

# Lawn Establishment





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## STEPS TO SUCCESS

Proper lawn establishment is one of the keys to a permanent, dense, weed-free lawn. A uniform stand of desirable perennial turfgrass species must be achieved as quickly as possible. The basic steps in turfgrass establishment are:

1. Control weedy perennial grasses such as quackgrass and bentgrass.
2. Complete the final rough grade and till deeply.
3. Remove stones, roots, stumps and other debris.
4. Make soil modifications if needed.
5. Apply fertilizer and/or lime as indicated by soil test.
6. Till the fertilizer and lime into the upper 3 to 4 inches of soil.
7. Complete the final grade.
8. Roll, till and level final seedbed.
9. Select adapted species and varieties of the quality and cultural level desired.
10. Seed or sod.
11. Roll.
12. Apply a mulch if seeded.
13. Keep moist until establishment is achieved.



## Site Preparation

If perennial weedy grasses such as quackgrass or bentgrass are present, they should be controlled before disturbing the soil. Dalapon or amitrol can be applied to control weedy perennial grasses when six to ten inches of growth is present.\* The area should be deep-tilled (six to eight inches) ten or fourteen days after application to insure kill of the weedy grasses. Thereafter, the site should be tilled at intervals of about four to six weeks. All debris, including large stones, roots, stumps and construction materials, should be removed.

**Grading.** If extensive grading is required, the topsoil should be removed and stockpiled nearby. Wet areas and standing water can be prevented through proper contouring. A slight grade sloping away from buildings is suggested. Steep slopes should be avoided since they are difficult to establish and maintain. Contours can be used to attract attention or blend in with natural or artificial landscape features such as trees, rock gardens or artificial ponds.

After the rough grade is established, the topsoil should be redistributed. The area should be allowed to settle following contouring or soil modification. Uneven settling of the soil is most common around buildings and over water and sewer trenches, but careful packing of the soil will reduce this hazard. Several thorough waterings will also help the settling process.

## Soil Modification

Careful soil preparation is essential for uniform, rapid establishment of a lawn, whether sodded or seeded. First, one must determine if the existing soil is acceptable for a permanent lawn. Careful planning to save topsoil during construction can reduce soil preparation problems. A soil texture of sandy loam to loam is preferred, but turfgrasses can be grown on less desirable soils. Soils with a high clay content are susceptible to compaction and become hard, while sandy soils require more frequent watering and fertilization for good turf. Both of these types of soils can be modified to improve their properties.

For soils high in clay, use peat, sand (or other coarse aggregates, such as calcined clay) to improve soil physical properties. On extremely sandy soils, one to two inches of peat and one to two inches of a soil higher in clay (such as clay loam) can be mixed with the existing soil to a depth of six inches.

If soil modifications are made, avoid the addition of soils containing quackgrass or other weedy peren-

nial grass seeds, rhizomes or stolons. These weeds cannot be removed from the desired grasses after establishment. A uniform depth of six inches of topsoil is desirable.

After the soil has been modified, a soil sample should be obtained for accurate fertilizer and lime applications. Collect small samples of soil from several locations, crush and mix well, using clean equipment. Air dry about ½ pint, package securely and send to your County Extension Agricultural Agent or a reputable commercial soil testing laboratory.

## Fertilization and Liming

**Fertilization.** Phosphorus and potassium applications should be based on a soil test if available. When soil test information is not available, a general recommendation for seeding is 15 to 20 pounds per 1000 square feet, of 1-1-1 ratio fertilizer (such as 10-10-10). Rates as high as 30 to 40 pounds can be used if the area is to be sodded, but the concentration of nitrogen should be reduced. For example, a 5-20-20 or similar fertilizer would be acceptable. As a general rule, do not apply more than 2 pounds of actual nitrogen (N) per 1000 square feet during the establishment period.

**Lime.** The ideal soil pH for most turfgrasses is 6.0 to 7.0. Lime should be applied only if the soil test indicates that the pH is below 6.0. The amount of lime applied should be based on a soil test. Excessive amounts of lime should not be used, especially on sandy soils.

## Seedbed Preparation

Limestone and fertilizer should be thoroughly tilled into the upper 3 to 4 inches of the soil. The final grade of the lawn should then be established. Light rolling at this time will firm the seedbed and delineate low spots or irregularities which can be corrected through a final raking. These site and seedbed preparation steps should be followed for both seeding and sodding.



The final raking should provide a loose, smooth surface.

\* These materials should be handled with extreme caution and applied only as the directions on the label indicate.



## Seeding

Soil moisture and temperature conditions are most favorable for rapid establishment during the late summer period. The preferred time to seed is between August 15 and September 10 in southern Michigan and from August 10 to September 1 in northern Michigan. If August establishment is not possible, early spring seeding is an alternative. However, excessive soil moisture and severe competition from annual weeds can be a problem in the spring. Mid-summer plantings are frequently unsuccessful because of high temperatures, lack of moisture, and competition from weedy, annual grasses.

Proper seeding means uniform distribution of seed at the recommended rate. It is best to seed when wind activity is minimal because of the light, chaff-like nature of turfgrass seeds. It is desirable to seed one-half of the total amount to be applied in one direction and apply the remaining half at a right angle. Cyclone or drop-type spreaders may be used for seeding.

*Raking.* After seeding, rake lightly to provide a thin covering of soil over the seed. Turfgrass seeds should not be covered by more than one-fourth inch of soil. The seeded area should then be rolled lightly to provide good moisture contact between the seed and soil.

*Mulching.* A mulch should be applied to insure optimum moisture conditions during the establishment period and reduce soil erosion and washing of seed. Straw is most commonly used and should be spread uniformly over the seeded area at the rate of 60 to 80 pounds per 1000 square feet. Be sure the straw is free of weed seeds and vegetative plant parts of bentgrass, quackgrass and nutsedge. Once the straw is in place, it can be stabilized by rolling, watering and with a twine netting if displacement by wind is a problem. An asphalt spray is often used to stabilize straw over large areas. Coarse burlap is frequently used on steep slopes of limited area where seed washing and soil erosion are severe problems. The burlap bags can be cut open and pegged down at the corners.

When the grass has grown to a height of 1 to 1.5 inches, a major portion of the straw mulch should be removed. This will permit greater light penetration and insure rapid, uniform establishment.

*Watering.* Watering is one of the most important practices for effective turfgrass establishment. The soil surface should be kept moist at all times since young seedlings can die within several hours, should a surface moisture stress occur. Daily, light sprinkling at noon or early afternoon is suggested. Water should be applied lightly to avoid puddling of the soil and

washing of the seeds. When no mulch is used, it may be necessary to water several times daily to maintain adequate moisture at the soil surface. About three to four weeks after seeding, turfgrass plants have developed an adequate root system so that watering frequency can be reduced.

## Sodding

Sodding can be done at any time during the growing season when the soil can be prepared and adequate moisture provided. The sod purchased should be of uniform density, high quality, and free from weeds, especially weedy grasses, such as quackgrass, bentgrass, annual bluegrass, or nutsedge. The seedbed should be moist at the time the sod is laid to insure rapid rooting.

Sod should be laid by staggering the ends of the pieces during the laying process. It is important not to stretch the sod excessively to avoid shrinkage and development of cracks between sod pieces during drying. Edges of the sod should be in good contact, but not overlapping. Once in place, the sod should be rolled to insure good contact with the soil. Roots will dry out rapidly if air pockets are left between sod and soil. When sodding a slope, it may be necessary to peg the sod strips to prevent slippage. An initial heavy watering to a soil depth of six inches should be applied as soon as possible or before wilting of the sod occurs. Thereafter, a daily, light watering at midday is required to maintain adequate surface moisture during the rooting period of two to three weeks.

## Post-Establishment Care

A newly seeded or sodded turf should be mowed when leaves of the grass reach a height of 2.5 to 3 inches. Mow to a height of 1.5 to 2 inches the first time — returning or removing the clippings, depending on quantity. To facilitate establishment, apply one-half pound of nitrogen, (ammonium nitrate or urea) per 1000 square feet when the young seedlings have reached a height of 1.5 inches. The fertilizer should be watered into the soil.

*Weed Control.* With seedings, it is usually necessary to control broadleaved weeds that germinate during the establishment period. However, certain broadleaved herbicides can injure the root system of young seedling turfgrasses if applied too soon. Thus, initial broadleaved weed control application should be delayed until four or five weeks after germination.

If a spring seeding is made, annual weedy grasses will have to be controlled through the use of an organic arsenical such as DSMA or AMA. Application of DSMA or AMA should be delayed until eight to





Rolling the sod will eliminate air pockets and insure root contact with the soil.



Infrequent watering during establishment resulted in this severe case of wilting.

ten weeks after establishment. Proper timing of the herbicide application is important. Delaying broad-leaved or weedy annual grass herbicide applications can cause excessive competition to the slower growing turfgrass seedlings and serious loss of stand. Further information may be obtained in Extension Bulletin 653, "Lawn Weed Control."

### SELECTING ADAPTED TURFGRASSES

Selection of adapted turfgrasses is essential to the establishment of high quality, permanent turf. Using turfgrass species or varieties not adapted to a particular environment, soil condition, intensity of culture, or use, will likely result in failure or an inferior quality turf. Intensity of culture refers to the degree of fertilization, irrigation and pest control practiced. Permanent turfgrasses, such as Kentucky Bluegrass and Red Fescue, should compose a major portion of most lawn turfs in Michigan. Low priced, rapid-growing seed mixtures are generally a poor buy since they may contain large quantities of temporary and weedy perennial grasses which are unsuited for a permanent, high quality turf.

A lawn area may include a wide range of soil and environmental conditions. Mixtures and/or blends of desirable perennial turfgrass species offer advantages for adaptation to these varied conditions.

### Blends

Blending involves mixing 2 or more varieties of the same species, such as Kentucky Bluegrass. Blending several bluegrass varieties which possess varying disease resistant characteristics is preferred. A blend is usually suited to a broader range of soils, environments, intensity of culture and diseases than a single variety. In general, blending reduces the incidence of any one disease at a given time and is preferred over a single variety.

### Mixtures

A mixture is composed of two or more different perennial turfgrass species. Its chief advantage is that each species within the mixture will be better adapted to certain conditions than the other components. Shade, sandy soil, poorly drained soil, or exposed subsoil are conditions which require specific turfgrass mixtures. Two important criteria in selecting components for a mixture are degree of shade and intensity of culture.

Following is a guide for the use of turfgrass mixtures for several specific conditions. Quality turfgrass mixtures which fall within the percentage ranges listed may be purchased, or the species may be purchased individually and mixed. Percentages are based on weight.

*Approximate Percentages*

- |  |    |
|--|----|
| A. <i>Sunny areas of medium to low intensity of culture:</i> |    |
| (2 to 4# of N per 1000 sq. ft. per year)                     |    |
| Kentucky Bluegrass (A blend of 2 or 3 varieties)             | 60 |
| Red Fescue (Pennlawn, Wintergreen)                           | 40 |
| B. <i>Sunny areas of high intensity of culture:</i>          |    |
| (6 to 8# of N per 1000 sq. ft. per year)                     |    |
| Merion Kentucky Bluegrass                                    | 20 |
| Kentucky Bluegrass (A blend of 2 or 3 varieties)             | 40 |
| Red Fescue (Pennlawn, Wintergreen)                           | 40 |
| C. <i>Dry, shaded areas with a low intensity of culture:</i> |    |
| Red Fescue (Pennlawn, Wintergreen, Chewings)                 | 70 |
| Kentucky Bluegrass (Newport, Delta)                          | 30 |
| D. <i>Moist, shaded areas:</i>                               |    |
| Creeping Red Fescue (Pennlawn, Wintergreen)                  | 60 |

(Continued on next page)



Kentucky Bluegrass (Newport, Delta)	20
Rough Bluegrass	20

E. *Special situations:* Add 20 to 25% Italian Ryegrass to the seed mixture under the following adverse conditions:

1. Seeding at improper time of year such as mid-summer.
2. Steep sloping areas which are subject to erosion.
3. During droughty periods when the area cannot be irrigated.
4. On areas where a quick cover of grass is needed.

Bentgrass, Redtop, Tall Fescue and Timothy should not be used in lawn seed mixtures where a high quality turf is desired. They eventually become patchy and otherwise undesirable. These weedy, perennial grasses cannot be selectively removed from the desirable turfgrasses with herbicides now available. As a result, they can become the most undesirable turfgrass weeds.

*Seeding Rate.* A seeding rate of 2 to 3 pounds per 1000 square feet is suggested for Bluegrass-Red Fescue seed mixtures. When Ryegrass is added, increase the rate to 3 to 4 pounds.

## LAWN GRASSES

### Kentucky Bluegrass

KENTUCKY BLUEGRASS (*Poa pratensis*) is the most widely used turfgrass in Michigan, and is best adapted to well-drained, fine textured, fertile soils. It is a perennial, cool-season species having good sod forming characteristics due to an extensive rhizome system. A mowing height of 1.5 to 2 inches is preferred. Kentucky Bluegrass is not generally adapted to shaded conditions. Appropriate variety selection should be determined by soil type, degree of shade, and quality desired. Table 1 outlines some of the important characteristics of the following Kentucky Bluegrass varieties:

COUGAR is a moderately low-growing variety with a blue-green color and a leaf texture similar to that of Merion. It is suggested for use only in the northern half of the Lower Peninsula where *Leafspot* is not a major problem. Outstanding attributes of Cougar are excellent drought tolerance and drought recovery on sandy soils.

DELTA has an erect growth habit and rapid vertical growth rate. This variety is quite susceptible to *Leaf-*

*spot*, but recovers from this disease and drought injury rather rapidly. Delta is outstanding in establishment vigor.

FLYKING is an improved variety which has a dense, low growth habit and a relatively fine leaf texture. It is resistant to *Stripe Smut* and *Leafspot* and blends well with Merion.

KENBLUE has superior early spring and late fall growth and color, but becomes dormant in midsummer. It withstands traffic moderately well and should be a basic component of a majority of lawn mixtures in Michigan which are to be maintained at a medium to low fertility level.

MERION forms a medium textured, dark green, dense turf of high quality when maintained at high fertility levels. An outstanding attribute is resistance to *Leafspot*, which results in superior summer growth, compared to Kenblue, Delta, Park, Cougar and Newport. Merion is highly susceptible to *Stripe Smut*, which is most prevalent under heavy thatch conditions. Merion has superior ability to tolerate and recover from droughts and therefore is better adapted to light, sandy soils than most bluegrass varieties. It demands an intense level of culture compared to most Kentucky Bluegrass varieties and requires a higher rate of nitrogen fertilization.

NEWPORT is a Kentucky Bluegrass variety similar to Merion in growth habit, color and texture. It blends well with Merion. Its main virtue is excellent late fall vigor and color. Newport is not as vigorous in rhizome production and sod formation as Merion. It should not be used on droughty sites since it has very poor drought tolerance. A medium-high nitrogen fertility level is preferable. Newport becomes very stemmy during seedhead production in June. It is intermediate in disease resistance.

PARK has an erect growth habit, a rapid vertical growth rate, and is best adapted to the northern half of Michigan. It has good *Stripe Smut* resistance but is susceptible to *Leafspot*. Establishment rate is outstanding.

PRATO has superior density and relatively fine leaf texture. It is a moderately low-growing variety with rather horizontal leaf blades, and is intermediate in disease resistance.

WINDSOR is a dark green, moderately low-growing Kentucky Bluegrass. Windsor responds to high nitrogen fertilization similar to Merion, and is intermediate in disease resistance.



## Red Fescue

RED FESCUE (*Festuca rubra*) is a perennial, cool-season turfgrass of fine texture which is well adapted to sandy soils, droughty sites, shaded conditions and low intensity of culture. It is superior to the Kentucky Bluegrasses in establishment vigor, and when mixed with Kentucky Bluegrass often serves as a valuable companion grass. Excessive nitrogen or water will cause severe thinning of Red Fescue. Normally, 1 to 2 pounds of actual nitrogen per 1000 square feet per year is adequate. A minimum cutting height of 1.5 inch is recommended. All commercially available varieties of Red Fescue are susceptible to the leafspot diseases, which can cause the death of extensive patches of turf in midsummer.

Available varieties include: Pennlawn, Wintergreen, Rainier, Illahee, Olds, and Trinity Red Fescue, which spread by underground creeping stems, and Chewings Red Fescue, which has a bunch-type growth habit. All of these varieties are similar in turfgrass performance, with Pennlawn and Wintergreen holding a slight advantage. Pennlawn has been the preferred red fescue variety in Michigan due to superior drought recovery capability and better low temperature tolerance. Wintergreen, a new variety developed in Michigan, has excellent density, fine texture, dark green color, and excellent winter color retention. Seed of this variety will be available in 1970. Wintergreen has excellent promise for Michigan lawns maintained at low intensity of culture. Chewings Red Fescue has a rapid establishment capability on sandy soils. Care should be taken to assure that no tall fescue is present in the seed used.

## Special Purpose Turfgrasses

ROUGH BLUEGRASS (*Poa trivialis*) forms a light-green, prostrate growing turf which is adapted to moist, shaded conditions. It is superior to Kentucky Bluegrass in establishment vigor but will not tolerate traffic, or hot, dry conditions due to shallow rooting habits and succulent leaf tissues. Since it does not blend well with most turfgrasses, it is not recommended except for moist, shaded sites where Red Fescue will not persist.

BENTGRASS (*Agrostis* sp.) is a vigorous, prostrate growing, perennial turfgrass which tolerates close cutting (to one-quarter inch). Creeping Bentgrass is used primarily on putting greens and fairways of golf courses. This variety requires intensive, costly care, including use of fungicides due to high susceptibility to diseases such as *Dollar spot*, *Brown Patch*, *Snow Mold*, etc. As a result of high cost and specific cultural requirements, use of bentgrass on lawns is limited in Michigan. Stoloniferous Bentgrasses are a serious

weed in Kentucky Bluegrass turfs. Bentgrasses are favored by wet soils, close-mowing of from 0.5 to 1 inch and high fertility, ranging from 5 to 8 pounds of nitrogen per 1000 square feet per year.

## Temporary Turfgrasses

PERENNIAL RYEGRASS (*Lolium perenne*) is a short-lived perennial due to lack of tolerance to low temperature stress. The major portion of a Perennial Ryegrass stand will be killed during the initial winter with complete loss frequently occurring by the end of the third winter. It has a bunch-type growth habit with no creeping stems. Improved winter-hardy varieties, such as Norlea, are being developed.

Perennial Ryegrass is difficult to mow due to the tough, fibrous nature of the leaves. The main attribute of Perennial Ryegrass is rapid germination and establishment. It is an ideal turfgrass to be used as a temporary lawn turf or as 20% of a mixture with Kentucky Bluegrass-Red Fescue. In this mixture, it will serve as a soil stabilizer and cover on sloping sites to reduce erosion until the slower germinating permanent turfgrasses become established.

ITALIAN RYEGRASS (*Lolium multiflorum*) is an annual, bunch-type turfgrass. It is slightly superior to Perennial Ryegrass in germination and establishment vigor. Light-green color, coarse-leaf texture and erect, rapid, vertical growth make this species undesirable for use in mixtures with Kentucky Bluegrass and Red Fescue.

REDTOP (*Agrostis alba*) is a gray-green, short-lived perennial grass which was used for many years in inexpensive seed mixtures, but which tends to thin out under close mowing and high fertility. As a result, it persists as scattered tufts which disrupt the turfgrass uniformity and quality. It has good tolerance to wet, acidic soils. However, Redtop is of little value in quality turfs and should not be used in lawn seed mixtures.

## Unadapted Turfgrasses

TALL FESCUE (*Festuca arundinacea*) should not be confused with the red fescues. It is a very coarse-textured, short-lived perennial which has good tolerance to intense wear, high temperatures, and drought. Tall Fescue is vigorous in establishment but susceptible to snow mold and subject to winterkilling in Michigan under close mowing and high fertility. The two most common varieties are Kentucky 31 and Alta which are very similar in performance. However, due to coarse leaf texture, Tall Fescue is not well suited for home lawns. It is used on athletic fields and areas of frequent traffic where wear is excessive.



The available Tall Fescue varieties do not have sufficient winterhardiness for wide use in Michigan.

JAPANESE LAWN GRASS (*Zoysia japonica*) is a perennial, warm season turfgrass which turns straw colored with the first hard freeze in the fall and remains brown until late spring. It is established vegetatively by sprigs and plugs and generally requires two growing seasons for establishment. The Meyer and Mid-west varieties are relatively winterhardy in southern

Michigan. Emerald will winterkill severely. Although Zoysiagrass is widely advertised and is satisfactory for use in warmer climates, it is not desirable for use in Michigan lawns.

WHITE CLOVER should be avoided in lawn seed mixtures. It tends to crowd out desirable grasses and forms solid patches which are slippery for play areas and unsightly during dry periods. Once established, it will persist until eradicated by chemicals.

Table 1. Characteristics of Kentucky Bluegrass Varieties

Variety	Density	Rate of Establishment	Growth Habit	Actual Nitrogen Requir. (Lbs/season/1000 Sq.ft.)
Cougar	+	++	Low	4-6
Delta	-	+++	Erect	4-6
Flying	++	++	Low	5-8
Kenblue	--	++	Erect	4-5
Merion	++	--	Low	5-8
Newport	+	-	Low	5-7
Park	-	+++	Erect	4-6
Prato	+++	+	Medium Low	5-7
Windsor	+	+	Medium Low	5-8
Excellent	+++			
Good	++			
Intermediate	+			
Fair	-			
Poor	--			