



Native Forb Guidance Document

420 MO-GD Native Forb

Natural Resources Conservation Service (NRCS)
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Missouri Conservation Practice 420

Native forbs, or broadleaf plants, are a natural part of the Missouri landscape. They welcomed European settlers to the state, painting the prairie and savanna landscapes with vibrant colors that changed throughout the season while supporting an incredible diversity of native wildlife. More than 800 plant species, most of them forbs, have been identified on Missouri's prairies.

Missourians are demonstrating a rekindled interest in native forbs for their beauty, hardiness, and wildlife benefits. Native forbs are well adapted to Missouri's climatic extremes, which range from potentially brutal cold in January to the often stifling heat of July. Once established, native forbs require few inputs and little maintenance.

Native forbs feature a variety of shapes, sizes, color, and value to wildlife. The towering compass plant, the vibrant butterfly milkweed, the rather plain but very valuable roundhead lespedeza, and the unique rattlesnake master all add important diversity to any planting. Choosing which ones to plant can be difficult; contact your local conservation agency representative, or one of the vendors of native forb seed for assistance. You can find a list at www.grownative.org, or www.monativeseed.org. Seed vendors can be excellent sources of information, and they are often as eager as you are for your planting to be successful.

Refer to Table 1 in this document for general information about native forbs that are most often available commercially.

Establishing native wildflowers can be fulfilling, but it can also be expensive. Fortunately, there are programs available that may be able to help offset the higher costs. Check with your local Missouri Department of Conservation or USDA office to see if your project qualifies for financial assistance. If you are establishing native forbs with cost-share, be certain you are following the requirements of that particular conservation practice, such as species numbers and selection and whether the seed is required to be Missouri source and origin. Be sure you understand all of the requirements before you commit to buying seed.

Finally, remember that native forbs grow well with native grasses. Most forb plantings, with the possible exception of small garden plantings or those with the major objective of establishing pollinator (see the Native Pollinators Implementation Requirement [420 MO IR Pollinators]) or monarch habitat (see the Monarch Habitat Guidance Document [420 MO GD Monarch]), should include native grasses. The presence of native grass aids with weed suppression, supplies fuel for prescribed burning, and provides fall color and support for tall wildflowers, while reducing soil erosion.



How do I establish native forbs?

Planting native wildflowers can be intimidating. Following these few simple guidelines will help ensure success.

Refer to the 420 Wildlife and Pollinator Plantings Implementation Requirement (420 MO IR Planting) to determine the seeding specifications for the community type to be restored. **Conservation of the monarch butterfly is critically important as it represents other pollinators and is experiencing precipitous declines, therefore, it is recommended that at least 2 species of approved milkweed (*Asclepias* spp.) is included in the seed mix (see Table 1). Also see the Monarch Habitat Guidance Document (420 MO GD Monarch) for more specific information related to the monarch.**

Include one or more native grasses in most new plantings, depending on the resource concern. If shorter grass species are desired, consider little bluestem or sideoats grama. If taller grasses are what you want, consider big bluestem or indiangrass. Reduce seeding rates of grasses, that would be required for a pure grass stand, to reduce competition with the native forbs. Check out the approved cultivar list for native grasses at the Missouri NRCS electronic Field Office Technical guide (FOTG) site for details (<https://efotg.sc.egov.usda.gov/>), go to Missouri and select your county. The sheet is located on the left side of the web page under Section IV, Conservation Practice Standards & Support Document, Wildlife Habitat Planting (420), 420 MO GD Wildlife Habitat Planting – Native Plant Cultivars and Selections for Missouri.

If you are establishing native forbs, as part of a restoration of a plant community considered to be rare or declining in Missouri (tallgrass prairie, oak savanna, or glades), be certain you are following the requirements of the Restoration and Management of Rare or Declining Habitats conservation practice standard (Code 643), and applicable job sheets, which require plant material selection based on:

1. The use of Missouri Source Identified Class (herbaceous material) – Missouri source is defined as a native plant source that genetically originated in Missouri; was not introduced; and existed within the state borders prior to arrival of settlers. The location of the wild growing parents must be within Missouri and implies that the geographical location is known.
2. All seed from herbaceous material shall comply with Missouri seed laws including Missouri Crop Improvement Association guidance. All seed will comply with AOSCA (Association of Official Seed Certifying Agencies) certification procedures (including appropriate tagging) to include third-party verification by the Missouri Crop Improvement Association of source, genetic identity, and genetic purity of wildland collected or field or nursery grown plant germplasm materials. Seed must be Missouri origin (grown in Missouri) and certified as Missouri Source Identified Class. If Missouri origin (grown) Source Identified Class seed is not available Missouri Source Identified Class seed may be obtained only from the area identified on the Seed Source Geography Map (see Figure 1 in the 420 MO IR Wildlife and Pollinator Plantings Implementation Requirement document).

Source Identified Certification means:

- Parent seed is collected from natural remnant Missouri populations.
- No selection, testing, or breeding for specific traits.
- Production fields are inspected to verify species, source, and lack of noxious weeds.
- Seed is certified for purity and germination.

Site Preparation

After determining what you want to plant, evaluate the area you want to plant. Competing vegetation, especially grasses, must be eliminated or suppressed to provide the young wildflower seedlings with adequate sunlight, nutrients, and water to become established. Success of wildflower establishment hinges on establishing good seed-to-soil contact, planting at the proper depth (average ¼ inch or less, depending on size of seed), and reducing competition. **An acceptable seedbed will have at least 50 percent bare ground if using a broadcast seeding method.**



Using a clean-tilled seedbed is perhaps the best way to establish native forbs, unless there is also a companion crop (e.g., winter oats or cereal rye) included with the native forbs followed by mowing the companion crop in the spring. Make sure that competing vegetation is removed and the field is well worked, but firm. You should just barely leave a footprint when you walk across the field. If you find your shoes sink in, take the time to roll the seedbed (cultipackers or rollers are the best).

Crop fields being converted to native forbs may require a contact herbicide application in the fall (October-November) before forb seeds begin to germinate in order to control winter annuals and persistent perennial weeds. No-till planting or broadcasting in soybean stubble is an excellent establishment method (see Table 2 for additional information).

If you plan to renovate an existing cool-season grass patch or an old field with a variety of existing herbaceous cover, follow the guidelines outlined in Table 2, or refer to the Preparing Non-Native Cool Season Grasses for Conversion to Wildlife Friendly Vegetation (420 MO GD Preparing). This is located on the Missouri NRCS FOTG site at: <https://efotg.sc.egov.usda.gov/>. Go to Missouri and select your county. The sheet is located on the left side of the web page under Section IV, Conservation Practice Standards & Support Document, Wildlife Habitat Planting (420), 420 MO GD Wildlife Habitat Planting – Non Native Cool Season Grasses for Conservation to Wildlife Friendly Vegetation.

In some cases you may wish to interseed wildflowers in an area currently dominated by native grasses. Planting in this situation should be done after the grass competition has been reduced since it is essential that seeds have contact with bare soil and that the existing grass is suppressed. Native grasses can be set back with a combination of properly timed prescribed burning and a fall herbicide application, depending on site conditions (see Table 2 for additional information).

Native forbs are often susceptible to conventional broadleaf herbicides so they should be applied before the forbs are planted or germinate. **Use all products at label rates.** However, the best alternative is mowing the first year to control weeds (see Table 2 for additional information).

When to Plant



Whatever cover type you are planting the native wildflowers into, dormant seeding is strongly recommended. Many forb species require 30-90 days of cold, moist stratification, before germinating and dormant seeding is the easiest way to achieve this necessary stratification. Be careful not to drill the seed too deep. A good rule of thumb is to not drill more than 1.5 times the diameter of the seed. It is far better to plant the seed too shallow than to plant too deeply.

The only acceptable time frames for planting are dormant and spring. Dormant seeding is strongly recommended, as the process of freezing and thawing will work the seed into the ground to the correct depth. The dormant season dates are:

- November 16 – March 15 for northern Missouri
- December 1 – February 29 for southern Missouri
- Either drilling or broadcast methods of planting can be used during the dormant season dates. Seed rates do not have to be increased for broadcast planting methods.
- Northern Missouri is all counties north of Bates, Henry, Benton, Morgan, Moniteau, Cole, Osage, Gasconade, Franklin and St. Louis Counties. Southern Missouri is all counties including and south of those listed.

Drilling of seed is the only acceptable method for spring season plantings. The spring season dates are:

- March 16 to May 31 for northern Missouri
- March 1 to May 15 in southern Missouri

If it is not possible to dormant seed, then make every effort to use species that do not require cold moist stratification (see Table 1).

Native grasses and forbs can be dormant seeded at the same time. Another option would be to dormant seed the forbs, followed by a grass planting the following spring or next dormant seeding period. This is important in situations with considerable cool-season grass competition, as this would allow the use of a grass-specific herbicide after the forb seeding, followed by a native grass planting the next dormant period.

Planting Methods

Broadcast seedings for wildlife and pollinator plantings do not require seeding rates to be increased by 50 percent. However, consultation with the local MDC Private Land Conservationist or NRCS planner, experienced in the establishment of diverse native plantings, is required to determine that an increase in seed rate is not necessary



when using broadcasting, rather than planted or drilled. Specifically, the planner must confirm that broadcasting seed, without an increase in the seeding rate, will result in satisfactory cover to reduce potential erosion.

Seeding can vary from site to site, depending upon the conditions of the site. Broadcasting seed by hand may be the most practical way of planting areas where equipment access is difficult and areas that are less than 3 acres in size. For small areas, an ATV-mounted spreader or seeder can also be used. Traditional planting methods will be more practical on larger fields.

Forb seed can vary in size from seed that resembles fine dust to small sunflower seed, therefore the use of some type of inert carrier is often advised to ensure even distribution, especially for hand seeding. Examples of inert carriers that can be used include cat litter, pelletized lime, dried distiller's grain, cotton seed hulls, milorganite, sawdust, rice hulls, or even sand. Mix the seed and carrier at a 50:50 ratio, more if hand seeding, to ensure better seed distribution.

Another alternative is to mix the seed with potash or lime, and spread with a fertilizer buggy. Broadcast seedings should not be dragged or harrowed after planting. Instead, use a cultipacker (with teeth up) to roll the ground. Research shows improved seedling abundance with incorporation by rolling or cultipacking. Use of a disk or harrow will bury the seed too deeply. Although some seed incorporation is desirable, **if you do not see seed on the top of the ground when you are finished, then you planted too deep.** If equipment access is an issue, a less desirable option is to just let the action of freezing and thawing work the seed into the ground. Remember that you still need at least 50 percent bare ground. Also, be aware of potential for increased soil erosion and take necessary precautions to prevent soil loss by seeding a companion crop, such as winter oats or cereal rye. These companion crops will need mowed in the spring to let in light for developing native forbs.



Using a native seed drill designed to handle wildflower seed is the best way to plant the seed, but **make certain that you can control the depth that the drill places seed into the ground; the shallower, the better.** Some seeders, such as a Brillion, simply drop the seed on the ground and press it in with rollers. These machines can be ideal on clean seedbeds. If you are only planting forb seed in a drill, you will need to add some type of carrier with the forb seed in order to get the proper application rate. If the forb seed is round and smooth, mix it with a carrier and place in the smaller legume box on the drill. If the forb seed is fluffy, mix it with a carrier and place it in a seed box that has an agitator and picker wheels. Calibrate the drill to ensure that proper seed slot openings are used and that the proper seed rate is applied.

In general, avoid the use of standard seed grain drills when planting native forbs, as they are not designed to handle forb seed. If using a seed grain drill, ensure that the coulters go no deeper than 3/8 inch. If allowed to go deeper, it increases the risk of the seed being planted too deep.

Patience is important because it may take 2 to 5 years before wildflowers begin to bloom. Refer to Table 2 for specific guidelines.

Management Recommendations for New Seedings

Management is critical to success! Mowing competing vegetation during the first year increases the abundance and survival of wildflower seedlings at the end of the establishment year, when compared to unmowed plots.

Establishment Period: Removal of competing vegetation is normally carried out for one growing season following establishment. Where applicable, mow as often as necessary during the first growing season to control competing



vegetation. Competing vegetation should be cut to a height of 3 to 6 inches (or above the height of the native seedlings) whenever competing vegetation begins to completely shade the ground. Failure to control competing vegetation is a common reason for the failure of new plantings. Frequent mowing the first year will not be a problem for the new seedlings, as most species use their resource to develop a root system first and produce limited shoot growth. Flail-type mowers are preferred because they thoroughly cut and shred the vegetation, which prevents smothering native wildflower seedlings. For small plantings, a portable string trimmer is a good option. Do not mow once the planting has gone dormant in late fall. During the second year, mow if weeds are out-competing the native wildflowers. The second year mowing should only be completed between March 15 and May 1, or make certain that you mow above the height of the forb seedlings.

Mow, clip, or use approved herbicides as necessary to control noxious weeds and undesirable plants during the establishment period. Avoid using broad spectrum herbicides. Instead, spot treat infestations with a selective herbicide as most herbicides will damage or kill some types of native forbs.

Long-term Management: Once the stand is established, the introduction of management practices is essential to maintain the vegetative community. Management practices can vary by program and landowner objectives.

Prescribed burning should be conducted no earlier than the beginning of the second growing season, and typically no earlier than the third growing season. ***Develop a prescribed burn plan before conducting a prescribed burn.*** If the field cannot be burned the second year, mow in early spring to reduce weed competition. Once the planting is established, burn every third year or divide the field in thirds and burn a different 1/3 each year to provide a mosaic of different vegetative habitats. To maintain plant diversity, vary the timing of your prescribed burns between years. For aesthetics, some people prefer to burn annually. However, be aware that annual burns could decrease plant diversity.

Prescribed burning is the preferred method to control undesirable woody vegetation and invasive perennial plants. ***Develop a prescribed burn plan before conducting a prescribed burn.*** Invasive perennial plants and undesirable woody vegetation may survive the prescribed burn. Use spot spraying or manual removal of problem plants to protect and maintain the seeded stand.

Primary Habitat Considerations

- Restoration and Management of Rare or Declining Habitats (643) conservation practice standard.
- Provide natural food and cover for many declining animal species.

References

“Effects of frequent mowing on survival and persistence of forbs seeded into a species-poor grassland.”
D. Williams, L. Jackson, and D. Smith. *Restoration Ecology* 15:124-33p.

Tallgrass Prairie Wildflowers, by Doug Ladd and Frank Oberle. 2005. The Globe Pequot Press, Guilford, Connecticut.

Steyermark’s Flora of Missouri, revised edition, by George Yatskievych. 1999, 2006, and 2013.
Missouri Botanical Garden Press, St. Louis, Missouri, and Missouri Department of Conservation, Jefferson City, Missouri.



United States Department of Agriculture

Websites

Ladybird Johnson Wildflower Center website, <http://www.wildflower.org/plants>

Missouri's GrowNative! website, <http://www.grownative.org>

Missouri Native Seed Association website, <http://www.monativeseed.org>

Pollinator Partnership, "Selecting Plants for Pollinators", <http://www.pollinator.org>

USDA PLANTS Database, <http://plants.usda.gov/>

USDA-NRCS Elsberry Plant Materials Center website,

<http://www.nrcs.usda.gov/wps/portal/nrcs/detail/mo/plantsanimals/?cid=stelprdb1083060>



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**TABLE 1 – AVAILABLE FORBS** - species selection will only be made for the appropriate habitat type based on a planting site evaluation.

<u>Common Name</u>	<u>Scientific Name</u>	<u>Habitat Type *</u>	<u>Flower Information **</u>	<u>General Information ***</u>	Conservatism Ranking (c value) (C)	Pretreatment to Germinate seed (E)
Alumroot	<i>Heuchera richardsonii</i>	DP, MP, G	1,2 - Sp - Su	Calyx is mainly green, may have cream colored tips.	6	CM or CD Light
Anemone, Meadow	<i>Anemone canadensis</i>	WP	1 - LS – Su, showy		6	CM
Aster, Aromatic	<i>Symphyotrichum oblongifolium</i>	DP, MP, G	2 - LSu – F, showy	POL, very high value for monarchs, Fragrant, prefers drier sites.	6	CD
Aster, New England	<i>Symphyotrichum novae-angliae</i>	MP, WP	2 - LSu – F, showy	POL, very high value for monarchs, Prefers wetter sites, leaves clasp the stem.	4	CM
Aster, Purple daisy	<i>Symphyotrichum patens</i>	S, DP, MP, G	2 - LSu - F	POL	5	CM
Aster, Silky	<i>Symphyotrichum sericeum</i>	DP, G	2 - LSu – F, showy	POL, high value for monarchs	9	CM
Aster, Skyblue	<i>Symphyotrichum oolentangiense</i>	S, DP MP	2 - LSu – F, showy	POL, high value for monarchs	7	CD
Aster, Smooth	<i>Symphyotrichum laeve</i>	S, DP, MP	2 - LSu – F, showy	POL, high value for monarchs	7	CD
Aster, Southern Swamp	<i>Eurybia hemispherica</i>	DP, S, MP	2,3 – LSu - EF		6	CM
Aster, White upland	<i>Solidago ptarmicoides</i>	S, MP, DP, G	2,3 – LSu - EF			CM
Aster, Willowleaf	<i>Symphyotrichum praealtum</i>	WP	2,3 - LSu – F	POL, high value for monarchs, Pale lavender color, likes moist areas	6	CM
Barbara's Button	<i>Marshallia caespitosa</i>	DP, MP, WP	1 - LS - ESu	Foliage green through winter.	9	



Bean, Slickseed Wild	<i>Strophostyles leiosperma</i>	DP, MP, S	2,3 – ESu – MF		2	IN
Beardtongue, Foxglove	<i>Penstemon digitalis</i>	DP, MP, WP, G	1 - LS – MSu, showy	POL	3	CM -30 days
Beardtongue, Prairie	<i>Penstemon tubaeiflorus</i>	S, DP, MP	1 - LS – MSu, showy	POL	6	CM -30 days
Beardtongue, Purple	<i>Penstemon cobaea</i>	S, DP, G	1,2 - LS – ESu, showy	POL	10	CM -30 days
Beggar's Lice	<i>Desmodium canescens</i>	S, DP, MP, G	1,2 - LS – Su, showy	Legume, food	5	CD, SC, IN
Beggartick (A)	<i>Bidens frondosa</i>	WP	2 - Su, showy	Food,	2	CM
Bergamot, Savanna	<i>Monarda bradburiana</i>	S, DP, G	2,3 - LS – EF, showy	POL, mint	5	CD
Bergamot, Wild	<i>Monarda fistulosa</i>	S, DP, MP, WP, G	2,3 - LS – EF, showy	POL, high value for monarchs, mint	4	CD
Black-eyed Susan (B)	<i>Rudbeckia hirta</i>	S, DP, MP, G	2,3 - LS – F, showy	POL, high value for monarchs, Food	1	CM or CD
Black-eyed Susan, Missouri	<i>Rudbeckia missouriensis</i>	DP, G	2,3 - ESu – F, showy	Food, blooms for a long period.	6	CM or CD
Black-eyed Susan, Sweet	<i>Rudbeckia subtomentosa</i>	MP, WP	2 - Su, showy	POL, high value for monarchs, Food	5	CM or CD
Blazing Star, Eastern	<i>Liatris scariosa</i>	S, DP, MP, G	2,3 LSu-EF	POL, very high value for monarchs, blooms during monarch migration.	9	CM
Blazing Star, Glade	<i>Liatris mucronata</i>	S, DP, G	2,3 - MSu – F, showy	POL, blooms during monarch migration.	10	CM
Blazing Star, Prairie	<i>Liatris pycnostachya</i>	DP, MP, WP, G	2,3 - MSu – F, showy	POL, very high value for monarchs, blooms during monarch migration.	6	CM
Blazing Star, Rough	<i>Liatris aspera</i>	S, DP, G	2,3 - MSu – F, showy	POL, very high value for monarchs, blooms during monarch migration.	6	CM
Blazing Star, Scaly	<i>Liatris squarrosa</i>	S, DP	2,3 - MSu – EF, showy	POL, blooms during monarch migration.	6	CM



Blazingstar, Squarrulosa	<i>Liatris squarrulosa</i>	S, DP, MP, G	2,3 MSu – EF, showy	POL, blooms during monarch migration.	8	CM
Blue Lobelia	<i>Lobelia siphilitica</i>	WP	2,3 MSu – F, showy	POL, high value for monarchs	4	CM Light
Boneset, Common	<i>Eupatorium perfoliatum</i>	WP	2,3 - MSu - F	POL, high value for monarchs	3	CM, CD- Light
Brown-eyed Susan (B)	<i>Rudbeckia triloba</i>	S, WP	2,3 - Su – F, showy	POL, high value for monarchs, Food	3	CM or CD
Bunchflower, Virginia	<i>Melanthium virginicum</i>	MP, WP, S (Wet)	2 – ESu - LSu		9	CM
Cardinal Flower	<i>Lobelia cardinalis</i>	WP	2,3 - MSu – EF, vivid red, showy	POL, high value for monarchs	6	CM Light
Catchfly, Royal	<i>Silene regia</i>	S, DP, MP	1,2,3 - LS – F, showy	Blooms for a long period. Flowers 2 nd year.	9	CM
Clover, Purple Prairie	<i>Dalea purpurea</i>	S, DP, MP, G	1,2 - LS – Su, showy	POL, high value for monarchs, legume	8	SC, CD, IN
Clover, White Prairie	<i>Dalea candida</i>	S, DP, MP, G	1,2 - LS – Su, showy	POL, high value for monarchs, legume	8	SC, CD, IN
Compass Plant	<i>Silphium laciniatum</i>	DP, MP, WP, G	1,2 - LS – Su, showy	POL, high value for monarchs, food	6	CM
Coneflower, Glade Purple	<i>Echinacea simulata</i>	S, DP, MP, G	1,2 - LS – MSu, showy	POL	7	CM
Coneflower, Gray-headed	<i>Ratibida pinnata</i>	S, DP, MP, G	1,2,3 - LS – F, showy	POL, food, robust perennial. Extensive root system reduces erosion.	4	CM or CD
Coneflower, Pale Purple	<i>Echinacea pallida</i>	S, DP, MP, G	1,2 - LS – MSu, showy	POL, high value for monarchs	7	CM, Light



Coneflower, Purple	<i>Echinacea purpurea</i>	S, MP, WP,	1,2,3 - LS – F, showy	POL, very high value for monarchs, prolific bloomer, flowers over a long period.	5	CM, CD, Light
Coneflower, Upright Prairie	<i>Ratibida columnifera</i>	DP, MP, G	1,2,3 - LS – EF, showy	Ray flowers sometimes marked with dark red. Weak perennial on good soil.		CM or CD
Coneflower, Yellow	<i>Echinacea paradoxa</i>	S, DP, G	1,2 - LS – ESu, showy	POL	9	CM
Coreopsis, Finger	<i>Coreopsis palmata</i>	S, DP, MP, G	1,2 - LS – MSu, showy	POL, high value for monarchs, Food	7	CM
Coreopsis, Lanceleaf	<i>Coreopsis lanceolata</i>	DP, MP, G	1,2 - LS – MSu, showy	POL, high value for monarchs, food	5	CM
Coreopsis, Plains (A)	<i>Coreopsis tinctoria</i>	DP, G	1,2 - Sp – ESu, showy	Food	1	CM
Coreopsis, Tickseed	<i>Coreopsis tripteris</i>	S, DP, MP, WP, G	1,2 - LS – MSu	POL, high value for monarchs, Food	6	CM
Coreopsis, Bigflower	<i>Coreopsis grandiflora</i>	DP, MP	1,2 - LS – MSu, showy	Food	6	CM
Culver's Root	<i>Veronicastrum virginicum</i>	S, MP, WP	2 - Su, showy	POL, high value for monarchs, Whorled leaves.	7	CD and Light
Cup Plant	<i>Silphium perfoliatum</i>	MP, WP	2,3 - Su – F, showy	POL, high value for monarchs	3	CM
Flag, Blue	<i>Iris virginica shrevei</i>	WP	1,2 - LS – MSu, showy	Forms large colonies	6	CM
Flag, Copper	<i>Iris fulva</i>	MP, WP	1 - Sp, showy		9	
Flax, Stiff Yellow	<i>Linum medium</i>	DP, MP	1,2 – LS - LSu		5	CM
Foxglove, Beach False	<i>Agalinis fasciculata</i>	DP, MP	2,3 – MSu - EF		7	CM, Light
Germader, American	<i>Teucrium canadense</i>	S, DP, MP, WP	2,3 - ESu – EF		2	CM
Goat's rue	<i>Tephrosia virginiana</i>	S, DP, MP, G	1,2 - LS – MSu, showy	Legume, may have pink/cream flowers.	5	SC, CM, IN -10 days



Golden Alexanders	<i>Zizia aurea</i>	S, DP, MP, WP, G	1,2 - LS - ESu	Blooms for a long period in the spring.	5	CM-120 days
Goldenrod, Gray	<i>Solidago nemoralis</i>	S, DP, MP, G	2,3 - LSu - F	POL, high value for monarchs	2	CM, Light
Goldenrod, Riddell's	<i>Oligoneuron riddellii</i>	WP	2,3 - LSu - F, showy	POL, high value for monarchs	10	CM, Light
Goldenrod, Savanna	<i>Solidago petiolaris</i>	S, DP, G	2,3 - LSu - F, showy	POL, likes partial shade	8	CM
Goldenrod, Showy	<i>Solidago speciosa</i>	S, DP, MP	2,3 - LSu - EF, showy	POL, very high value for monarchs	7	CM, Light
Goldenrod, Stiff	<i>Oligoneuron rigidum, Solidago rigida</i>	S, DP, MP, G	2,3 - LSu - F, showy	POL, very high value for monarchs	5	CM
Hyacinth, Prairie	<i>Camassia angusta</i>	MP, WP	1,2 - Sp - ESu, showy	Plant dormant by early summer.	10	CM
Hyacinth, Wild	<i>Camassia scilloides</i>	S, DP, MP, G	1,2 - Sp - ESu		6	CM
Illinois Bundleflower	<i>Desmanthus illinoensis</i>	MP, WP, G	1,2 - LS - MSu	Legume	3	CD, SC, IN
Indian paintbrush (A)	<i>Castilleja coccinea</i>	DP, MP, WP, G	1,2 - Sp - Su, showy	Can be summer seeding on poor sites with established grass	7	CM
Indigo, Blue Wild	<i>Baptisia australis</i>	S, DP, MP, WP, G	1,2 - Sp - ESu, showy	POL, legume	8	SC, IN, CM
Indigo, Cream Wild	<i>Baptisia bracteata</i>	S, DP, MP, G	1 - Sp - LS, showy	POL, legume	7	SC, IN, CM
Indigo, White Wild	<i>Baptisia alba</i>	S, DP, MP, WP, G	1,2 - LS - MSu, showy	POL, legume	6	SC, IN, CM
Ironweed, Missouri	<i>Vernonia missurica</i>	MP, WP	2,3 - MSu - F	POL, high value for monarchs	5	CM, or CD
Ironweed, Tall	<i>Vernonia gigantea</i>	S (Wet), MP, WP	2,3 - MSu - EF	POL, high value for monarchs	6	CM, or CD
Ironweed, Yellow	<i>Verbesina alternifolia</i>	BF, WP	2,3 - LSu - MF	POL, high value for monarchs	4	CM
Leadplant	<i>Amorpha canescens</i>	S, DP, MP, G	1,2 - LS - Su, showy	POL, legume, somewhat woody, high value for monarchs	8	CM, IN



Lespedeza, Hairy	<i>Lespedeza hirta</i>	S, DP, MP, G	2,3 - LSu - F	Legume, food	7	SC, IN, CM
Lespedeza, Roundhead	<i>Lespedeza capitata</i>	S, DP, MP, G	2,3 - MSu - F	Legume, food, bloom may be greenish/cream colored	6	SC, IN, CM
Lespedeza, Slender	<i>Lespedeza virginica</i>	S, DP, MP, G	1,2,3 - LS - EF	Legume, food	5	SC, IN, CM
Lespedeza, Trailing	<i>Lespedeza procumbens</i>	DP, G	2,3 - LSu - MF		4	SC, IN, CM
Lespedeza, Violet	<i>Lespedeza violacea</i>	S	2,3 - MSu - MF		6	SC, IN, CM
Longflower Beeblossom (A/B)	<i>Gaura longiflora</i> , <i>Oenothera filiformis</i>	DP, MP, WP, S	2,3 - MSu - EF		1	CM
Lousewort / Wood Betony	<i>Pedicularis canadensis</i>	S, DP, MP, G	1 - LS		5	CM- 30 days
Milkvetch, Canada	<i>Astragalus Canadensis</i>	MP	1, 2 - LS - Lsu		6	CM - 10 days
Milkweed, Butterfly	<i>Asclepias tuberosa</i>	S, DP, MP, G	1,2 - LS - Su, showy	POL, very high value for monarchs	5	CM, CD
Milkweed, Common	<i>Asclepias syriaca</i>	S, DP, MP, WP, G	1,2 - LS - LSu	POL, milky sap, very high value for Monarchs.	0	CM
Milkweed, Green	<i>Asclepias viridiflora</i>	S, DP, MP, G	2,3 - MS - F	POL, high value for monarchs	7	CM
Milkweed, Purple	<i>Asclepias purpurascens</i>	S, DP, MP, G	1,2 - LS - MSu, showy	POL, milky sap, high importance for monarchs	6	CM, CD
Milkweed, Sand	<i>Asclepias amplexicaulis</i>	DP, MP, G	1, 2 - S - Su	POL, high value for monarchs	7	CM
Milkweed, Showy	<i>Asclepias speciose</i>	DP, MP	1, 2, 3 - LS - LSu	POL, high value for monarchs		
Milkweed, Smooth	<i>Asclepias sullivantii</i>	MP, WP	2 - Su	POL, high value for monarchs	8	CM, CD
Milkweed, Spider	<i>Asclepias viridis</i>	DP, MP, G	1,2 - LS - ESu	POL, very high importance for monarchs	5	CM



Milkweed, Swamp	<i>Asclepias incarnata</i>	MP, WP	3 - F, showy	POL, milky sap, very high value for monarchs	4	CM
Milkweed, Tall Green	<i>Asclepias hirtella</i>	S, DP, MP, WP, G	2 - Su	POL, high value for monarchs	4	CM, CD
Milkweed, Whorled	<i>Asclepias verticillata</i>	S, DP, MP, WP, G	1,2,3 - LS - EF	POL, very high value for monarchs	2	CM, CD
Mint, Ohio Horse	<i>Blephilia ciliata</i>	S, WP	1,2 - LS - LSu	POL, high value for monarchs	6	CM, Light
Mountain Mint, Hairy	<i>Pycnanthemum pilosum</i>	S, DP, MP, WP, G	MSu-F	POL, mint	5	CM
Mountain Mint, Slender	<i>Pycnanthemum tenuifolium</i>	S, DP, MP, WP, G	1,2 - LS - Su	POL, high value for monarchs, Mint, spreads slowly	4	CD, Light
Mountain Mint, Virginia	<i>Pycnanthemum virginianum</i>	WP	2 - Su	POL, high value for monarchs, mint	6	CD, Light
New Jersey Tea	<i>Ceanothus americanus</i>	S, DP, MP, G	1,2,3 - LS - F, showy	POL, Somewhat woody.	7	SC, CM
Obedient Plant	<i>Physostegia virginiana</i>	S, MP, WP, G	2,3 - MSu - EF, showy	POL, high value for monarchs, Mint, spreads slowly	7	CM
Obedient Plant, Early	<i>Physostegia angustifolia</i>	S, DP, MP	2,3 - LSu - EF		6	
Pea, Partridge (A)	<i>Chamaecrista fasciculata</i>	S, DP, MP, G	2,3 - Su - F, showy	POL, legume, food	2	SC, IN, CM
Pea, Sensitive (A)	<i>Chamaecrista nictitans</i>	S	2,3 - MSu - EF		2	SC, IN, CM
Petunia, Wild	<i>Ruellia humilis</i>	DP, MP, G	1,2,3 - LS - EF	Short		CM
Poppymallow, Fringed	<i>Callirhoe digitata</i>	DP, MP	1,2 - MS - LSu, showy	Spindly plant, slender, leafless stems.	4	CM
Poppymallow, Purple	<i>Callirhoe involucrata</i>	DP, G	1,2 - MS - MSu, showy		5	CM
Prairie Blue-eyed Grass	<i>Sisyrinchium campestre</i>	DP	1,2 - LS - ESu	Resembles grass	5	CM
Prairie Cinquefoil	<i>Drymocallis arguta</i>	DP, MP, G	1,2 - LS - Su		10	CM



Prairie Dock	<i>Silphium terebinthinaceum</i>	S, DP, MP, WP, G	2,3 - Su - F	POL, high value for monarchs	5	CM
Prairie Parsley	<i>Polytaenia nuttallii</i>	DP, MP, WP	1,2 - LS - ESu		10	CM
Primrose, Common Evening (B)	<i>Oenothera biennis</i>	MP	2,3 – ESu -MF		0	Light
Primrose, Missouri Evening	<i>Oenothera missouriensis</i>	DP, G	1,2 - LS – MSu, showy	POL	7	CD
Quinine, Wild	<i>Parthenium integrifolium</i>	S, DP, MP, G	1,2 - LS - Su		6	CM
Rattlebox (A)	<i>Crotalaria sagittalis</i>	DP, G	1,2,3 - LS - EF		5	CD, IN
Rattlesnake Master	<i>Eryngium yuccifolium</i>	S, DP, MP, G	2 - Su	POL, high value for monarchs, unique plant	8	CM
Rose, Pasture	<i>Rosa carolina</i>	DP, MP, S	1 – LS		4	SC/CM
Rose, Prairie	<i>Rosa setigera</i>	MP	1 - Sp, showy	POL, food	4	SC/CM
Rosinweed	<i>Silphium integrifolium</i>	S, DP, MP, WP, G	2,3 - Su – F, showy	POL, high value for monarchs, food	4	CM
Sage, Pitcher	<i>Salvia azurea</i>	DP, MP, G	2.3 - Su – F, showy	POL, high value for monarchs	4	CD
Scurf Pea, Gray	<i>Pedimelum tenuiflorum</i>	DP, MP, WP, G	1,2 - LS – MSu	Legume, food	8	SC/CM 10 days
Seedbox	<i>Ludwigia alternifolia</i>	WP	2 – ESu - LSu		4	CM
Senna, Maryland	<i>Senna marilandica</i>	S, MP, WP	2 - MSu – LSu	POL, legume, food	4	SC, IN, CM
Sensitive Brier	<i>Mimosa quadrivalvis var nuttalli</i>	S, DP, MP, G	1,2 - LS – Su, showy	Legume	6	CM-30 days, SC, IN
Shooting Star	<i>Primula meadia</i>	S, DP, G	1 - LS, showy	Plant goes dormant by July 1 st .	7	CM 30 days, Light
Skullcap, Downy	<i>Scutellaria incana</i>	S (S. MO), MP	2,3 – MSu - EF		5	CM
Snakeroot, Sampson's	<i>Orbexilum pedunculatum</i>	S, MP, WP	1,2 - LS – MSu	Legume	6	CM-10 days, SC, IN
Spanish Needles (A)	<i>Palafoxia callosa</i>	S, DP, G	2,3 - LSu – F, showy	Tolerates mowing/pruning.	5	CD, Light



Spiderwort, Ohio	<i>Tradescantia ohiensis</i>	S, DP, MP, WP	1,2,3 - LS – F, showy	POL	3	CM
Spiny-toothed Gumweed (B)	<i>Grindelia lanceolata</i>	S, DP, MP, G	2,3 - Su - F		3	CM, Light
Spurge, Flowering	<i>Euphorbia corollata</i>	S, DP, MP, G	1,2,3 - LS – F	Milky sap	3	CM
Sunflower, Ashy	<i>Helianthus mollis</i>	DP, MP, G	2,3 - MSu – F, showy	POL, high value for monarchs, food	6	CM, CD
Sunflower, False	<i>Heliopsis helianthoides</i>	S, DP, MP, G	1,2,3 - LS – F, showy	POL, very high value for monarchs, Food, blooms over a long period.	5	CM or CD
Sunflower, Maximillian ¹	<i>Helianthus maximiliani</i>	S, DP, MP, G	2,3 – MSu – MF	POL, high value for monarchs, food	5	CM, CD
Sunflower, Paleleaf Woodland	<i>Helianthus strumosus</i>	S, MP	2,3 - MSu – F	POL, high value for monarchs, food	7	CM
Sunflower, Sawtooth	<i>Helianthus grosseserratus</i>	, MP, WP, G	2,3 - MSu – F, showy	POL, very high value for monarchs, food	4	CM, CD
Sunflower, Stiff ¹	<i>Helianthus pauciflorus</i>	DP, MP, G	2,3 – LSu - F	POL, high value for monarchs, food	5	
Sunflower, Tickseed (A/B)	<i>Bidens aristosa</i>	MP, WP	2 – MSu - LSu	POL, very high value for monarchs	1	CM, Light
Sunflower, Western	<i>Helianthus occidentalis</i>	DP, MP, G	2,3 - MSu – F, showy	POL, high value for monarchs, food, good wildlife structure.	5	CM, CD
Sunflower, Willow-leaved	<i>Helianthus salicifolius</i>	WP, MP, DP	3 – EF - MF		8	CD
Sunflower, Wingstem	<i>Verbesina helianthoides</i>	S, DP, MP, G	2,3 - LS - Su	POL, high value for monarchs	5	CM, CD
Ticktrefoil, Showy	<i>Desmodium canadense</i>	S, DP, MP, WP, G	2 - MSu – LSu, showy	Legume, food	4	CD, SC, IN
Verbena, Rose	<i>Glandularia canadensis</i>	S, DP, G	1,2 – LS - LSu		5	CM or CD
Vervain, Blue	<i>Verbena hastata</i>	WP	2,3 - ESu - MF	POL, high value for monarchs	4	CM, CD, Light

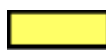
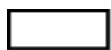


Vervain, Hoary	<i>Verbena stricta</i>	S, DP, MP, G	1,2,3 – LS - EF	POL, high value for monarchs	2	CM, CD, Light
White Crownbeard	<i>Verbesina virginica</i>	S, BF	2,3 – LSu - MF	POL, high value for monarchs	5	CM
Yarrow	<i>Achillea millefolium</i>	DP, MP	1,2,3 – LS – F		1	Light

Under the "Common Name" column, A= Annual B= Biennial, otherwise the plant is perennial.

*S = Oak Savanna, DP= Dry Prairie, MP= Mesic Prairie, WP= Wet Prairie, G= Glade, BF= Bottomland Forest

**Blooming dates: In general, SP= Spring (1)= April/May; LS= May; Su=Summer(2) = June-August; ESu = June; MSu=July; LSU= August, F= Fall (3)=September-early November; EF= September; MF= October; LF=late October-early November



White Flowers

blue/purple flowers

green flowers

red/orange flowers

yellow flowers

pink/violet flowers

***POL - Important pollinators, native for food = important for wildlife

¹Maximilian sunflower (*Helianthus maximiliani*) and Stiff Sunflower (*Helianthus pauciflorus*) can be used at a rate of less than 0.1 seeds per square foot. Prairie Gold Maximilian sunflower cultivar (*Helianthus maximiliani* Schrad) can also be used at this reduced rate.

Conservation Ranking (C value)²: A conservatism ranking (C value) is an integer between 0 and 10 reflecting the degree of obligate dependence of a taxon on intact natural habitats with direct composition, site conditions, and process regime linkage to the immediate pre-Euro settlement period. For each taxon, coefficients are assigned based on observed ecological performance, derived from collective extended field experience and observations in the contemporary landscape. Factors influencing C value include disturbance tolerance, habitat affinities, and degree of dependence on intact native vegetation assemblages and their associated site conditions and process regimes. Conservatism embodies 2 interrelated tenants: (1) organisms differ in their tolerance of the response to disturbance, and (2) organisms display varying degrees of fidelity to intact habitats, process regimes, and site continuity. **It is very important to select species with varied C values for a mixture, especially depending on the length of the site's conservation practice planned.**

0-3: These native plants are adapted to disturbance and the post-Euro settlement environment. Early successional plants are an important component to their community displaying high opportunistic potential for occupancy of disturbed sites as they will readily establish a new site as they will readily establish a new site and will compete with early invader exotic plants.



4-6: These mid-successional plants are typically matrix species in intact habitats with some limited ability to disturbance and repopulate areas from which they have been removed.

7-10: Conservative plants are late-successional, occurring in mature native plant communities with high fidelity to intact habitats that reflect our state's pre-Euro settlement conditions.

² Ladd, D. and J.R. Thomas. 2015. *Ecological checklist of the Missouri Flora for Floristic Quality Assessment*. *Phytoneuron*. 12: 1-274.

Seed Pretreatment: Many species need a pretreatment process applied to their seed prior to sowing in order to stimulate plant germination. Pretreatments vary, but many mimic natural seasonal conditions, such as cold stratification or exposure to light that a seed must undergo in order to emerge in the spring. A dormant seeding will complete cold moist stratification as a pre-treatment. Leguminous plants often require scarification of their hard seed coat in order to allow water and gasses to pass through which assists the seed in imbibing; additionally, applying an inoculant to a leguminous seed increases the success rate of those plants forming beneficial symbiotic relationships with microbes in the soil.

CM: Cold moist stratification (minimum of 60 days; can be achieved by dormant planting)

CD: Cold dry stratification (over-winter storage)

SC: Scarify seedcoat (weaken seedcoat by scratching or rubbing it)

IN: Incolutate seedcoat (add correct microbe)

Light: Requires sunlight to germinate; plant seed on surface



Table 2. Options for controlling competing vegetation during forb establishment.

Option	Current Cover	Timing	Method(s)
Single herbicide application	Cropland OR Sparse Grassland	Fall	<p>(This option should not be used when tall fescue or brome is the dominant cover. Two herbicide applications are needed to adequately control these species. Heavy stands of red or ladino clover will also require 2 treatments)</p> <ol style="list-style-type: none"> For sparse grassland, remove excess vegetation prior to spraying, preferably in late summer or fall (Aug./Sept.) to allow regrowth. Mowing/haying or prescribed burning are the preferred options. Apply herbicide (follow all label instructions) on new growth when it is 4-6 inches in height and actively growing. <ul style="list-style-type: none"> Apply a broad-spectrum contact herbicide, such as glyphosate, at label rates. Glyphosate may be tank-mixed with imazapic, but be sure that forbs to be planted are tolerant according to the product label. Spray while undesirable vegetation is actively growing. For cropland, spray winter annuals prior to March 15th in south Missouri, April 1st in north Missouri, but prior to native forb seedling emergence.
Two herbicide applications	Non-desirable grassland	Fall and Spring	<ol style="list-style-type: none"> Remove excess vegetation in early spring (March). Apply herbicide on new growth when it is 4-6 inches in height and actively growing. <ul style="list-style-type: none"> Apply a broad-spectrum contact herbicide, such as glyphosate. Follow all label instructions. <p>AND</p> <ol style="list-style-type: none"> Apply herbicide in fall (Sept.—Oct.) when grass is actively growing. <ul style="list-style-type: none"> Apply a broad-spectrum contact herbicide, such as glyphosate. Follow all label instructions. Subsequent applications of a broad-spectrum contact herbicide, such as glyphosate or a grass-specific herbicide may be necessary in future years to knock back invading undesirable cool-season grasses, see footnotes below for more information. Dormant seeding of native forbs and grasses is strongly recommended. <p>OR</p> <ul style="list-style-type: none"> Dormant seed native forbs after a fall application a broad-spectrum contact herbicide (at label rates), such as glyphosate. Follow all label instructions, and then use a grass-specific herbicide the following spring to eliminate undesirable grasses. Follow-up with a dormant native grass planting the following winter. <p>OR</p> <ul style="list-style-type: none"> Consider glyphosate-tolerant soybeans or forage sorghum for a year or 2 to eliminate undesirable vegetation, then dormant seed native forbs and grasses.
Mow or burn	Desirable native grass	Late Summer or Fall	<ol style="list-style-type: none"> Mow/hay or burn in September—October to suppress existing grass. If there is an abundance of litter present, either burn, bale the residue, or lightly disk to expose bare ground prior to seeding. If there is an abundance of undesirable cool-season grass present (such as fescue), wait until the native grass has gone dormant (usually after the first killing frost) and then spray as outlined above for Cropland or Sparse Grassland. Burning is the preferred option, and forbs may be broadcast during the dormant season by seeding directly onto the remaining ash.
Mow and/or burn	Rank stands of native grass	Late Summer	<ol style="list-style-type: none"> Mow or hay in August, then spray regrowth with a broad-spectrum contact herbicide, such as glyphosate (follow all label instructions), in September prior to native grasses going dormant, OR Conduct a prescribed burn mid-July to early August. Apply a broad-spectrum contact herbicide, such as glyphosate (follow all label instructions), when grass reaches a height of 4-6 inches and is actively growing in early September. Continue frequent mowing throughout the 1st growing season following the forb seeding.



Contact your local University of Missouri Extension office, or local herbicide dealer for recommendations on type of herbicide and rates for your specific situation and follow all label instructions. NRCS does not endorse any particular herbicide product. Be sure and follow all label directions. Take note that the timing of the use of a contact herbicide, such as a glyphosate, occurs after desirable plants are dormant in the fall, or prior to their beginning growth in the spring. Remember that native cool season grasses (such as wildrye) and some forbs (such as beardtongue) may not go dormant. In general, spraying to control undesirable cool-season grasses should take place before October 31.

Note that an adequate seedbed for native forb establishment will have at least 50 percent bare ground. Prescribed burning is the preferred method for seedbed preparation when establishing forbs into an existing grass stand. **Do not seed native forbs in the spring.**

Mowing for weed control during the establishment year is important, especially for forbs established into existing grass. Research has shown repeated mowing in the establishment year results in better forb establishment and persistence in existing native grass.

When using an herbicide, such as glyphosate or grass-specific herbicides (sethoxydim, quizalofop p-ethyl, or clethodim), timing is critical. Glyphosate is a contact killer and its use may harm or kill desirable forbs. Timing should be late fall/early winter after natives have gone dormant. Spray during warm days (50-60 degrees) with low label rates. Use of grass-specific herbicides should be timed in early spring prior to native grass breaking dormancy.

For additional information on native forbs, contact your local USDA Service Center or Missouri Department of Conservation office.

Photos courtesy of the Missouri Department of Conservation.

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