**PREVENTING ‘DAMPING OFF’**

If otherwise healthy seedlings suddenly fall over, appearing to have lost all of their vitality, damping off is present. Legumes are particularly susceptible, but other species can be affected if soil conditions are not ideal. Maintain good air circulation to evaporate excess water from stems and the soil surface. A box fan set on low facing the seedlings will help. Thinning may be necessary. Sprinkling a layer of perlite over the top of the soil surface can help prevent or stop infection from spreading. Washing and sterilizing containers, tools, and equipment and using sterile potting medium will also help reduce the risk of damping off.

---

**Roots**

Almost any plant with fibrous roots and multiple stems can be propagated by division. Dig up or un-pot plant and use a sharp knife or trowel to cut into the root mass. Some damage will occur, but be sure to include intact root and shoot portions for re-planting. Divide in half for two large plants, or multiple times for maximum number of smaller plants. Fall or early spring are the best times for division, depending on the species (see table).

**Cornt**

A corn is a short, fleshy, vertical underground stem. The blazingstars (Liatris spp.) grow from corns. In the fall these can be dug up and divided in a way similar to potatoes, and transplanted for mature flowering plants the next growing season. Small corns (cormels) can be broken off the main corn, or cut larger corns (2-inch diameter or more) in half.

**Bulbs**

A bulb is thickened, underground bud with fleshy scales. Species like prairie onion and wild garlic (Allium spp.) and Michigan and Wood lily (Lilium spp.) have bulbs. In vigorous plants smaller side bulbs (bulbs) may develop that can be removed and re-planted. Lilies have scale bulbs, and each scale can be grown into a separate plant. Under good growing conditions, lilies will send out one or two short rhizomes a short distance (2-3") and a new bulb can be formed. Bulb scale (right) growing new leaves and rootlet.

---

**Starting from Seed**

Propagating native plants from seed is a great learning experience, and a great way to grow a large number of plants from diverse genetic sources. It is the best way to develop seedling identification skills for assessing new restoration plantings. Be sure the seed you’re planting is viable, either from seed test results or from an experienced collector. It is important to know a bit about seed dormancy and how to overcome it to successfully germinate native seed.

**Seed Dormancy and Germination**

Dormancy is an important trait of native species, especially forbs, allowing germination to occur over time and in the proper season in nature. If starting seedlings in the greenhouse, it’s best to break dormancy artificially using various techniques as described below.

---

**To request copies, or for more information, call the Tallgrass Prairie Center at 319.273.3836.**

---

**To request copies, or for more information, call the Tallgrass Prairie Center at 319.273.3836.**

**To request copies, or for more information, call the Tallgrass Prairie Center at 319.273.3836.**

---

**To request copies, or for more information, call the Tallgrass Prairie Center at 319.273.3836.**

---

**To request copies, or for more information, call the Tallgrass Prairie Center at 319.273.3836.**
**Stratification**

Most prairie species require a winter treatment, i.e. cold, moist conditions known as stratification to break dormancy. Mix seed with an equal amount of moist sterile sand, sawdust, or vermiculite and place in a Ziploc bag. Avoid excessive moisture; water should not be pooled anywhere in the bag. Use vermiculite if working with species adapted to drier conditions to minimize the risk of rot. Place seeds in the refrigerator (32 to 45°F or 0 to 10°C) for the recommended period of time (see table on back). Check bags weekly for mildew or dryness. A few species, among them American vetch (Vicia americana) and butterfly milkweed (Asclepias tuberosa), will germinate at these temperatures, so plant immediately if this occurs.

Some species may germinate best when stratified under natural winter temperature fluctuations. If sowing seeds in flats for outdoor stratification, cover with screen mesh to protect seeds from being displaced by animals or heavy rains. Sow seeds in early March in cold frames for stratification and extending the growing season in the spring. A few species may require warm (68 to 94°F or 20 to 35°C), moist conditions, or warm-moist followed by cold-moist stratification, such as Michigan lily (Lilium michiganense). Other species requiring this treatment are found in the Parsley, Buttercup, Arum, Lily, and Iris families (Baskin and Baskin 1998).

**Scarcification**

Species with a hard or waxy seed coat require scarification. Scarification is a technique that simulates the natural desiccation (such as weathering, abrasion, or partial digestion) of the seed coat to allow water uptake for timely germination. Species in the Sumac, Legume, Geranium, and Buckthorn families may require scarification (Baskin and Baskin 1998). A simple scarification technique is to rub a single layer of seed between two sandpaper-covered boards for a minute or so until the seed coat begins to appear dull. Pericussion scarification involves shaking seeds vigorously inside a heavy glass bottle for a few minutes. Commercial scarifiers are also available from seed equipment manufacturers, such as a Fosberg scarifier. In all cases, care is necessary to avoid breaking or damaging seeds.

**Special Case: Wet-Heat Scarification**

New Jersey tea (Ceanothus americanus) and false gromwell (Gossypium mollis) require wet-heat treatment. Pour boiling water (212°F, 100°C) over the seeds just for a minute or so until the seed coat begins to appear dull. Wet-heat treatment will improve with stratification after wet-heat treatment. For best consistency, screen peat moss, soil, and composted cow manure through a ⅜-inch mesh hardware cloth. Add remaining ingredients and mix with shovels on clean floor. Caution: All of these materials are extremely dusty in their dry form. Wear a high-quality dust mask and moisten materials thoroughly with water as they are mixed to reduce dust and seed water uptake of the finished medium. Store unused medium in plastic tubs with tight-fitting lids to prevent drying out.

**Potting Medium**

A good potting medium should be light enough to allow for good root development, provide adequate drainage, and have enough fertility for seedlings to grow quickly for timely transplanting. It should also be sterile, meaning weed seed-and-disease-free. A soil-less mix (less than 20% soil) is a good choice, and pre-mixed and packaged sterile potting soil is available commercially. Just be sure it’s well-moistened before filling containers and sowing seed.

**Ready, Get Set, Sow...**

Seeds are primed and ready to go! Critical to successful propagation of native seedlings is the use of suitable containers and potting medium, and proper watering, soil temperature, light, and air.

**Containers**

Containers should provide good drainage, space for strong root development, and yet be small enough to provide efficient use of potting medium and bench space. Deeper containers aren’t necessary but they will help accommodate tap-rooted species. It’s important to allow roots to ‘air-prune’ (can’t grow any further) as they reach the bottom of the soil column so lateral root development will occur within the container. This is accomplished with good drainage around and away from the container (no water puddling under pots). Good lateral root development will aid later in transplanting (and survival) of seedlings.

**Soil-less Mix Recipe**

This recipe makes about 1 cubic yard of potting medium:

- Peat moss (4 cu. ft/bag)
- Vermiculite (medium 4 cu. ft/bag)
- Perlite (4 cu. ft/bag)
- Sterile soil
- Composted (sterile) manure
- Osmocote® Plus fertilizer (15-0-12) (30 days)
- Sterile water

For best consistency, screen peat moss, soil, and composted cow manure through a ⅜-inch mesh hardware cloth. Add remaining ingredients and mix with shovels on clean floor. Caution: All of these materials are extremely dusty in their dry form. Wear a high-quality dust mask and moisten materials thoroughly with water as they are mixed to reduce dust and seed water uptake of the finished medium. Store unused medium in plastic tubs with tight-fitting lids to prevent drying out.

**Growing**

Prairie seedlings need full sunlight for normal development. Sow seeds in early February in a greenhouse environment (mid-March in cold frames). Keep the soil surface moist until germination has occurred. Use a gentle spray wand so seeds aren’t dislodged, forced deeper into the soil, or splattered out of the containers. Expect germination and emergence to occur over a 2-6 week period. Warm-season grasses and legumes germinate best in warm soils greater than 70°F (21°C). Cool-season grasses and many forbs germinate more readily in cool soil temperatures 40 to 50°F (5 to 10°C) and may cease germination at temperatures above 77°F (25°C). If sowing seed in flats, precise regulation of soil temperature can be achieved with propagation mats. These are commercially available at reasonable cost from nursery or greenhouse supply companies. Water established seedlings thoroughly at least once a day, moistening the entire soil column. Allow the soil to drain and surface soil to begin to dry somewhat between waterings.

**Transplanting Seedlings**

Strong root development is the key to successful transplants. Roots should fully occupy the entire soil column, forming an intact root ‘plug’ (retains the shape of the container when removed for transplanting). The ideal time for transplanting is in the spring after the last frost-free date for your region. Accclimate seedlings gradually to outdoor conditions of sun and wind through a process called ‘hardening off.’ Set flats or trays outside (sheltered from strong winds and full sun) for a few hours each day from mid-morning to mid-afternoon about a week before transplanting. ‘Hardening off’ in summer is prepared to water regularly and deeply until plants are established. Transplanting in the fall (early to mid-September) is an option if strong root development is present to survive the winter months.