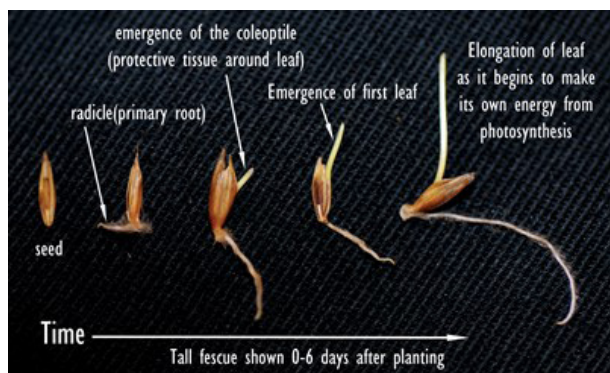


LATE-SUMMER TURF ESTABLISHMENT STRATEGIES FOR SEED SELECTION, WATERING, FERTILIZATION AND POST-GERMINATION CARE

The following article was written by Aaron Patton, Ph.D., Associate Professor/Turfgrass Extension Specialist with Purdue University, Department of Agronomy



Pictured is the order of the germination process are a newly planted seed, a seed with the radicle emerging, the coleoptile emerging, the leaf emerging through the coleoptile, and the leaf and root elongating. *Photos courtesy of Dr. Aaron Patton.*

For northern turf and overseeded areas in the southern United States, late summer/early fall is the most opportune time for seeding cool-season turfgrasses. Whether you're improving a thin stand of turf, seeding into bare ground, or (assuming you're managing warm-season lawns) overseeding bermudagrass many of the establishment principles are the same. However, to ensure successful establishment, you must first understand what and when to seed and how to care for the seeds after planting. Following proper establishment procedures lays the groundwork for producing a healthy turf for many years to come.

There are many species of turf commonly used for lawns, sports fields, parks and golf courses. Each species has its strengths and weaknesses and no one grass is perfect for all locations. As such, it can be difficult to determine which turf species is right for your application. However, choosing the right grass species (or mixture of species), along with an improved cultivar (variety), significantly impacts the future performance and maintenance of your turf.

Various resources can help you make this decision. State extension publications at land grant university websites contain recommendations on specific turf species. Cultivar (variety) selection can be trickier as there are so many cultivars. University research reports, National Turfgrass Evaluation Program data (<http://www.ntep.org>), as well as the Turfgrass Water Conservation Alliance website (<http://www.tgwca.org/qualified>) are just some of the locations where you can find the latest information on cultivar performance. The good news is that most companies that sell professional turf products carry many of these improved cultivars.

In addition to choosing improved cultivars, it's wise to plant a seed blend or a seed mixture rather than a single cultivar to take advantage of the unique performance of different cultivars and species. Each

species and each cultivar has its own unique strengths and weaknesses. A seed blend is when several cultivars of the same species are combined together to enhance the performance of the turf (i.e. improved disease, drought or heat resistance or improved color, texture, density, etc.). A mixture is when two or more species are mixed together in a seed lot to take advantage of the different growth characteristics of each species.



A close-up of a straw erosion blanket is shown here. This and many other types of erosion blankets reduce erosion and increase soil temperature and moisture which favors establishment.

Planting blends or mixtures is advisable to improve the overall performance of the turf.

When to seed

The best time to seed a cool-season lawn is in the late summer to early fall. Adequate soil moisture, soil warmth and limited weed pressure allow for excellent seedling growth. The seeding window extending from August 15 to September 15 is the best time for seeding cool-season turf in the northern-half of the United States. Seed as early as possible within this window. Waiting even a week later into the fall to seed may mean the turf will take two more weeks to mature as germination and subsequent growth slows later in the season as temperatures cool.

The second best time to seed turf is as a dormant seeding. Dormant seeding is the practice of planting seed when soil temperatures are below the normal range needed for germination. Depending on your location, dormant seeding can be done as early as Thanksgiving and as late as March. The benefit of dormant seeding is that as the soil freezes and thaws during winter, crevices are created for the seeds, which provide ideal germination conditions, and moisture is plentiful in late winter and early spring to enhance germination. Additionally, dormant seeding is easier to schedule than spring seeding, because spring rains make it difficult to seed.

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Spring and summer seeding

Seeding in spring is difficult and often unsuccessful with slowly germinating turf species like Kentucky bluegrass. If a spring seeding is necessary, consider doing it before the ground thaws from winter. If you can't seed until late April or May, you'll need to seed with one of the faster germinating turf species such as tall fescue to be successful. Kentucky bluegrass planted in the spring almost always fails due to its slower establishment rate and competition from weeds.

Avoid summer seeding if possible. Areas seeded in summer will succumb to heat and drought stress because of the limited root system of the turf seedlings. Additionally, seedling turf will be out-competed by summer annual weeds resulting in a poor lawn.



Tall fescue seedlings emerging in a hydroseeded area. As new seedlings germinate they need to be watered frequently enough to avoid drying. Once desiccated, new turf roots wither and die.

Immediately after seeding bare areas lightly rake the soil surface with the back side of a leaf rake or drag the surface with a piece of chain link fence to incorporate the seed into about a quarter inch of soil. After raking or dragging, you can also roll the area with a water ballast roller one-third to one-half full to bring the seed into contact with the soil. A light rolling is optional but it can help.

When using slit seeders that drop the seed into or adjacent to the slits, this raking is not needed. When seeding into a freshly aerified area, it is a good idea to drag the site afterwards to break-up the soil plugs. This will help incorporate the seed into the aerification holes, and also the broken plugs will provide a light soil topdressing over some of the seed.

Mulching bare soil areas after seeding will prevent erosion and conserve water. One to 1.5 bales of clean (weed-free) wheat straw per thousand square feet will give a light covering that will not have to be removed after germination. Apply the mulch lightly so you can still see 25 to 50 percent of the soil through the mulch layer. There are many other erosion blankets available to help prevent erosion and increase soil temperature and moisture, which favors establishment. These materials are often constructed out of jute, coconut fiber, excelsior, polypropylene, and paper based products. Some blankets are permanent, while others are to be removed after seedling germination. Hydroseeding is another method of mulching where seed is applied in a water, fertilizer and mulch slurry.

Choosing the right grass species (or mixture of species), along with an improved cultivar (variety), is an important decision as it will have a significant impact on the future performance and maintenance of your turf.

Post-seeding care

Seeds need water to germinate. As the seed takes up water, enzymatic reactions within the seed trigger germination. Enzymes break down the energy stored inside the seed endosperm; the seed embryo needs this energy to grow.

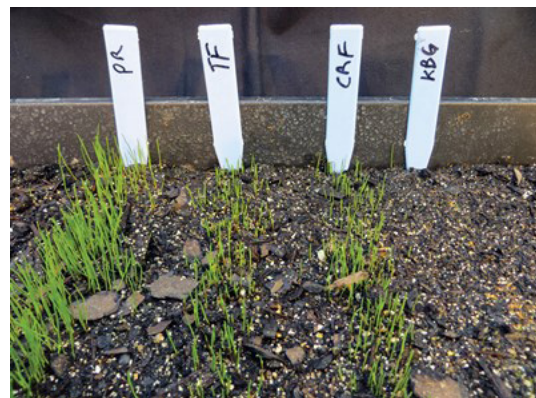
The emergence of the radicle (the first root) signals germination. Next, the coleoptile (an opaque protective sheath) emerges. The coleoptile functions to protect the emerging leaf. Lastly, the green color of the first leaf can be seen as it emerges through the coleoptile. Once the first green leaf emerges, the plant can begin to make its own energy through photosynthesis and it no longer relies on the energy that was stored in the endosperm.

Keep watering. Seedlings are very susceptible to moisture stress during the first few weeks after seeding. Keep the upper inch of soil moist with frequent irrigations for the first two or three weeks after planting. Germination will occur in five to 14 days depending on the temperature and the species planted.

After the seed germinates and seedlings develop roots into the soil, the lawn can be watered less often. Once established, the lawn should be watered deeply and infrequently only when the plant shows signs of water stress.

Mowing a new lawn will encourage the turf to fill in quickly. Begin mowing when the first few seedlings are tall enough to mow. Mow only a small portion of the plants in the first mowing. Most people wait too long to mow a newly seeded lawn, so you should mow early and often.

Initially, mow Kentucky bluegrass, perennial rye, and fine fescues at 1.5 inches and tall fescue at 2 inches. To allow the soil to firm up enough to allow mowing, you may need to turn the irrigation off for one to two days before the first mowing. Use a push mower for the first few mowings as a heavy ride-on mower can compact soil in newly planted areas as well as easily tear out seedlings when making turns. Make sure the blade on the mower is sharp to avoid injuring the seedlings. After the first few cuts, adjust your mower to the permanent mowing height, which is 2.5 to 3.5 inches for Kentucky bluegrass, perennial rye and fine fescues and 3 to 4 inches for tall fescue. Never remove more than one-third of the grass blade at any one mowing to avoid scalping the turf. Frequent mowing of seedlings will help with weed control in newly seeded areas, increase turf tillering and limit clipping accumulation.



Note the difference in seed germination. Perennial ryegrass, far left, is up and growing faster than tall fescue, creeping red fescue and Kentucky bluegrass, far right, which as yet to emerge. Photo taken six days after planting. Start early in fall in planting Kentucky bluegrass.

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Fertility

A starter fertilizer (which is high in phosphorus but low in nitrogen and potassium) application is recommended prior to or immediately following seeding. This application should contain about 0.5 to 1 pound of nitrogen per 1,000 square feet of lawn and at least 1 pound of phosphorus (usually listed as P₂O₅ or phosphate on the fertilizer analysis) per 1,000 square feet of lawn. An example of a starter fertilizer that might deliver that ratio of nutrients is one with analysis of 16-25-12. Although soil phosphorus is measured as P, recommendations are given as P²O⁵ as this is the common form in fertilizers and the standard form by which it is listed on the fertilizer bag. Phosphorus is important in newly seeded areas as it is critical for the initial development of roots in the soil. Potassium application at seeding are not needed unless soil tests indicate a need.

Following the starter fertilizer application at seeding, apply nitrogen four to six weeks later to help the turf develop its root system and to increase turf density in order to crowd out weeds. Apply 0.75 to 1.0 pound N per 1,000 square feet for this second fertilization application four to six weeks after germination. Apply a third application eight to 10 weeks after germination. Assuming seeding in mid-August, these applications would be a starter fertilizer at seeding, mid- to late September and again mid- to late October.

Weed control

There are few weeds that aggressively grow in the fall and compete with newly seeded areas. Broadleaf weeds may become a problem, but these can be easily controlled by applying a broadleaf herbicide in October or early November, after the third or fourth mowing of the newly planted seedlings. Avoid using broadleaf herbicides in newly seeded areas until seedlings have been mowed at least three times. Annual grasses such as crabgrass can be easily controlled with

preemergence herbicides applied the following spring.

For late fall seeding dates or dormant seedings where the lawn is not fully established by winter or by the following spring, avoid applying preemergence herbicides in the spring because it may damage immature seedlings. In this case, consider using a postemergence crabgrass herbicide later in early summer to control crabgrass.

Do not use preemergent crabgrass controls (except siduron) at the same time as a spring seeding as the preemergence herbicide will prevent the desirable turf from germinating as well as the weed seeds. Siduron is the only preemergence herbicide that can be used at the time of seeding, but will only control crabgrass for three or four weeks.

As a general recommendation, delay the use of preemergence herbicides until the new seedlings have been mowed four to eight times, depending on the herbicide. Check the herbicide label for exact recommendations.

For weed control in newly germinated turf, consider the following herbicide options which are safe on new seedlings which have not been mown or mown only once or twice. Quinclorac (Drive, Quinclorac and others), carfentrazone (Quicksilver), quinclorac + carfentrazone (SquareOne), mesotrione (Tenacity) and topamezone (Pylex). Instructions on if they can be used before seeding or how soon they can be used after seedling emergence varies by turf species and can be found on the herbicide label.

Dr. Aaron Patton is associate professor of agronomy and turfgrass extension specialist at Purdue University. More information about weed control for turfgrass professionals written by Dr. Patton is available in a 96-page Purdue University Extension publication AY-336, "Turfgrass Weed Control for Professionals", available from the Purdue Extension Education Store (<http://www.the-education-store.com>). Contact him at ajpatton@purdue.edu for more information.

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