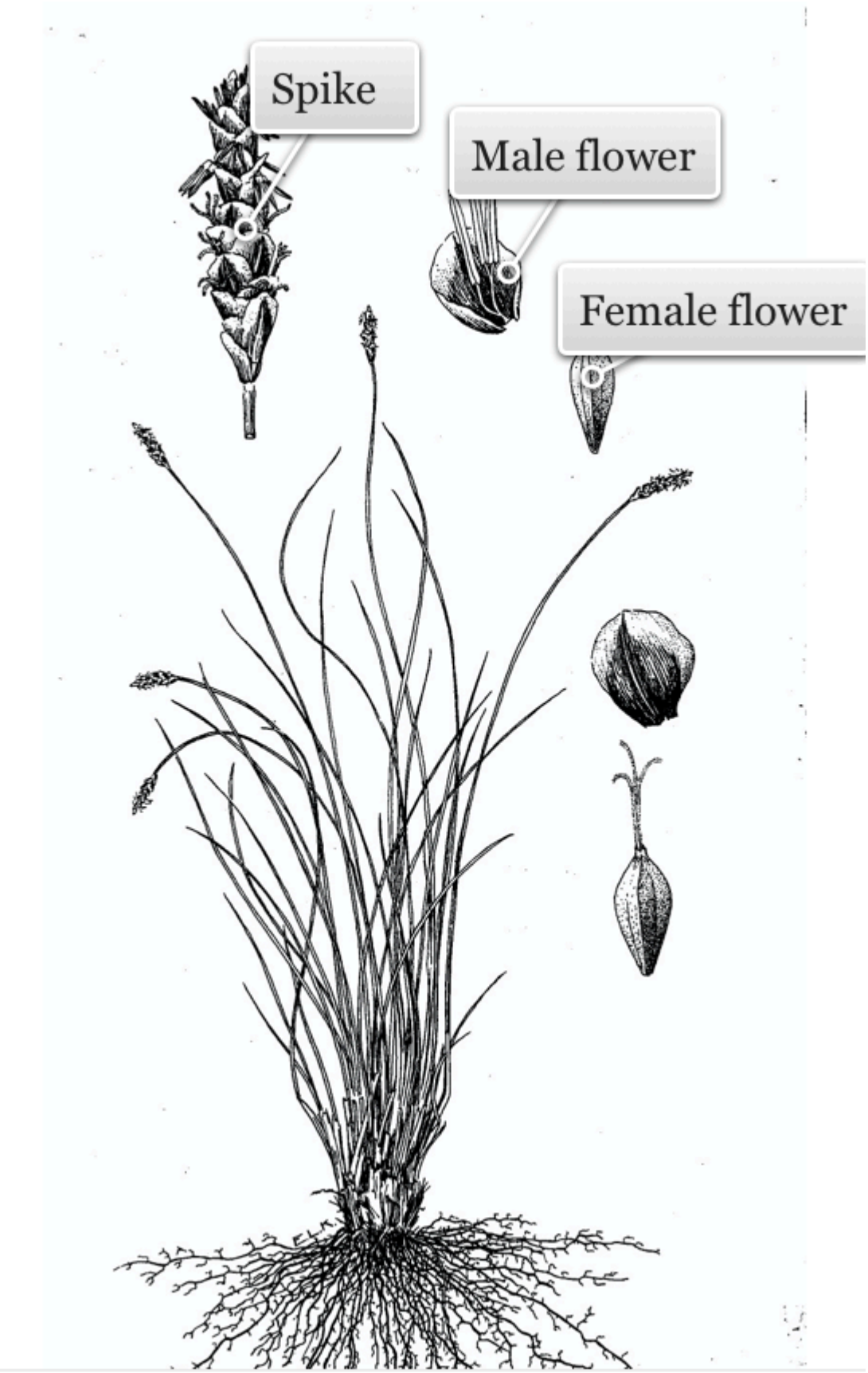


Spike – This is a Carex filifolia spike containing both male and female flowers. The male flowers make

up the top half of the spike, distinguished by anthers. The female parts make up the bottom half of the spike, distinguished by the three feathery stigmas emerging from the perigynium.

Female Flower – The female flower is enclosed by a sack called a perigynium. Three feathery stigmas emerge from the top of the perigynium.

Male Flower – This male flower has the characteristic leaf-life scale which encompasses the three anthers emerging from the base.

Rushes have the simplest inflorescence. The flowers are typically bisexual. From beneath each flower emerge six small green or brown, petal-like structures called **tepals**. Typically, there are many rush flowers held together in a cluster at the end of a stem.

Typical rush inflorescence.

Typical rush flower.

Stems and Leaves

To quickly tell the difference between grasses, sedges, and rushes, look at the stem and leaves. Grass stems **(culms)** are normally round like a straw, and their leaves come off in two ranks, meaning one on either side of the plant—whereas the stems of sedges are usually triangular, and their leaves are three-ranked. It can be hard to feel the three edges when you roll the stem between your fingers.

Rushes have round stems as well, but unlike grasses the leaves of rushes grow from the base of the plant, so the stems lack the nodes that arise from leaf joints and are completely smooth.

A view of muskingum sedge 'Oehme' from above clearly showing the three-ranked leaves of a sedge

A zoomed in photo of little bluestem. The yellow arrows point to nodes on the stems.

This famous poem can help you remember the differences between the three:

Sedges have edges;

Rushes are round;

Grasses have bumps all the way to the ground.

In the poem, “edges” refers to the triangular stem of a sedge. “Round” refers to the smooth round stem of a rush. “Bumps” refers to the nodes or joints where leaves attach to the stem of a grass.

Illustration credit for this section in order:

American beakgrain: Hitchcock-Chase Collection of Grass Drawings, on indefinite loan from the Smithsonian Institution, courtesy of Hunt Institute for Botanical Documentation, Carnegie Mellon University, Pittsburgh, Pa.

Angiosperm flower, grass flower, grass spikelet, inflorescence type: Clark, Lynn G., and Richard W. Pohl. Agnes Chase’s first book of grasses: the structure of grasses explained for beginners. Smithsonian Institution, 2012.

Threadleaf sedge, rush flower, rush inflorescence: United States Department of Agriculture Forest Service Collection, courtesy Hunt Institute for Botanical Documentation, Carnegie Mellon University, Pittsburgh, PA.

1.2 Growth

Native sedge in wetland. Photo by Dave Hansen.

Cool Season vs. Warm Season

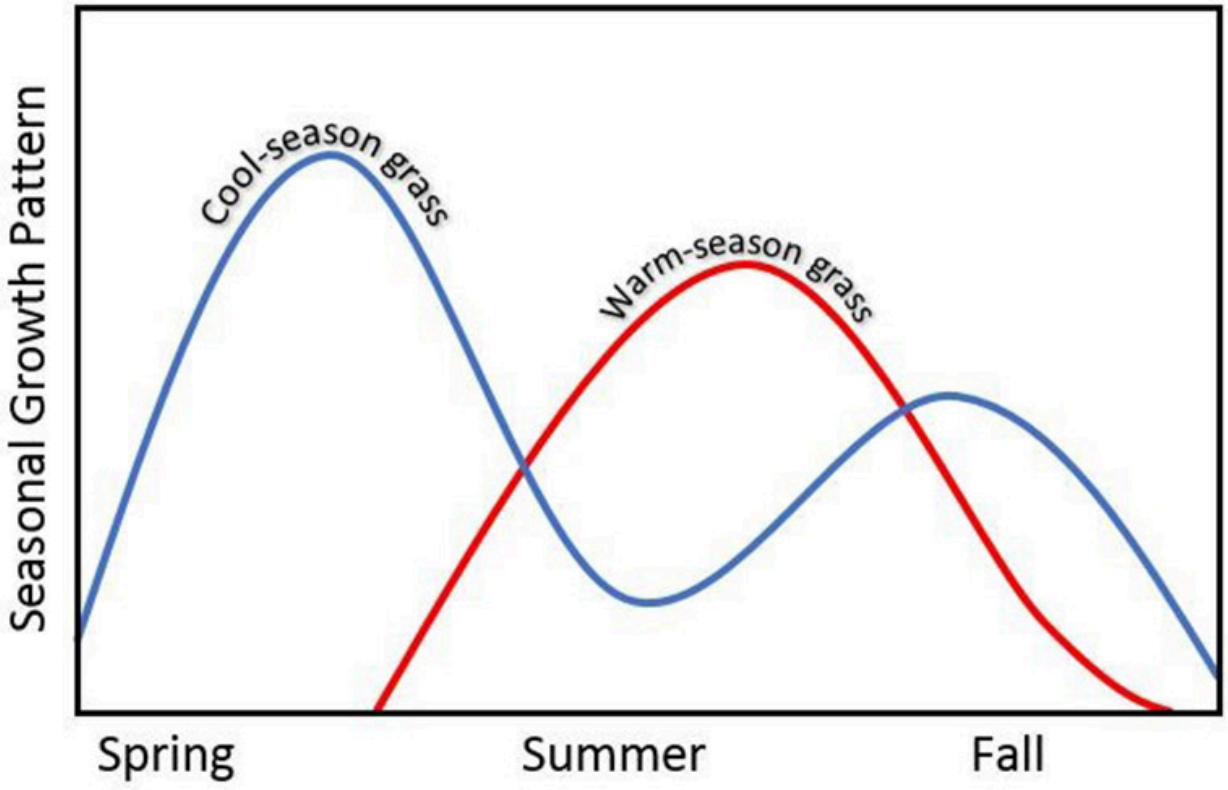
Grasses have evolved over centuries to take advantage of the environment around them. Depending on the climate where they originated, they have developed one of two different ways to produce sugars through **photosynthesis**.

These ways are referred to as **C3** and **C4** photosynthesis. C3 plants have evolved in temperate climates and are called cool season plants because their photosynthetic pathway is most efficient in cooler temperatures. Hot temperatures slow the growth of C3 grasses and may induce dormancy until temperatures cool again. C3 grasses flower in late spring or early summer before temperatures get too high.

C4, or warm season grasses, use an altered photosynthetic process that uses less water and takes advantage of warmer temperatures. Their optimum temperature range for growth and development is

higher than C3 grasses. Warm season grasses flower at the end of the summer and reach their peak growth in September.

Cool and **warm** season grasses will have very different growth rates and life cycles in a garden and prairie setting. Using these differences for design and function in the garden should be part of your overall use of grasses to maximize their benefit. The exact seasonal growth patterns of cool and warm season grasses differ slightly depending on the species and the climate. The above graph shows the general growth patterns of each type and how they overlap.



A visual representation of cool-season and warm-season grass growth patterns from University of Minnesota Extension.University of Minnesota Extension

Growth Habit

Grasses have two general growth habits, clumping and running. Clumpers grow in tufts or bunches and are often referred to as bunch grasses. Grasses with a running growth habit spread rapidly by sending out horizontal stems called **stolons** if aboveground or called **rhizomes** if below ground.

The type of growth habit is important to consider when deciding where and which grass to plant. Running grasses can be great for stabilizing banks and acting as good ground cover, but can also take over areas with less competitive plants. Most clumping grasses do not spread rapidly and instead grow slowly outward, making them easier to manage.

The Morris Grass Collection in 2002, originally planted in 1996. In 6 years the rhizomatous grasses in back clearly show their method of growth compared to the bunch grasses in the foreground.

Growth Form

In addition to their growth habit, grasses grow in various shapes that are referred to in the design world as forms. Common grass forms are irregular, upright open, upright narrow, upright arching, mound, and open and spreading.

IRREGULAR

Culms *are of varying length, often branched, and exhibit no regular pattern of growth, like the 'Oehme' palm sedge above.*

UPRIGHT OPEN

***Culms** are multi-stemmed or branched, varying in height and spreading upward and outward, like the big bluestem above.*

UPRIGHT NARROW

Culms *are rarely, if ever, branched and usually perpendicular to the ground; mature height of each culm many times greater than width, like the Indiangrass above.*

MOUND

Culms *are usually short and hidden by long leaves that curve outward and downward, forming a dense plant that is more or less round in outline like the prairie dropseed plant above.*

UPRIGHT ARCHING

Culms *upright and spreading, with the inflorescence arching and/or nodding. Prairie cordgrass, pictured above, typically exhibits an upright arching form.*

OPEN AND SPREADING

Culms *and/or leaves spread more or less horizontally outward from the center of the plant and are rarely erect. Above, Pennsylvania sedge is exhibiting an open and spreading form.*

Annual vs. Perennial

Most native grasses used for landscapes are long-lived perennials, going dormant in the winter and growing again the following spring. However, some grass species are annuals, completing their entire life cycle, and then dying in one year.

Other grasses are perennials in warmer climates, such as in **hardiness zones** 6 or 7, but are grown as annuals in zones 3 and 4. Details on the perennial life-cycles of individual species can be found in Chapter 3.

'Blond Ambition', a selection of blue grama from New Mexico may act as an annual in zones 3 and 4.

1.3 Literature Cited

Form definitions come from: Hockenberry, M. L. 1973. *Landscape Characteristics and a key for selected ornamental grasses*. M.S. Thesis. Cornell University.

Chapter 2. Benefits of Native Grasses

Native grasses are not only aesthetically pleasing, they are low maintenance and beneficial for the surrounding wildlife.

Chapter sections

Dion skipper by Bryan Reynolds

2.1 Soil Benefits

Low Inputs

Native grasses need little maintenance or input from gardeners. If they are planted in sites suitable to their native habitat, they rarely need water once established. They do well in tough sites that other plants may not be able to handle. Some native grasses are drought tolerant, able to grow in clay-soils, or standing water tolerant. Matching the native grass to its preferred site is key to a long-term sustainable planting. Native grasses rarely need fertilizer, and in fact too much fertilizer can actually be harmful, causing full-grown plants to grow weak and flop over.

Native grasses are generally insect pest and pathogen free (see exceptions in Chapter 4). Because they are indigenous to the region, they have evolved to survive with larger animals that may be pests on other garden plants, such as deer and rabbits. In fact, some grasses with sharper leaves can be used as a barrier to protect vulnerable plants from deer (Darke 2007).

Soil Benefits

Grasses have deep, fibrous root systems that stabilize the soil, reducing erosion. The underground root system of many perennial grasses is larger than the aboveground plant. The fibrous or hair-like nature of grass roots enables them to take up large quantities of water and to increase organic matter in the soil as they decompose. Grasses, with their deep roots, helped produce the rich, fertile soils of the prairie.

Because of their soil stabilization properties, native grasses and sedges make good choices for berms, slopes, and banks.

These root systems also act as absorption and filtration systems for water runoff, catching impurities and pollutants before they enter the ground water. For this reason, grasses have long been recommended as good plants for buffer strips, located along the edge of crop fields or along paved parking areas. Native grasses can be the workhorses for rain gardens and green swales in urban areas.

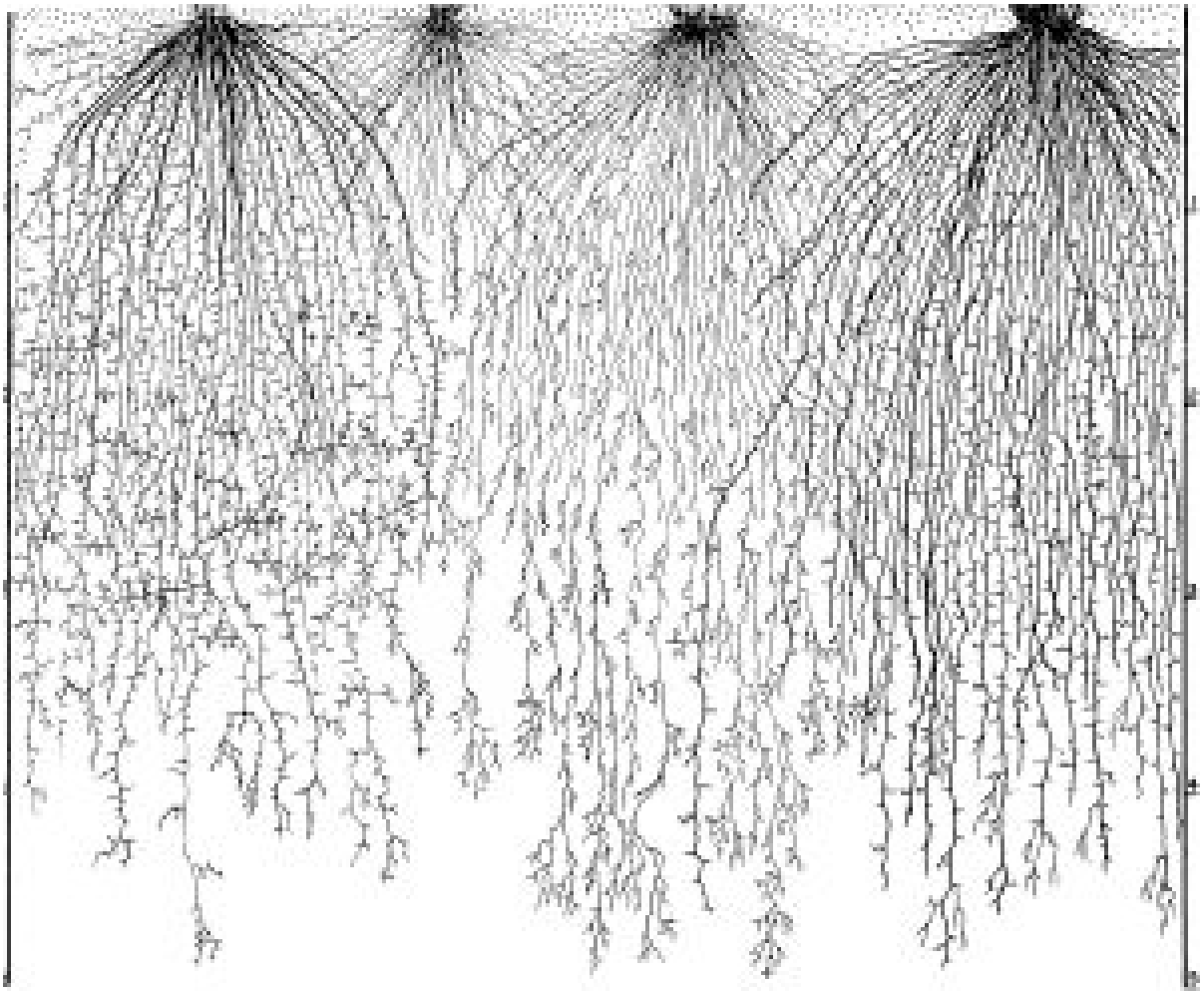


Diagram of root growth in a typical upland prairie. From left: needlegrass (Stipa spartea), Junegrass (Koeleria cristata), little bluestem (Schizachyrium scoparium) and prairie dropseed (Sporobolus heterolepis). Diagram reproduced from Weaver 1958.

Grass Root Depths In Tall and Mixed grass prairie (source: Weaver, 1958)

PLANT	ROOT DEPTH
big bluestem	6-7 feet
prairie cordgrass	6-10 feet
switchgrass	8-11 ft
little bluestem	4 -5 ft
prairie dropseed	4-5 ft
side-oats grama	4.5-5.5 ft
Junegrass	15-20 in

2.2 Lepidoptera Relationships

Grasses are important components in prairie ecosystems. Estimates on the components of the original North American prairie indicate that grasses composed up to 80% of the plants. Numerous species of grassland birds, mammals, and insects use grasses for nesting, cover, and food. As the prairie has declined across the Midwest, so have numerous native prairie species.

Garita skipperling by Bryan Reynolds

Native grasses are especially important to certain plant-eating insects. In general, insect herbivores specialize in eating a specific species, genus, or family. These insects are called specialists, as compared to generalists, which can eat a wider variety of plants. A common example of this is the monarch butterfly, whose larvae feed only on plants in the milkweed genus. If there is a dearth of milkweed plants, the larvae do not start eating different species. Instead, they are simply left without food. Monarchs need milkweed species in order to survive and sustain their populations. This is the case with most other **Lepidoptera** (butterfly and moth) species, although there are exceptions. Groups of insects that have been comprehensively studied suggest that less than 10% of larvae feed on species from more than three families (Bernays and Graham 1988).

Dakota skipper larvae by the Minnesota Zoo.

Numerous species of Lepidoptera larvae have been noted in the literature to use native graminoids for food and shelter. In Minnesota alone, 36 species of Lepidoptera were recorded to feed on 17 dominant or common prairie grasses during their larval stage (Narem and Meyer 2017). When the range is expanded to include more states and more species of grasses, the number grows. Even more species, especially moths, are suspected of eating grasses, but as of yet do not have documented larval eating habits. As more research is done and more larval habits are documented, more species will be added to the list. Specific associations between native Lepidoptera of the northern Midwest and native grasses are listed in Chapter 3.

Dakota skipper larvae shelter in prairie dropseed plant. Photo by Diane Narem.

Butterflies that feed on native grasses occur in two subfamilies: the Hesperiinae or grass skippers and the Satryinae or browns, stayrs, or nymphs.

Grass skippers have short, thick bodies that grant them the ability to fly in bursts, making it look like they are skipping across the prairie. Larvae feed on grasses, sedges, and/or rushes. Many make and reside in shelters within or at the base of grasses during their larval life stage. They overwinter as larvae within the bases of bunch grasses at or just below the soil surface.

The common wood nymph, a species in the Satyrinae family. Photo by Karl Foord.

The Satyrinae subfamily contains browns, satyrs, and nymphs. All species eat monocots during their larval stage; some eat grasses and/or sedges. The larvae pupate underground in silklined nests or hang upside down. They hibernate as larvae (Scott 1986).

Many of the Lepidoptera that feed on grasses are endangered, threatened, or rare, like the Dakota skipper and Poweshiek skipperling. Often, these species depend on only a few species of grass to provide them with cover and/or food during their larval life stage. We should not be surprised that as the native grasses of the prairie disappear, the butterflies and birds dependent on this habitat have disappeared.

2.3 Predatory Insect Relationships

Native grasses provide habitat for other beneficial insects as well, such as ground beetles. Ground beetles are voracious predators. They prey on other invertebrates such as aphids, slugs, and grasshoppers, that can be pests on vegetable and row crops. For this reason, native grasses are being used in various agricultural schemes as a form of biological pest control.

In England, farmers have been using beetle banks since the 1970‘s as a way to reduce chemical inputs. Beetle banks are rows of elevated earthen embankments that have been planted to native grasses and sometimes wildflowers. Predatory beetles take shelter in these strips over the winter, and dispatch in the spring into the fields where they prey on crop pests. Beetle banks have begun to catch on in the United States largely in the Pacific Northwest (Mäder et al. 2014). They are not commonly used throughout the country as of yet. Organizations like the Xerces Society are teaming up with federal agencies to research and promote this and other biological pest control measures.

2.4 Nativars

Potential Indiangrass nativars planted for trials at the MN Landscape Arboretum.

A **cultivar** is a plant that has been produced from human selection or breeding. A **nativar** is a cultivar of a native plant. Most native grass cultivars are nativars that have been selected from the wild and not bred in cultivation for many generations.

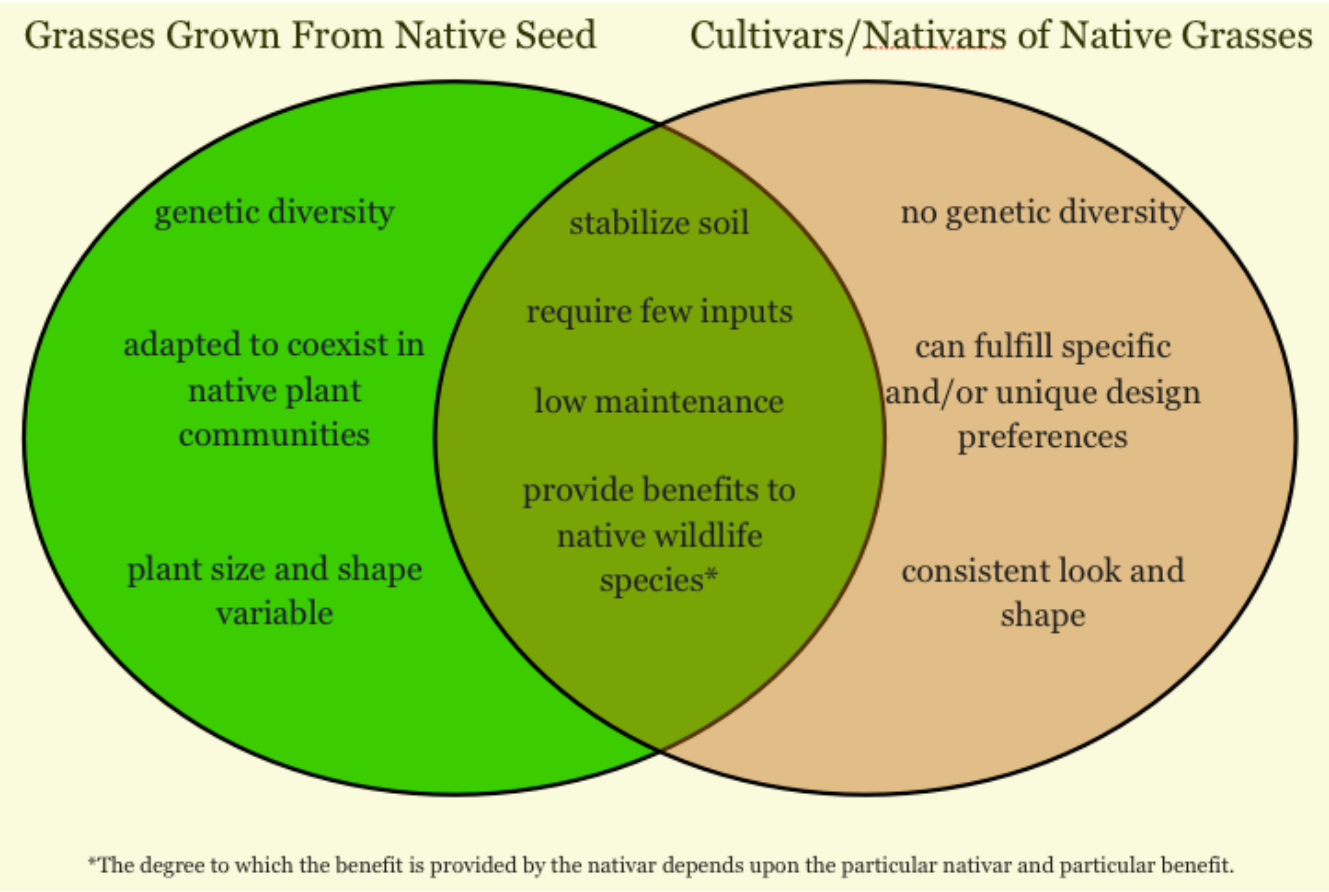
Because they are propagated vegetatively, nativars are clones of each other. This ensures they have consistent size, shape, and color, but means they lack genetic variability. Plants grown from seed, however, have great **genetic variability**, as each seed is distinct and will produce a plant with different characteristics. This means that, appearance will vary between plants. While this is not optimal for a garden design, it is good for restorations. Plants grown from native seed will be better adapted to exist in native plant communities. For this reason, nativars are not equivalent ecological substitutes for plants grown from native seed and are not recommended for restorations (White 2016).

However, native grass nativars provide many of the same benefits that grasses grown from seed provide. They both add organic matter to the soil, require few inputs, and require little maintenance. Benefits provided to wildlife are situational and nativar-specific, and have not been thoroughly studied yet. A study that looked at how well wildflower nativars attracted pollinators compared to the same species grown from seed found that plants grown from native seed outperformed their nativar counterparts more often, but sometimes no differences were found (White 2016). For one species, the nativar attracted more pollinators than the plant grown from seed. This demonstrates the need to evaluate nativars on

an individual basis for the benefits they provide. In general, the farther removed a nativar is from the original plant, the less likely it will be to provide the same benefits (White 2016).

Blue HeavenTM in fall color.

Many native grass nativars are not far removed from their original species. For example, Blue HeavenTM is a nativar of little bluestem that was selected from a population of seed collected from Benton County, Minnesota. Blue HeavenTM was not bred with specific parents or used in a breeding program. It is simply a plant that was grown along with several other hundred little bluestem and literally 'stood out in a huge field planting' as a distinctively tall and darker colored little bluestem. All of the Blue HeavenTM plants have originated from this one original plant. Seed that comes from Blue HeavenTM will of course be little bluestem, but may not look exactly the same as the parent plant.


Grasses Grown From Native Seed
Cultivars/Nativars of Native Grasses
genetic diversity
adapted to coexist in native plant communities
plant size and shape variable
stabilize soil
require few inputs
low maintenance
provide benefits to native wildlife species*
no genetic diversity
can fulfill specific and/or unique design preferences
consistent look and shape
*The degree to which the benefit is provided by the nativar depends upon the particular nativar and particular benefit.

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Chapter 3. Common Native Grasses of the Northern Midwest

Big bluestem (Andropogon gerardii) by Dave Hansen.

This chapter contains a guide to the most commonly sold native grasses, their characteristics, growing conditions, and nativars. We also searched the literature for records of Lepidoptera larval food and host plants, and included any associations we found for Lepidoptera species native to the Northern Midwest.

Chapter sections

3.1 Big bluestem

Andropogon gerardii

'Dancing Wind' big bluestem

Warm season; Perennial

Characteristics: 4–8'; upright open; flowers purple; foliage blue-green; fall color

Growing Conditions: average to wet soils; full sun; hardy zones 3–8

Big bluestem is one of the dominant grasses of the tallgrass prairie. An upright **bunch** grass, the foliage changes color from blue-green to rich bronze in the fall. The inflorescence is 3-branched and is commonly said to resemble a turkey foot. Each branch has a purple spike that turns bronze in the fall.

Nativars:

- 'Blackhawks': Foliage is darker purple than other nativars. Foliage starts dark green and takes on purple tones by midsummer, turning completely dark purple by fall. Can be susceptible to rust.
- 'Dancing Wind': Reddish copper stems and flowers, turns purple and dark red in the fall.
- 'Indian Warrior': Dark purple foliage and flowers, becomes open spreading with age.
- 'Rain Dance': Foliage and flowers are purple with red tips. Foliage becomes maroon in the fall.
- 'Red October': Red foliage in summer and fall

Associated Lepidoptera:

Species that feed on big bluestem according to the literature are Oslar's roadside skipper (*Amblyscirtes oslari*), Delaware skipper (*Anatrytone logan*), Arogos skipper (*Atrytone arogos*), dusted skipper (*Atrytonopsis hianna*), wheat head armyworm (*Faronta diffusa*), Dakota skipper (*Hesperia dacotae*),

cobweb skipper (*Hesperia metea*), Ottoe skipper (*Hesperia ottoe*), Indian skipper (*Hesperia sassacus*), Newman's borer (*Meropleon ambifusca*), and byssus skipper (*Problema byssus*).

Big bluestem nativars: 'Lord Snowden' and 'Red October'

'Indian Warrior' seedheads

3.2 Sideoats grama

Sideats grama in flower, note the red, pendulous stamens.

Bouteloua curtipendula

Warm season; Perennial

Characteristics: 12–30”; upright open; flowers green, red; foliage gray-green

Growing Conditions: average to dry soils; drought tolerant: full sun; self-seeder; hardy zones 3–8

Sideoats grama is a mid-height grass that grows upright and open, spreading out into a rounder shape. The pendulous seedheads hang from the stems and appear red when the stamens are shedding pollen.

Nativars:

Currently, no nativars are available.

Associated Lepidoptera:

Species that feed on sideoats grama according to the literature are Oslar's roadside skipper (*Amblyscirtes oslari*), Arogos skipper (*Atrytone arogos*), Assiniboia skipper (*Hesperia assiniboia*), Dakota skipper (*Hesperia dacotae*), Pawnee skipper (*Hesperia leonardus pawnee*), Ottoe skipper (*Hesperia ottoe*), and Poweshiek skipperling (*Oarisma poweshiek*).

3.3 Blue grama

Bouteloua gracilis

Warm season; Perennial

Characteristics: 8–24”; irregular; flowers green to yellow; foliage gray-green; self-seeder

Growing Conditions: average to dry soils; drought tolerant: full sun; hardy zones 3–8

Blue grama has interesting **seedheads** that have been described as looking like tiny combs, eyebrows, or grasshoppers. Blue grama can handle hot and dry sites. It can be used for low maintenance or alternative lawns. Infrequent mowing, monthly or as little as twice a year, can maintain grasses, but broadleaf weed control may be necessary until grasses are established.

Blue grama in flower.

Nativars:

‘Blond Ambition’: **Seedheads** are yellow-green and are borne on stems 3’, taller than blue grama plants from the Midwest. Selection is from New Mexico and may have limited hardiness in colder **zones**, can easily be grown as an annual.

Associated Lepidoptera:

Species that feed on blue grama according to the literature are Oslar’s roadside skipper (*Amblyscirtes oslari*), Simius skipper (*Notamblyscirtes simius*), Mead’s wood nymph (*Cercyonis meadii*), Blake’s tiger moth (*Grammia blakei*), Assiniboia skipper (*Hesperia assiniboia*), Common branded skipper (*Hesperia comma*), Leonard’s skipper (*Hesperia leonardus*), Ottoe skipper (*Hesperia ottoe*), Pahaska skipper (*Hesperia pahaska*), Uncas skipper (*Hesperia uncas*), Ridings’ satry (*Neominois ridingsii*), Garita skipperling (*Oarisma garita*), and Rhesus skipper (*Polites rhesus*).

The nativar ‘Blonde Ambition’, in a boulevard planting. Blue grama does well in droughty conditions so is a good choice for boulevard plantings.

3.4 Hairy grama

Bouteloua hirsuta

Warm season; Perennial

Characteristics: 12–24”; upright open; flowers green to purple; foliage chartreuse

Growing Conditions: average to dry; drought tolerant; full sun; hardy zones 3–8

Hairy grama is a smaller grass that has a very open growth habit, with leaves crowded near the base. The **seedheads** are similar in shape to blue grama, but are covered in fine hairs, giving them a fuzzy look. The seedheads can be green to purple, sometimes taking on a deep bronze color.

Hairy grama in a prairie. Photo courtesy of Peter Dzuik of Minnesota Wildflowers.

Nativars:

Currently, no nativars are available. The plant is not widely available, but can be found at native garden centers.

Associated Lepidoptera:

Species that feed on hairy grama according to the literature are Uncas skipper (*Hesperia uncas*), Ottoe skipper (*Hesperia ottoe*), and Leonard’s skipper (*Hesperia leonardus pawnee*).

3.5 Lake sedge, hairy sedge

Carex lacustris

Lake sedge in a wetland. Photo courtesy of Peter Dzuik of Minnesota Wildflowers.

Cool season; Perennial

Characteristics: 1–4'; open upright; foliage green; flowers yellow-green

Growing Conditions: moist to wet soils; full sun to heavy shade; standing water tolerant; hardy zones 3–7

Lake sedge is a colony-forming sedge with strong rhizomes. For this reason, it is good for stabilizing river banks and lake shores, but may be aggressive.

Nativars:

No nativars are currently available. The plant is not widely available, but can be found at native garden centers.

Associated Lepidoptera:

Species that feed on lake/hairy sedge according to the literature are Dion skipper (*Euphyes dion*), Dukes' skipper (*Euphyes dukesi*), sedge witch (*Euphyes vestris*), marsh eyed brown (*Satyrodes eurydice*), Appalachian brown (*Satyrodes appalachia*), and broad-winged skipper (*Poanes viator*).

3.6 Palm sedge

Palm sedge at the Minnesota Landscape Arboretum.

Carex muskingumensis

Cool season; Perennial

Characteristics: 2–3’; upright open; foliage green to yellow; flowers tan; self-seeder

Growing Conditions: full sun to medium shade; self-seeder; hardy zones 3–7

Native to wet areas along rivers and marshes, palm sedge is known for its stiff foliage and the three-ranking leaf arrangement typical of sedges. Easy to grow, it tolerates standing water at lake edges and soils that flood. In ideal sites, plants can be 36” wide, thick, and full. Chartreuse foliage when grown in sun, dark green in shade.

Nativars:

- ‘Little Midge’: very fine textured, 12-15” tall, stiff three-ranked foliage.
- ‘Oehme’: has yellow margins, slower growing, very attractive. Named for Wolfgang Oehme.

Associated Lepidoptera:

No records of Lepidoptera feeding on palm sedge were found in the literature, but further research into Lepidoptera larval habits may discover associations in the future.

3.7 Pennsylvania sedge

Carex pensylvanica

Pennsylvania sedge growing in the shade.

Cool season; Perennial

Characteristics: 6–12”; mound; foliage yellow-green to forest green; flowers brown to yellow

Growing Conditions: average to dry soils; full sun to heavy shade; drought tolerant; hardy zones 3–8

This fine-textured sedge grows in a variety of sites, including dry shade. It can be used as a ground cover in landscaping situations, on steep slopes, and on other tough sites.

Nativars:

Currently, no nativars are available, but the species is widely available at garden centers.

Associated Lepidoptera:

While no records of Lepidoptera feeding or using Pennsylvania sedge were found in a search of the literature, there are records of Lepidoptera using sun sedge (*Carex inops subsp. heliophila*), which is closely related. Sun sedge occurs in dry prairie, whereas Pennsylvania sedge occurs in wooded areas. Lepidoptera that use sun sedge are Dakota skipper (*Hesperia dacotae*), Dun skipper (*Euphyes vestris*), Assiniboia skipper (*Hesperia assiniboia*), and Garita skipperling (*Oarisma garita*).

3.8 Tussock sedge

Carex stricta

Cool season; Perennial

Characteristics: 1–4’; mound to open upright; foliage green; flowers brown

Growing Conditions: moist to wet soils; full sun; standing water tolerant; hardy zones 3–7

Tussock sedge is a clump-forming sedge that can tolerate very wet sites. It is native to wetlands, wet meadows, fens, and prairie swales. It can tolerate flooding because it forms clumps above the water line, which allows water to get to its roots. This sedge can be aggressive in certain situations and develops a strong, deep root system.

Nativars:

No nativars are currently available. The plant is not widely available, but can be found at native garden centers.

Tussock sedge in its native habitat. Photo by Peter Dziuk of Minnesota Wildflowers.

Associated Lepidoptera:

Species that feed on tussock sedge according to the literature are bog lithacodia moth (*Deltote bellicula*), black dash (*Euphyes conspicua*), Appalachian brown (*Satyrodes appalachia*), marsh eyed brown (*Satyrodes eurydice*), and mulberry wing (*Poanes massasoit*).

3.9 Tufted hairgrass

Deschampsia cespitosa

Tufted hairgrass in full flower, 'Goldstaub' in foreground.

Cool season; Perennial

Characteristics: 3–4'; mound; foliage dark green; flowers beige

Growing Conditions: average to wet soils; sun to shade; hardy zones 3–9

This mound-forming grass requires moisture to establish. It is semi-evergreen, and one of the first grasses to grow in the spring. Foliage may show rust, but it is not fatal.

Nativars:

- 'Bronzeschleier': bronze veil hairgrass, flowers are darker, more bronze colored.
- 'Goldstaub': gold dust hairgrass, shorter, only 1–2', beautiful mound habit.
- 'Schottland': Scotland hairgrass, yellow flowers, 2–3', most common nativar.

Associated Lepidoptera:

No records of Lepidoptera feeding on tufted hairgrass were found in the literature, but further research into Lepidoptera larval habits may discover associations in the future.

3.10 Eastern bottlebrush grass

Elymus hystrix

Cool season; Perennial

Characteristics: 30–36”; upright narrow; foliage chartreuse; flowers green to beige; self-seeder

Growing Conditions: average to moist soils; full sun to heavy shade; hardy zones 3–7

This grass can be short-lived, but easily self-seeds. It is often found in wooded areas or at the edge of woods. The seedheads are unique and shaped like bottlebrush cleaners (hence the name), but shatter readily.

Eastern bottlebrush grass in flower.

Nativars:

Currently, no nativars are available.

Associated Lepidoptera:

Species that feed on eastern bottlebrush grass according to the literature are the scythridid moth *Asymmetrura graminivorella*, golden borer moth (*Papaipema cerina*), the elachistid moths *Elachista epimicta* and *Elachista orestella*, the northern pearly eye (*Enodia anthedon*), and lanceolate helcystogramma moth (*Helcystogramma hystricella*).

3.11 Junegrass

Koeleria macrantha

Cool season; Perennial

Characteristics: 28–36”; irregular; foliage blue gray; flowers light green to beige

Growing Conditions: average to dry soils; full sun to light shade; hardy zones 3–8

Native to dry prairies, this grass grows in irregular tufts or bunches. It may be short-lived, especially in heavy soils. Good for septic mounds, dry gravely soils, dry slopes, and low maintenance lawns. Can tolerate foot traffic and mowing.

Nativars:

No nativars are currently available. The plant is not widely available yet, but can be found at native garden centers.

Junegrass in flower.

Associated Lepidoptera:

Species that feed on Junegrass according to the literature are tawny-edged skipper (*Polites themistocles*), Blake’s tiger moth (*Grammia blakei*), Assiniboia skipper (*Hesperia assiniboia*), Dakota skipper (*Hesperia dacotae*), and Garita skipperling (*Oarisma garita*).

3.12 Switchgrass

‘Praire Fire’ switchgrass in flower, showing fall color.

Panicum virgatum

Warm season; Perennial

Characteristics: 3–6’; upright, foliage greenish purple; flowers bronze to beige; upright open; self-seeder

Growing Conditions: average to wet soils; full sun; hardy zones 3–8

Native to the tallgrass prairie, switchgrass is competitive and can be aggressive. It is attractive through every season, even providing winter interest. Some nativars are prone to **lodging**, others self-sow large amounts of seed. Form and foliage color vary widely between nativars.

Nativars:

- ‘Cloud 9’: upright arching to 6’ or more, equally as wide; plant in the middle of a border with support for the huge 36” flowers.
- ‘Heavy Metal’: upright, dense, thick foliage, 4–5’
- ‘Northwind’: very stiff and upright, wide olive green foliage with flowers borne partially in foliage, good for creating a vegetation screen when planted close together, 5’.
- ‘Prairie Fire’: red and purple tipped foliage, 3.5–4’.
- “Rehbraun’: red tipped foliage and red seeds, red-brown switchgrass, 3–4’.
- ‘Shenandoah’: red and green foliage, 3–4’.
- ‘Thundercloud’: very tall, upright, thick and massive, 6–7’.

Associated Lepidoptera:

Species that use switchgrass according to the literature are the noctuid moth *Dichagyris acclivis*, the tortricid moth *Aethes spartinana*, Delaware skipper (*Anatrytone logan*), the blastobasid moth *Blastobasis repartella*, pink-streak moth (*Faronta rubripennis*), Leonard’s skipper (*Hesperia leonardus*), silvered haimbachia moth (*Haimbachia albescens*), Texas mocis moth (*Mocis texana*), stalk borer (*Papaipema nebris*), and tawny-edged skipper (*Polites themistocles*).

Switchgrass nativars from left to right: ‘Northwind’, ‘Warrior’, ‘Thundercloud’, and ‘Cloud 9’. Shape and color vary greatly between nativars.

3.13 Little bluestem

Blue HeavenTM in brilliant fall color. Photo by Dave Hansen.

Schizachyrium scoparium

Warm season; Perennial

Characteristics: 2–4’; upright; flowers purple; foliage blue-green; fall color; self-seeder

Growing Conditions: average to dry soils; full sun; hardy zones 3–8

Native in tall and shortgrass prairies, little bluestem can grow in a variety of soils, but prefers well-drained to upland. It is beautiful throughout the season, with typically blue-green summer foliage turning to red and orange in the fall.

Nativars:

- ‘Carousel’: a rainbow of colors in blue-gray, bowl-shaped, 30” foliage.
- Blue HeavenTM: University of Minnesota selection, upright blue foliage in summer, burgundy in late summer, red in fall, 3–4’.
- ‘Prairie Blues’: blue foliage, but can be very open and prostrate, 3–4’.
- ‘Standing Ovation’: Upright, blue-green turning orange, red, and yellow in the fall, 3–4’.
- ‘The Blues’: light blue foliage, but can easily lodge in rich soil, 3–4’.

Associated Lepidoptera:

Species that feed on little bluestem according to the literature are Oslar’s roadside skipper (*Amblyscirtes oslari*), Arogos skipper (*Atrytone arogos*), dusted skipper (*Atrytonopsis hianna*), common wood nymph (*Cercyonis pegala*), the elachistid moth (*Cosmopterix callichalca)*, Assiniboia skipper (*Hesperia assiniboia*), Dakota skipper (*Hesperia dacotae*), Leonard’s skipper (*Hesperia leonardus*), Pawnee skipper (*Hesperia leonardus pawnee*), cobweb skipper (*Hesperia metea*), Ottoe skipper (*Hesperia ottoe*), Indian skipper (*Hesperia sassacus*), swarthy skipper (*Nastra lherminier*), Poweshiek skipperling (*Oarisma poweshiek*), crossline skipper (*Polites origenes*), and the gelechiid moth (*Stereomita andropogonis*).

On the left, from left to right, 'Prairie Blues' and 'Carousel'.

Nativars ‘Smoke Signal’ and ‘Twilight Zone’

3.14 Indiangrass

Sorghastrum nutans

Warm season; Perennial

Characteristics: 3–6’; upright to columnar; flowers bronze; foliage blue-green; fall color

Growing Conditions: full sun; hardy zones 3–8

A dominant grass in the tallgrass prairie, Indiangrass is a large grass that grows very upright. The **seedheads** are long, feathery spikes that appear yellow when pollen is shedding and turn bronze as the season continues.

Nativars:

- ‘Indian Steel’: upright with numerous, shiny bronze flowers, 5–6’.
- ‘Sioux Blue’: an excellent selection for gardens; showy yellow flowers, 5–5.5’.

Associated Lepidoptera:

Species that use Indiangrass according to the literature are pepper and salt skipper (*Amblyscirtes hegon*) and wheat head armyworm (*Faronta diffusa*).

Indiangrass in flower.

3.15 Prairie cordgrass

Spartina pectinata

Warm season; Perennial

Characteristics: 4–6’; upright arching; flowers green; foliage green to yellow green in fall

Growing Conditions: average to wet soils; full sun; hardy zones 3–8

In native habitats, this grass is found in wet meadows and ditches, the edges of wetlands, and lakeshores. It prefers wet soils, and can tolerate sandy seashores and heavy clay soils. Its strong rhizomes can be aggressive in a garden, but are perfect for lakeshores and areas too wet for other plants. It provides a yellow fall color.

Prairie cordgrass in its native habitat showing fall color. Photo by Dave Hansen.

Nativars:

- ‘Aureo-Marginata’: variegated prairie cordgrass, yellow margins and stripes on the foliage, 4–6’

Associated Lepidoptera:

Species that use prairie cordgrass according to the literature are the tortricid moth *Aethes spartinana*, the noctuid moth *Chortodes enervata*, the noctuid moth *Mesapamea stipata*, and the pyralid moth *Peoria gemmatella*.

3.16 Prairie dropseed

‘Tara’ prairie dropseed in flower.

Sporobolus heterolepis

Warm season; Perennial

Characteristics: 3–4’; mound; flowers beige with purplish hue; foliage deep to lime green;

Growing Conditions: average to dry soils; full sun; hardy zones 3–8

This fine-textured mound-forming grass does well in upland or dry sites. The flowers are light and airy, creating a cloud-like mass. They have a unique fragrance and smell like hot buttered popcorn or coriander and cumin. Prairie dropseed can be used en masse to cover slopes and as an alternative lawn where foot traffic is minimal.

Nativars:

- ‘Tara’: shorter form, uniform and upright, flowers gold; 24–30”.

Lepidoptera:

Species that use prairie dropseed according to the literature are the noctuid moth Anicla tenuescens, the noctuid moth *Dichagyris reliqua*, Dakota skipper (*Hesperia dacotae*), Pawnee skipper (*Hesperia leonardus pawnee*), Ottoe skipper (*Hesperia ottoe*), and Poweshiek skipperling (*Oarisma poweshiek*).

Chapter 4. Planting, Maintenance, and Management

Chapter sections

Little bluestem in a garden setting.

4.1 Planting

Minnesota Landscape Arboretum Grass Collection May 2012

Planting

Grasses can be planted anytime starting from after the last frost in the spring to one month before the first hard freeze in the fall. However, planting in the spring in zones 3 and 4 provides the best chance of success. Only in the spring and early summer should you plant bare rooted grasses, like plugs or other small plants. In the fall, plant only large container plants with established roots and allow for at least one month of growth before winter. Nativars are only propagated as plants, not seed, in order to maintain their characteristic plant form and growth habit.

Make sure to give plants plenty of water until they are properly established. Supplemental water may be needed if grasses are planted in the summer. Once they are established, additional irrigation or watering is unnecessary for most native species.

Determine the spacing between plants according to the desired landscape effect and the plant's setting. A good rule of thumb is to space plants equal to their mature height (plants 4' tall are spaced 4' apart), but you can plant farther apart if using them as **specimen plants**. To create a hedge or screen, plant grasses one-half their height apart from each other (4-foot tall grasses would be spaced 2 feet apart for a hedge).

Blue HeavenTM hedge in fall color. Photo by Dave Hansen.

Seed vs. Plants

If you are not concerned with specific plant placement, the planting is very large, or you are restoring a prairie, then establishing grasses from seed is the best option. Restoration projects that are a few thousand square feet or more should be seeded with native seed that will result in a diversity of **genotypes** and plants. Numerous resources are available to help with your specific needs and questions from the University of Minnesota Extension, The Nature Conservancy, and the Minnesota Department of Natural Resources.

Native Minnesota prairie. Photo by Dave Hansen.

4.2 Maintenance

New bunch grass growth in the spring.

Removing Old Growth

Grasses require the removal of old tops, or previous year's growth, in early spring. This can be done by cutting back or burning grasses. The best time of year to remove old growth is very early in the spring before new growth has started. Grass plants add interesting shapes to the landscape and provide shelter for various kinds of wildlife during the winter, so it is important to wait to remove old growth until the spring.

Switchgrass that was cut back in early spring.

Cutting Back

The type of tool you use to cut back grasses depends on the size of the planting. Hand pruning shears or an electric trimmer can be used for small to medium sized plantings. Larger plantings, like restorations, may require larger implements, like mowers or haying machinery.

Bunch grasses that have been cut back.

Burning

Native prairie grasses evolved with periodic fires so they respond well to prescribed burns. Seed set and vigor often increase with annual burning. However, insects and mammals may be killed during burns, so it is recommended to burn only a portion of a prairie or planting at a time. The Minnesota Deparment of Natural Resources, and the Minnesota Department of Agriculture provide resources on prescribed burning.

A professional burning crew carrying out a prescribed burn at the Minnesota Landscape Arboretum. Burning native grasses increases vigor and seed set.

Grasses after they have been burned at the Minnesota Landscape Arboretum.

Professional burning crew at the Minnesota Landscape Arboretum burning the grass collection in the spring.

Crown Division

As bunch grasses age and grow outward, the old growth in the middle often dies, which can give large bunch grasses an uneven, doughnut, or unhealthy appearance. A great way to invigorate these older plants is to divide them, discarding any dead centers or old growth, and transplanting the newly divided crowns. In early spring as new growth starts, you can determine the alive material and easily discard the dead portions. To divide the plant, use a sharp spade or knife to chop through the crown. Remove the old, dead growth, and replant the crown sections. After replanting, water generously until the grass is established.

New spring growth forms a ring around the dead center of this bunch grass.

Use a sharp spade to divide grasses.

Lepidoptera-Friendly Management

Many butterflies and moths that feed on grasses as larvae overwinter in the larval stage, and so are vulnerable to fire. If you suspect that you have skippers overwintering in your planting, consider cutting back grasses instead of burning. If fire management is a must, burn only a portion of the planting, leaving a refuge for skippers or other invertebrates that may be taking shelter in the grasses.

Employees and volunteers cutting back grasses at the Minnesota Landscape Arboretum

4.3 Management

But I thought they were low maintenance?

In general, native grasses are low maintenance, but like any plant, they can have periodic issues that require management. This chapter covers the most common problems that can occur with native grasses.

Blue HeavenTM little bluestem in the fall. Photo by Dave Hansen.

Lodging

Sometimes completely healthy grasses will flop over, or lodge. Lodging can happen at the root or the stem level and is considered any displacement in the plant from a vertical position. It is a common problem in grasses and affects field grasses as well as ornamental grasses.

Many factors can play a role in lodging, making it hard to pinpoint the exact cause. Factors include weather, soil type, sunlight, genetics, and topography. Lodging is often associated with high nutrient loads in the soil, such as excess nitrogen. Lodging is also partially genetic. Some cultivars are more prone to lodging than others.

To help prevent lodging, make sure to plant grasses in appropriate sites. Manage your plants by dividing them and cutting back or burning them each year. This prevents grasses from getting too big and heavy at the top. Avoid planting in shade or low light conditions, which can increase lodging.

Panicum virgatum ‘Cloud Nine’ lodging.

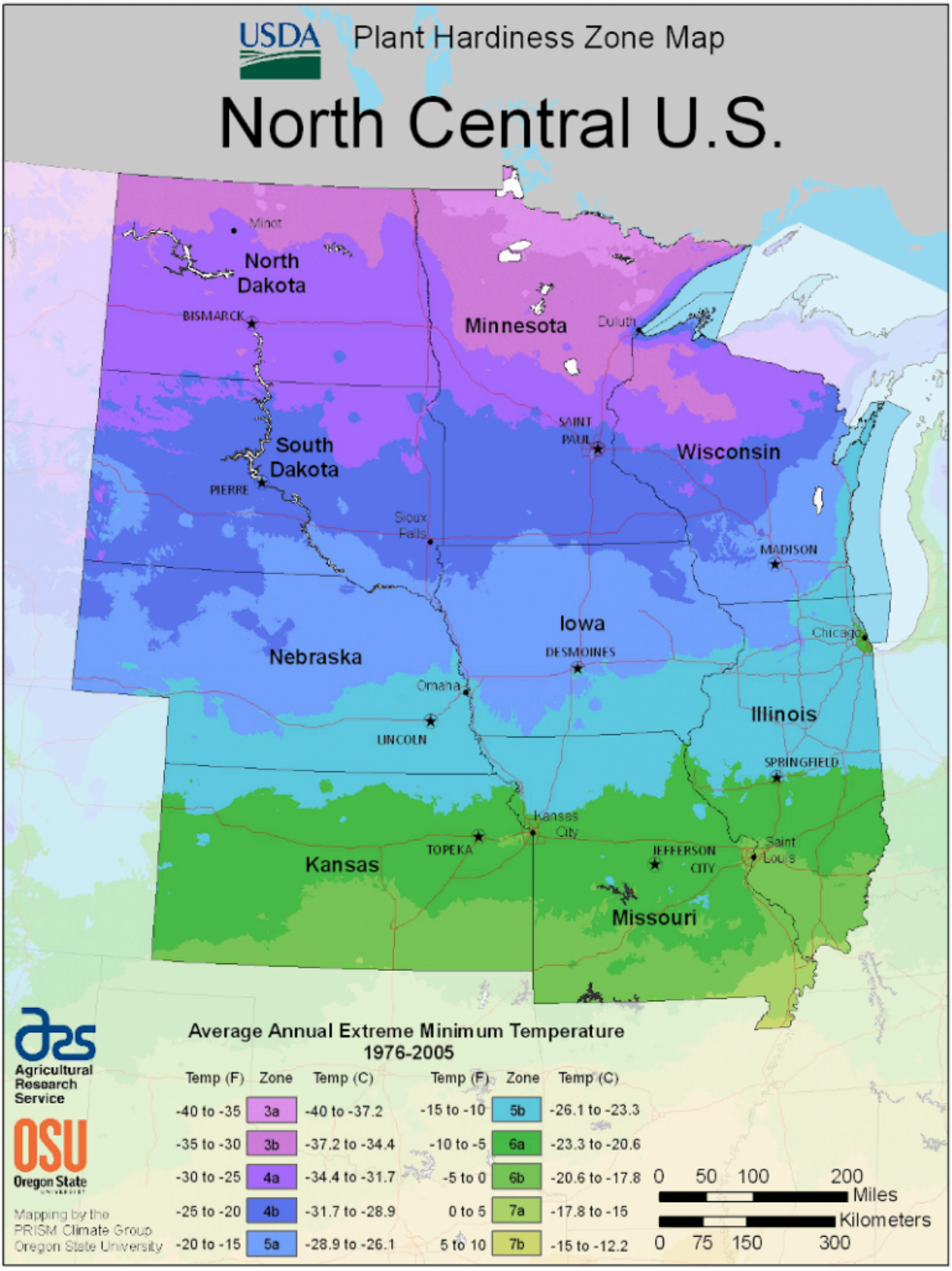
Grasses that lodge can be supported by staking and circling a string around the grass.

Little bluestem nativars exhibiting lodging. From left to right Blute HeaveTM, 'Prairie Blues', and 'The Blues'.

Cold Hardiness

Hardiness refers to the temperature range in which a plant can grow successfully. The USDA plant hardiness zone map gives the average annual minimum winter temperatures in 10 degree zones across the United States. If a grass is native to your region then it should be winter hardy. However, the distribution of many native grasses, especially prairie grasses, spans large geographical regions. For example, blue grama (*Bouteloua gracilis*) grows from Saskatchewan to Mexico. Because it occurs across such varied climates, there is variation within the species. For example, the nativar 'Blonde Ambition', which was selected from New Mexico, has limited hardiness in zone 4 and may not be hardy at all in zone 3 or 2.

Keep this in mind when purchasing nativars from garden centers and make sure to double check the zones on the tag. If buying native seed, check the source of the seed, and make sure it comes from a local seed source (usually within 200–300 miles).



This map is used to determine which plants grow best in which regions. The map is based on the average annual minimum winter temperature, divided into 10-degree F zones. We defined cold climates in this book as zones 3 and 4.

Pests and Pathogens

Pests and pathogens are rare in native grasses, but they are not entirely immune. Fungus in various forms, affects grasses. One such form, rust, can occur on many different grasses, but most commonly affects reed grass, reed canary grass, big bluestem, little bluestem, and switchgrass. Rust is not a fatal disease, but it does discolor foliage. Switchgrass and reed canary grass are prone to leaf spot and blight diseases, especially during wet growing seasons, and root and stem rot pathogens. Smut and head scab have also been known to affect switchgrass (Gleason et al. 2009). Fungal diseases are more damaging to some of the blue cultivars of switchgrass like ‘Heavy Metal’, ‘Warrior’, and ‘Prairie Sky’. Some sedges may develop Pythium root rot if overwatered.

Rust forms brown or orange discoloration on the leaves of some grasses in mid to late summer, shown here on ‘Red October’ big bluestem, shown here.

Weed Control

Weed control can be a bit tricky in grass stands because it is difficult to identify weedy grasses from the grasses you planted intentionally at the beginning of the season. Additionally, many herbicides are made to kill grasses and monocots (Meyer 2012). You can prevent weeds in between plants by using mulch. Also, weedy cool season**s** such as quack grass will start growing early in the spring. If quack grass seedlings sprout near a dormant warm season grass, nonselective herbicides can be applied

in early spring to kill cool season grass weeds without harming the desired warm season grasses. However, weedy grasses, like quackgrass, may often start growing within an ornamental grass clump. Quackgrass has extensive rhizomes that are difficult to remove. In addition to removing any visible stems, quackgrass can grow from small pieces left behind after weeding. If the problem persists, digging the plants followed by careful examination of the different grass roots may be necessary. If the weedy grass roots are totally entangled with the desirable grass, you might have to discard everything and purchase new weed-free plants.

Careful observation of your plants is the best defense against unwanted weeds. Weeds are always easiest to remove when they are small.

Rhizomatous Kentucky bluegrass has invaded this row of bunch grasses.

Quackgrass seedlings, a cool season, sprout around a warm season switchgrass bunch. Switchgrass starts growth later and is still dormant when quackgrass grows.

Self-Seeding

Some species and nativars of native grasses are competitive and self-seeding, and so require management in a garden setting. Two of the most aggressive are switchgrass and river oats. River oats may be marginally hardy in **zone** 4 gardens, but will often self-sow and grow from new seedlings each year.

To manage self-seeders, keep an eye out for seedlings and control with hand weeding or selective herbicide. If any grasses become problematic from self-seeding, **seedheads** can be removed before the winter. Self-seeding characteristics of each grass are listed in the Chapter 3. For more information about self-seeders, check out this article in the University of Minnesota Extension Yard and Garden News by Mary Meyer.

Seedlings coming up on their own without the aid of cultivation in MN Landscape Arboretum grass collection.

4.4 Literature Cited

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Chapter 5. Grass Selection and Butterfly Pairings

Little bluestem and sideoats grama

Armed with new knowledge on the benefits and characteristics of native grasses, you may be eager to start your new garden project. But where to begin? This chapter offers some helpful tips and resources on how to go about choosing native grasses for your situation.

Chapter sections

5.1 How to Begin?

So, how do you decide which grass is the best for your landscape? When determining which native grass is right for your specific planting, you should first take into consideration the site conditions. Site considerations include the soil type, amount of sun, and the size and location of your planting. This will help narrow down the native grasses that you should choose for the site. Secondly, you should consider your design needs. What size, shape, and color fits best in your design? Thirdly, consider the temporal aspect of your planting. Do you want something that blooms mid-summer or in the fall?

For a quick guide to species for tough sites, take a look at this list from Mary Meyer, made for the 30th anniversary of the Grass Collection at the Minnesota Landscape Arboretum. This list includes both native and non-native grasses, so be aware and double check the grass species at USDA plants to figure out if it's native or not.

A big bluestem plant pairs nicely with purple coral bells and threadleaf coreopsis.

Nativar vs. Plant from Native Seed

Once initial considerations are narrowed down, you can make the decision between using a nativar or a plant grown from native seed. For the bonuses and drawbacks and nativars vs. plants grown from native seed refer to section 2.4. Even when selecting native seed, different regional ecotypes are available, so research the origin of the seed you will be using.

Native pollinator garden on the University of Minnesota campus.

Functional Gardens

Native grasses are great plants for gardens that are designed with sustainable or ecological goals, such as pollinator gardens or rain gardens. There are numerous resources available for anyone interested in both pollinator and rain gardens. Organizations that have resources on pollinator gardens include the University of Minnesota Extension, the University of Minnesota Bee Lab, and the Xerces Society. Organizations that have resources on rain gardens include the University of Minnesota Extension, the Evironmental Protection Agency, and the Wisconsin Department of Natural Resources.

Native grasses and wildflowers stabalizing the banks of Lake Noerenberg.

5.2 Wildflower and Grass Pairings

As discussed in Chapter 2, native grasses benefit butterflies and moths during their larval stage. During this stage, these insects are small and earthbound, and so are not very mobile. Lepidoptera do most of their traveling during their adult stage, when they can fly and traverse longer distances. To attract Lepidoptera to a planting, grasses should be paired with wildflowers that provide food for their adult stage.

There is a lot of information available on how to attract pollinators using floral resources. However, there is less information out there about grass skippers and other grass-feeding species. Generally, grass skipper butterflies feed on the nectar of flowers that grow in the same type of habitat where their host grasses grow, and that bloom during their butterfly life span. They seem to prefer composites and other flowers with easily available nectar, but as a group are moderately opportunistic in their choices for nectar. Many grass skipper species have short life spans as butterflies, sometimes only 3–5 weeks. They can only use the flowers that are blooming during the window of time that they are flying. Different species emerge as butterflies at different times during the spring and summer season, taking advantage of different floral resources.

Complete Life Cycle Table

To benefit Lepidoptera during their whole life cycle, plant both the nectar flowers for the adult stage and the host plants for the larval stage. The following table list combinations of nectar flowers and grasses that serve Lepidoptera species during both their butterfly and larvae life stages.This list was compiled by searching the literature (guidebooks and scientific journal articles) and taking note of adult nectar plants and larval food plants.

Plains branded skipper. Photo by Bryan Reynolds.

GRASS	+	FLOWER	=	LEPIDOPTERA
big bluestem		bird's-foot violet		cobweb skipper
little bluestem		Carolina larkspur		cobweb skipper
big bluestem		wild hyacinth		cobweb skipper, dusted skipper
little bluestem		wild strawberry		cobweb skipper, dusted skipper
switchgrass		viburnum spp.		pepper and salt skipper
sideoats grama		penstemon spp.		hilltop little skipper
switchgrass		dogbane		tawny-edge skipper
switchgrass		purple coneflower		tawny-edge skipper
big bluestem		common milkweed		Delaware skipper, Ottoe skipper
big bluestem		pickerelweed		Delaware skipper
switchgrass		swamp milkweed		Delaware skipper
big bluestem		ox-eye		Dakota skipper, arogos skipper
prairie dropseed		black-eyed Susans		Dakota skipper, Poweshik skipperling
little bluestem		purple coneflower		Dakota skipper, arogos skipper, Poweshik skipperling, Ottoe skipper
prairie dropseed		leadplant		Ottoe skipper
lake sedge		Joe Pye weed		northern/marsh eyed brown

sideoats grama	green milkweed	arogos skipper, Ottoe skipper
lake sedge	blue vervain	broad-winged skipper
lake sedge	swamp milkweed	broad-winged skipper
lake sedge	pickerelweed	Dion skipper
lake sedge	sneezeweed	Dion skipper
blue grama	blazing star spp.	common branded skipper
blue grama	goldenrod spp.	common branded skipper
blue grama	New England Aster	Leonard's skipper
tussock sedge	swamp milkweed	northern/marsh eyed brown
little bluestem	New Jersey tea	crossline skipper

Limitations and Possibilities of Butterfly Gardens

While the addition of native nectar flowers into human dominated landscapes has shown to be successful in providing nectar to butterflies (Vickery 1995), there is debate surrounding the efficacy of butterfly gardens as breeding habitat. There have not been any studies on whether restorations or butterfly gardens function as successful breeding habitat for grass skippers. Many of the rare species that are grassland specialists have only been known to occur on native habitat and are not suspected to travel far from their established populations. However, other species of butterflies, such as the Monarch, have shown to be able to successfully use butterfly gardens as breeding habitat. Additional research is needed to fully understand the benefits of native landscaping in suburban and urban areas to Lepidoptera communities and rare species. A main benefit of residential butterfly gardens may be as stepping stones between larger natural areas, where Lepidoptera can obtain nectar before continuing on to permanent habitat (Vickery 1995; Di Mauro et. al. 2007). Hall et al. (2017) suggest new thinking as we continue to learn how to best design and use our man made environments to make them livable for not only us, but our critically important natural world.

5.3 Literature Cited

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