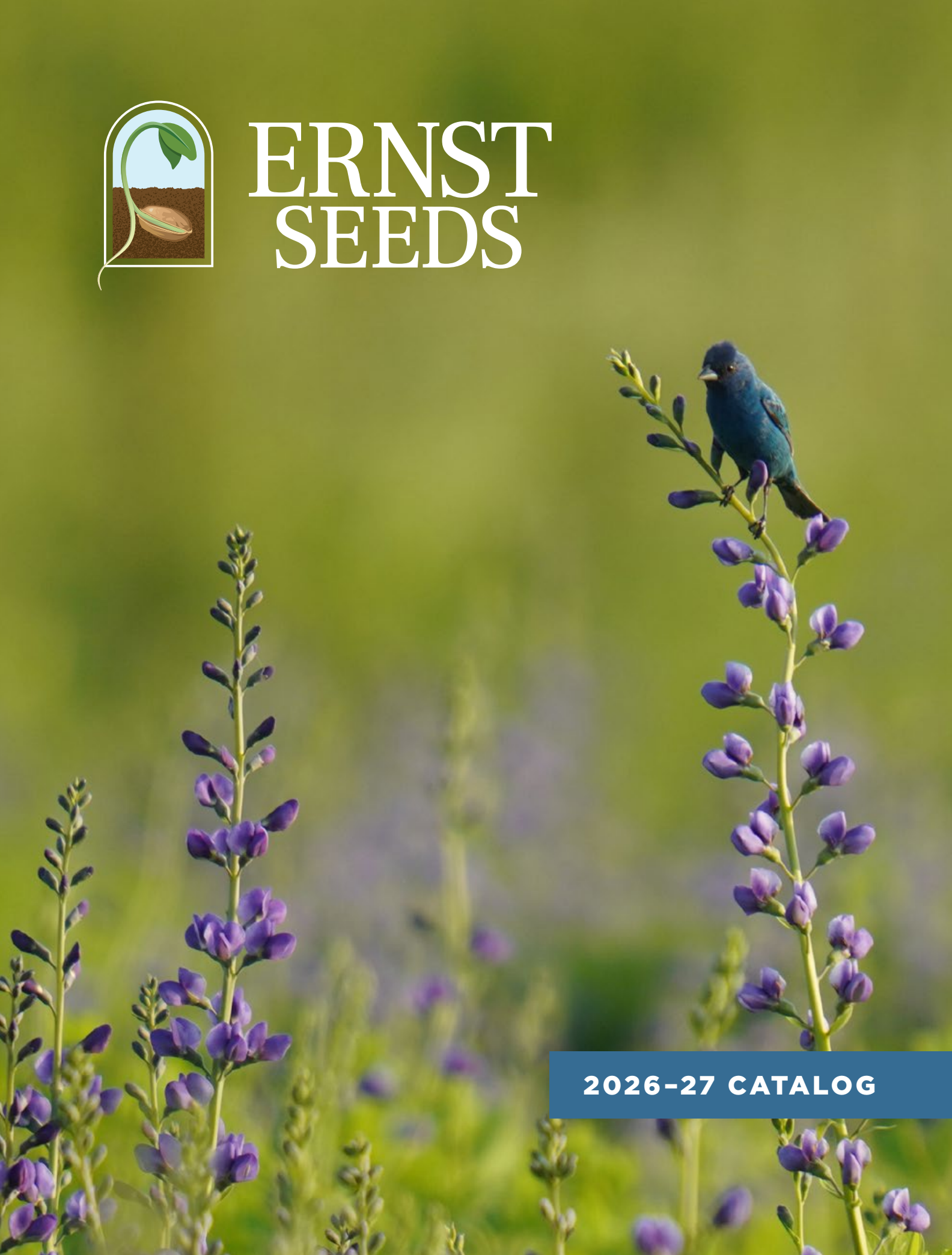
ERNST SEEDS



2026–27 CATALOG

OUR mission

The mission of Ernst Seeds is to increase habitat. In support of this mission, we will make key native and naturalized plant species available to Eastern North America for restoration, reclamation, conservation, wildlife and pollinator habitat enhancement, renewable biomass energy production, and beautification.

Ernst Seeds
8884 Mercer Pike
Meadville, PA 16335

DIRECTIONS

Our farm is located in Northwest Pennsylvania, 80 miles north of Pittsburgh and 40 miles south of Lake Erie off I-79. To get here:

- Take I-79 to Meadville Exit 147A (US 322 East to Meadville).
- Travel on US 322 East to 2nd traffic light.
- Turn right onto Mercer Pike and travel approximately 1,000 feet before turning left to continue on Mercer Pike (follow the sign to the “Ernst Bike Trail”).
- Drive two miles on Mercer Pike.
- After crossing the railroad tracks, turn left into the Ernst Lane.

(Note: Some internet and GPS directions are not accurate.)

CONTENTS

planting resources

planting guides

species we offer

EXPECTATIONS OF NATIVE SPECIES

EXPECTATIONS OF NATIVE SPECIES

GERMINATION & GROWTH (all the following assume adequate light, adequate soil temperature, appropriate moisture, and good seed-to-soil contact):

In general, annual species have less seed dormancy than biennials and biennials have less than perennials. Seed dormancy is nature's hedge against unfavorable conditions during a plant's life cycle. Unfavorable conditions can be, but are not limited to, late spring frost or drought. Dormant seeds germinate when favorable conditions are present.

ANNUALS

Most species germinate, flower, and set seed by the end of the first full growing season. Germination of an individual species is likely to be high.

BIENNIALS

Most species germinate, with some plants within a species' population flowering and setting seed in the first full growing season. The bulk of the plants will flower and set seed in the second growing season. Germination of an individual species is likely to be lower than that of an annual due to seed dormancy.

PERENNIALS

1. Warm Season Grasses: Germination will occur in the spring when moisture conditions are appropriate and soil temperatures exceed 55°F (12°C) at a 3" depth. Best germination occurs when soil temperatures are much higher.

Most of these species do not require cold, wet stratification to produce an adequate stand. Five exceptions are *Tripsacum dactyloides* (Eastern Gamagrass), which requires 14-60 days of stratification, and *Chasmanthium latifolium* (River Oats), which requires 60 days of stratification for northern genotypes, *Panicum anceps* (Beaked Panicgrass), *Tridens flavus* (Purpletop), and *Sporobolus heterolepis* (Prairie Dropseed), all requiring 60-90 days of cold, wet stratification. Stratification is the process by which seed is exposed to cool, moist conditions.

While cold, wet stratification is not necessary in most cases to produce an adequate stand, 20%-50% of the seed may be dormant. Most seedlings that emerge will be growing by the end of the second full growing season.

Greatest growth of these species occurs when air temperatures are 75°F-95°F (24°C-35°C). Most of the growth is in root development the first season. Very few (<5%) plants within a species may flower and set seed in the first growing season. Maximum plant development may take two years or longer.

New growth of Eastern Gamagrass *(Tripsacum dactyloides)* in a Florida field in the spring.

Eastern Gamagrass *(Tripsacum dactyloides)*

2. Cool Season Grasses: Some species will germinate when temperatures are a little higher than 40°F (4°C) while others will require warmer temperatures. They may germinate in the fall or spring. Adequate stands of most species do not require stratification; however, 50% of the seed may remain dormant without stratification. Most seedlings that emerge will be growing by the end of the second full growing season.

Greatest growth occurs when temperatures are 65°F-85°F (18°C-29°C). With adequate moisture and nutrients, some flowering and seed set may occur in the first growing season.

3. Some sedges *(Scoparia, vulpinoidea)*, **rushes** *(Juncus effusus, tenuis)*, and **bulrushes** *(Scirpus atrovirens, cyperinus, expansus, polyphyllus)* have a very high seed count per pound of seed. When planted in the spring, a substantial number of seedlings may be produced by these species in the first growing season. These seedlings may represent 5% or less of the total seeds present. Flowering and seed production will occur one to two growing seasons after an individual seedling has germinated. Maximum germination will take at least two years due to seed dormancy. Sedges and bulrushes are recognizable by the arrangement of any three successive leaves in a pattern resembling the spokes in the Mercedes™ symbol. *Juncus spp.* will have round stems that originate at a common point near or on top of the soil.

4. Some bur reeds *(Sparganium americanum, eurycarpum),* **sedges** *(Carex comosa, crinita, frankii, grayi, intumescens, lupulina, lurida, squarrosa, stricta),* and **bulrushes** *(Scirpus validus)* have a high level of seed dormancy and may not have consequential germination without stratification.

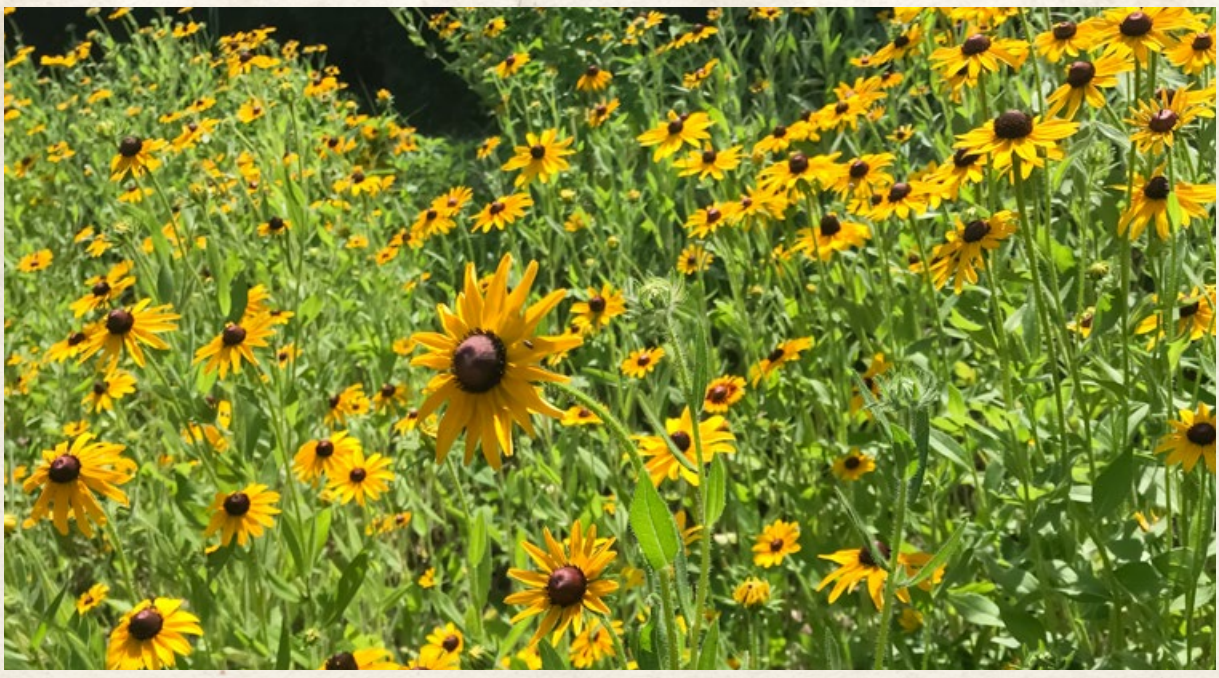
Most seedlings will emerge in the first and second growing seasons after stratification (artificially or naturally). Plants will flower and set seed one to three years after they germinate. *Carex spp.* in this group may be recognized as described above for other *Carex spp. Scirpus spp.* in this group have round or triangular stems arising from a point often below the soil surface. The stems are typically larger than those of *Juncus spp.*

5. For most broadleaf species, some germination will occur in the first year without stratification (artificial or natural). A high percentage of species and seeds within the species are likely to germinate in the first growing season following the first winter *in situ* (on-site). Most of the seeds that germinate will have done so by the end of the growing season following stratification. Following germination, blooms may occur in the first growing season: *Rudbeckia hirta* (Blackeyed Susan); second growing season: *Rudbeckia triloba* (Browneyed Susan), *Aster spp., Monarda spp., Penstemon spp., Solidago spp.*; after three to five growing seasons: *Liatris spp.*; or, not until the seventh growing season: *Baptisia tinctoria* (Yellow False Indigo). The number of years to blooming depends on soil fertility, available moisture, and growing season temperatures. It may be shorter for a given species the further south one is located.

6. Seed dormancy in perennial species is affected by latitude of ecotype origin. In greenhouse studies, we have found that northern ecotypes (PA, OH, NY, NJ) typically

Virginia Wildrye *(Elymus virginicus)*

Nodding Sedge *(Carex crinita)*



Blooms may occur in the first growing season with *Rudbeckia hirta* (Blackeyed Susan), while other broadleaf species may take numerous growing seasons to bloom.

require more weeks of cold, wet stratification than southern ecotypes (FL, GA, NC, SC) of the same species.

Most of our native seed mixes are composed of perennial species. Mixes dominated by perennial species have the potential to last more than a decade if properly maintained. For all mixes, a site must be kept free from invasive species or aggressive weeds. Mixes of herbaceous species with no tree, shrub, or vine components in the formula must be kept free from the encroachment of woody or vine species with controlled burning, mowing, or spot spraying. For tips on weed control see the QR code on page 25.

The natural communities we create with native seed mixes are dynamic. Annuals, biennials, and short-lived perennials may be widely present in the landscape in the first three growing seasons, but non-existent or present in small pockets by the fifth growing season. Over time, colonies of some long-lived perennials will grow larger in area and species composition will change in response to annual rainfall variations.

It is not unusual for those new to planting meadows to be nervous about a mix's performance during its establishment year. Typically, customers need confirmation that the desirable species are growing. Fortunately, our ability to assess a situation is assisted by a small set of species that generally germinate very well.

For wetland meadows, some common early emerging species include: *Asclepias incarnata* (Swamp Milkweed), *Eupatorium perfoliatum* (Boneset) and *Carex spp.* For upland meadows, some common early emerging species include: *Chamaecrista fasciculata* (Partridge Pea), *Elymus virginicus* (Virginia Wildrye), *Helianthus angustifolius* (Narrowleaf Sunflower), *Heliopsis helianthoides* (Oxeye Sunflower), *Monarda fistulosa* (Wild Bergamot), *Penstemon digitalis* (Tall White Beardtongue), and *Rudbeckia hirta* (Blackeyed Susan). Seedling images of many of these species are available on our website.

DISCLAIMER: The information in this review of practices is the result of 60+ years' experience in seed production. Ernst Seeds has been supplying seeds and consulting in the reseeding of tens of thousands of acres of roadsides, surface-mined lands, conservation, and restoration sites in eastern North America, as well as growing and supplying seed and consulting in the planting of hundreds of thousands of acres of CRP/CREP-related areas for erosion control and wildlife habitat.

All these practices are opinion only and our best advice as a result of these experiences. These recommendations are for individual consideration and do not cover all the conditions that will be encountered in the field.

Ernst Seeds is not responsible for conditions that will be encountered in individual situations. The use of brand names does not represent our endorsement of a specific product; rather, it represents our experience only and has not necessarily been replicated in peer-reviewed research. The use of chemical pest control agents is subject to manufacturers' instructions and labeling, as well as federal, state, and local regulations.

ESTABLISHMENT GUIDE

ERNMX-105 Mesic to Dry Native Pollinator Mix buffer planting.

ESTABLISHMENT GUIDE INTRODUCTION

In eastern North America, there is a wide variety of native vegetation to replicate. Most planting objectives fall into the following categories:

- Soil erosion control & soil stabilization on slopes and along waterways
- Beautification & enhancement of landscapes
- Biodiversity & wildlife habitat enhancement and restoration
- Bioremediation to correct environmental disturbances
- Historical, cultural & ecological restoration
- Habitat for honeybees & native pollinators (butterflies, bumblebees, etc.)
- Native species for renewable biomass production

Using native plants saves time and money while improving ecological function. Reduced water, chemical, fertilizer, and maintenance needs make them a sustainable and environmentally sound choice for virtually all scenarios. Select a mix of species that creates the desired outcome for the project. Goals should be compatible with site conditions that cannot be altered. Native plant communities can be selected to meet nearly all site conditions.

Please review the appropriate section(s) below for information regarding seed mix selection and seeding methods. Matching the functional goals of the site and site conditions to the appropriate seed mix will lead to greater project success. The stock seed mixes noted in each section represent a mere sampling of our complete list of mixes. A more comprehensive list may be found at www.ernstseed.com or by contacting a member of our sales team. Mixes can also be customized to specific needs as well as those of a site and ecological region.

PLANTING GUIDES

FALL VS. SPRING SEEDING

Traditionally, seeding is thought of as a spring activity, but it can also occur during the fall or dormant season. Fall seeding works well for restoration projects completed in the summer.

While there are some noteworthy advantages to fall seeding, seeding in either spring, fall, or the dormant season will produce good results. In drought-prone regions, seeding should be timed to take advantage of the available moisture in the area.

FALL OR "DORMANT" SEEDING

- Fall seeding imitates natural reseeding. Dormant seeding can take place when soils are dry enough to work.
- Good seed-to-soil contact occurs through precipitation and the freeze-thaw cycle.
- Natural stratification and scarification occur; natural changes within the seed or to the seed coat during the winter enhance germination in the spring.
- Mulching is an important element of dormant seeding to protect the soil.
- Some seed may be lost to decay and wildlife consumption during the winter.
- Establishment may be hindered by growth of winter annuals in the fall.

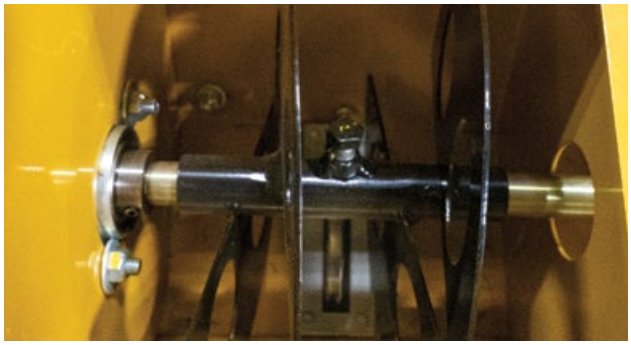
FROST SEEDING

- Frost seeding is the act of broadcasting seed onto or drilling into frozen soil.
- Good seed-to-soil contact occurs through the freeze-thaw cycle.
- Natural stratification and scarification occur; natural changes within the seed or to the seed coat during the winter enhance germination in the spring.
- Mulching may be done.
- Some seed may be lost to decay and wildlife consumption during the winter.
- Establishment may be hindered by growth of winter annuals in the fall.

SPRING SEEDING

- Cool season species germinate soon after seeding.
- Germination of warm season species generally occurs within three weeks of the soil temperature reaching 55°F (13°C).
- Seed loss due to decay and wildlife consumption is minimized.
- Seed-to-soil contact should be accomplished by working the seed into the soil 1/4"-1/2" deep.
- Seeding may be delayed until weed control is applied to improve establishment.
- Irrigation during dry weather periods is necessary for proper germination.
- Light mulching is an important element of seeding to protect both the seed and soil and retain moisture.
- When planting native grasses for biomass, seeding generally takes place during the spring when soil temperatures at a 3" depth are near 55°F and rising.

SEEDING METHODS



DRILL SEEDING

Drill seeding is a mechanical means of creating furrows (openings) in the soil surface and metering seed in at a uniform rate. A drill seeder is practical for seeding multiple acres in larger areas.

Conventional drills can work in tilled and partly tilled soil. No-till drills are designed to work in soil that has not been tilled. They have heavy openers that cut through vegetation and sod to make a furrow for seed placement. With the proper adjustment, a no-till drill can work in tilled soil. It has discs that aid in loosening the soil. All drills should be equipped with a closing or packing wheel that follows seed placement.

The goal of drill seeding is to achieve uniform seed distribution over the site with seed placement at the correct depth (1/4"-1/2") and good seed-to-soil contact. With experience, this depth may be adjusted. Calibrating a drill or broadcast seeder depends on seed bulk density and required application rates. Manufacturers provide manuals with charts to guide seeding rate calibration. To ensure uniform application of seed, conduct a test run over a small area using the appropriate amount of seed for that area, then make any necessary adjustments. Most traditional seed drills are designed to handle seeds with high bulk densities, such as oats and wheat. Some drills may have a small seed box able to plant small seeds, such as alfalfa, clover, and switchgrass.

Many native and naturalized species are fluffy and will not readily flow through a traditional seed drill. Examples of fluffy seed include little bluestem, big bluestem, and indiangrass. With the aid of a bulking agent, some fluffy seeds may be planted through the large seed box of a traditional drill. Bulking agents include kitty litter, dry sawdust, vermiculite, or rice hulls. Test with a small amount of seed. Native seed drills, such as Truax, have specialized seed boxes that are effective for planting fluffy seed (see above left). When seed will not readily flow through a native seed drill's fluffy seed box, a bulking agent may be needed.

HAND SEEDING

Hand seeding is the casting of seed onto the soil (see above right). Hand seeding is used on small plots or difficult terrain where seeding with machinery is not an option. The goal is to achieve an even distribution of seed over the site. This can be accomplished by spreading half of the seed in one pass and the balance in a perpendicular pass. To ensure uniform application of seed, conduct a test run over a small area using the appropriate amount of seed for that area. To know how wide to make your passes, check the width of seed distribution.

If possible, a light raking to a depth of 1/4" and/or firming with a lawn or Brillion-type roller is recommended to achieve good seed-to-soil contact. Cover with straw mulch at 70 lb per 1,000 sq ft or hydromulch at 34 lb per 1,000 sq ft.

When the volume of seed to be applied is small (less than 50 lb per acre), a bulking agent may be helpful to provide the volume necessary to get uniform application. Such bulking agents include kitty litter, dry sawdust, vermiculite, or rice hulls.

BROADCAST SEEDING

A broadcast seeder consists of a hopper with an adjustable door that regulates seed flow onto a spinner. Some broadcast seeders have an agitator that aids with seed flow in the hopper. Broadcast seeders are commonly used to spread seed, fertilizer, lime, and other granular products. The goal is to achieve an even distribution of seed over the site. To ensure uniform application of seed, conduct a test run over a small area using the appropriate amount of seed for that area. To know how wide to make the passes, check the width of seed

distribution from the spreader. The settings can then be adjusted as needed. To achieve better distribution, spread half of the seed in one pass and the balance in a perpendicular pass. We recommend refilling the hopper when it is 1/3 full rather than letting it empty out. Follow up by tracking or firming the seed into the soil with a lawn or Brillion-type roller to achieve good seed-to-soil contact. Do not roll or track the seed if the soil is wet. Cover with straw mulch at 70 lb per 1,000 sq ft or hydromulch at 34 lb per 1,000 sq ft.

Many native seeds are fluffy and will not uniformly flow through a broadcast seeder. To enhance the flow, mix the seed with a bulking agent of similar density. Dry sawdust, vermiculite, or rice hulls are some options. An agitator in the hopper may be required in these circumstances. We recommend a minimum rate of 50 lb per acre of seed and bulking agent.

A bulking agent can also be helpful if you are planting small quantities of seed. It provides the volume necessary to get uniform application. For fine seeds, kitty litter is a more appropriate bulking agent.

CULTIPACKING

A cultipacker is an excellent tool for covering the seed with a minimum amount of soil to ensure proper seed-to-soil contact. It resembles a large rolling pin with evenly spaced ridges and dimples. The primary functions of a cultipacker are to break up clods, remove excess air spaces from loose soil, and smooth the soil. The heavy-duty smooth, spoke, or crowfoot rollers provide clod-breaking and smoothing capabilities. As with any tillage, it is important not to overwork the soil or work it when it is too wet.

HYDROSEEDING

A hydroseeder combines water, seed, fertilizer and, sometimes, hydromulch into a mix that is pumped through a nozzle and sprayed uniformly over the area to be seeded. Hydroseeders can distribute this mix at 150' or more, allowing for the ability to seed terrain that may not be accessible with other seeding methods, such as steep slopes, roadside cuts, or sites that are too wet. Using hydromulch aids in seed placement and reduces erosion on slopes. Depending on site conditions, erosion control blankets or straw mulch may be needed to cover the seed. Many native seeds should be broadcast with 500 lb per acre of mulch as a marker. Do not exceed this amount as native seeds may die if suspended in the mulch with little or no seed-to-soil contact. The balance of the hydromulch, often 1,000 lb per acre, may be applied on top in a secondary application.

STRAW MULCHING

A straw-mulch blower distributes mulch over a seeded area. It has a slide (or chute) in which to feed the mulch, chopper blades to break up the mulch, and a blower to spread the mulch over large areas. Straw mulch may be spread by hand in smaller areas. It is important to use weed-free straw from small grains, such as oats or grain rye, to minimize potential weed issues.

TOOLS FOR SITE PREPARATION

MINIMUM-TILL EQUIPMENT

Minimum-till equipment incorporates a portion of the surface vegetation into the soil and levels uneven surfaces. One of the most common tools is a disc which cuts through vegetation, sod, or hard soil and partially turns or tills it into the soil. Similar equipment that turns part of the vegetative residue into the soil is known as Aerway® or Turbo® Till.

TRACKING

Tracking is the use of a crawler or rubber-tired tractor to make depressions and firm loose soil after construction or tilling. Tracks should be oriented perpendicular to the slope of a site. The depressions from tracking help to reduce erosion and retain seed and moisture. The firm, but not compacted, seedbed will not dry out as quickly as loose soil.

CHISEL PLOW

A chisel plow is a minimum-till plow because it does not dislodge or turn over the entire soil profile the way a moldboard plow does. Chisel plowing is primarily used for breaking up hardpan soil or loosening compacted soil while leaving a high percentage of debris on top. A chisel plow can be adjusted to till shallow or deep and typically has C-shaped shanks mounted on dual coil springs, and the frame, shanks, and springs are of sufficient weight, size, and strength to provide a cutting depth of 8”-12”. To make the soil smooth enough for planting after the use of a chisel plow, use a disc harrow, tandem disc harrow, or offset disc harrow of sufficient weight and size to provide a cutting depth of 6”-8”.

ROTOTILLER

A rototiller is used to pulverize the soil with rotating blades and incorporate soil amendments and surface vegetation. Most units till up to 6” deep.

TOOLS FOR MAINTENANCE

ROTARY MOWER

Heavy vegetation on under-utilized fields is difficult to mow with a discbine or sickle bar mower. Heavy-duty rotary mowers can be utilized as brush hogs to tame heavy grass and light brush, such as multiflora rose, honeysuckle, and small tree seedlings.

DISCBINE MOWER

A discbine mower is a hay-harvesting machine with high-speed rotary discs that mow biomass for baling and assemble the material into a windrow.

SPRAYER

Sprayers come in various sizes and styles, including common hand-held units like the one shown here. These are often preferred for carefully targeted spraying of unwanted or invasive vegetation. Larger areas may be effectively sprayed using tractor or ATV-drawn tank units.

Use of herbicides to control undesirable vegetation can be an important part of an integrated pest management (IPM) program when applied according to the manufacturer's label. Prior to using any herbicide, read the label for safe handling and application information. Many herbicides are only available to licensed applicators. When these are needed, employ a licensed professional.