Selecting Forages for Pasture

Jeff Semler – Extension Agent- AgFS
Washington County

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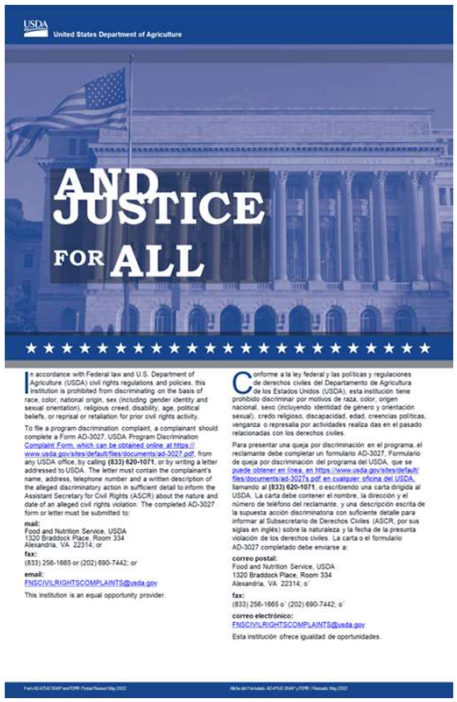

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Selecting Forages for Pasture

- Goals
- Farm Resources
- Management
- System
- Be Flexible!

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Selecting Forages for Pasture

A good grazing system begins with a forage system that allows the maximum number of grazing days per year with forages that are suited to the land, the livestock, and the manager.

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Selecting Forages for Pasture

- Grasses
- Legumes
- Forbs
- Perennials
- Annuals

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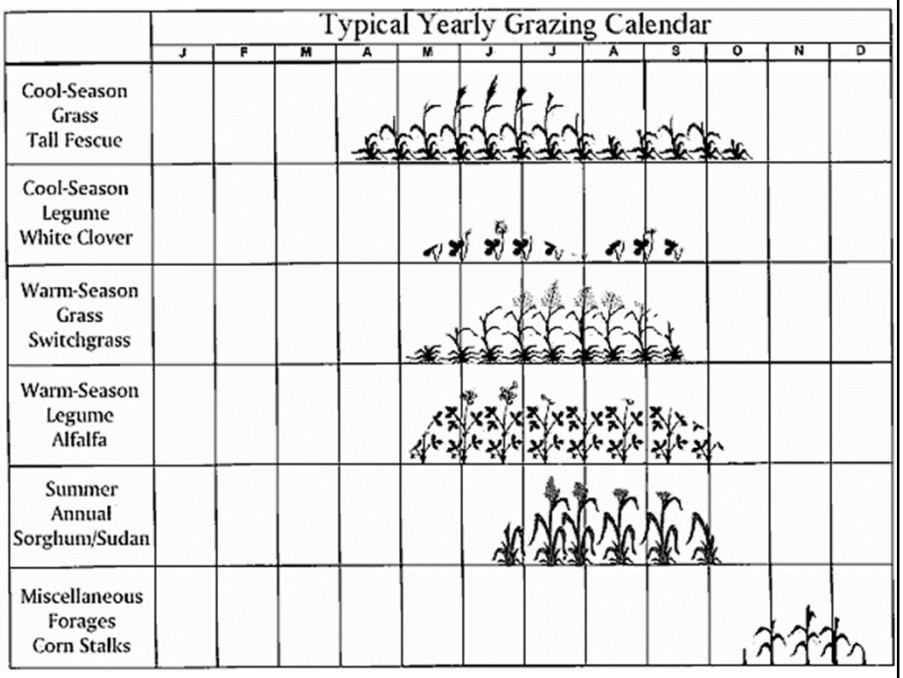
Selecting Forages for Pasture



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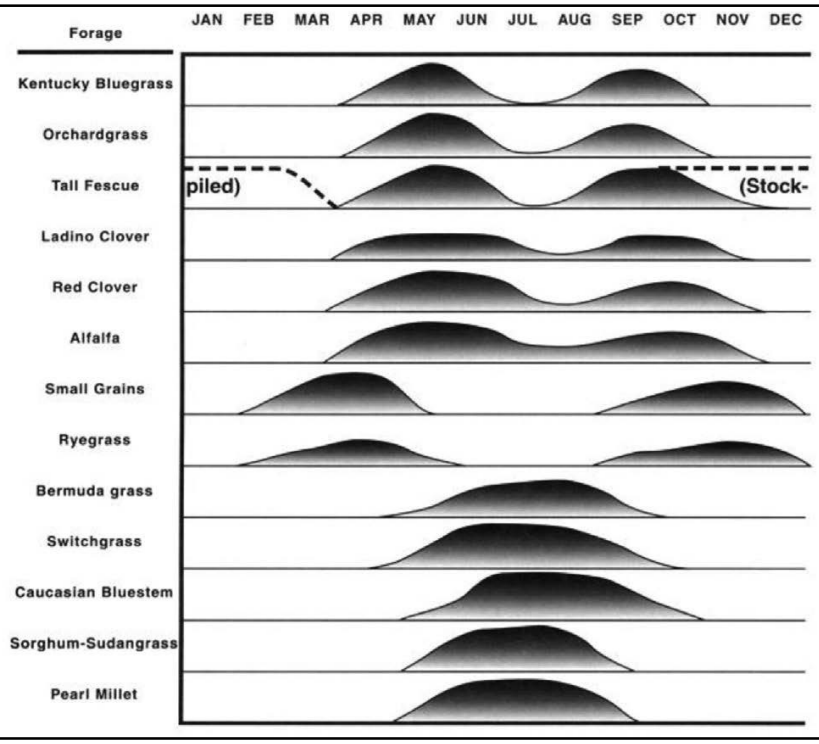
Selecting Forages for Pasture



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Cool Season Perennials

Orchardgrass

A bunch-type, tall-growing, cool-season perennial grass.
It is one of the most productive cool-season grasses, tolerant to shade, fairly drought resistant with moderate winter hardiness.

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Orchardgrass

Does not exhibit as much tolerance to drought or winter hardiness as tall fescue and bromegrass. Orchardgrass is well adapted to grow with legumes such as alfalfa, red clover, lespedeza and white clover.

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Orchardgrass

It establishes more easily than bromegrass or timothy when seeded with other species.
Stands will be more productive and last longer than bromegrass or timothy when grown with alfalfa that is cut frequently and heavily fertilized.

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Orchardgrass

Will persist and make reasonable yields on soils that have moderately poor drainage.
It will not tolerate wet areas as well as reed canarygrass or tall fescue.

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Tall Fescue

- A bunch-type grass, but will spread slowly to form a dense sod.
- It is deep-rooted.
- Prefers the cool temperatures of spring and fall, and grows poorly in mid-summer, which gives rise to the term "summer slump."
- It tolerates excessive moisture and drought as well as acidic (pH 5.4 - 6.2), low fertility soils.
- Begins spring growth when average daily temperatures remain above 40 F for several days.
- It is not completely dormant at lower temperatures; thus, there may be fescue growth in many states from early March to December.
- A good species to use in areas that receive heavy livestock traffic.

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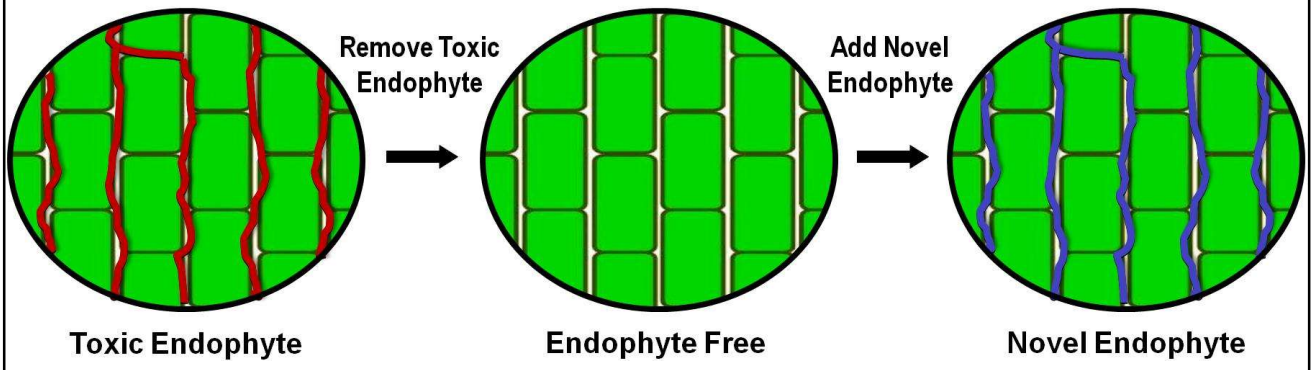
Tall Fescue



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Kentucky 31

Most common variety.
Endophyte infected.
Wide blades, pronounced veins, serrated edges.
Symptoms such as nervousness, rough hair coat, elevated body temperature, reduced weight gain, and low conception rates.
Interseed legumes or other grasses.

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Tall Fescue

Low Endophyte

Endophyte Free

Novel Endophyte

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Kentucky Bluegrass

High quality forage grass.
Most of its growth in the spring and fall when the weather is cool and adequate soil moisture is available.
Becomes semi-dormant in the hot summer months. By doing so it avoids drought damage, but becomes relatively unproductive.
Unlike these other cool season grasses, spreads by rhizomes.
Withstands overgrazing

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Timothy

Short lived bunch grass.
The root system is shallow and fibrous. Up to 80% of the root mass has been found in the top 2 inches (5 cm) of soil.
Susceptible to disease and insects.
Good companion for bromegrass.
Better for hay than grazing.

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Bromegrass

- A leafy, sod-forming perennial grass that is best suited for hay or early spring pasture.
- It is deep-rooted and spreads by underground rhizomes.
- The most widely used cool-season grass in North America.
- It is grown extensively in Canada and the north-central United States.
- Survives periods of drought and extremes in temperature.
- It matures somewhat later in the spring and makes less summer growth than orchardgrass.
- Forage quality of smooth bromegrass compares well with other cool-season grasses, being affected primarily by stage of maturity.

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Perennial Ryegrass

- A leafy, sod-forming perennial grass that is best suited for hay or early spring pasture.
- It is deep-rooted and spreads by underground rhizomes.
- The most widely used cool-season grass in North America.
- It is grown extensively in Canada and the north-central United States.
- Survives periods of drought and extremes in temperature.
- It matures somewhat later in the spring and makes less summer growth than orchardgrass.
- Forage quality of smooth bromegrass compares well with other cool-season grasses, being affected primarily by stage of maturity.

Reed Canarygrass

- A tall, leafy, high-yielding perennial.
- It is a cool-season grass which is greater in winter hardiness and more resistant to foliar diseases than other cool-season grasses.
- Plants spread and thicken from short rhizomes, creating a dense sod.
- If not grazed or clipped, plants will reach heights exceeding 6 feet under high fertility conditions.
- Does well on most soils except droughty sands.
- It is a “natural” for poorly drained soils because of its tolerance to flooding and standing water.
- In addition to its adaptation to wet sites, reed canarygrass is one of the most drought-tolerant of the cool-season grasses.

Cool Season Annuals

Oats

Makes excellent feed and can be seeded in early spring or late summer.
Spring oats should be sown as soon as the ground can be worked in late winter or early spring.
The earlier conditions permit increases the chances for high yields.
May be seeded as late as early April for use as a companion crop.

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Oats

Summer seeding rates seedings should be slightly higher, 90 to 100 pounds/acre, with higher rates the later into September. Higher seeding rates result in smaller stem size and can produce more digestible fiber. Seedings can be made at any time in August but should be completed by mid September. Harvest will occur approximately 60 to 75 days after seeding. By staggering seeding dates, harvest can be more manageable.

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Annual/Italian ryegrass

Can be interseeded.
Some fall grazing.
Nitrogen hog.
First to graze in the spring.
The high forage quality and rapid regrowth of annual ryegrass leads to improved livestock production at a lower cost over stored forage.

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Winter Cereals

Winter Cereals

Barley
Rye
Triticale
Spelt
Wheat

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Festulolium

True hybrid cross of fescue and ryegrass.
Some varieties favor fescue while others favor ryegrass.
Short lived perennial.
High quality forage.

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Warm Season Grasses

Annuals
Perennials

Warm Season Annuals

Sorghum
Sorguhm/Sudangrass
Sudangrass
Millet

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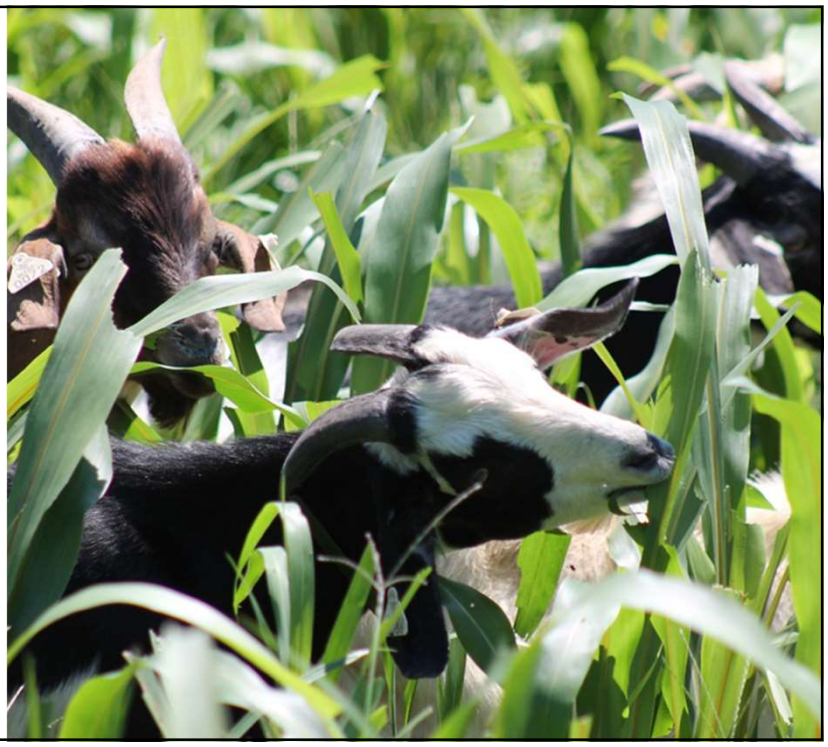

Warm Season Perennials

Bermuda Grass
Crab Grass

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Legumes

Alfalfa
Clover
Birdsfoot
Trefoil
Lespedeza

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Alfalfa

High quality perennial.
High establishment cost.
Seed with grass.

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Clover

Crimson Clover
Red Clover
White Clover
Ladino
Arrow Leaf

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Birdsfoot Trefoil

A perennial that adapts well to production on poorly drained, low-pH soils.
It can reseed itself, is resistant to *Phytophthora* root rot and numerous alfalfa insects, responds well to fertilization, and does not cause bloat in animals.

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Lespedeza

Sericea lespedeza is an erect, deep-rooted perennial legume that persists for many years.
A high-tannin forage (4–15% DM) scientifically proven to reduce parasite loads in sheep and goats.
Sericea lespedeza is on the noxious weed list in some states.

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Forbs

Chicory
Brassicas
“Weeds”

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Brassicas

High quality, high yielding, fast growing crops that are particularly suitable for grazing.
Both tops (stems plus leaves) and roots (bulbs) can be grazed and are very nutritious.
Turnips, Rape, Radishes, Kale and Mustard.

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Weeds

Dandelions
Dock
Plantain
Lambsquarter
Thistle

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Conclusions

Select forages based on:
Soil Type
Animals
Management system

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Questions

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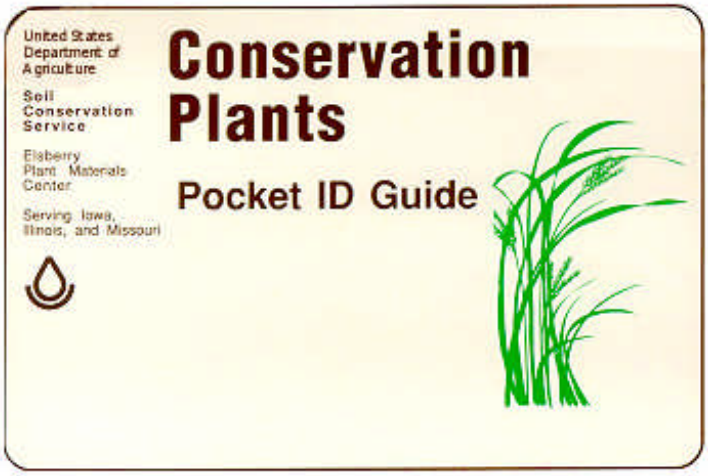
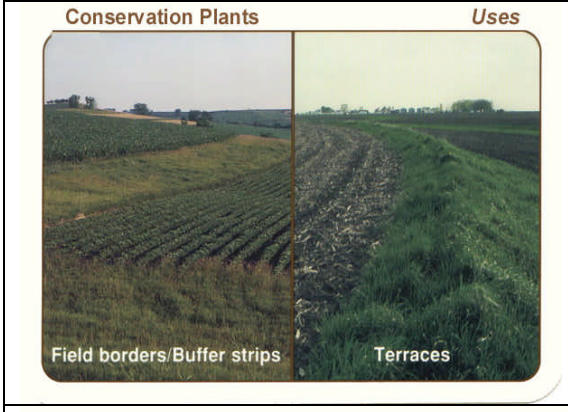
NORTHEAST SARE Sustainable Agriculture Research & Education

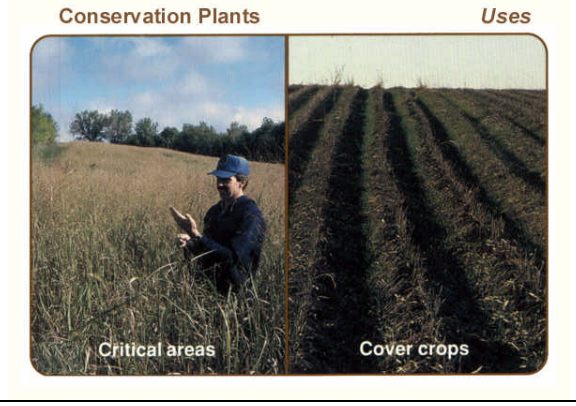


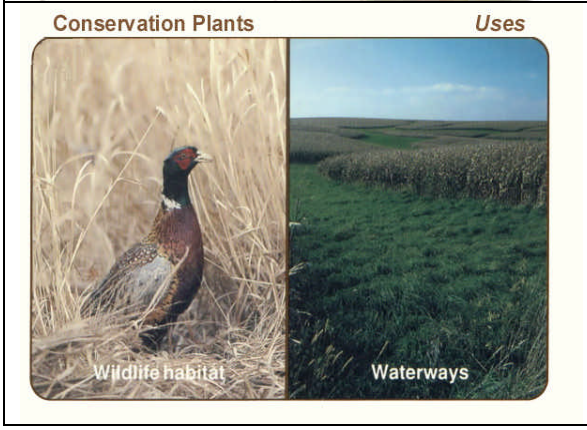
About this guide.....

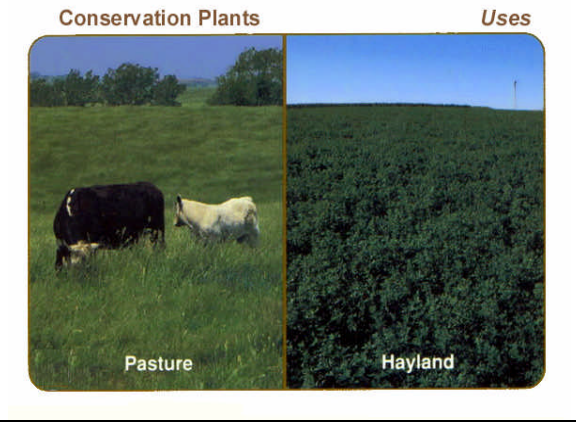
The purpose of this guide is to help you identify come commonly used conservation plants. Its color photos, line drawings and seed photos will help you make identifications. Also included are plant stand evaluation and recommended use charts. Keep this guide with you as long as you need it!

Uses









Conservation Plants — *Uses*

Conservation use

Cool-season plants	Pasture	Hay	Wildlife habitat	Waterways	Field borders/buffers	Terraces	Critical areas	Cover crops	Nurse crops
Smooth bromegrass	H	S*	H*	H	H	H	H*	N	N
Orchardgrass	H*	S*	S*	N	S*	S*	S*	N	N
Timothy	S*	S*	S*	N	S*	S*	S*	N	N
Tall fescue	S	N	N	N	S*	S*	S*	N	N
Reed canarygrass	S	S	N	S	N	N	S*	N	N
Redtop	S*	N	S*	S*	S*	N	S*	N	N
Kentucky bluegrass	S	N	N	S	S	N	S*	N	N

* most suitable in mixtures
H=highly recommended S=suitable N=not suitable

Conservation Plants — *Uses*

Conservation use

Cool-season plants	Pasture	Hay	Wildlife habitat	Waterways	Field borders/buffers	Terraces	Critical areas	Cover crops	Nurse crops
Perennial ryegrass	S*	N	N	N	N	N	S*	N	S
Cereal rye	N	N	N	N	N	N	N	H	S
Annual ryegrass	N	N	N	N	N	N	N	N	S
Oats	N	N	N	N	N	N	N	S	H
Wheat	N	N	N	N	N	N	N	S	S

* most suitable in mixtures
H=highly recommended S=suitable N=not suitable

Conservation Plants — *Uses*

Conservation use

Legumes	Pasture	Hay	Wildlife habitat	Waterways	Field borders/buffers	Terraces	Critical areas	Cover crops	Nurse crops
Alfalfa	S*	H	H*	N	H*	N	H*	N	N
Red clover	S*	S	S*	N	S*	N	H*	N	N
White clover	S*	N	N	N	N	N	S*	N	N
Birdsfoot trefoil	H*	N	S*	N	S*	N	H*	N	N
Sweet clover	N	N	H*	N	N	N	N	N	N
Alsike clover	S*	N	N	N	S*	N	S*	N	N
Hairy vetch	N	N	S*	N	N	N	S*	H	S
Crownvetch	S*	N	N	N	N	S*	S*	N	N

* most suitable in mixtures
H=highly recommended S=suitable N=not suitable

Conservation Plants *Uses*

Conservation use

Warm-season plants	Pasture	Hay	Wildlife habitat	Waterways	Field borders/buffers	Terraces	Critical areas	Cover crops	Nurse crops
Switchgrass	H	S	H	S*	S	S	H*	N	N
Indiangrass	H	S	H	N	S	N	H*	N	N
Big bluestem	H	S	H	S*	S	S	H*	N	N
Little bluestem	S*	N	H*	N	N	S*	H*	N	N
Sideoats grama	S*	N	H*	N	N	S*	H*	N	N
Eastern gamagrass	S	H	S	N	N	N	S*	N	N

Note: Warm season plants are not recommended in mixtures with introduced cool season plants

*most suitable in mixtures

H=highly recommended S=suitable N=not suitable

Evaluating Stands

Seeding success may not be obvious from visual observation. Use the chart below to determine whether your first-year stand is adequate. Lay a square-foot frame, or a circular frame with a 42.5-inch circumference on the ground. Count the number of seedlings within the frame, taking at least 10 counts for each 10 acres, in representative areas of the field. The table is based on pure stands; if a mixture of grass and legume is planted, reduce the numbers by the ratio of each species planted.

Inadequate stands should be re-seeded. When a stand is judged to be between adequate and inadequate, it should be reevaluated after the second growing season. Warm-season grasses may need to be evaluated after the third growing season.

Conservation Plants *evaluating stands*

Species / Use	Seedlings needed per square foot: Critical areas A	Critical areas N	Forage A	Forage N	Idle land A	Idle land N
Big bluestem, Indiangrass, Sideoats grama	>4.0	<1.0	>2.0	<0.5	>1.0	<0.25
Switchgrass	>4.0	<2.0	>2.0	<0.5	>1.0	<0.25
Little bluestem	>6.0	<1.5	>3.0	<0.75	>1.5	<0.38
Smooth bromegrass, Reed canarygrass	>4.0	<2.0	>2.0	<1.0	>1.0	<0.5
Tall fescue	>4.0	<2.0	>1.0	<1.0	>1.0	<0.5
Crownvetch, Ladino clover, Orchardgrass	>8.0	<4.0	>4.0	<2.0	>2.0	<1.0
Kentucky bluegrass, Redtop, Timothy	>10.0	<5.0	>5.0	<2.5	>2.5	<1.25
Alfalfa, Alsike clover, Birdsfoot trefoil, Red clover	>12.0	<6.0	>6.0	<3.0	>3.0	<1.5

>=greater than <=less than A=adequate N=not adequate

Seeds

Early ID -- Seed is Key

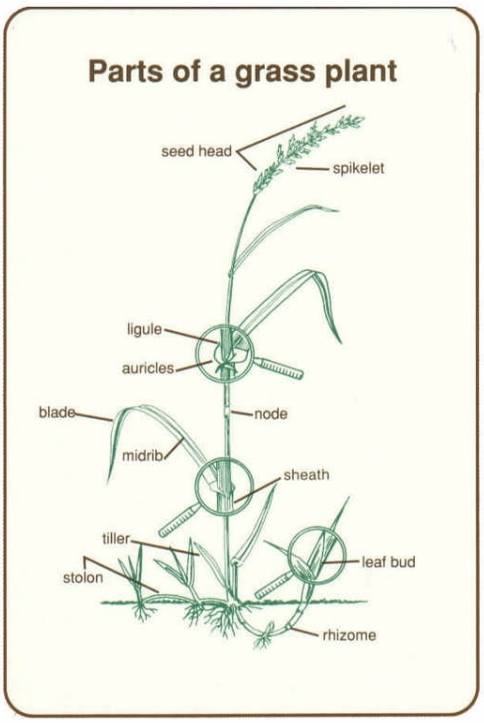
Grasses can be very difficult to identify in early growth stages. The seed may be the best identify aid. A seed retains its form and position in the ground through the seedling's early growth stages. To identify a seedling, carefully dig it up and compare it to photographs or actual seeds.

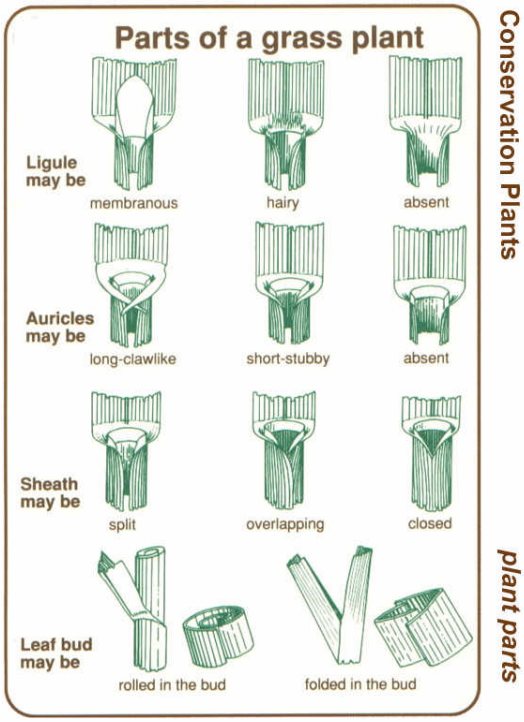
Conservation plants seeds

Plant	Number of seeds per pound	Number of seeds to be found in a square foot per pound seeded*
Alfalfa	200,000	5
Alsike clover	700,000	16
Annual ryegrass	227,000	5
Big bluestem	165,000	4
Birdsfoot trefoil	400,000	9
Cereal rye	18,000	.4
Crownvetch	110,000	3
Eastern gamagrass	7,280	.2
Hairy vetch	20,000	.5
Indiangrass	175,000	4
Kentucky bluegrass	2,177,000	50
Little bluestem	260,000	6
Oats	13,000	.3
Orchardgrass	654,000	15
Perennial ryegrass	227,000	5
Red clover	275,000	6
Redtop	4,990,000	114
Reed canarygrass	533,000	12
Sideoats grama	191,000	4
Smooth bromegrass	136,000	3
Sweet clover	260,000	6
Switchgrass	389,000	9
Tall fescue	207,000	5
Timothy	1,230,000	28
Wheat	15,000	.3
White clover	800,000	18

Example: If the recommendation is to plant 8 pounds of big bluestem per acre, expect to find about 32 seeds in a square foot.

Plant Parts





Conservation Plants

The Elsberry Plant Materials Center

The Elsberry Plant Materials Center is a 243-acre facility near Elsberry, Missouri. The Center, operated by the US Department of Agriculture, Soil Conservation Service, serves the states of Iowa, Illinois and Missouri.

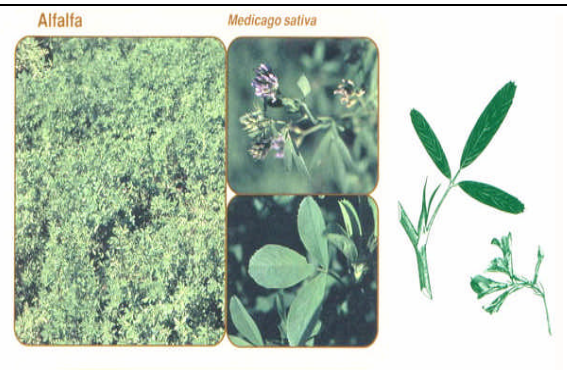
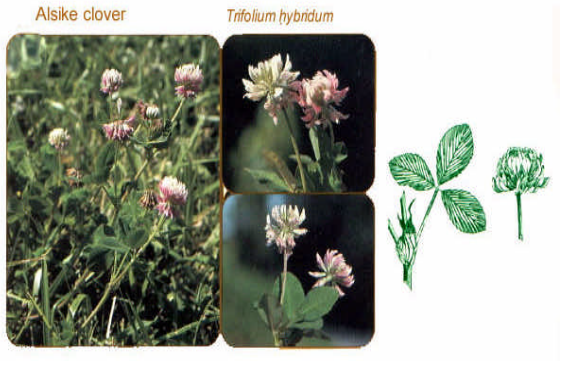
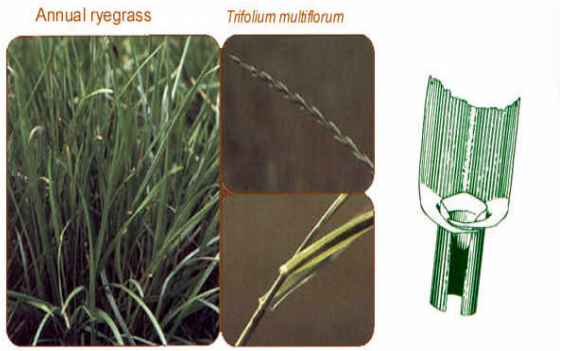
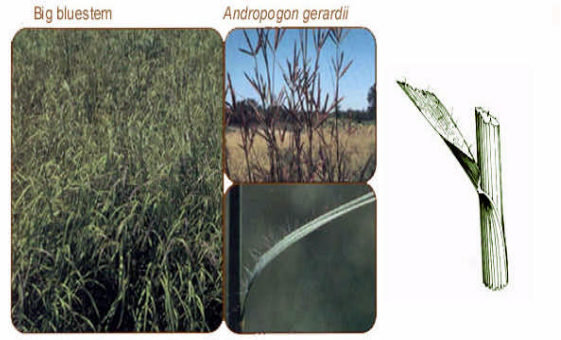
The center is examining more than 1,000 collections of grasses, legumes and woody plants. Its primary task is to develop plants to help control soil erosion on cropland and to improve water quality. Plants are also developed to increase forage production, provide wildlife habitat, beautify the land and for other purposes.

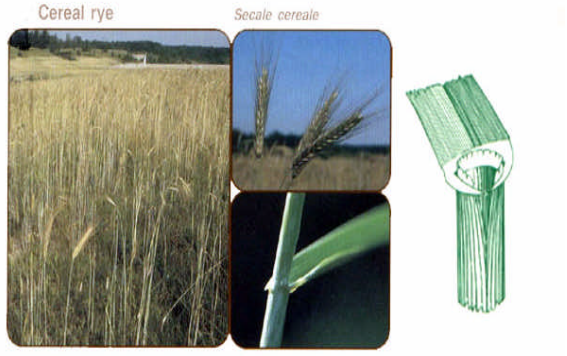
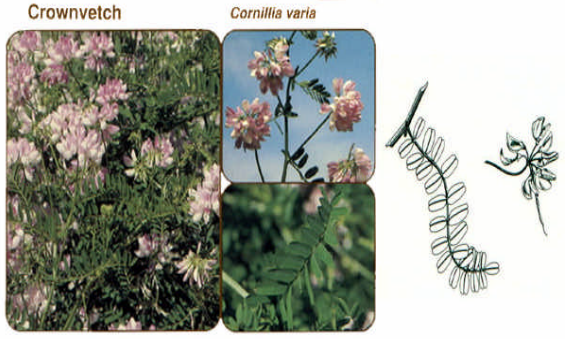
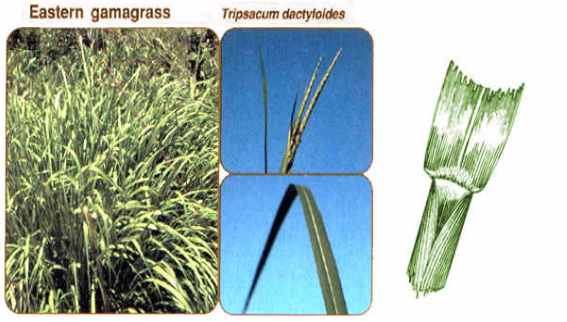
The center continually strives to find the best plants for soil and water conservation.

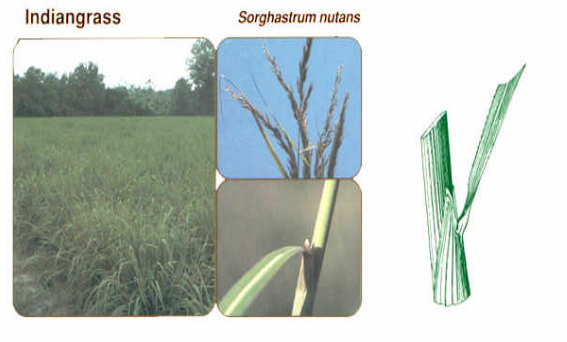
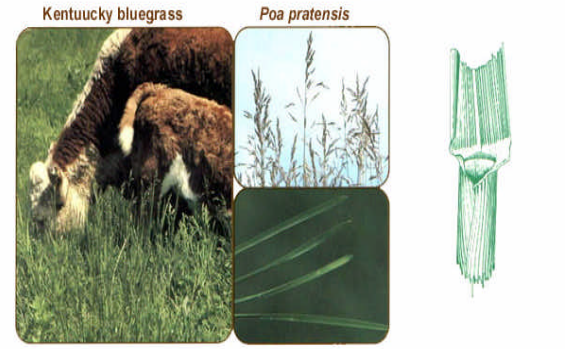
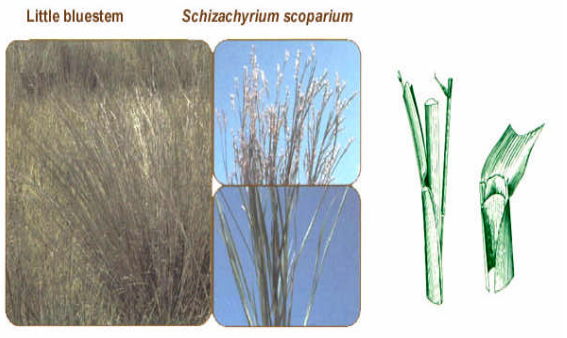
Plants for Conservation

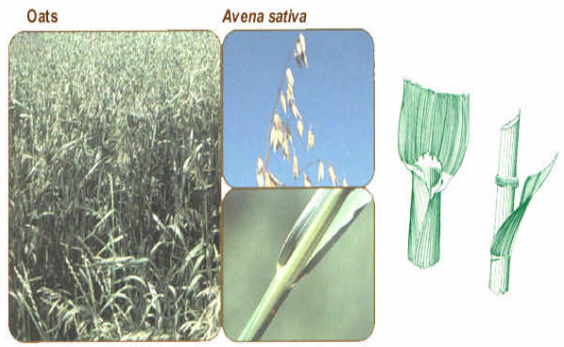
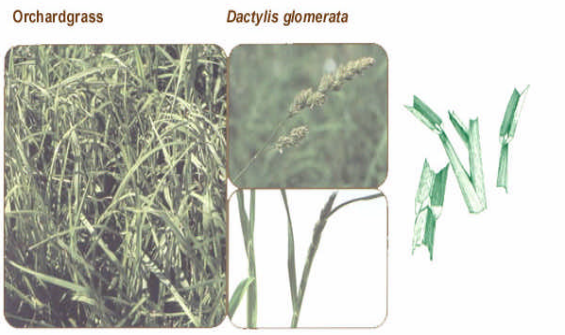
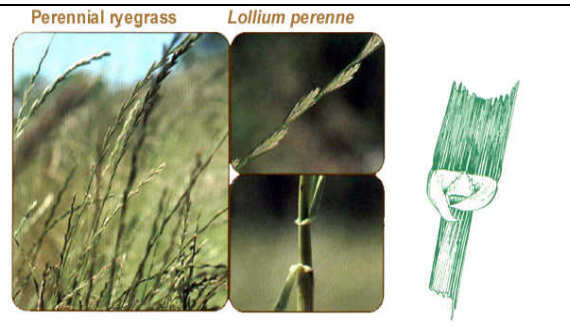
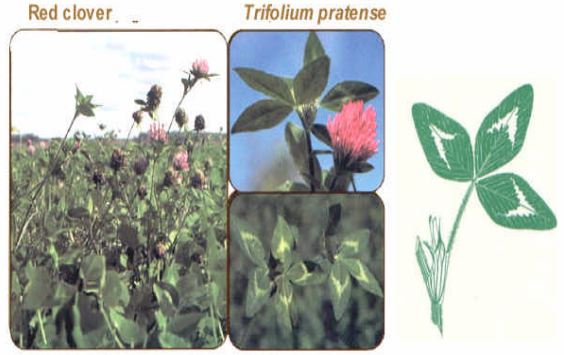
Maintaining good ground cover is basic soil conservation. Recognizing the best plant for the intended purpose, planting it correctly and keeping it healthy is a formula for successful care of the land.

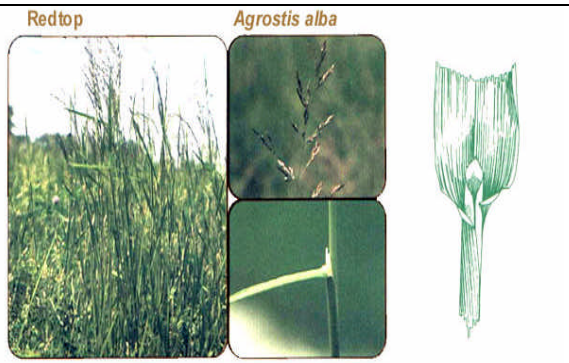
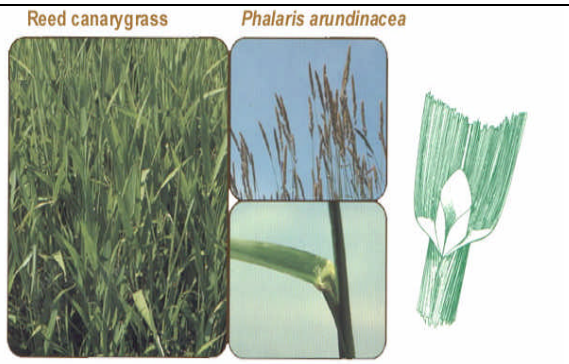
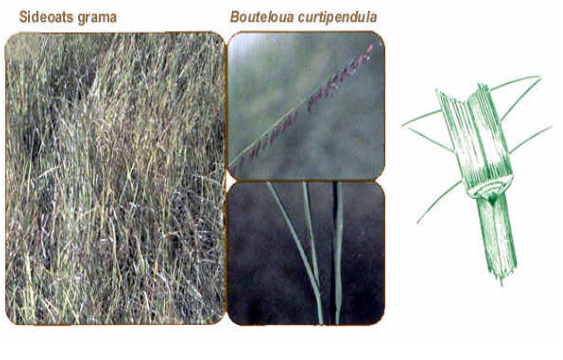
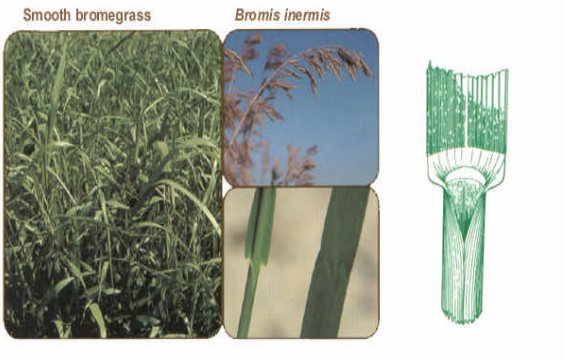
The List…….

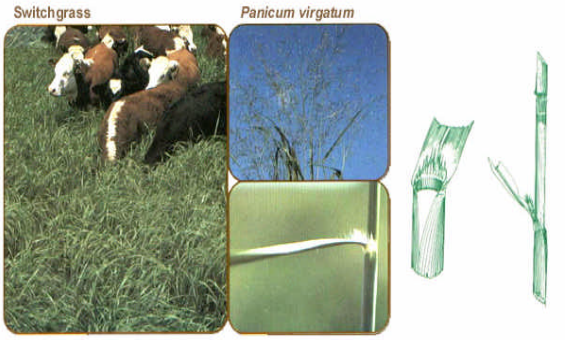
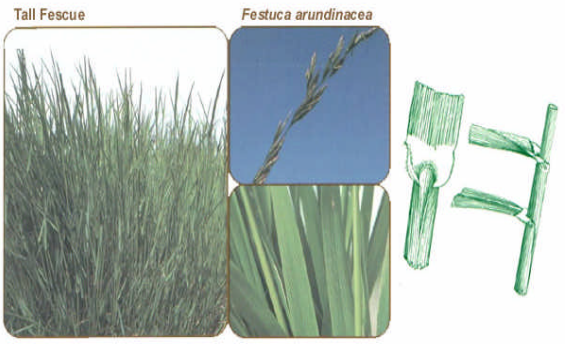
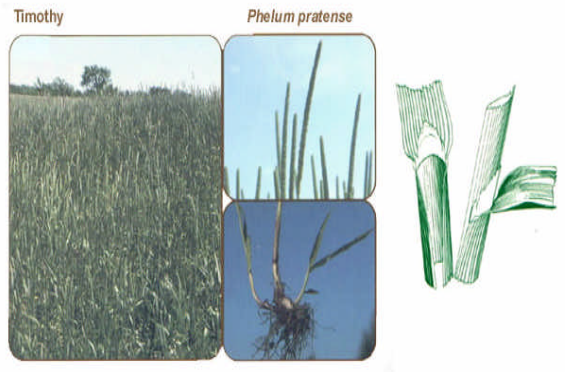
	Alfalfa -- *Medicago sativa* **About this plant:** Perennial Legume Growth occurs from crowns Grows 2 to 3 feet tall **Identification Tips:** Leaf: Usually three leaflets with terminal leaflet on small stem; 1/3 of leaflet is toothed Flower: Purple
	Alsike clover -- *Trifolium hybridum* **About this plant:** Perennial short lived legume Growth from a crown with multiple stems Grows 12 to 24 inches tall **Identification Tips:** Leaf: Three leaflets all equal distance from petiole, no light marks present on upper leaf surface, not shiny underneath Flower: White to rose Other: No hairs on vegetative parts
	Annual ryegrass -- *Lolium multiflorum* **About this plant:** Annual Cool season Grows 1 to 2 feet tall **Identification Tips:** Sheath: Round, smooth and open Blade: Rolled in the bud shoot, flat, 1/8-inch wide Ligule: Small, membranous Other: Small auricles present
	Big bluestem -- *Andropogon gerardii* (native) **About this plant:** Perennial grass Warm season Spreads by short rhizomes Somewhat bunchy Grows 6 to 9 feet tall **Identification Tips:** Sheath: Round to somewhat flattened, open purplish at base, usually hairy Blade: Rolled in the bud shoot, silky hairs widely dispersed on upper leaf surface Ligule: Small membrane

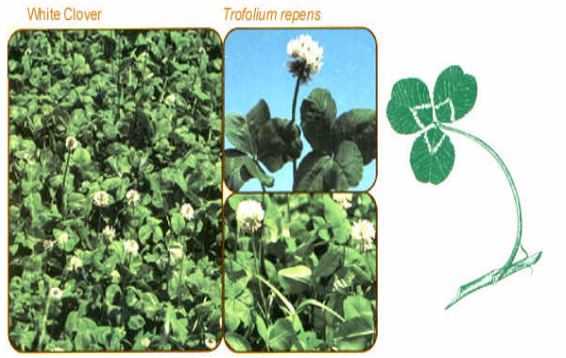
	Birdsfoot trefoil -- *Lotus corniculatus* **About this plant:** Perennial legume Growth occurs from crowns but roots can also produce new growth Grows 12 to 18 inches tall **Identification Tips:** Leaf: 5 leaflets, 3 above and 2 below Flower: Yellow to deep orange, tinged with red Other: Inch-long seed pods resemble several toes of a bird's foot, thus plant's name
	Cereal rye -- *Secale cereale* **About this plant:** Annual cereal grain Grows 3 to 5 feet tall **Identification Tips:** Sheath: Round, smooth, split with overlapping margins Blade: Rolled in the bud shoot, 1/2 to 1 inch wide, margins rough Ligule: Small membranous, torn on the edges Other: Small auricles without hairs
	Crownvetch -- *Coronilla varia* * **About this plant:** Perennial legume Spreads to underground rootstocks Creeping stems grow to 3 to 5 feet tall **Identification Tips:** Leaf: 12 to 14 pairs of leaflets arranged along a common stem, no tendrils Flower: Variegated white to purple in color
	Eastern gamagrass -- *Tripsacum dactyloides* (native) **About this plant:** Perennial grass Forms bunches up to 4 feet in diameter with thick short jointed rhizomes Grows 6 to 8 feet tall **Identification Tips:** Sheath: Flattened and open Blade: Rolled in bud shoot, flat, smooth, up to 1/2-inch wide, with large, prominent, light-colored midrib Ligule: Ring of short hairs

	Hairy vetch -- *Vicia villosa* **About this plant:** Winter annual legume Usually planted in late summer for major growth the following year Grows 3 to 4 feet and attaches to other plants by tendrils **Identification Tips:** Leaf: Multiple leaflets arranged along the sides of a common stem ending in a tendril Flower: Blue violet Other: Vegetative parts are covered by small hairs
	Indiangrass -- *Sorghastrum nutans* (native) **About this plant:** Perennial grass Warm season Strong bunch grass Grows 2 to 4 feet tall **Identification Tips:** Sheath: Flattened, open, often purplish at the base Blade: Folded in the bud shoot, folded along the midrib, narrow (less than 1/4-inch wide) Ligule: Small membranous
	Kentucky bluegrass -- *Poa pratensis* **About this plant:** Perennial grass Cool season Sod forming Grows 1 to 2 feet tall **Identification Tips:** Sheath: Somewhat flattened and open Blade: Folded in bud shoot, 1/8-inch wide, boat shaped tip and two white lines down center of leaf Ligule: Small, membranous
	Little bluestem -- *Schizachyrium scoparium* (native) **About this plant:** Perennial grass Warm season Spreads by short rhizomes, somewhat bunchy Grows 3 to 6 feet tall **Identification Tips:** Sheath: Round, open, may be hairy at the base Blade: Rolled in the bud shoot, flat, narrowed at the base Ligule: Prominent, membranous, clawlike -- often referred to as a rifle sight

	Oats -- *Avena sativa* **About this plant:** Annual cereal grain Cool season Grows 2 to 4 feet tall **Identification Tips:** Sheath: Round, short, hairy, split with overlapping margins Blade: Rolled in the bud shoot, 1/4 to 1/2 inch wide, margins short, hairy Ligule: Prominent, membranous, rounded and toothed Other: Auricles absent
	Orchardgrass -- *Dactylis glomerata* **About this plant:** Perennial grass Cool season Bunch grass Grows 2 to 4 feet tall **Identification Tips:** Sheath: Flattened and open Blade: Folded in bud shoot, flat, at least 1/4-inch wide Ligule: Large, membranous, often split at maturity
	Perennial ryegrass -- *Lolium perenne* **About this plant:** Perennial grass (short lived) Cool season Bunch grass Grows 2 to 3 feet tall **Identification Tips:** Sheath: Flattened, smooth and open Blade: Folded in the bud shoot and V-shaped, 1/8-inch wide, smooth and glossy below Ligule: Small, membranous Other: Narrow, small auricles
	Red clover -- *Trifolium pratense* **About this plant:** Biennial or short lived perennial legume Growth is from crows; tufted appearance Grows 18 to 30 inches tall **Identification Tips:** Leaf: Three leaflets all equal distance from petiole, light colored V marks present on upper leaf surface, not shiny underneath Flower: Rose red color Other: Vegetative parts usually covered with many hairs, does not have stolons

	Redtop -- *Agrostis alba* **About this plant:** Perennial grass Cool season Sod forming Grows 2 to 3 feet tall **Identification Tips:** Sheath: Round, open, shorter than internodes Blade: Rolled in the bud shoot, up to 1/4-inch wide, with prominent veins on the surface Ligule: Large, membranous and shovel shaped
	Reed canarygrass -- *Phalaris arundinacea* * (native) **About this plant:** Perennial grass Cool season Sod forming Grows 2 to 6 feet tall **Identification Tips:** Sheath: Round, open and pale below ground Blade: Rolled in the bud shoot, flat, up to 1/2-inch wide Ligule: Large membranous ligule, pointed, often described as papery Other: Large rhizomes, greater than 1/8-ich diameter
	Sideoats grama -- *Bouteloua curtipendula (native)* **About this plant:** Perennial grass Warm season Sod forming Grows 1 to 3 feet tall **Identification Tips:** Sheath: Round, open, longer than the internodes Blade: Rolled in bud shoot, flat, up to 1/8-inch wide, hairs protruding from bumps on margins Ligule: Small, membranous with short hairs on top
	Smooth bromegrass -- *Bromus inermis* * **About this plant:** Perennial grass Cool season Sod forming Grows 2 to 3 feet tall **Identification Tips:** Sheath: Round, closed near the top Blade: Rolled in the bud shoot, pinched 'W' in leaf blade Ligule: Small, membranous

	Sweet clover -- *Melilotus sp.* **About this plant:** Biennial legume (some annual forms also) Growth occurs from a crown with one main stem Grows 2 to 5 feet tall **Identification Tips:** Leaf: Usually three leaflets with terminal leaflet on small stem; entire leaflet is toothed Flower: Yellow/White Other: White sweet clover is more coarse, taller and flowers 10 to 20 days later than yellow sweet clover
	Switchgrass -- *Panicum virgatum* (native) **About this plant:** Perennial grass Warm season Sod forming Grows 3 to 6 feet tall **Identification Tips:** Sheath: Round, open, white to purplish tinged below Blade: Rolled in the bud shoot, slat up to 1/2-icnh wide Ligule: Fringe of hairs with a dense mat of hairs extending onto the upper leaf surface
	Tall fescue -- *Festuca arundinacea* * **About this plant:** Perennial grass Cool season Bunch grass; forms a weak sod Grows 2 to 3 feet tall **Identification Tips:** Sheath: Round, open, fitting loosely around the stem Blade: Rolled in the bud shoot, smooth and shiny underneath, ridged on the upper surface Ligule: Small membranous Other: Very small auricles, not readily seen by the naked eye
	Timothy -- *Phleum pratense* **About this plant:** Perennial grass Cool season Bunch grass Grows 2 to 3 feet tall **Identification Tips:** Sheath: Round, open and overlapping Blade: Rolled in the bud shoot, flat, up to 1/4-inch wide, often twisted Ligule: Large, membranous, with notch at either side Other: Each stem grows from a distinctive swollen base

	Wheat -- *Triticum aestivum* **About this plant:** Annual cereal grain Grows 2 to 3 feet tall **Identification Tips:** Sheath: Round, smooth, split with overlapping margins Blade: Rolled in the bud shoot, 1/4 to 1/2 inch wide, margins smooth Other: Small auricles, mostly long, hairy
	White clover -- *Trifolium repens* **About this plant:** Perennial legume Spreads by stolons Grows 6 to 12 inches tall **Identification Tips:** Leaf: Three leaflets all equal distance from petiole, light colored V marks present on upper leaf surface, shiny underneath Flower: White to pinkish white Other: No hairs on vegetative plant parts

* indicates the plant may be considered weedy or invasive in some parts of the US and may not be appropriate for conservation uses in certain areas. Check with your local Conservation District or state department of natural resources for more information on weediness and recommendations for use. This guide in primarily intended as an identification tool. Persons intending to use these plants for conservation or landscape should consult additional sources of information for use, establishment, and management of the species.

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For more information about the PM Program visit our web site at: **http://plant-materials.nrcs.usda.gov**