

MAINTENANCE OF ATHLETIC TURFS:

FERTILIZATION, IRRIGATION,

CULTIVATION

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All sports emphasize skills of the athlete in individual and team performance. Many of our most enjoyed sports events are held on turf. Where the sports field is poorly or irregularly turfed, the element of chance determines whether an athlete will have a sound footing at any given time. A two fold danger results from play on poor turf. First, an unreliable footing may result in injury to the athlete. Second, games should be won because of superior skill not errors created by a poor playing surface. We place great importance on the quality of sports equipment. Equal attention should be placed on the maintenance of a safe and sound sports field.

WHY DOES SPORTS TURF DETERIORATE

Fields are Over-used

Athletic fields like many school facilities are becoming overused as enrollments increase and as interest in athletics and physical fitness become more widespread. "Use" of sports fields is synonymous with "soil compaction." Most fields have not been constructed to resist the effects of compaction on grass growth. Many fields that have been so constructed are overused to the point where grass has little chance of survival.

Soils Become Compacted

Grass roots require water, fertilizer elements, and air for optimum development. As soils become compacted, air is squeezed out and oxygen becomes deficient in the root zone. Hard compacted soils are more difficult to wet and at the same time dry out quicker. Water relations become unfavorable for grass growth. Finally, since all fertilizer elements are absorbed in solution, the lack of water also prevents the plants from obtaining adequate supplies of nutrients.

Soils Compact When Wet

Every farmer knows the damage that can result from working a soil when wet. Sports events are held rain or shine and all too often this means use of water soaked turfed soils. Compaction develops rapidly under these conditions. Fields that have poor surface drainage; ie, contain low spots where water collects, often develop localized areas of soil compaction. Turf thins, then dies out as the season progresses. A well crowned field possesses good surface drainage, and helps reduce compaction problems.

Weeds Take Over

There are several weeds which grow well on compacted soils, of these crabgrass and knotweed are the most troublesome. Both of these weeds can survive under conditions which turfgrass cannot. Both are annuals, knotweed germinates in early April and Crabgrass seed starts in early May and continues to germinate through most of the summer whenever conditions are favorable. Unless the establishment of these weeds is stopped, the athletic field will eventually be ruined for sports use. It may take two years or five years but the result is always the same.

FALL MAINTENANCE AND RENOVATION PRACTICES

Maintenance Tips

Fall months are the best time of year to improve a poor turf. However, it is difficult to improve a football field while it is being used regularly. The following maintenance tips may be helpful in keeping it in good shape.

1. Mow regularly at a 1½ inch height of cut.
2. Irrigate infrequently with large amounts of water sufficiently ahead of games to allow the soil surface to dry out some. Satisfy major water needs of the grass in this way.
3. Over seed thin spots with a quick germinating grass like Manhattan ryegrass. Sprinkle these areas frequently with small amounts of water to encourage rapid germination and establishment. Keeping the soil surface moist in these spots will also help bluegrass rhizomes to spread in. Remember always let the soil surface dry out some before game time.
4. Use a mechanical aerifier early in the season before games start. Also aerify during the season whenever there is a period of non use long enough to permit a stimulation of grass growth. The type of machine that punches holes and removes plugs of soil is recommended. Run the machine over the area two or three times at each treatment.
5. Break up surface crusts on the soil by use of a mechanical spiker. Fields may be spiked 1 to 2 times a week.
6. Fertilize to keep grass growing vigorously. One to two lbs. of nitrogen per 1000 sq. ft. should be applied in early September and a second application made at the same rate in early October. Need for lime and other nutrient elements should be based on soil test information obtained from your county agricultural agent. There are numerous fertilizer ratios that may be prescribed to do the proper job. The following table may serve as a guide.

<u>Ratio</u>	<u>Fertilizer Trade Name</u>	<u>Pounds of Fertilizer per Application</u>
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FOR TURF REQUIRING ONLY NITROGEN

45-0-0	Urea	1-2
38-0-0	Ureaformaldehyde	15
33-0-0	Ammonium Nitrate	3
20-0-0	Ammonium Sulfate	3-5
20-0-0	Ayanamid	3-5
16-0-0	Nitrate of Soda	7
6-5-0	Processed Sewerage Sludge	30

FOR TURF REQUIRING NITROGEN AND PHOSPHORUS

16-20-0	Ammonium Phosphate	7
10-20-0	Ammonium Phosphate	10
6-5-0	Processed Sewerage Sludge	30

FOR TURF REQUIRING NITROGEN, PHOSPHORUS, AND POTASSIUM

12-12-12	Inorganic-chemical	10
10-10-10	Inorganic-chemical	10-15
9-7-7	Inorganic-chemical	15
8-8-8	Inorganic-chemical	15-20
7-7-7	Inorganic-chemical	20

FOR TURF REQUIRING NITROGEN AND POTASSIUM

0-0-60	Muriate of Potash plus one of the nitrogen fertilizers listed above.	2
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FOR ROUTINE MAINTENANCE WHERE NO
MAJOR DEFICIENCIES ARE NOTED

The following ratios are available under a variety of trade names

20-10-5	10-8-6	8-6-4
12-5-7	10-8-4	8-6-2
12-8-4	10-6-4	
12-6-6	10-5-5	

Renovation

At the end of the season weather may be suitable for late fall renovation of the field. A heavy aerification is advised followed by a vertical thinning of the turf and scarification of the soil surface. The field is then over seeded with a mixture of about 50% Kentucky Bluegrass-50% Creeping Red Fescue. Seed at a rate of 2 lbs. per 1000 sq. ft., and cover thin areas by raking or dragging with a steel mat. Much of the seed may lie on the soil surface over winter and will be ready to germinate early in the spring.

SPRING RECONSTRUCTION AND RENOVATION PRACTICES

Spring months are the only time when major renovation of athletic fields can take place. Work can seldom start before early April and should be completed by early May. It is necessary to plan ahead so that you can make best use of this short period of time.

Decide first whether the field should be reconstructed, including complete reseeding or sodding; or whether a renovation of existing turf is possible. Follow this guide. If last year the field was more than 50% weeds, a large portion of them being crabgrass and knotweed, reconstruction is advised; if the field was less than 50% weeds with little crabgrass and knotweed, renovation is recommended.

Reconstruction

Modify the soil if needed, so that it contains sufficient sand to be classified as a good sandy loam. Your county agricultural agent can help with these specifications. About 12 inches of this type soil should be available as a root zone. Install drainage tile if needed, and be certain that there is an 18 inch crown in the center for football fields (center line 18" higher than side lines).

Tips on Use of Sod

If crabgrass and knotweed have been prevalent, the field should be sodded. Prepare a sod bed by mixing 20 lbs. of 10-2-10 fertilizer per 1000 sq. ft. with the top 3 to 4 inches of soil. Rake to final grade and lay sod strips crossways on the field. Pack strips together and press into the sodbed with a roller. Sod should be cut 3/4 inch thick and be free of weeds. Irrigate frequently with small amounts of water for the first week or two until sod has become knit to the soil below. The earlier in April sod is layed the better the turf for fall play. Fields sodded in late spring or early summer often do not produce sufficient roots to be safe for fall use. Lose sod strips are dangerous to play on.

Athletic fields may also be spot or patch sodded in localized areas where turf has been destroyed. Prepare the soil in the same way advised for complete sodding. Be certain the sod is free of weeds and weed seeds so that new weed problems are prevented.

Tips on Use of Seed

Where fields are to be seeded prepare the seedbed the same as described for the sodbed. Where seeding dates in early April can be made a mixture of 33% Kentucky Bluegrass-33% Creeping Red Fescue and 33% Manhattan Ryegrass is recommended. Seed at a rate of 4 to 5 lbs. of seed mixture per 1000 sq. ft. Where date of seeding is delayed until sometime in May seed with Kentucky 31 Fescue at a rate of 8 to 10 lbs. per 1000 sq. ft. It is important to cover the fescue seed well and seed at this high rate in order to obtain a satisfactory turf from this coarse textured grass. Whether establishing a turf from sod or seed mow at a 2 to 3 inch height as needed. Gradually increase the amount of water used to irrigate and decrease the frequency of application.

Seed May Be Pregerminated

Seed may be pregerminated prior to seeding so that the grass makes the fastest possible start. Mix the required amount of seed with vermiculite in about equal proportions. Wet the mixture until the pile is saturated. Cover with a plastic tarp and keep moist for 7 to 10 days with temperature held at about 70°F. Watch for swelling of the seed and emergence of seedling parts. When most of the seed has started to germinate, mix processed sewerage sludge fertilizer with the mixture until dry enough to spread. Calibrate a spreader to seed at the proper rate and then sow without delay. The field should be watered at once and kept moist so that germination continues without interruption.

Scorched Earth Reconstruction

At times athletic fields become infested with grassy and broad leaved weeds, but soil properties are not directly related to the weed problem. A "scorched earth" treatment of 1 lb. actual sodium arsenite per 1000 sq.ft. in about five gallons of water will kill out all vegetation. After three to four days the surface of the soil should be mechanically raked, sliced and de-thatched and the area seeded with a bluegrass-red fescue seed mixture. Natural organic or Ureaformaldehyde nitrogen fertilizers may be applied with the seed.

Renovation

Fields to be renovated may be divided into two categories. First those having had heavy stands of crabgrass and second those with little crabgrass.

Overseeding

Fields that are thin because crabgrass has crowded out the bluegrass will need to be over-seeded as early in the spring as possible. Use a vertical cutting machine to scarify the soil surface and prepare a seedbed without injuring existing bluegrass. Fertilize with processed sewerage sludge (containing about 5% nitrogen) at a rate of from 20 to 30 lbs. per 1000 sq. ft. or with ureaformaldehyde nitrogen fertilizer (containing 38% nitrogen) at a rate of 8 to 10 lbs. per 1000 sq. ft. Seed with a mixture of 33% Kentucky Bluegrass-33% Creeping Red Fescue and 33% Manhattan Ryegrass at a rate of 2 to 3 lbs. per 1000 sq. ft. Use the vertical cutting machine to mix seed and fertilizer into the soil surface. Irrigate frequently with small amounts of water for the first three weeks then increase amount and decrease frequency of application. An early seeding will get the grass sufficiently ahead of crabgrass that good post emergence control may be obtained during the summer. Knotweed may also be controlled with other non grassy weeds during late spring and early summer.

Preemergence Crabgrass Control

Fields that are thin, but do not require overseeding should be treated about the middle of April with a preemergence crabgrass control herbicide containing DCPA, Benefin, Bensulide, Siduron, Terbutol or Bandane as the active ingredient. Follow manufacturers directions for proper rate and method of application.

In order to encourage existing grass to fill in turf should be well fertilized during April and May. Fertilizer application should be based on soil test information obtained from your county agricultural agent. In general, about 2 lbs. of nitrogen per 1000 sq. ft. from inorganic fertilizers may be used. Make two applications, one in early April, the second in early May. Use of the rotary or whirlwind type spreader increases uniformity of application and decreases chance of foliar burn. Fertilizers containing slowly available organic nitrogen sources will better meet turf needs for plant food and when used should be applied at a rate of 3 to 4 lbs. of nitrogen per 1000 sq. ft. Treat the turf in early April with 2 lbs. of nitrogen and apply the other 1 or 2 lbs. in early May.

Broad Leaved Weed Control

Non grassy weeds such as dandelion, plantain, and buckhorn may be controlled with a 2, 4-D herbicide any time during the spring. Chickweed, ground ivy, yellow sorrel, yarrow, clover, black medic, and knotweed should be treated during May with Silvex, or MCPP herbicide. Remember, spray with care to prevent drift of the chemical to ornamentals in adjacent property. In general the use of these chemicals is not recommended during summer months so treat early and make any repeat applications before hot weather sets in.

SUMMER MAINTENANCE TIPS

Major renovation of sports fields should not be attempted during the summer months. Root development is restricted during hot weather and growth rates of most grasses are reduced. During this period the turf should be maintained by proper watering, mowing, fertilizing, and disease, insect and weed control practices.

Watering.

Soak the turf well every seven to ten days when natural rainfall fails to total about one inch of water. Don't sprinkle frequently with small amounts of water. This practice encourages crabgrass and knotweed and creates conditions that are ideal for fungus diseases. When you water deep, the soil will dry out on top in a day or so, helping to prevent weed and disease problems, but at the same time roots can absorb needed water from below.

Mowing

During the summer clip athletic fields which are not being used at a 2 to 3 inch height. This higher cutting will help develop stronger healthier grass plants by slowing down the rate of growth. Mow frequently, whenever there is from 1/2 to 1 inch of foliage produced above the recommended height of cut. Fields that are being used should be mowed regularly at a 1 1/2 inch height. Remember to mow often so that long clippings do not accumulate and add to thatch and disease problems.

Fertilizing

During hot summer weather turf should be placed on a light feeding program. Use only materials containing slow release organic forms of nitrogen. Where soil

tests have shown potassium levels to be low a little extra Muriate of potash (0-0-60) is recommended. In general, fertilizers with a 3-1-2 ratio supply nitrogen and potassium in the proper balance. Use these fertilizers so that about 1 pound of nitrogen is applied per 1000 square feet and 1/3 pound of phosphorus and 2/3 pound of potassium will also be added to the turf. If you use a nitrogen fertilizer alone, apply it at a rate of about 1 pound of nitrogen per 1000 square feet. Muriate of potash or potassium sulphate should be spread at a rate of about 2 lbs. per 1000 square feet. Treatments may be made in late June and mid August.

USE THE FIELD WITH CARE

Turf consists of over 1000 living plants per square foot. Unlimited use of an athletic field will wear out the grass and kill these plants regardless of how well the field is constructed. Watch for wear on your sports fields and program activities so that the grass can recover between events.