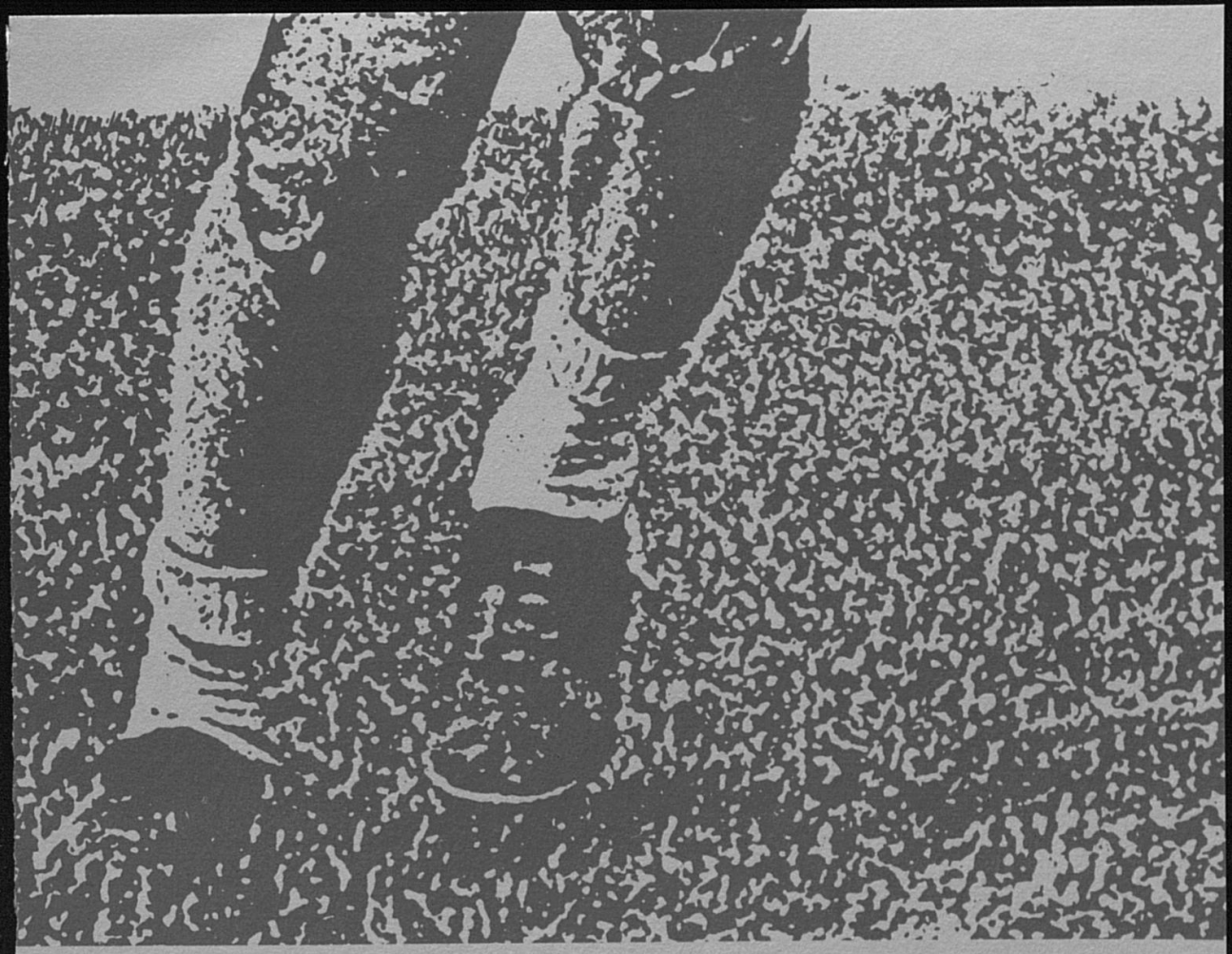

Establishing & Managing Turf on Kentucky Athletic Fields, School Grounds, & Other Recreational Areas

By T.E. POPE and PAUL GRAY • CIRCULAR 609

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The information contained in this publication is partially based on results obtained at the Franklin County High School football field in Frankfort, Kentucky. The authors are indebted to Dr. Robert Buckner and Harold Miller of the Agronomy Department at the University of Kentucky who gave the original recommendations for establishing and maintaining this field.

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Almost every Kentucky county has at least one football field. These fields are planted and maintained by school personnel or county or city park departments. In addition to these "game football fields," hundreds of acres of turf are in lawns or areas for physical education, intramurals, or baseball at high, junior high, and elementary schools.

Many of these fields, particularly those devoted to football and baseball, are not adequately covered with turf or are not maintained properly to produce a desirable turf. Thus, these areas are often bare, hard, or muddy and do not provide a surface where athletic contests can best be played while providing maximum safety to the players during "game-contact."

If sound principles are followed in establishing and maintaining athletic and play grounds, an excellent turf can be obtained. These same principles can be adapted to other areas such as school grounds and public parks.

PREPARING THE SOIL

Fall is the best time to prepare the soil, but most athletic fields are in use at this time, and the work cannot be done unless alternate fields are available. Where alternate fields are available, the soil should be prepared in August.

Late winter (February), or the first time the field is dry enough to work thereafter, is probably the most ideal time to begin soil preparation on those fields which must be used in the fall.

To remove dead growth and make disking easier, chain harrow those fields previously planted in grass. If the field is plowed, this is not necessary. Heavy clay soils should be disked or plowed to a depth of 3 or more inches. Cultivating to a depth of 6 inches is desirable where the soil type permits. In order to thoroughly cut up the area, cross disk by first disking lengthwise and then crosswise.

At the time the soil is prepared limestone may be added if a soil test indicates that it is needed. A pH of approximately 6.5 is desirable for most grasses. In rare instances, an acidifying agent, such as sulfur or aluminum sulfate, may be needed to lower the pH of the soil. Consult your county extension office on the technical aspects of this problem as well as fertilizer needs. When soil tests show a low level of phosphorus and potassium, use 1,000 - 1,200 pounds of a complete fertilizer such as 10-10-10 per acre. Additional fertilizations will be needed; the time and rate of application are given in the section on fertilization.

SELECTING THE GRASS

Generally, only three kinds of grasses are grown on athletic fields in Kentucky: (1) tall fescue (Kentucky 31), (2) bluegrass, and (3) bermuda (common and named varieties).

BERMUDAGRASS

Tall fescue and bluegrass are cool season grasses. This means that best growth is obtained in the cool seasons during the spring and fall months. Bermudagrass is a warm season grass, with best growth occurring from mid-May to October 1. Most varieties are not hardy in Kentucky. Bermudagrass turns brown with the first frost and does not begin growth until the temperature reaches about 60°F in the spring.

Since bermudagrass is dormant for a good part of the fall when play is heaviest on the field, it is the least desirable of the three for turf on athletic fields. If it is used, a thick turf must be built up during the late spring and summer to allow for the wear during the playing season. Little or no recovery of this grass occurs during the football season, and bare spots are common in late fall. In extreme western Kentucky, where the growing season is longer, common bermudagrass might be used. Most schools, however, are not equipped to give the high levels of maintenance required by bermudagrass.

Common bermuda can be established by sowing seed or by sprigging. The best bermudagrasses for athletic fields in Kentucky are U-3, Kansas Q-17, and Tifgreen. These can be established by vegetative means only, since they produce no seed.

Bermudagrass should be used on athletic fields only after careful thought is given to the frequent mowing, fertilization, and watering that this grass requires. In addition, it is subject to sod webworm and susceptible to a number of severe fungus diseases. These factors, coupled with the growth cycle which occurs only during the warm

months, make bermuda a poor choice for athletic fields in most of Kentucky.

BLUEGRASS

Kentucky bluegrass has been widely used on athletic fields in the Bluegrass and Outer Bluegrass regions of the state, but its performance leaves much to be desired. The chief objections to bluegrass are its susceptibility to sod webworm, grub worms, fungus diseases, moderate level of drought resistance, lack of resistance to high temperatures, and moderate tolerance to heavy traffic.

While the insect and disease problems can be controlled, its lack of drought resistance and tendency to become somewhat dormant during periods of high temperature make bluegrass a poor choice for southern and western Kentucky. The rate of recovery of bluegrass from heavy traffic and wear is slower than for tall fescue. At warm temperatures, it also recovers slower than bermudagrass. However, bluegrass is well adapted to central and northern Kentucky and is still extensively used on play areas in these regions. Bluegrass can be successfully used for school grounds not intended for the hard wear of football and baseball.

TALL FESCUE

Tall fescue (Kentucky 31) under proper management makes excellent turf for athletic fields in Kentucky. This grass, when heavily seeded and mowed relatively close, does not stool and form undesirable clumps in the playing fields. In texture, this grass is the coarsest of the three discussed.

Kentucky 31 fescue is adapted to the entire state. It will tolerate a great deal of traffic, grow on relatively infertile soils, recover fairly rapidly from heavy use, and is not so subject to insect and disease pests as are the other two grasses. For these reasons, it is recommended for athletic fields in Kentucky.

SEED MIXTURES

Seed mixtures containing various amounts of Kentucky bluegrass, Chewing's or creeping red fescue, ryegrass, clover, and tall fescue have been used on some fields. However, mixtures produce a turf containing grasses that require different management practices, are susceptible to different insects and diseases, and are somewhat different in growth cycles.

If a turf cover is needed in less than 2 months, perennial ryegrass is recommended for the athletic field. With a well-fertilized soil, adequate moisture, and moderate temperatures, this grass will provide

a serviceable, temporary cover in 4-8 weeks. Remember—ryegrass should be considered a temporary cover only.

Clover should be excluded from planting on athletic fields. It is extremley susceptible to the rugged wear during athletic events, the tops soon disappear during the playing season, and it provides very slippery footing. When clover is in flower, bees may also present a problem.

Where fine-textured turf is not absolutely essential and the management practices given in this publication are followed, Kentucky 31 fescue is a good turf for athletic fields.

Which Is the Best Turfgrass for Athletic Fields?

No variety is perfect; all have certain good and bad features. Study their characteristics, decide what is required in the turf to be planted, and then choose the variety which meets most of these requirements.

An evaluation of some of the most important characteristics and requirements of common turfgrasses for athletic fields are given below. In all instances the grasses are listed in descending order of preference for each consideration.

1. Wear resistance
Improved bermudas
Tall fescue
Common bermuda
Perennial ryegrass
Kentucky bluegrass

2. High temperature tolerance
Improved and common bermudas
Tall fescue
Kentucky bluegrass
Ryegrass

3. Disease tolerance
Tall fescue
Perennial ryegrass
Bluegrass
Bermudagrasses

4. Cool temperature tolerance
Perennial ryegrass
Tall fescue
Bluegrass
Bermudagrasses

5. Tolerance of close clipping
Bermudas
Tall fescue
Perennial ryegrass
Kentucky bluegrass

6. Drought tolerance
Bermudas
Tall fescue
Kentucky bluegrass
Perennial ryegrass

7. Compacted soil tolerance
Tall fescue
Bermudagrasses
Perennial ryegrass
Kentucky bluegrass

8. Nitrogen fertility requirement
Bermudagrasses
Perennial ryegrass
Kentucky bluegrass
Tall fescue

9. Rate of establishment
Bermudagrasses
Perennial ryegrass
Tall fescue
Kentucky bluegrass

10. Insect tolerance
Tall fescue
Perennial ryegrass
Bermudagrasses
Kentucky bluegrass

SEEDING

Mid-August to mid-September is the best time to plant either fescue or bluegrass. The weather conditions are very favorable at this time of year for growth of the seedlings, and competition from summer weeds is less. However, since most fields must be used in the fall, a later winter or early spring planting will be required in most cases. The earlier in the spring the seeding can be made, the better the chance of success. Bermudagrass, if seeded or sprigged, should be planted in May or later, depending on the temperature or when the soil temperature approaches 60°F. Table 1 gives the seeding dates and rates for grasses to be seeded on athletic fields.

Table 1.—Seeding Rates and Dates for Planting Grass on Athletic Fields

Kind of grass	Seeding date	Seeding rate
Fescue	Feb. 15 - Mar. 30 Aug. 15 - Oct. 1	5-8 lb/1,000 sq ft
Bluegrass	Same as above	2-3 lb/1,000 sq ft
Ryegrass	Same as above	6-8 lb/1,000 sq ft
Common bermudagrass	May or later	1-2 lb/1,000 sq ft

Seed can be sown with a cyclone-type seeder, grain drill, or one of the other types available. Whatever kind is used, it must distribute the seed uniformly. Divide the amount of seed needed into two lots if a grain drill is not used. One-half the seed should be sown lengthwise of the field and the other half crosswise to give uniform distribution. No further covering is needed if a grain drill is used. If surface-seeded, covering may be accomplished in several ways. The most convenient is to run a cultipacker lengthwise and crosswise over the seeded area. If this is not available, use a disk in one direction only to *lightly* turn the soil. However, a grain drill or disk produces an undesirable rowing effect which can still be seen 1 or 2 years later. If neither of these two methods can be used, the athletic teams can hand rake the seed into the soil. Other alternatives are dragging or floating the area with large brush (cedar tree top) or tooth or chain harrow turned over.

Mulching with straw or ground tobacco stems is recommended where they are available and finances will permit. Use 1 bushel of ground tobacco stems on each 100 square feet or one bale of fumigated straw to each 1,000 square feet, if possible. The straw must be fumigated to kill weed and crop seed it may contain. Your county extension office can furnish information on how this is done.

Mulching helps prevent conpaction of the soil, conserves some moisture, and adds organic matter to the soil.

After the seed are sown, covered, and the mulching is done, the field should be irrigated. Up to ½ inch of water can be applied at this time, depending on the moisture content of the soil. Avoid coarse streams of water and washing, for the seed will move causing thin stands in some areas and heavy stands in others. Watering is one of the most important factors in obtaining a good stand from seed. Once the seed is sown and watered in, do not allow the surface to dry out completely. Considerable hand watering will be required for 4-14 days. If enough plastic hose sprinklers are available (bought or borrowed), they will provide ideal droplet size for the initial and follow-up waterings. If enough sprinklers can be "permanently" attached to supply hoses, no one will need to walk on the wet ground to relocate them. Coarser droplet sprinklers can be used when a mulch is used.

FERTILIZATION

When the seedbed is being prepared the initial application of fertilizer can be worked into the soil. Follow the recommendations of a soil test and your county extension office. Based on the initial soil test, from 300 to 1,000 pounds of a complete fertilizer per acre should be added at planting time to bring the phosphorus level up to 60-100 pounds per acre and the potassium level up to 200-250 pounds per acre. Phosphorus and potassium increase the vigor of the new seedlings. More fertilizer—about the same rate as the first application—may be necessary during the first year to hold the desired fertility levels. The time of application will depend on when the seed was sown. If spring sown, fertilizer should be applied in mid-October. When the grass is planted in the fall, the fertilizer should be applied by mid-March. Additional actual nitrogen at the rate of 1 pound per 1,000 square feet may be necessary during the growing season. Applications are usually made when the grass is growing rapidly in mid-May and in late August or early September and just prior to the season of heavy use. The vigor of the grass and the amount of available moisture will determine rate and frequency of nitrogen applications.

During the second and subsequent years, the amount of fertilizer applied will generally be less. A spring application of a complete fertilizer followed by one or two topdressings with nitrogen only will usually be sufficient. Use these materials at the same rate as previously given. When the grass appears light green to yellowish, the addition of nitrogen to the turf should correct this condition. A soil

test once a year provides an excellent check on the need for phosphorus, potassium, and lime. Visual observations on the vigor of grass and loss of deep green color are the best methods to determine the need for nitrogen.

The fertilization practices given above have proved satisfactory on tall fescue. Bluegrass and other cool season grasses should grow well when fertilized in a like manner.

Bermudagrass generally requires 1 pound of actual nitrogen per 1,000 square feet per month during the growing season. Begin fertilization about 2 weeks before growth starts in the spring, and cease 2 weeks before the first killing frost in the fall. For the first spring fertilization, apply 15-30 pounds per 1,000 square feet of a complete fertilizer such as 10-10-10. To hasten establishment, topdress every 2-4 weeks with 1 pound of nitrogen per 1,000 square feet. Additional phosphorus and potassium may be needed to bring the levels up to the desired 60-100 pounds per acre for phosphorus and 200-250 pounds per acre for potassium. Only by a soil test can these levels be determined.

After the first year, fertilize bermudagrass each spring with 15-20 pounds of a complete fertilizer. Topdress with 1-2 pounds of nitrogen per 1,000 square feet at monthly intervals. A total of 6-9 pounds of nitrogen per 1,000 square feet per season is needed for bermudagrass turf.

In all fertilizations, divide the amount to be applied in two equal parts, and apply one part lengthwise and the other part cross-wise of the field. This method accomplishes better distribution of the material, and strips of the turf are less likely to be missed or overfertilized. When possible use granular material which can be distributed with a cyclone-type seeder or spreader. The "feather edge" of overlapping swaths permits "one-way" application without burning. Apply nitrogen and complete fertilizers when the soil is moist and the grass tops dry. If it does not rain within 24 hours, irrigate with ½ to 1 inch of water.

MOWING

Mowing practices on athletic fields planted in spring-seeded tall fescue are extremely important. Frequent mowing is essential. It should be mowed at least once a week and, if growing rapidly, perhaps twice a week. When possible, clippings should be removed.

Do not allow the grass to become too tall (4 inches or more) before mowing, and start mowing when *any* of the grass reaches 4 inches. If the newly planted grass is allowed to grow tall before mowing is

started, scalping and stooling may be problems. Mow often enough so that not more than 1 inch of blade is removed at any one clipping. Never remove more grass than is left. Mowing should be done according to height, not according to schedule. That is, the grass itself determines when mowing should be done, not the day of the week.

During the first year the mower blades should be set to cut no closer than 2½ to 3 inches until mid-August. Starting in mid-August, gradually lower the clipping blade about ¼ inch at each successive mowing until the turf is at 1½ inches; this should be accomplished by the time the first game is played. Gradually raise the mowing height, ¼ inch at a time, until a height of 2-2½ inches is reached. This height of cut is maintained throughout the playing season. It is best to go no lower than a minimum of 1½ inches when clipping tall fescue.

During the spring and summer of the second and subsequent years after establishment, the clipping height can be raised to 3-4 inches. Clipping at this height will allow the grass to build up a strong root system that is needed during the time the field is used during the fall. Again, gradually lower the cutting blade ¼ inch at a time to return to the 2-2½ inch mowing height maintained during the playing season.

A 40-inch mower will fit the needs for most high school athletic fields. With this width of mower, 2½ hours will be required to mow 2 acres of turf. Mow the field lengthwise one time and crosswise the next. Diagonal mowing should also be done at least 6-10 times in the course of each year. If the field is continuously mowed in one direction the turf "takes a set" and appears uneven. Changing the direction of mowing avoids this problem.

Bermudagrass should be maintained at a height of 1 inch. Mowing should be started when the grass reaches a height of approximately 2 inches. If the grass is allowed to grow taller than this, two mowings a week may be necessary to maintain the grass at the desired height.

IRRIGATION

Turf on athletic fields should receive approximately 1 inch or more of water every 2 weeks. It is a good idea to put a rain gage on the field. When rainfall does not supply this amount, irrigation should be practiced. When the leaves begin to roll and the grass takes on a wilted appearance, water is needed. Gradually apply water until the soil is wet to a depth of 6 inches. This can be checked with a soil auger. Remove the irrigation pipes from the field following watering, as they exclude light from the grass underneath them and cause it to

become light green or yellowish, depending on the length of time the pipe remains in one spot. (When irrigation is limited, be sure to water the field for the first few weeks after seeding.)

INSECTS

Grub worms may injure established stands of turf. Aldrin applied at the rate of 3 pounds of actual material per acre (once every 3-5 years) will control this insect. Control of grub worms also indirectly controls moles which feed on them.

DISEASES

Diseases have not been a serious problem with tall fescue. A few fungus diseases are common to fescue and other turf grasses. Have these identified by your county extension office. Current control recommendations can be given by these persons.

WEEDS

Crabgrass and other noxious weeds sometimes become problems on athletic fields. Again, the weeds should be identified by the county extension office, and control recommendations given should be followed.

REPAIRING THE FIELD

On bluegrass or fescue football fields that have been damaged to the extent of exposing soil, it is desirable to make a seeding at the close of the playing season. For fields planted in fescue, about 1 or 2 pounds per 1,000 square feet of fescue seed can be oversown on the field depending on amount of damage. Bluegrass is sown at the rate of ½-1 pound per 1,000 square feet. This can be done just prior to the last game; traffic on the field will help work the seed into the soil. After the last game, chain harrow the field to remove dead material and to further cover the seed. It may be necessary to scarify the soil before seeding, where damage is severe. Sacrifying and cultivation give the grass seedlings a better chance to grow. Seeding can also be done on bare spots during January and February. Winter freezing and thawing helps the seed make contact with the soil without cultivation.

Seed may be sown on bluegrass and tall fescue turf from mid-September to October 1 while the football field is being used. Suf-

ficient tillage and cultipacking of the seedbed may be achieved by the cleats. Bermudagrass overseeding should be done in late spring, as it does not germinate until warm weather arrives.

NEED FOR A PROGRAM

Considerable planning, effort, and persistence is required to maintain a good turf when an athletic field is heavily used. Plan the treatments that are necessary for the individual field and make certain these are carried out regularly. Generally, it is best to have one person responsible for the maintenance of an athletic field(s). If this is done, duplication of effort and conflicting decisions are eliminated, and the omission of certain essential practices is less likely. The turf grass cover is far more satisfactory when the required maintenance program is followed. Remember that good turf is protection for the players and a point of pride for the community.

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