

A Quick Guide to Prairie Establishment

Successful Prairie Plantings and Wildflower Gardening require attention to your site conditions and adherence to the following procedures.

1. **Planning and Designing Your Prairie Meadow**
2. **Understanding Your Soil**
3. **Site Preparation**
4. **Prairie Seeding and Management Procedures**

Site Selection

Prairies and meadows require sunny, open sites with good air circulation. A minimum of one half day of full sun is necessary for most prairie plants to thrive and bloom. Any sunny, level site is suitable for a prairie meadow. On hills, south-facing slopes receive more sun than level ground, are hotter and drier, and thus well-suited to prairie meadows. West-facing slopes are subject to desiccation from prevailing westerly winds and the hot afternoon sun and are also good sites for prairies. East-facing slopes are good candidates as well. Steep north-facing slopes are protected from the sun, stay cooler and moister and are usually not well-suited to prairies. Prairie flowers and grasses will also do well when planted on the east, west, and south sides of a building in full sun. The north side is too shady and is better suited to ferns and woodland wildflowers.

Prairie meadows are often recommended for planting over septic fields and mound systems (see page 25). The roots of the herbaceous perennial flowers and grasses apparently do not grow into the pipes and do not pose a threat to their function. The Wisconsin Department of Natural Resources suggests planting prairie on top of mound systems. An added benefit is that the deep-rooted prairie plants can utilize the wastewater and the nutrients contained in it, preventing them from entering the ground water. You can help recycle your wastewater with native plants!

Be careful if aggressive, weedy plants are located adjacent to your future prairie site. Some plants can creep into your meadow by means of underground rhizomes, while others have seeds that can blow in on the wind. Problem neighbors include quackgrass, smooth bromegrass, johnsongrass, Canada goldenrod, tall goldenrod, Canada thistle, grey dogwood, sumac, buckthorn, Tatarian and Japanese honeysuckles, and multiflora rose, to name a few. If there is an old field



next to your prairie, expect some incursion by unwanted visitors, some of whom may attempt to make your prairie their home. To prevent this problem, maintain a mowed strip 5-10 feet wide between the prairie and the old field, and mow the adjacent fields every summer in late July, before the plants go to seed.

Beware of attempting to establish a prairie on sites that have a long history of weedy vegetation. Extensive site preparation will be required to kill off existing weeds growing on the site, and to also reduce the weed seeds that are harbored in the soil. This typically requires one to two full years to accomplish, using Roundup herbicide, cultivation, or a combination of the two. Please refer to the section on Site Preparation on pages 12-13 for specifics on converting old fields to prairies.

Tall and Short Prairies

The Eastern Tallgrass Prairie once covered the midcontinent from central Kansas east into Ohio, from Texas north to Manitoba. On the richer, moister soils grew many taller plants. On poorer, drier soils, shorter plants predominated. Today, we use combinations of these plants to create the landscape effects we desire. Short prairies are a good choice for around homes and buildings. Tall prairies are best when planted on larger acreages, or in background situations. Include trails through your prairie so you can enjoy its different moods and intricacies up close.

You may want to plant some areas of both tall and short prairie to create two different landscape effects and habitat types. Place the tall prairie to the back, and short prairie in the front to create a layered effect. Beware that if you plant tall prairie to the west or north of your short prairie, the ripening seeds of the taller plants may be blown into the short prairie to the east and south. Eventually your short prairie may become a tall grass prairie, as the invading seeds from the tall plants grow and mature.

For a prominent display of wildflowers, plant them with the shorter bunchgrasses, such as little bluestem, prairie dropseed, and side oats grama (see the prairie grasses on pages 44-47). These low-growing, clump-forming grasses allow the flowers to show off better than when planted with taller prairie grasses. Large, robust flowers should be planted with the tall prairie grasses. Please refer to our tall prairie seed mixes on pages 4-7, and 25.

Beware of planting only one type of flower in an area. Most flowers do not have sufficiently thick root systems to squeeze out weeds by themselves. They require help from other flowers and grasses. Tap-rooted flowers seem to grow better and produce more flowers when growing together with clump grasses.

The complementary root systems of the prairie flowers and grasses work together to squeeze out weeds. By occupying different parts of the soil, these plants co-exist with one another as a tight-knit plant community. The inclusion of a wide variety of native flowers and grasses is the secret to creating low-maintenance flower gardens that require little chemical input and less work than typical flower beds. By understanding plant behavior and working with nature, we let the plants do most of the work for us. Carefully follow the procedures on the next few pages, use quality seeds and plants from Prairie Nursery, and let Mother Nature do the rest!

1. Planning and Designing Your Prairie Meadow

Successful establishment of a prairie wildflower meadow involves preparing your site properly, selecting the plants that are suited to your soil, and choosing your method and time of installation.

For small prairie gardens, transplants are often preferable to seeds. Perennial wildflowers and grasses are slow to grow from seed and typically do not bloom until the third year or later. With care, transplants often bloom the first year, giving you an instant prairie garden.

Select the plants that will flourish in your soil. Please refer to page 11 for determining your soil type. Then choose the flowers and grasses that match your soils from our Wildflower Selection Guide (see center insert, pages 2-3).

Transplants do best when installed in spring or early fall. Early spring flowers often do better when transplanted in autumn. Refer to the Wildflower Selection Guide for bloom times & other information on pages 2 and 3 of the center price insert.

Transplants should be spaced approximately 1 foot apart. Mark each transplant at planting time so that it is easily identified. Mulching with 3-4 inches of clean straw helps keep weeds down. One weeding may be required the first growing season. Once established, little further weeding should be necessary.

Spring plant shipping season starts in early April and continues through mid-June. Our fall plant shipping season starts in mid-September and continues until freeze-up. For the best plant selection, place your order early. We can reserve your plant order and with one week advance notice, ship when you are ready to plant.

Seed is shipped year round. Availability is best in winter and early spring. For fall seeding, we recommend that you purchase and reserve your seed in early spring. When you are ready to plant, give us one week notice and we will ship the seed to meet your schedule. If you wish to store seeds, keep them cool and dry in rodent-proof containers. Some woodland seeds are difficult to store without proper facilities, and should be planted immediately upon receipt.

On areas over 1000 sq. ft. seeds are more economical than plants, but take longer to mature. Seeds can be planted in spring, early summer, or fall. Prairie Nurs-

ery's seed mixes are excellent values, ranging in cost from less than 3 cents per square foot to 9 cents per square foot. Please see our wildflower seed mixes on pages 4 - 7, and 25.

Seeding prairies in late spring or early summer typically produces good results. Most prairie wildflowers and grasses are "warm season" plants that germinate best after soil temperatures have warmed up. In contrast, "cool season" lawn grasses do better when planted in fall or early spring when soil temperatures are cooler. Prairie grasses do best with spring and summer seedings. Planting in spring or early summer allows for better pre-planting weed control than fall seeding. Prairie plantings can be successfully seeded through early July.

Fall seeding can be very successful, especially on dry soils. Fall plantings are "dormant seedings." (The seeds will not germinate until next spring). Fall plantings on dry soils allow seeds to germinate in early spring and become established before the heat of summer. Clay soils can also benefit from fall plantings. Young seedlings can become established before the clay dries out in summer and restricts downward root growth. Careful soil preparation and weed control is essential with fall plantings. Wildflowers exhibit higher spring germination when planted in fall.

Fall seedings on erosion-prone sites require planting with a nurse crop for soil stabilization. Nurse crops of annual rye (15 lbs. per acre) or oats (128 lbs. per acre = 4 bushels per acre) must be planted by mid to late September to grow sufficiently to form a protective covering over the soil. The nurse crop will be winter killed but the dead roots will continue to hold the soil over winter, until spring when the prairie seeds germinate.

Site preparation is the single most important factor for success with wildflower plantings. The long-lived but slow-growing wildflowers and grasses are subject to intense competition from weeds in the first two years. Uncontrolled, weeds will compete for light and nutrients, slowing the growth of your flowers and grasses. Before planting be sure to follow the Site Preparation Procedures detailed on pages 12 and 13.

We generally recommend including native grasses in your meadow. Their dense root systems help squeeze out the weeds, making the prairie meadow truly low maintenance.

Grasses also support the wildflowers, and provide cover and seeds for birds. The grasses' warm autumn colors of gold, orange, and bronze extend the meadow's interest well into winter. See pages 44 - 47 for more information on prairie grasses.

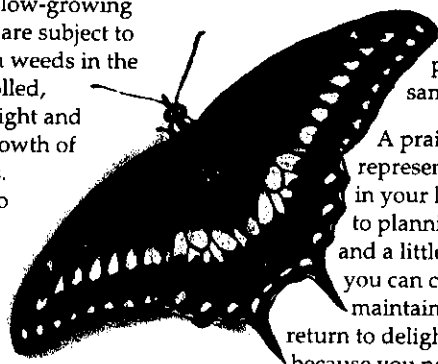
The North American Prairie evolved under the influence of fire. Started by lightning or by Native Americans, these fires kept out trees, recycled nutrients into the soil, and stimulated growth of the wildflowers and grasses. Controlled burning on a two to five year rotation remains the best method for managing prairie plantings. Properly conducted, a controlled burn is safe, economical, and actually can be fun!

Using fire as a management tool requires designing firebreaks into your landscape. A closely mowed grass strip 5 - 10 ft. wide can serve this purpose. Driveways, sidewalks, lawns, ponds, and streams also make excellent firebreaks. Do not plant your prairie next to conifers or other trees that are easily damaged by fire! Fire resistant native trees, such as bur oak, white oak, and shagbark hickory can be scattered widely within your prairie. Be sure to mow around less fire tolerant trees and remove all flammable material before burning.

Mowing is an effective substitute when fire is not an option. Mowing also helps control invading trees and shrubs. Mowing in mid-spring and removing the cut material will expose the soil to sun and favor the growth of the heat loving prairie plants.

Dividing your meadow into two or three "management units" encourages ecological diversity and landscape interest. Burn or mow one management unit in rotation each year. The undisturbed plots will help preserve overwintering butterfly chrysalises and provide cover and nesting habitat for birds. Each unit will respond differently to the management cycle. This creates changing patterns of wildflowers and prairie grasses within the same planting.

A prairie wildflower meadow represents a long-term investment in your landscape. With attention to planning your prairie meadow, and a little well-timed maintenance, you can create a beautiful easy-to-maintain landscape that will return to delight you year after year. And because you need no fertilizers or pesticides to maintain your prairie, it's an investment that preserves the environment, while you save time and money!



2. Understanding Your Soil

A major factor in determining how well your plants or seeds will grow is their compatibility with your soil. Each plant species has a range of soil types in which it will flourish. It is very important to choose your seeds and transplants to match your soil type. We have included the soil conditions best suited for each species in our plant descriptions and our Wildflower Selection Guide on pages 2 & 3 of the price insert.

Soil Types

Soils can be divided into three basic classifications: sands, loams, and clays. There is great variation within these basic groups, but these categories will suffice for the purpose of describing where a given plant will or will not grow.

Sandy Soils, referred to as "light" soils, contain large sized soil particles that are loose and easy to work. They allow water to drain readily and tend to be low in nutrients. Sandy soils tend to be more acid than the more fertile loams and clays. If your soil has a pH lower than 5, consider adding lime or wood ashes to bring it closer to a pH of 6 or 7.

Clay Soils are commonly known as "heavy" soils. Consisting of very small, tightly packed soil particles, clays tend to be dense and hard to work. However, they are generally rich in nutrients, have a high water-holding capacity, and can be very productive.

Loamy Soils are "intermediate" between sands and clays. Composed of many different sized soil particles, they combine fertility and moisture-holding capacity with good drainage. Easier to work than clays and better consolidated than sands, loamy soils make an excellent medium for growing most plants. Many prairie plants do best in loam soils.

Determining Your Soil Type

The "Feel Test" can help you determine your soil type. Take just enough moist soil to rub between the thumb and fingers. Rub it back and forth several times and feel it very carefully. A clay soil will be slick and smooth, with little or no grittiness. A predominantly sandy soil will be gritty and will not stick together well. A loamy soil will stick together easily, but not tenaciously like a clay. Loams will feel moderately gritty. As the soil dries

between your fingers, rub it into a dust and feel it carefully. A loamy soil will have a component to it that feels like flour. This is silt, a soil particle size between sand and clay. Clays may also have a floury feeling to them, indicating silt content, but clay soil lacks the gritty sand component found in loams.

If you have difficulty determining your soil type by this method, dig into your soil when it is dry. A sandy soil will seldom exhibit clods. Any clods that do form will crumble easily. A loamy soil will have clods that can be sliced cleanly with a shovel. Clay soils tend to form hard, persistent clods. Rather than slicing through them, a shovel will get stuck or will shatter the clod into many hard, little blocks of soil.

If you are still in doubt, take a soil sample to your local county extension agent or soils lab for analysis.

Improving Your Soil

If you have a sand or clay soil and wish to improve it, there is no better method than to add large quantities of organic matter. Compost and dead leaves are excellent. Do not use sawdust, wood chips, or similar materials. These require a long time to break down and rob the soil of nitrogen. Avoid uncomposted manure. It contains large numbers of weed seeds. Organic matter holds more water and nutrients than any other soil constituent. It breaks up heavy soils, improving water intake and air exchange to plant roots. Organic matter firms light soils, making them richer and less drought prone. In each case, adding organic matter modifies a soil so that it behaves more like a loam. The benefits of adding organic matter include increased seedling survival, better root development, and faster plant growth.

Another effective method of improving poor soils is to plant a "green manure crop," such as buckwheat or winter wheat. These crops improve the soil by bringing up nutrients from the lower soil and converting them into plant organic matter. The crop is plowed under while actively growing to incorporate the roots and leaves into the soil. This is a cheap, ecologically sound way to build soil organic matter.

Tips for Working with Clay Soils

Clay soils with low levels of organic matter can be difficult to work. The fine soil particles pack together tightly, impeding drainage and air exchange. In the heat of summer, clay soils harden and prevent downward root growth. Clay soils warm up slower in spring and

compact if worked when wet. Each of these problems will retard root development and plant growth.

Adding organic matter helps to "open up" clay soils by improving porosity or "breathability." This increases water infiltration and air movement through the soil, which is critical for good root growth.

There are many prairie plants that can grow in clay soils, such as our "Clay-Busters," (page 4). With good initial care, these wildflowers and grasses will flourish even on difficult sites. Their roots will gradually work their way down into the clay, opening and improving it, just as these plants have done for thousands of years.

After Planting in Clay Soils, We Recommend:

Mulching with weed free straw (clean winter wheat, oat, or marsh hay) to hold in moisture and prevent drying. Mulch 2 - 3 inches deep for transplants with openings for the emerging leaves. For seeded areas, 1 - 2 inches of mulch will help to maintain upper soil moisture.

Regular light watering of prairie seedlings for the first two months will greatly increase germination and seedling survival. Water when the surface begins to dry out. Mulched areas require less frequent watering. Water only in the morning to help prevent disease problems. Do not over-water. Clay soils hold moisture well and drain down slowly.

Soil Moisture

Soil moisture is equally important in deciding which species to plant. Moist soils have a generous amount of water in the subsoil throughout the growing season. They may have periods of standing water in the spring or fall.

Dry soils include sandy and gravelly soils that drain readily and never have standing water, even after a heavy rain.

Medium, or mesic, soils include well-drained loams and clays. These soils may have standing water for short periods after a hard rain.

See our plant descriptions and our Wildflower Selection Guide on pages 2 and 3 of the center insert to choose plants for your soil type and moisture conditions.

*Prairie Nursery offers full design & installation services.
Call 608-296-3679*

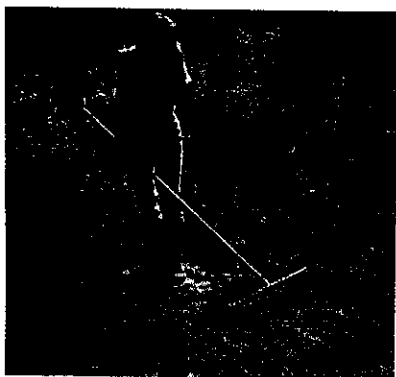
3. Site Preparation



1. Alfalfa field (in background) two weeks after spraying with Roundup herbicide. Note green growth in center of brown zone: this is quackgrass that survived the spraying. A single spraying with Roundup seldom kills all perennial weeds. Please refer to the text for other non-herbicide soil preparation methods.



2. Lightly tilling soil creates seedbed after all weeds have been completely killed. For larger plantings of many acres, a no-till planter can be used. No-till planters seed directly into dead sod and expose fewer weed seeds.



3. Leveling the seedbed prior to planting, creates a smooth, even surface for broadcasting the seed.

Proper soil preparation is the single most important factor in the success of any prairie planting. The seed bed must be smooth and weed free. Existing weeds will compete with prairie seedlings for nutrients, water and sunlight. If not controlled they can considerably delay the growth and maturation of your prairie. A smooth, clump-free seed bed will guarantee firm contact between the soil and seed, enhancing seed germination. Whether you're planting seeds or transplanting plants adhere to the following guidelines to ensure good results.

The first step in soil preparation is to remove the existing vegetation. You can do this by smothering, cultivating, herbiciding, or employing a combination of these techniques.

On small areas of a few thousand square feet or less, smothering weeds on the area is simple, effective, and requires no chemicals or special equipment. Smothering involves covering the soil surface with black plastic, old rugs, 4x8 pieces of old plywood, or a thick layer of leaves. This should be left in place for a full growing season in order to kill the plants underneath.

If you choose to use herbicides, we recommend using a broad spectrum, non-persistent herbicide. The best choice is to use a glyphosate (ie. Roundup, Ranger or Kleenup). When using herbicides, READ THE LABEL, and follow the manufacturer's instructions.

If you prefer not to use herbicides, a variety of equipment is available to prepare your soil using cultivation only. A sod-cutter, rototiller, tractor-mounted rototiller, rotovator, or farm implements such as a plow, disk or harrow may be used, depending on the size of the area to be planted.

Lawns The quickest way to prepare a lawn for planting is to remove the top three inches of grass and soil using a sod-cutter. This usually creates a nearly weed-free planting site ready for seeding or installation of transplants. Be aware that the area will be lower than the surrounding lawn after sod removal. Sod cutters can be rented for this procedure.

When using herbicides, apply in fall or spring, when lawn grasses are actively growing. Cultivate after everything has turned brown to prepare the seedbed for planting (about two weeks after spraying).

To remove an existing lawn by cultivation, you will need to cultivate 2 to 3 times, approximately 1 week apart. If rhizomatous perennial grasses such as Quackgrass or Johnsongrass are present, a year-long tilling program may be required to eliminate them.

Old Fields Old fields are difficult to work up due to the presence of a variety of perennial weeds. An old field usually requires at least one full growing season to prepare the site. This may seem long, but a little patience at this stage is essential for a successful planting.

To herbicide, begin by mowing in early spring to remove the previous years growth. This will encourage new spring growth. Apply a glyphosate herbicide three times throughout the season, once in mid-spring, again in mid-summer, and finally in early fall, unless no plant growth is visible one month after the second spraying. This schedule allows you to attack different weeds which have peak activities at different times. When the existing vegetation is clearly all dead, prepare the seedbed for planting.

Using cultivation only, you will need to cultivate beginning in spring and continuing through fall. Cultivate every two or three weeks at a depth of 4-5 inches. Be religious about this. If you are fighting rhizomatous, perennial weeds, waiting longer than 2 or 3 weeks will allow these weeds to recover. For some species, such as Quackgrass, cultivating in intervals greater than 2 weeks may actually increase its density.

Corn, Soybean, and Small Grain Fields typically have less weed problems compared to old fields, and require less preparation. Corn, bean, and grain fields can usually be sprayed with glyphosate herbicides once, or twice if necessary. Spray in mid-spring for a spring planting, or after crop removal for a fall planting. If perennial weeds are common, site preparation will require a full year, similar to old fields.

The seedbed may be prepared without herbicides, using cultivation as you would for any other crop. If rhizomatous perennials are present, work up the soil all year, as described for old fields. Once all existing vegetation is removed, the final seedbed should be prepared by tilling or disking, followed by dragging or raking.

Do NOT plant wildflowers in fields treated with Atrazine within the last 2 years. While some prairie grasses can tolerate low levels of Atrazine, the prairie flowers cannot tolerate any. Atrazine breaks down in 2 to 3 years depending upon soil type, precipitation, and the amount originally applied. A smother crop of corn or sorghum will hold your soil for a year and control unwanted weeds while the Atrazine breaks down.

Erosion Prone Sites Precautions need to be taken on erosion prone sites. To avoid runoff and soil loss the site should not be left unvegetated for any length of time. Cultivation should be kept to a minimum. Preparing your site solely by cultivation may create unwanted erosion problems. The site should be planted immediately following soil preparation. Use a nurse crop of oats and a covering of mulch, stabilized with netting to hold the soil.

Planning Information

If you are unable to plant your prairie seed immediately the site may be stabilized by planting oats at a rate of 4 bushels (128 lbs.) per acre, or annual rye at a rate of 50 lbs. per acre. Till the oats or rye under when ready for planting, or spray with Roundup herbicide and no-till plant into the dead stubble.

A Final Pre-Planting Tip After the existing perennial vegetation is eliminated, weed seeds still lurk in the soil below. These seeds will germinate and compete aggressively with your wildflowers and prairie grasses. Weed density can be greatly reduced by a final treatment of the surface soil just prior to planting in late spring or early summer (this treatment will not work in late summer or autumn).

Start with a prepared seedbed. Allow weeds to germinate and grow. Apply herbicide when the weeds are 2-3 inches tall. Wait 10 days, and then shallow till the soil one inch deep. Tilling deeper will bring up more weed seeds to the surface. Plant immediately.

If you prefer to avoid using herbicides, similar results can be obtained using well-timed, careful cultivation. Start with a prepared seedbed. Till the soil one inch deep 5 to 7 days after the first good rain. This will kill weeds after they germinate but before they come up, without bringing up more weed seeds. On sandy soils, a drag can be used. A very light discing is usually more effective on heavy soils. Plant immediately.

This final treatment can greatly reduce weed competition, yielding faster growth of wildflowers and prairie grasses.

A well prepared site is half the battle when establishing a prairie planting. Possession is nine-tenths of the law in this game. By removing the existing vegetation, and providing a suitable seed bed for germination and seedling growth, you are well on your way to a successful planting. Once established, your prairie will bring you years of enjoyment with a minimum of maintenance!

4. Prairie Seeding and Management Procedures

Seeding

Once the area to be planted has been properly prepared, seeding can commence. On small areas, less than an acre or two, seed can be planted by hand broadcasting. Broadcast seeding a prairie is very similar to planting a lawn. Instead of using a seeder, the prairie seed can be mixed in a larger volume of a lightweight, inert material such as sawdust, peat moss, or vermiculite, that has been slightly dampened so that the seed will stick to it. For a 1000 square foot planting, one bushel basket of inert material is

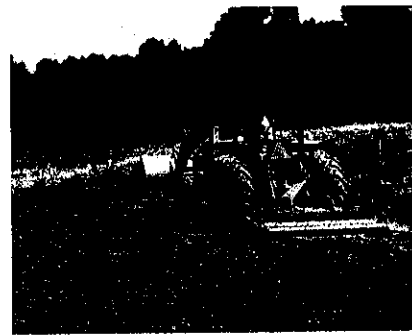
plenty. For a tenth acre planting (4400 square feet), four bushel baskets is sufficient. Mix the seed evenly into the inert material. Take one-half of the total mix and spread it across the area. In the event that you run out before covering the entire area, you still have the other half. Once you have covered the area with the first half of the seed mix, take the second half and spread it evenly across the same area, walking perpendicular to your first pass. Now rake or drag the seed in so that it is lightly covered with soil, one eighth to one quarter inch deep. Roll the site with a roller, or drive across it with truck or tractor tires to firm the seed into the soil. Do not roll the site if the soil is wet. Wait until the soil is dry to avoid soil compaction.

For larger areas, mechanical planters can be used. Specific models that can successfully plant prairie grasses and flowers include the Tye drill, Truax drill, John Deere Rangeland drill, and properly outfitted Brillion alfalfa-grass seeders. It is important to know the capabilities and limitations of each seeder in order to select the one that will best suit your needs. The Tye, Truax, and John Deere seeders plant the seed in rows by opening slits in the soil into which the seed falls. Seed drills can open up the surface soil to seat the seed properly without working the soil just prior to planting. The Brillion seeder broadcasts seed rather than drilling it, creating a more natural effect (no rows). The Brillion seeder requires a well-prepared seedbed with a loose surface soil in order to plant the seed properly.

Most wildflower and prairie grass seeds require firm seed-to-soil contact to promote good germination and survival. Rolling the seeded area after planting is very important to success, especially on light, sandy soils. This procedure firms the soil around the seed and reduces moisture loss during the germination period. Hydro-seeding does not ensure firm seed-to-soil contact. For this reason, hydro-seeding is not generally recommended for wildflower and prairie grass seedings. Results in hydro-seeding plantings to date have been spotty, with numerous failures.

Most wildflower seed germinates better after exposure to a period of cold temperature, called stratification. This is a natural protective mechanism that prevents the seed from germinating at the wrong time of year. For more information on seed propagation and stratification techniques we recommend the *Prairie Propagation Handbook* on page 48.

Mulching: A light covering of clean, weed-free straw or marsh hay after seeding helps to hold in moisture and increase germination. This is particularly helpful on dry sandy soils and heavy clay soils. Straw should just cover the soil surface, but not bury it. Some soil should be visible through the straw. Chopping and blowing the straw onto the area is the best method, as chopped straw is less susceptible to being blown away by the wind. On steep slopes, hold the straw in place by staking down a jute or plastic mesh over it. Never use field hay, as it invariably contains innumerable weed seeds.



4. Work up soil for planting a large area using a tractor and tiller. A rototiller, harrow, disc, power-rake, or similar implement can be used effectively for this procedure, too.



5. Mix the prairie seed into a large volume of slightly damp sawdust or peat moss to serve as a dilutant and carrier during seeding. Use one bushel of carrier per 1000 square feet of area.



6. Hand broadcast the diluted seed mixture onto the prepared seedbed. Fling the seed in a broad arc to scatter it widely and evenly across the soil. It's all in the wrist!



7. Rake seed mix into the soil after hand broadcasting. Rake lightly so seed is just covered. A good rule of thumb is to cover seed two to three times its diameter in depth. Most prairie seed should be planted 1/4 to 1/2 inch deep.



8. Firm the planted seedbed with a water-filled roller to ensure good seed-to-soil contact. This is essential for germination and seedling survival. Don't have a roller? Drive your car or tractor tires over the seeded area!



9. Use a "Brillion" seeder to plant a large area. This is a "double box," agricultural seeder that handles prairie grass and wildflower seed simultaneously in two special seedboxes.

Watering: Spring and summer seedings will benefit greatly from regular watering during the first four to six weeks after planting. This encourages higher germination and seedling survival. Water after six weeks only if prolonged dry periods occur. Always water in the early morning. Watering during the day is often ineffective and wasteful. Watering in the afternoon and evening encourages high moisture levels at the soil surface and can lead to seedling loss due to fungal attack. Water every other day for 15 minutes to half an hour, or just enough to keep the soil moist. Overwatering can be harmful, especially on heavy clay soils that retain moisture.

Nurse Crops: Nurse crops such as annual rye, annual flax, oats, etc. can help suppress weed growth without harming desirable seedlings. When planted at the recommended rates, these annual "nurse plants" grow rapidly without competing with the wildflowers and grasses. Nurse crops occupy the "ecological niche" that would otherwise be taken by annual weeds, thus reducing weed growth. Nurse crops generally do not re-seed themselves.

Selected Nurse Crops Seeding Rates

| | Spring Plantings | Fall Plantings |
|--------------|----------------------------------|----------------|
| Oats: | 64 lbs./acre (2 bushels/acre) | 128 lbs./acre |
| Annual Rye: | 5 lbs./acre | 15 lbs./acre |
| Annual Flax: | 10 lbs./acre | NA |

Warning! Never use agricultural grain or perennial rye as a nurse crop. Studies have shown that grain rye produces chemicals in its roots that suppress the germination of other plants. For this reason, grain rye should not be used as a nurse crop, nor as a soil organic matter builder prior to planting, as the chemicals are believed to remain in the soil well after the plants have been plowed under.

Weed Control —Very Important!

First Year: Perennial wildflowers and grasses grow slowly, and weeds will likely grow much faster in the first two years. Weeds can be controlled by keeping them mowed back to a height of 4 – 6 inches the first year. Most native wildflowers and grasses will not grow taller than 6 inches in their first year when seeded and will not be damaged by mowing. Keeping weeds cut back in the first year also prevents production of more weed seeds that could cause problems in the second year. Mowing back weeds on a regular basis in the first year of establishment is one of the most critical steps in the success of your prairie planting. Do not fail to keep weeds in check!

A flail-type mower works best, as it chops up the weeds so they can dry out rapidly. Rotary mowers and sickle bar mowers are not recommended; they do not chop up the weeds and can smother your seedlings. String trimmers or "Weed-Eaters" are excellent for cutting back weeds on smaller plantings

of an acre or less. These devices gently lay the cut material down on top of the cut stems where it will dry out rapidly and not smother your seedlings. Weeds should be cut back in the first year when they have reached a height of 8-12 inches. Do not allow the weeds to get taller than this before cutting. Tall weeds will shade out your seedlings, and the large quantities of weedy material that will eventually have to be cut back can smother the small seedlings. Expect to mow weeds about once a month in the first year. The actual mowing frequency will depend upon rainfall in any given year, and the actual weed density and height. Nurse crops can often reduce or eliminate the need for cutting back weeds in the first year.

However, if weeds become thick by mid-summer they should be cut back, along with the nurse crop. If weeds are thin, cut when in bloom, before they set seed.

At the end of the first season, do not mow down the year's growth. Leave it to help protect the young plants over the winter. The plant litter and the snow that it catches insulates the soil from rapid changes in soil temperatures, which can cause plant losses due to frost heaving.

Pulling Weeds: Despite the temptation, pulling weeds in a first year prairie seeding is not generally recommended. Wildflower seedlings remain very small the first year, and can be easily pulled up right along with the weeds! If you can identify weeds when they are still young and small, it is safe to carefully pull them, making sure you do not disturb adjacent wildflower or prairie grass seedlings. If you must pull a large weed, hold your feet closely together on either side of the stem at ground level, and pull straight up. This will hold the surrounding soil and any nearby prairie seedlings in place as you extract the weed. Firm any disturbed soil and seedlings by tamping with your feet. If the soil is dry, watering after pulling weeds is beneficial for seedlings that may have been dislodged during the process. Beware that pulling weeds creates soil disturbance, which exposes new weed seeds and encourages their germination. If you wish to avoid this, or have large well established weeds that cannot be easily pulled, you can cut weeds off at the base using pruning shears. Remove any seed bearing weeds from the site immediately after cutting.

Second Year: In spring of the second year, the planting should be mowed right to the ground, and the cuttings raked off, if possible. At this stage, the prairie plants are still small and have not yet gained full control of the soil environment. Burning in spring of the second year often encourages germination of dormant wildflower seed, but also exposes the surface soil, which can cause increased weed growth. Mowing tends to facilitate germination of dormant seed and enhance the growth of prairie plants, without potentially increasing weeds.

If weeds remain a problem in the second year, they may have to be mowed in late spring or early sum-

Planning Information

mer. Biennial weeds can be very competitive in the second year. Mowing them back to about one foot when they are in full bloom will kill them or set them back severely, with minimal damage to your prairie plants.

A biennial weed of particular concern is Sweet Clover (*Melilotus* spp.). This must be controlled because the seeds of Sweet Clover are stimulated to germinate by fire and can become a long-term management problem if not handled at the outset. Mowing in mid-summer of the second year when in full bloom will usually kill sweet clover plants and prevent them from making seed to re-infest your planting. If it reappears in the third year, it will likely be on a limited basis and can be hand-pulled. Do not let sweet clover make seeds, as it can be a most pernicious weed.

Long Term Management: Burning and Mowing

Burning or mowing your prairie meadow on a regular basis helps ensure continued success. Burning or mowing is usually, but not always, conducted in mid-spring. The best time to burn is generally when the buds of the Sugar Maple tree are just opening. Burning removes the accumulated plant litter from the previous year's growth and exposes the soil surface to the warming rays of the sun. Most prairie plants are "warm season" plants and respond favorably to warm soil temperatures. Burning encourages earlier soil warming and typically increases growth, flowering, and seed production of the native flowers and grasses. A mid-spring prairie fire also sets back undesirable "cool-season" weeds such as quackgrass, bluegrass, brome grass, clover, etc., which come up earlier and get a head-start on the prairie plants. By waiting until these undesirable plants have initiated spring growth before burning, the fire will destroy their new growth and set them back, favoring the warm season prairie plants, most of which remain dormant under the soil and thus unharmed by the fire.

Timing is critical to success with burning. It is generally recommended to burn in mid-spring rather than early spring. However, this does not apply to dry prairies with an abundance of early-blooming flowers that would be harmed by a mid-or late-spring fire. Dry prairies should be burned in late fall after most of the native plants have gone dormant, but the non-native cool season grasses are still active. Burning in very early spring can also be done successfully on dry prairies.

In the event that burning your prairie meadow is not an option, mowing can be substituted. Although not quite as effective as burning, mowing and raking off the mowed material is a good substitute. Mowing simulates the effect of fire by removing the previous year's vegetation, and cuts back cool season weeds if mowed in mid-spring. It is important to remove the mowed material to expose the soil surface and encourage soil warming. Do not mow or burn after

new plant growth has reached 1 foot or taller, as this could damage some of your desirable plants. Many ground-nesting birds also build their nests in late spring and mowing or burning at this time could destroy some nests. Mid-spring burning or mowing maintenance leaves sufficient time for birds to re-nest and successfully raise its young.

Burning can usually be instituted at the beginning of the third growing season. At this point, sufficient combustible plant matter is often available from the previous year's growth to support a fire. If there is insufficient fuel to carry a fire, mowing and raking off the material should be substituted.

Frequency of Mowing or Burning: Most prairies and meadows will respond positively to periodic burning or mowing. Research indicates that annual spring burning tends to favor the prairie grasses and legumes over most of the other flowers. A study conducted by Prairie Nursery showed that when one-half of the same prairie planting was burned in mid-spring and the other was left unburned, the appearance of the plantings were markedly different. In fall, the burned half was dominated by prairie grasses, while the unburned half exhibited fewer grasses, but more asters and golden-rods. The structure of the plantings, in terms of the actual numbers of individual flowers and grasses, was very similar between the plantings; however, the burning had favored the development of the grasses in that year, while the lack of burning had favored the late-blooming wildflowers.

Rotational burning of one-half or one-third of your meadow on an annual basis is generally recommended, for a variety of reasons. First, the same planting, with different management regimes, can present very different aspects in the same year, increasing the landscape interest and diversity of habitat for wildlife. Second, leaving unburned sections preserves overwintering butterfly, moth, and other invertebrate pupae and eggs, that would otherwise be destroyed by burning. Third, variation in management prevents any given species from gaining overall dominance in the planting, thus maximizing species diversity. If mowing management is to be used instead of burning, rotational mowing is recommended for the same reasons.

Once your prairie has become well-established, it will return year after year with just a minimum of maintenance. Following these guidelines will ensure that your planting will have the very best chance of success, while providing you with a maximum of landscape interest throughout the year!

Prairie Nursery offers full design & installation services. Call 608-296-3679 for complete descriptions of our services.



10. Mulch a small area with straw after seeding and rolling. Larger areas can be mulched using shredder-blower machines. Always use weed-free straw, marsh hay, or hydromulch.



11. Regular watering of the seeded area stimulates germination and improves seedling survival. Keep soil moist and do not over-water. Use sprinklers on larger areas to maintain soil moisture.



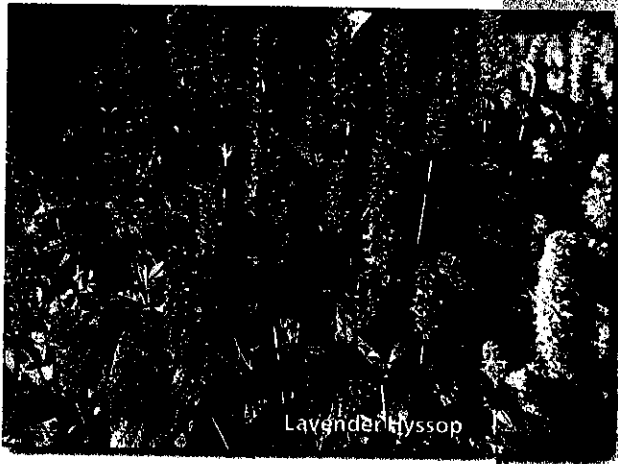
12. A controlled burn being conducted in a mature prairie on a mid-spring evening. Burning late in the day is safer due to lower winds, cooler temperatures, and higher humidities. Note that the house is not burning, a very important detail.

Wildflowers

The North American prairie is perhaps best known for its fabulous floral display. Of the many hundred different plants found in the prairie, most are wildflowers. Their showy blooms not only dazzle the eye, they also attract butterflies and hummingbirds, and their seeds nourish many a songbird.

The prairie wildflowers coexist together with the prairie grasses to form one of the most complex and intricate plant communities in the world. The prairie is now one of the rarest plant associations in North America, having been almost totally destroyed by sodbusters of the nineteenth century.

Today, Prairie Nursery is helping to preserve and propagate these beautiful plants. We are pleased to offer a wide selection of native prairie wildflowers to help brighten your surroundings while preserving a piece of our natural heritage.

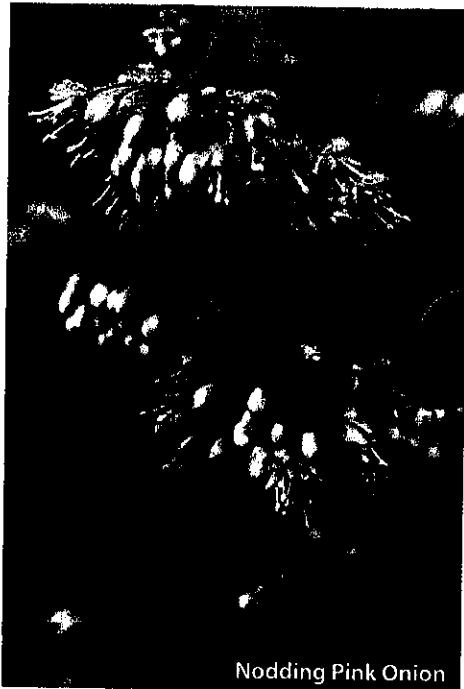


Lavender Hyssop

LAVENDER HYSSOP

Agastache foeniculum

This gorgeous member of the Mint family issues a multitude of purple flower spikes atop deep green, crinkly foliage. Growing no more than two feet tall, it is excellent for semi-shaded spots or in full sun. Acts as a biennial and self-sows readily on open ground. The leaves and flowers emit a potent licorice odor when crushed and can be used in cooking and for tea. Easy to grow from seed, requiring a moderately rich, well-drained soil.



Nodding Pink Onion

NODDING PINK ONION

Allium cernuum

Very easy to grow, this attractive plant produces large globes of white flowers that turn pink as they age. Does best in medium to slightly moist, rich soil. Blooms in July, reaching a height of two feet. Like many other prairie plants, Nodding Pink Onion increases vegetatively and forms new plants adjacent to the main bulb.



This lovely prairie landscape is featured at Dr. Rodney Sturm's home in Madison, Wisconsin. His prairie is beautiful and functional, too! Dr. Sturm has created a refuge for wildflowers, butterflies, birds, and a host of other living things with his residential prairie planting.