NATIVE GRASSLAND TRAINING

PIONEER & CLIMAX GRASSES / FORBS IDENTIFICATION / HABIT FIELD MANUAL

Watershed Protection
Development Review

October 26, 2006
Environmental Resource Management Division

CITY OF AUSTIN
FOUNDED 1839

Native Grasses And Wildflowers Specified For Use In Austin, Texas
An Illustrated Primer For Identification And Habit

For educational purposes only.
Information and photos taken from the following sources:

1. City of Austin Standard Specification Manual, Section 609S and 604S.6 Establishing Native Grasslands
2. Native American Seed Catalog Phone 1-800-7284043
3. Native Texas Plants Landscaping Region by Region by Sally Wasowski
4. Flora of North Central Texas by Diggs, Lipscomb, and O'Kennon
5. Wildflowers of the Texas Hill Country by Marshall Enquist
6. Pasture and Range Plants by Fort Hays State University, Kansas

Upland Full Sun Climax Grasses

1. Buffalo Grass (*Buchloe dactyloides*)
2. Indian Grass (*Sorghastrum nutans*)
3. Little Bluestem (*Schizachyrium scoparium*)
4. Big Bluestem (*Andropogon gerardii*)

Upland Shade/Dappled Light Climax Grasses

1. Meadow Sedge, Caric Sedges (*Carex spp.*)
2. Inland Sea Oats (*Chasmantheum latifolium*)
3. Prairie Wild Rye (Elymus canadensis)

Facultative/Moderate-High Moisture Climax Grasses

1. Switchgrass (*Panicum virgatum*)
2. Big Muhly (*Muhlenbergia Lindheimeri*)
3. Bushy Bluestem (*Andropogon glomeratus*)
4. Eastern Gama Grass (*Tripsacum dactyloides*)
5. Indian Grass (*Sorghastrum nutans*)
6. Inland Sea Oats (*Chasmantheum latifolium*)
7. Big Bluestem (*Andropogon gerardii*)

Buffalo Grass (*Buchloe dactyloides*)

- Planted as sod 16”X24”, 3’-10’ O.C.
- Short Grass: 5” – 8”
- Very drought tolerant, 5-8 inches per year
- Spreads by seed and runners (stolons). Attractive male flowers when seeded; ‘prairie’ variety female sod only
- If Short Grass cover is desired customize seeding around sod with pioneer shorter Blue Grama grass
- Excellent substitute for Bermuda Grass
- Good for golf course roughs
- Easily invaded by weeds when planted alone

Loyola Lane ROW – Buffalo Sod Seeded with Blue Grama. ROW to be mowed.

Buchloe dactyloides [HI1]

Solid Buffalo Grass Turf

BUFFALOGRASS

(Búchloe dactyloídes)

BUFFALOGRASS is a native, perennial, warm-season, sod-forming short grass that reproduces by seed and vigorous surface runners which root at the joints. The plants are seldom more than 5 inches tall and the leaves grow so near the ground that much of the plant remains, even under close grazing. There are usually both male and female plants as illustrated (with male plant on left). Seed is produced in small hard burs (see inset), usually close to the ground but burs may be borne on elongated seed stems 1 to 3 inches above the base of the plant. Each bur contains 1 to 4 seed.

Buffalograss is usually found growing with blue grama in the lower rainfall part of the Great Plains and in continually overgrazed areas of the tall grass country. It is eaten readily by all classes of livestock except when dormant during dry periods of the growing season. Curing well, it furnishes excellent winter grazing in drier areas.

Buffalograss somewhat protects itself from overuse by growing close to the ground, usually increasing on tall and mid-grass ranges that are abused by overgrazing; however, it is more vigorous and productive when not grazed closer than 1 to 3 inches. Thousands of pounds of seed have been harvested and successfully seeded in pure stands and mixtures with other short grasses.

Because of its excellent ground cover, aggressive spread under use, wide climate adaptation, and relative ease of establishment (seed and re-vegetation by use of sod pieces), buffalograss is ideally suited for erosion control on ranges and pasture lands where the soil does not contain too much sand.

Buchloe is contracted from Greek *bous*, cow or ox *(boubalos*, buffalo) and *chloë*, grass.

Indian Grass (*Sorghastrum nutans*)

- Planted as 1-5 gallon containers
- Tall Grass: 3’ – 4’
- Drought tolerant but can thrive in rich, moist soils
- Attractive golden plume-like seed heads
- Forms circular communities as it spreads
- Food source for larval butterflies & seed for turkeys
- Leaves are bluish-green and broad

Golden Plume-like Seed Head

Indian Grass Community

INDIANGRASS

(Sorghástrum nútans)

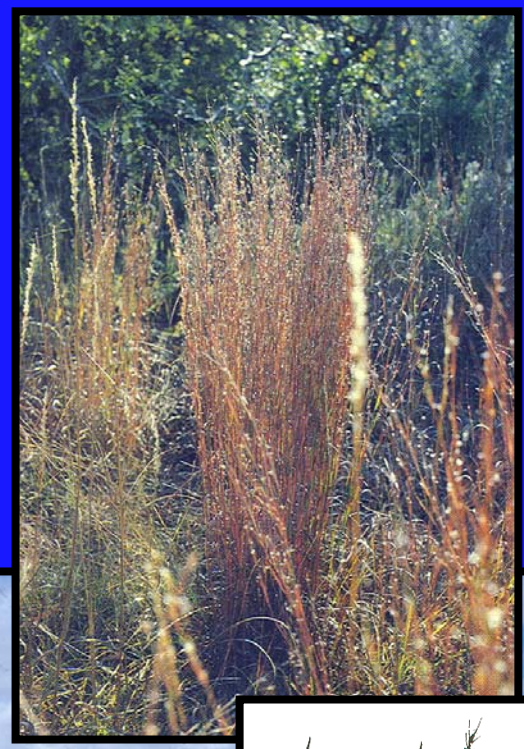
INDIANGRASS is a native, perennial, warm-season tall grass which reproduces from seed and short, scaly, underground stems. The beautiful golden plume-like seed heads, 4 to 12 inches long, are on stems from 4 to 8 feet tall. The leaf blades, ⅛ to ⅓ inch wide and 4 to 12 inches long, spread at 45-degree angles from the stems. This grass is easily identified by the prominent claw-like ligule where the leaf blade attaches to the sheath (see inset). Indiangrass is found growing throughout the bluestem belt of the United States and is one of the most important tall grasses. It is very nutritious and readily eaten by all classes of livestock, either as green forage or dry prairie hay. This high producing tall grass is a decreaser on bluestem ranges when continually grazed shorter than 5 to 8 inches during the growing season, and is replaced by less productive plants.

Indiangrass, like big bluestem, may form patches of sod and occur in bunches. It is readily distinguished from big bluestem by its slightly more erect habit of growth.

Indiangrass can be harvested with a combine or by hand-stripping the seed. It is easily established from seed and is being planted more each year in pure stands. The vigorous seedlings endure a wider range of extremes as regards to drouth than most lowland species. This probably explains, in part, the habit of this grass of readily invading disturbed sites throughout the prairie. This important tall grass responds to nitrogen fertilizer with increased seed and forage production. Indiangrass is increasing in popularity both in pure stands and in mixtures with other tall grasses.

Little Bluestem (*Schizachyrium scoparium*)

- Planted as 1-5 gallon containers
- Medium-Tall Grass: 2’ – 3’
- Very drought tolerant
- Deep root system: 5’ – 8’
- Covers uniformly with small spaces between compact slender clumps
- Food source for larval butterflies & nesting cover for birds
- Blue-green bunchgrass, turns reddish-bronze after frost with fluffy, silver-white seeds in winter



Little Bluestem Community After Frost

LITTLE BLUESTEM

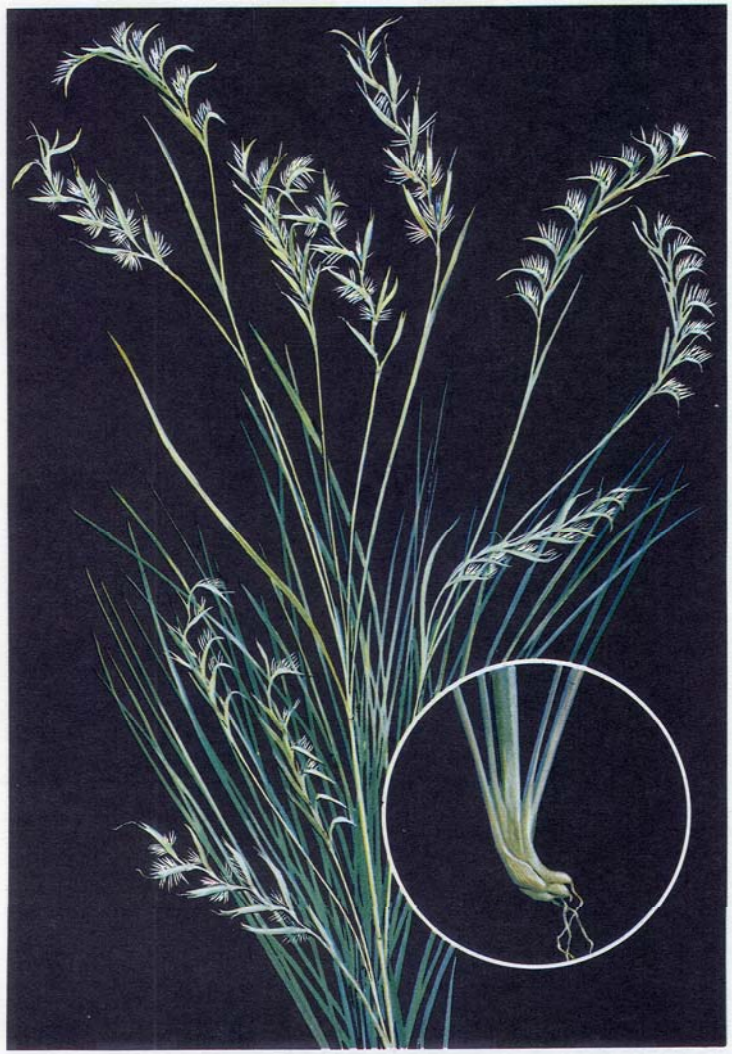
(Andropógon scopárius)

LITTLE BLUESTEM is a native, warm-season, perennial mid grass with a dense root system that may reach 5 to 8 feet in depth. This bunch grass spreads by seed, tillers and short underground rootstocks. Growth begins in early April with seed stalks from 2 to 5 feet tall appearing from late August to October. Little bluestem can be identified by its flat, bluish-colored basal shoots (see inset) and its leaf blades which tend to fold. Mature plants have a reddish cast after frost.

Little bluestem is native in all states except California, Washington, Oregon and Nevada. It is one of the most widely distributed perennial grasses in America and grows well on deep, shallow, sandy, fine-textured, and rocky soil. At one time little bluestem was the most abundant grass in the midlands of America and is still the most important grass in the Flint Hills of Kansas and in Eastern Oklahoma.

This native grass provides nutritious grazing during the growing season and has been used for hay since the first days of settlement. Cattle have for many years been shipped from the south and southwest to fatten on the little bluestem ranges in the Kansas Fint Hills and the Osage Hills of Oklahoma. Little bluestem produces from ¾ to 2 tons of forage per acre and makes good winter grazing when supplemented with protein and minerals. When little bluestem is continually grazed closer than 4 to 6 inches during the growing season, it is finally killed out and replaced by less productive plants.

Good seed crops occur on native stands only once every five to ten years and can be harvested with a grain combine. The combined seed, in mixtures with tall and short grasses, has been successfully seeded on thousands of acres of formerly cultivated land.



Switchgrass (*Panicum virgatum*)

- Planted as 1-5 gallon containers
- Tall Grass: 3’ – 6’
- Very moisture tolerant, great for biofiltration ponds
- Covers uniformly so dense as to limit weed invasion
- Food source & nesting cover for ground birds, larval butterfly food
- Extensive roots, great erosion control on creek banks and around ponds
- Rich golden color in fall and tan in winter (attractive)

After A Frost

Along A Stream

SWITCHGRASS

(Pánicum virgátum)

SWITCHGRASS is a native, perennial, warm-season, sod-forming tall grass with vigorous roots, which reproduces from underground stems and seed. It can be identified by a small nest of hair where the blade attaches to the sheath (see inset). Switchgrass has rather large seed with a sprangled-type seed head, on stalks 3 to 6 feet tall. The green to bluish-green leaves are usually from one-fourth to one-half inch wide and 6 to 18 inches long.

This grass is found growing throughout the bluestem belt of the eastern and central Great Plains and on certain prairie sites in other parts of the United States. Switchgrass is best adapted to lower areas of moist soils, but is winter-hardy and drouth-resistant, thus found growing under a wide range of soils and climatic conditions.

Switchgrass is very nutritious and readily eaten by all classes of livestock, either as green forage or in prairie hay.

This tall grass is a decreaser on bluestem ranges when continually grazed closer than 5 to 7 inches during the growing season and is replaced by less productive plants.

Switchgrass can be harvested with a grain combine, and is easily established from seed. It is usually seeded in mixtures with bluestems, Indiangrass and sideoats grama.

Best seedling stands have been obtained where plantings were made on a clean, firm well-prepared seedbed. Two distinct strains are recognized – the upland and the bottomland. The bottomland strain has a much coarser stem and is from 1 to 3 feet taller than the upland strain and is less desirable for grazing and hay. Blackwell, a new and improved variety, yields excellent forage and shows considerable resistance to stem rust, a disease that is injurious to most native switchgrass plants.

Big Bluestem (*Andropogon gerardii*)

- Planted as 1-5 gallon containerized
- Tall Grass: 2’ – 6’
- Drought & Moisture tolerant
- Deep root system: 5’ – 12’
- Covers uniformly
- Turkey Foot Shaped Seed Head

Big Bluestem Community

BIG BLUESTEM

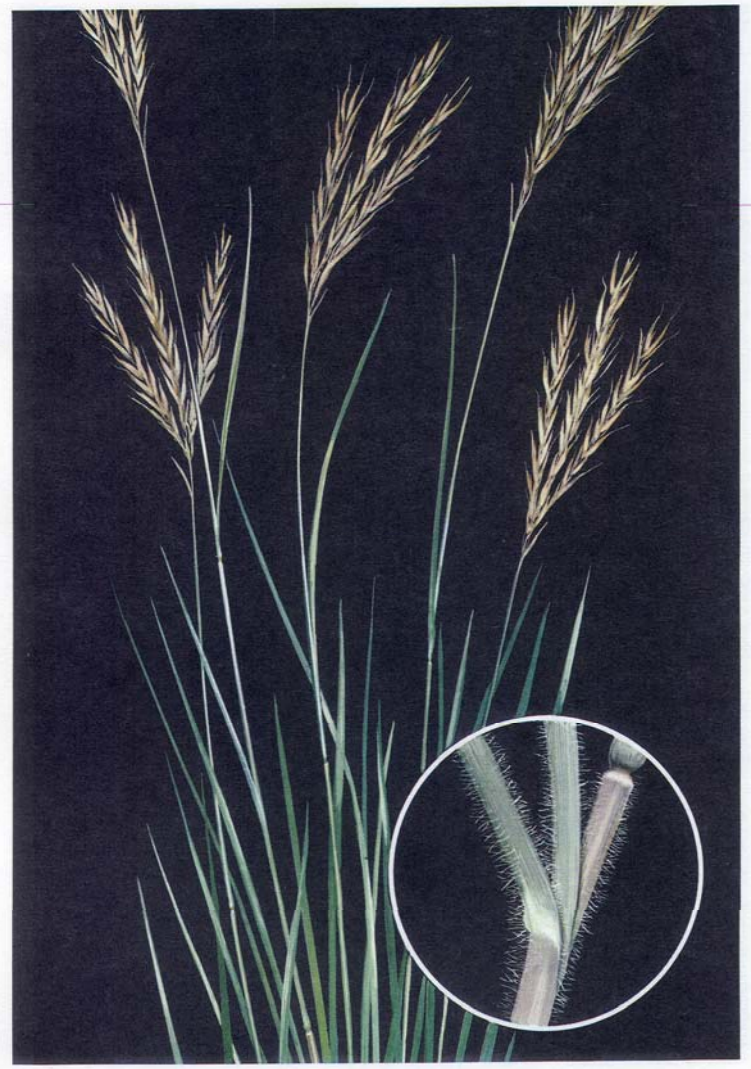
(Andropógon gerárdi) (A. furcátus)

BIG BLUESTEM is a native, warm-season, perennial, tall grass with short scaly underground stems and roots that saturate the top two feet of soil and may reach depths up to twelve feet. It begins growth in early April and seed stalks 3 to 8 feet tall appear from late August to October. The grass is sometimes called "turkey foot" bluestem because the seed head usually branches into three parts resembling a turkey's foot. The young shoots are somewhat flattened at the base and the lower leaves are usually covered with silky hair (see inset). Big bluestem grows in large clumps and is extremely leafy. The lower leaves of this native grass curl when dry, pulling off easily at the base. Mature plants have a reddish cast after frost.

Big bluestem is found in valley bottomland sites almost to the Rocky Mountains. It grows on most all the better soils in the true prairie belt, especially in the eastern half of Oklahoma and the Flint Hills of Kansas.

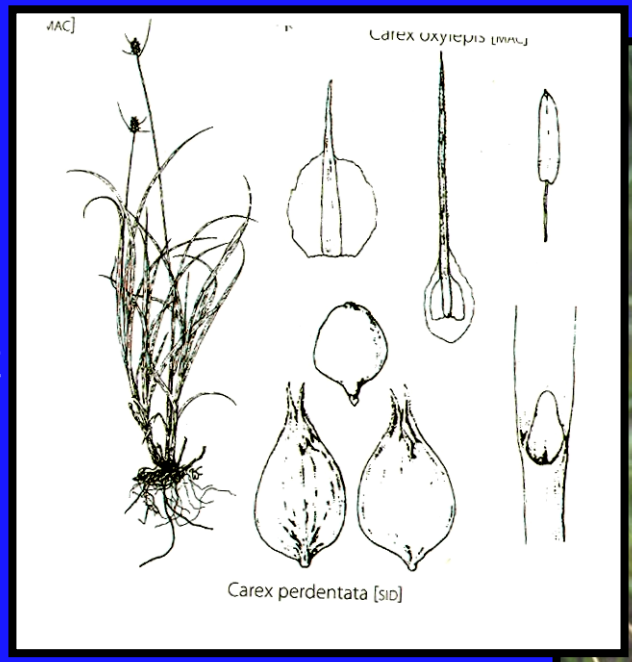
Few, if any, of the prairie grasses can equal big bluestem in quality or quantity of forage produced. It is relished by livestock and usually eaten in preference to other grasses in the mixture. Through overuse and abuse this native grass has been killed out or greatly reduced on most of its original area since 1885. If big bluestem is never grazed shorter than six to eight inches during the growing season, enough green leaves are left to promote fast regrowth and the dead leaves will soon form a good protective layer of litter on the ground. When continually grazed closer than 6 to 8 inches during the growing season it decreases and is replaced by less productive plants.

Seed can be harvested with a combine and has been successfully seeded in pure stands and mixtures with other tall and mid grasses.



Meadow Sedge, Caric Sedges (*Carex spp.*)

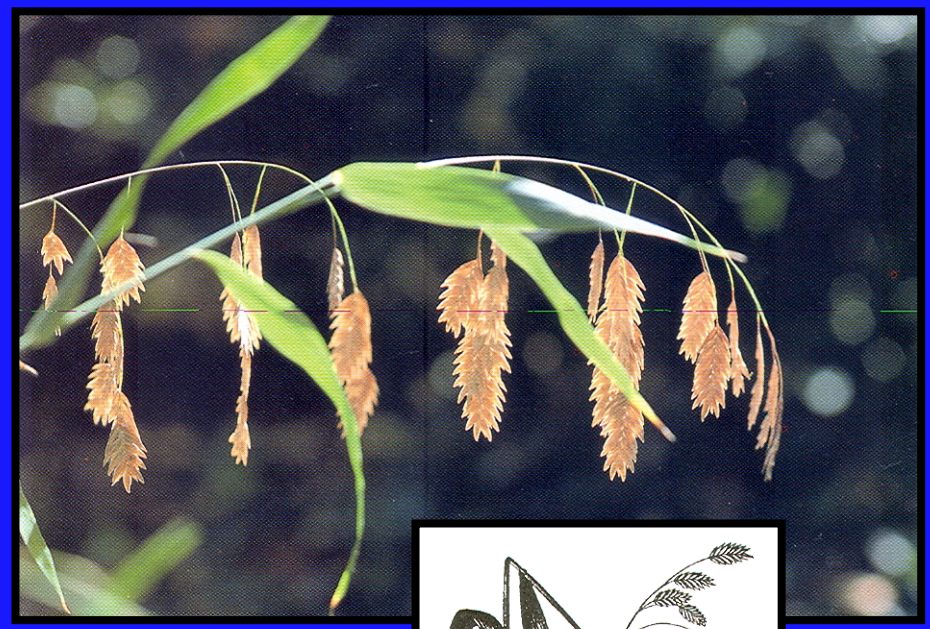
- Planted as 1-5 gallon containers
- Small-Medium Sedges: 1’ – 3’
- Extremely Shade Tolerant and Drought Resistant
- Attractive, “Monkey Grass” or “Liriope”-looking plant



Flowers of Caric Sedges

Inland Sea Oats (*Chasmantheum latifolium*)

- Planted as 1-5 gallon containers
- Medium Grass 2’-3’
- Extremely Shade & Moisture Tolerant
- Attractive ornamental native plant with wide leaves and oat-like/chevron flowers. Almost evergreen.



Wide Leaves, Chevron Flowers

Prairie Wild Rye (*Elymus canadensis*)

- Pioneer grass in full sun, Climax grass in shade/dappled areas
- Medium grass: 2’ – 3’
- Excellent germinator
- Cool season grass
- Shade tolerant
- Moisture tolerant

Understory Grass

CANADA WILDRYE

(Élymus canadénsis)

CANADA WILDRYE is a native, cool-season, perennial, bunchgrass which reproduces by tillering and seed. It reaches a height of 2 to 4 feet, and can be identified vegetatively by the spear-like appearance of the blades. After seed heads appear they curve downward which accounts for another of its common names, "nodding wildrye." This cool-season grass is winter-hardy and begins growth in early fall.

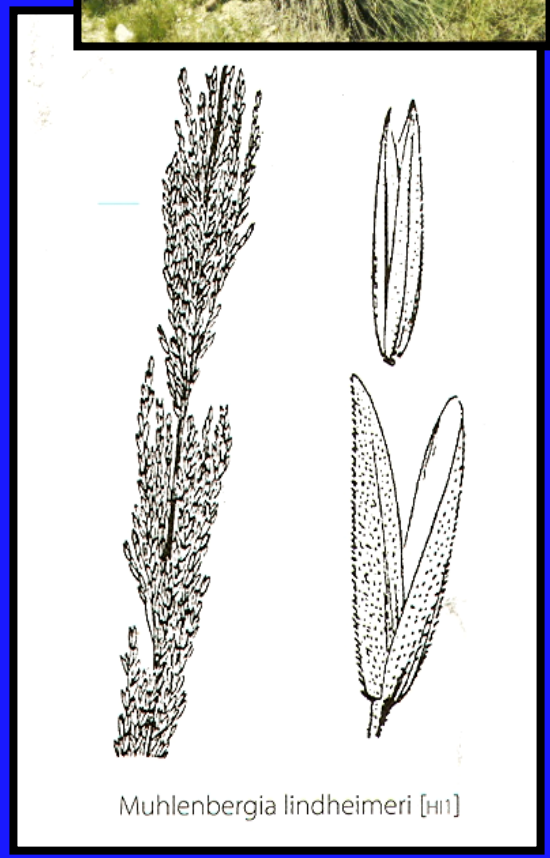
Canada wildrye grows abundantly on prairie sites, but is also found in shaded areas on bottom lands in the Great Plains region, Pacific Northwest and the Rocky Mountain states. This grass grows as far north as Canada and southern Alaska. It is best adapted to medium-textured soils, but grows on most all types of prairie soils.

Canada wildrye is very palatable, nutritious and is readily eaten by all classes of livestock. It produces good forage and hay; however it should be harvested early since mature plants are tough and seed heads are often infested with ergot. It is found in abundance along roadsides and protected areas, which indicates that it is a decreaser on prairie sites.

Canada wildrye is a desirable grass to seed in mixtures with warm-season, native grasses, as it affords fall and spring pasture. It is also seeded with mixtures of other cool-season native grasses, as its seedlings are vigorous and produce ground cover rapidly. An improved strain of the Canada wildrye has been developed at the Northern Great Plains Field Station at Mandan, North Dakota.

Big Muhly (*Muhlenbergia Lindheimeri*)

- Planted as 1-5 gallon containers.
- Medium-Tall grass: 2’ – 5’
- Pampas Grass – looking plant, very clumpy. Nice border plant to wild riparian areas.
- Leaves turn white in winter.
- Moisture tolerant, may work well in detention or biofiltration ponds.



Tall Seed Heads Form Spikes Above Leafy Clumps

Individual Plant A True Bunch Grass

Large Community In Seep Environment

Bushy Bluestem (*Andropogon glomeratus*)

- Planted as 1-5 gallon containers.
- Medium-Tall grass: 2’ – 5’
- Pampas Grass – looking plant, very clumpy. Nice border plant to wild riparian areas.
- Forms dense burnt orange stands with fluffy white flowers.
- Moisture tolerant, may work well in detention or biofiltration ponds.

Burnt Orange Community In Winter (Hook’em)

Individual Plant With Fluffy White Flower Head

Bushy-White Seed Heads

BROOMSEDGE BLUESTEM

(Andropógon virgínicus)

BROOMSEDGE BLUESTEM is a native, warm-season, mid-tall bunchgrass that reproduces by seed and the old bunches increase in size by tillering. It has a coarse shallow feeding root system and can be pulled up by hand on most sites. The main stems are from 2 to 4 feet tall, in bunches, and branch freely toward the upper part. The blades are flat or folded, 10 to 15 inches long, ⅛ to ¼ inch wide, with scattered long hairs at the base on the upper side. Leaf sheaths are shorter than the internodes, somewhat flattened at the base and usually have hairs along the lower margins. Broomsedge bluestem produces seed at the upper nodes. The downy, fuzzy flowering parts are partially enclosed in the sheath and from a distance appear silvery. The small spikelets appear as shown by inset.

This perennial grass is found on the lighter soils throughout the eastern half of the United States and recent reports indicate it is spreading. It is a poor range plant and a common invader on abused native ranges. This grass is also a problem on low fertility tame pastures. Broomsedge bluestem usually appears first on the wetter, moist areas and will spread fast unless controlled by good management and proper fertilization. This coarse plant, with a characteristic, straw-yellow color, is not relished by livestock. Some green shoots are eaten in early spring, but it is usually grazed only if desirable, palatable grasses are not present. This is one of the first perennials to move into old sandy fields and if not disturbed may form a solid, pure stand that resembles some of the better bluestem grasses. Some grassland buyers, not knowing this grass, have been completely mislead by its appearance.

Eastern Gama Grass (*Tripsacum dactyloides*)

- Planted as 1-5 gallon containers.
- Medium-Tall grass: 3’ – 4’
- Good looking clump grass; ancestor to corn.
- Jointed seed-bearing parts.
- Butterfly larval food, turkey food and cover.
- Moisture tolerant, may work well in detention or biofiltration ponds. Grows well along creeks.

Beautiful Red Flower Anthers

Flowers & Seeds Look Like Small Ears of Corn

Large Seed “Kernels” Need Winter Cold and Spring Moisture to Sprout

Rich Green Bunch Grass

EASTERN GAMAGRASS

(Trípsacum dactyloídes)

EASTERN GAMAGRASS is a native, warm-season, perennial, tall grass that grows in large clumps from 1 to 4 feet in diameter. It spreads by thick (½ to 1 inch) knotty, short jointed rhizomes and produces seed from July to September on stems 3 to 9 feet tall. The blades are 18 to 24 inches long, smooth and ½ to 1½ inches wide. Seed heads consist of 1 to 3 spikes with the female (pistillate) part below and the male (staminate) part above as illustrated. The spikes are 6 to 10 inches long and the seed are sunken in the joints of the lower one-fourth of the spike. When mature the seed bearing parts break at the joints with each part containing one seed (see inset).

This "granddad" of the grasses is found throughout the eastern half of the United States and extends west on favorable sites to Colorado. It grows on a variety of soils in low areas where additional run-in water and deeper soils favor its development. This grass grows in pure stands in lowlands where it is usually bordered on one side by sloughgrass and on the other side by switchgrass. On wet, deep prairie meadows it is associated with big bluestem.

Eastern gamagrass is palatable, nutritious and readily eaten by all classes of livestock. Cattle particularly like this grass and it has been killed out by close grazing on most ranges. This tall, leafy grass produces a tremendous volume of forage and is probably our most productive hay grass. The addition of nitrogen fertilizer will increase forage production on the good sites.

Some authorities believe that corn originated in the South American lowlands and that it is closely related to gamagrass. Corn and gamagrass do not cross naturally although hybrids have been grown in the laboratory. Its palatability and high volume production favor its further study and development.

Early Succession / Pioneer Grasses

1. Blue Grama (*Bouteloua gracilis*)

2. Green Sprangletop (*Leptochloa dubia*)

3. Prairie Wild Rye (*Elymus canadensis*)

4. Purple Threeawn (*Aristida purpurea*)

5. Sideoats Grama (*Bouteloua curtipendula*)

6. Sand Lovegrass (*Eragrostis trichodes*)

7. Switchgrass (*Panicum virgatum*)

8. Others: Sand Dropseed (*Sporobolus cryptandrus*), Wintergrass or Speargrass (*Nasella leucotricha*)

Blue Grama (*Bouteloua gracilis*)

- Pioneer Grass, seed only
- Short Grass: 3” – 6”
- Very drought tolerant (7” annual rainfall)
- Excellent germinator
- Good in combination with Buffalo Grass sod for short grass or manicured look.
- Fine leaves; bluish seed heads look like tiny mustaches
- Spreads by seed and rhizome but not aggressive

Blue Grama & Hairy Grama (*B. hirsuta*) Look Like Smiling Mustaches. Both Good Early Succession Grasses

BLUE GRAMA

(Bouteloúa grácilis)

BLUE GRAMA is a native, perennial, warm-season, short grass with narrow leaves 3 to 6 inches long that form a curly mass of bunchy sod. Seed stalks vary from 10 to 20 inches high. It is often mistaken for buffalograss and hairy grama. Blue grama grows erect in definite bunches and reproduces only by seed. As the seed heads mature they usually bend into a curve resembling a human eyebrow.

This short grass is the most important grama and is found growing throughout the Great Plains. It will stand extreme drouth, reviving and making rapid growth when favorable conditions return. Like buffalograss, its weak point is its low forage productivity.

Blue grama is nutritious, palatable, and eaten by all classes of livestock. It cures out in the fall and retains most of its nutritive value for winter grazing. Blue grama is an increaser on most tall and mid-grass ranges where the taller grasses are abused by overgrazing. Blue grama is more vigorous and productive when not grazed closer than 2 to 3 inches during the growing season. This short grass can be harvested with a combine and established readily from seed. Excellent stands have been obtained by broadcast or solid-drill seedings. The usual seeding rate is 8 to 12 pounds of clean seed to the acre.

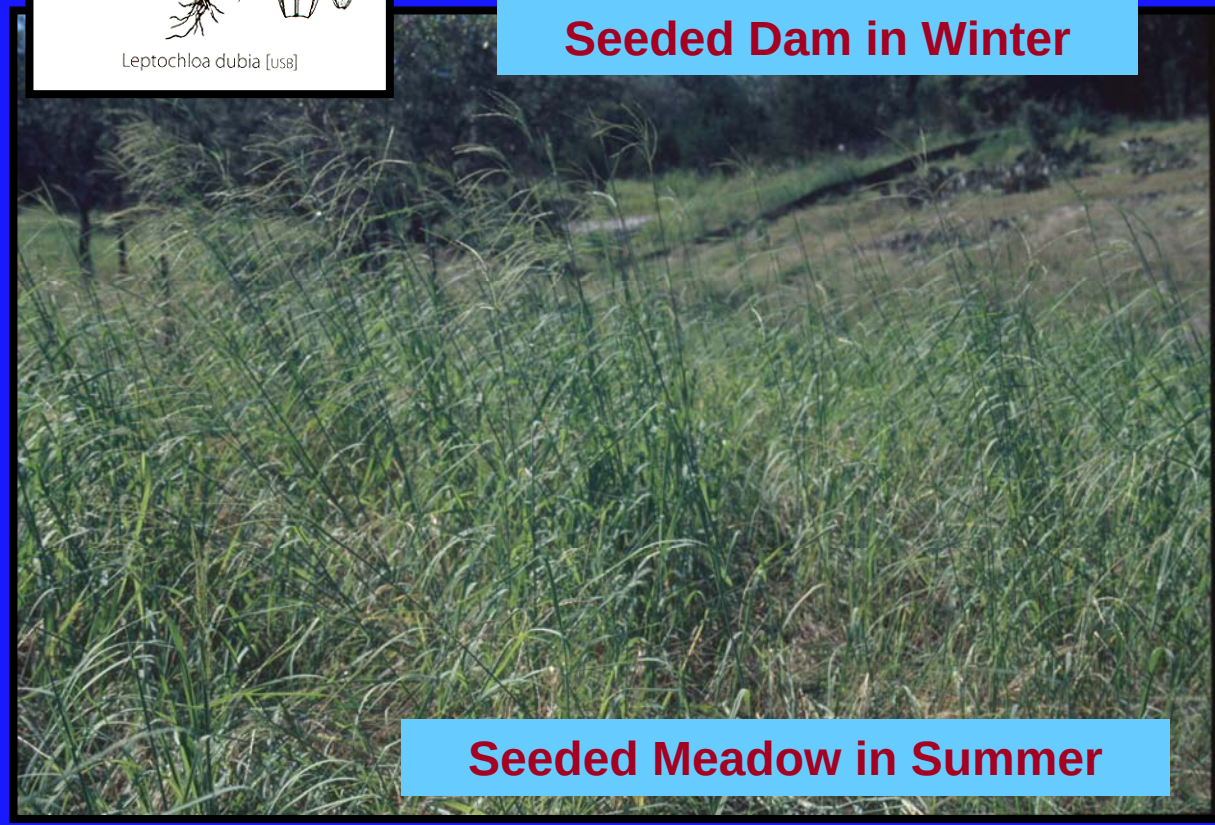
Because of its wide adaptation (all soil types, including alkaline soils), ease of establishment, and economic value, blue grama is used extensively for conservation purposes. Although its erosion-control properties are effective when this short grass is seeded in pure stands, the general practice is to make plantings with mixture of other adapted grasses. Most revegetation seedings have been made on native range land and abandoned cropland.

Green Sprangletop (*Leptochloa dubia*)

- Pioneer grass; seed only
- Medium grass: 1' – 3'
- Excellent germinator and 'nursegrass', fading away after 2 – 3 years and re-placed with other natives.

Spreading Seed Head

Seeded Dam in Winter

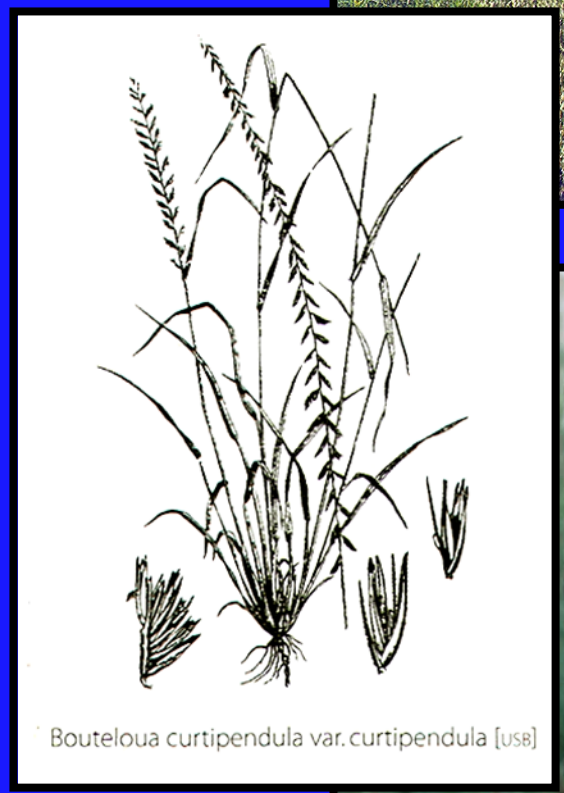


Seeded Meadow in Summer

Sideoats Grama (*Bouteloua curtipendula*)

- Seed in all environments. Plant 1-5 gallon containers in shade/dappled areas.
- Medium grass: 1' – 2'
- Excellent germinator
- State Grass of Texas
- Full sun to dappled shade
- Butterfly larval food
- Turkey food

Seeds Dangle From Side of Flower Rachis



Bouteloua curtipendula var. curtipendula [USB]

Ornamental Grass

SIDEOATS GRAMA

(Bouteloúa curtipéndula)

SIDEOATS GRAMA is a native, warm-season, perennial, mid grass with short scaly underground stems. Growth begins in early April and the seed stalks which appear from July to September are from 18 to 36 inches in height. The small oatlike seeds hang down uniformly on one side of the seed stem as indicated by the name "sideoats." Leaf blades are flat with hairs and bumps along the edges (see inset). When dry, the lower leaves of this grass are usually curled and whitish in color.

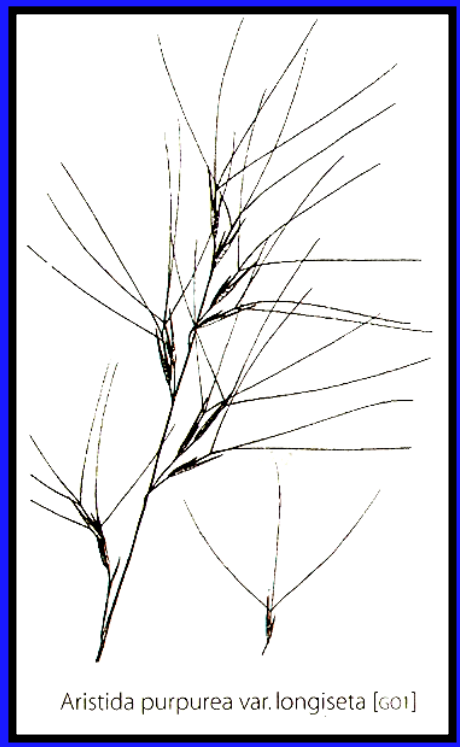
Sideoats is the most widely distributed of the grama grasses and is found throughout the United States east of the Rocky Mountains. It grows on well-drained uplands, shallow ridges, and rocky areas, but may be found on soils ranging from deep to very shallow.

This grass produces high-quality, nutritious, green forage that is readily eaten by all classes of livestock. Sideoats will increase and tend to replace taller grasses on ranges that are abused. However, it will also gradually decrease if continually grazed closer than 2 to 3 inches during the growing season.

Sideoats grama is a good seed producer and can be harvested with a small grain combine. The combined seed has been successfully planted in pure stands and mixtures with other adopted grasses on thousands of acres of formerly cultivated land. A seeding rate of 15 to 25 pounds an acre is generally recommended. The desirable rate depends upon the quality of seed and upon the other grasses used in the mixture. Seedling vigor of sideoats grama is good, and failure to obtain a satisfactory stand seldom occurs if minimum care is used in seedbed preparation and seeding. This grass is considered excellent for conservation use and responds to nitrogen fertilizer for increased seed and forage production.

Purple Threeawn (*Aristida purpurea*), Sand Lovegrass (*Eragrostis tricodes*) Sand Dropseed (*Sporobolus cryptandus*)

- Pioneer grass, seed only
- Short grass: 6” – 1’
- Excellent germinator
- Grows on poor soils
- Full sun
- Helicopter seeds
- Threeawn is four times cost of other seeds (propose to drop from list). Sand Dropseed less expensive may replace Threeawan.



Aristida sp. **Look For Three Awns**

Sand Lovegrass Is A Short (1-2’) Bunchgrass

Sand Dropseed *Sporobolus cryptandus* (1-4’ tiller reproduction)

ARROWFEATHER THREEAWN

(Arístida pupurás cens)

ARROWFEATHER THREEAWN is a native, warm-season perennial, tufted grass, that reproduces by seed and the bunches grow in size by tillering. The slender, fine stems grow 15 to 30 inches tall from a rather thin, weak base. Leaf blades are 4 to 8 inches long, narrow, and sometimes have a few hairs on upper side near the base. Sheaths are longer than internodes and the lower ones are flattened and sometimes sparsely hairy. This grass forms a neat, grayish-colored small bunch with the leaves sometimes curly and bunched at the base of the plant. The seed heads are slender, 4 to 12 inches long, and rather lax in appearance as illustrated. Spikelets are crowded close to the seed head, one-flowered, with 3 awns about ¾ inch long. These sometimes nodding seed heads may have a purplish cast when mature, thus the name "purpurascens."

Arrowfeather threeawn grows best on dry sandy soil throughout the eastern half of the United States—Massachusetts to Wisconsin, and Kansas, south to Florida and Texas. It is an undesirable range plant and is considered an invader that will increase when the better grasses are abused by excessive grazing and/or mowing. Proper management of the desirable grasses will usually provide control for this unpalatable invader.

The species are of distinctly minor importance for forage except in the Southwest where several; such as, *A. longiseta* (Red threeawn) and *A. glabrata* (Santa Rita threeawn) are grazed by livestock before flowers are produced.

SAND LOVEGRASS

(Eragróstis trichódes)

SAND LOVEGRASS is a tall, leafy, warm-season, perennial, native bunchgrass. It reproduces by seed and the old bunches increase in size by tillering and sometimes rooting at the nodes of basal stems. Sand lovegrass produces a dense deep root system and bears seed on stems 2 to 5 feet tall in early fall. Seed heads are 6 to 12 inches long, rather loose and sprangled as illustrated. Spikelets are mostly 4 to 6 flowered and from ⅛ to ¼ inch long (see inset). Sand lovegrass can be further identified by a tuft of hair at the sheath throat or leaf collar.

This tall, leafy grass has been reported growing in 10 central Great Plains States from Illinois to Colorado to Texas. It grows best on sandy land in the 18- to 35-inch rainfall belt but is sometimes found on heavier soils. Sand lovegrass has been called the "ice-cream grass" of the prairie because of its palatability. This tasty grass decreases quickly when continuously grazed closer than 5 to 8 inches during the growing season. It is usually replaced by less palatable, and less productive plants. Grazing tests at the Woodward Experiment Station show 105 pounds of beef per acre produced from pure stands. Seed can be harvested with a combine and dry-land row plantings produce about 100 pounds per acre while irrigated plantings produce from 200 to 400 pounds per acre. Production of seed has been greatly increased by the application of 40 to 60 pounds of nitrogen per acre, and the small seed (1,500,000 per pound) are usually planted with a special drill. Sand lovegrass is easily established by seeding in pure stands or in mixtures with other good grasses.

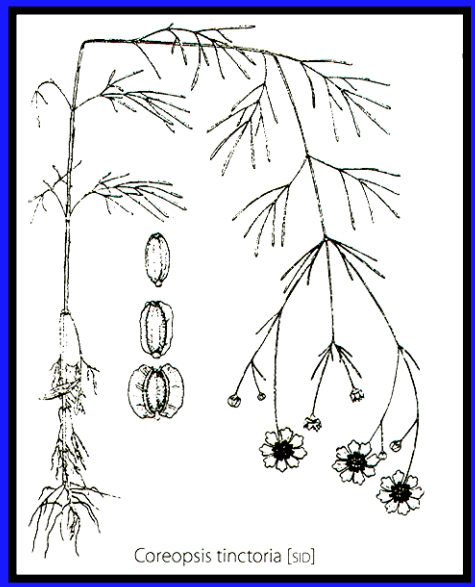
Upland Full Sun Wildflowers

1. Bluebonnet (*Lupinus texensis*)
2. Clover, Purple Prairie (*Petalostemum purpurea*)
3. Coreopsis, Plains (*Coreopsis tinctoria*)
4. Goldenrod (*Solidago altissima*)
5. Greenthread (*Thelesperma filifolium*)
6. Indian Blanket (*Gaillardia pulchella*)
7. Lemon Mint (*Monarda citriodora*)
8. Mexican Hat (*Ratibida columnaris*)
9. Pink Evening Primrose (*Oenethera speciosa*)
10. Sunflower, Common (*Helianthus annuus*)

Upland Full Sun Wildflowers

Bluebonnet, *Lupinus texensis* Annual

Legumes Fix Nitrogen In The Soil



Purple Prairie Clover, *Petalostemum purpurea* Perennial

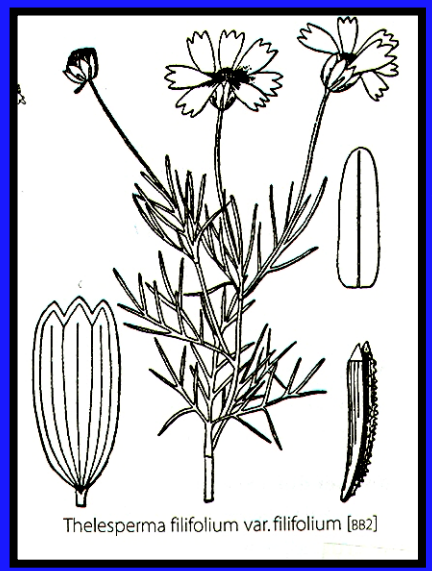
Plains Coreopsis, *Coreopsis tinctorium* Annual
Grassland Nurse Crop, Butterfly Nectar

Upland Full Sun Wildflowers

Goldenrod, *Solidago spp.*
Perennial

Greenthread, Annual
Thelosperma filifolium

Indian Blanket, *Gaillardia pulchella*
Annual, Deerproof

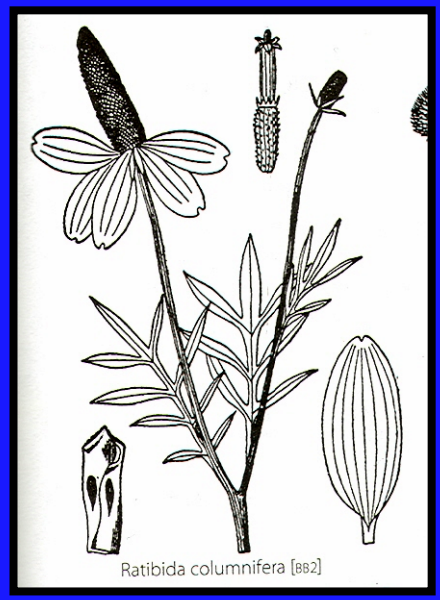


Painted Bunting Seeds,

Butterfly Larval Food

Upland Full Sun Wildflowers

Lemon or Horse Mint, *Monarda citriodora*
Annual, Aromatic, Deerproof



Mexican Hat, Grazeproof
Ratibida columnaris

Pink Evening Primrose, *Oenethera speciosa*
Perennial, Great Ground Cover, Almost evergreen

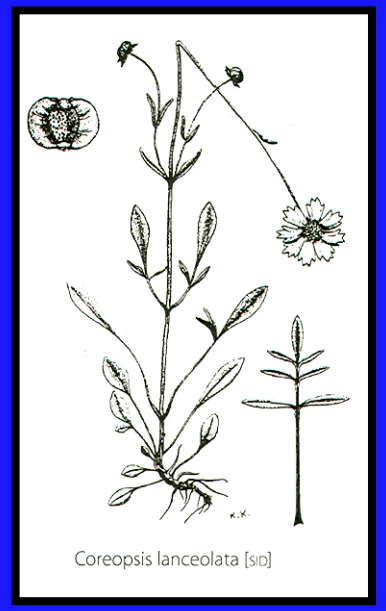
Bird Seed

Common Sunflower, *Heleanthus Annuus* Annual

Upland Shade Tolerant Wildflowers

1. Purple Cone Flower (*Echinacea purpurea*)
2. Coreopsis, lanceleaf (*Coreopsis lanceolata*)
3. Scarlet Sage (*Salvia coccinea*)
4. Phlox, Drummond (*Phlox Drummondii*)
5. Black-Eyed Susan (*Rudbeckia hirta*)
6. Cutleaf Daisy (*Engelmannia pinnatifida*)
7. Tall Aster (*Aster praealtus*)
8. Illinois Bundleflower (*Desmanthus illinoiensis*)
9. Standing Cypress (*Ipomopsis rubra*)
10. Winecup (*Callirhoe involucrata*)

Purple Cone Flower
***Echinacea purpurea* Perennial**



Lanceleaf Coreopsis,
Ratibida columnaris
Perennial

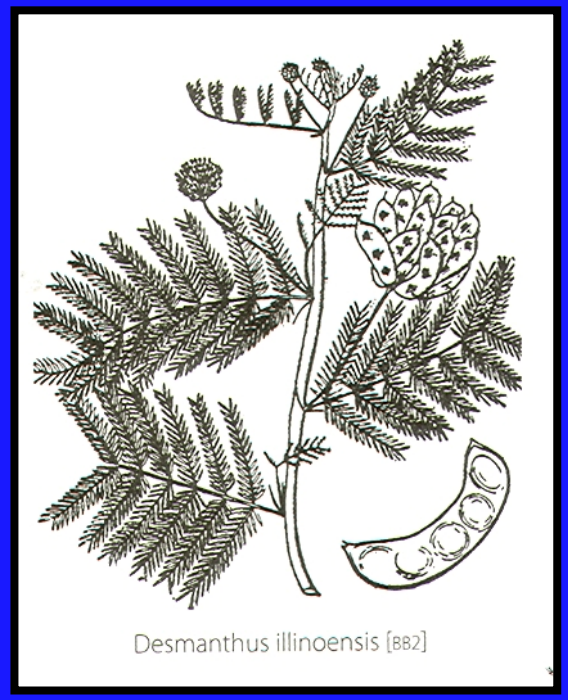
Scarlet/Cedar Sage, Perennial
***Salvia coccinea*, Deerproof**

Drummond Phlox,
***P. Drummundii* Annual**

Black/Brown-Eyed Susan
***Rudbeckia hirta* Annual/Perennial**

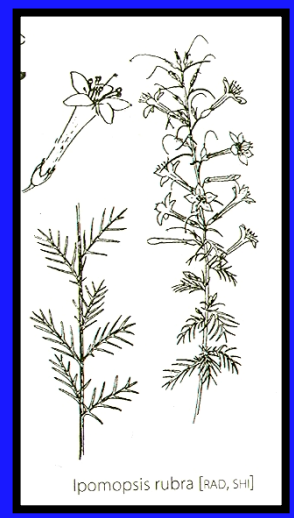
Cutleaf Daisy, Perennial
Engelmannia pinnatifida

Tall Aster,
Aster praealtus
Perennial



Illinois bundleflower, Perennial
Desmanthus Illinoiensis

Standing Cypress,
***Ipomopsis rubra* Biennial**



Winecup, *Callirhoe involucrata* Perennial

MoistureTolerant Wildflowers

1. Black-Eyed Susan (*Rudbeckia hirta*)
2. Illinois Bundleflower (*Desmanthus illinoiensis*)
3. Scarlet Sage (*Salvia coccinea*)
4. Purple Prairie Clover (*Petalostemum purpurea*)
5. Clasping Coneflower (*Rudbeckia amplexicaulis*)
6. Goldenrod (*Solidago altissima*)
7. Lazy Daisy (*Aphanostephus sp.*)
8. Lemon Mint (*Monarda citriodora*)
9. Common Sunflower (*Helianthus annuus*)
10. Maximilian Sunflower (*Helianthus maximiliani*)

Purple Prairie Clover, Perennial *Petalostemum purpurea*

Lazy Daisy, Annual *Aphanostephus sp.*

Maximilian Sunflower, *Heleanthus maximiliani* Perennial

Cool Season Cover Crop
Nonpersistent

Cereal Rye Grain
Secale cereale

Wheat
Triticum aestivum

Plant Only Between Oct. 1 and Jan. 31

Oats, *Avena sativa*

Forage and pasture cereals

WHEAT (Tríticum aestívum)

OATS (Avéna satíva)

BARLEY (Hórdeum vulgáre)

ANNUAL RYE (Secále cereále)

The annual harvest of cereal grains provides most of the world's people with their basic food staples. In addition, cereal grains, all members of the grass family, serve as feed in the form of grain, pasture, hay and by-products for domestic livestock and poultry. The small grains serve both capacities.

Factors that affect favorably the world supply of cereals are improvements in crop production techniques, in which higher levels of fertility play an important role. Small grains serve as excellent nurse crops in seeding of legumes for supplemental pastures and for green manure crops in improving soil tilth. All respond to plant nutrient applications, especially nitrogen. Wheat is the second highest user of commercial nitrogen fertilizer when considering all farm crops. Both bread wheats and club wheats respond to nitrogen by increased yields and protein content. In many areas, high levels of fertility on small grain crops permit fall-to-spring grazing with increased gains more than sufficient to cover the cost of added plant foods. Annually these cereals are planted in spring and fall for use as pasture, soiling crops, silage and hay. They are high in protein and rich in vitamins when supplied with adequate fertility and properly harvested.