

SOLVING ATHLETIC FIELD PROBLEMS

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Those charged with care of turf on football and other playing fields are concerned with three major areas. These are: the condition of the grass, the firmness and uniformity of footing from a playing standpoint, and color and grooming from a spectator's standpoint. These along with the number of events and the weather at game time also are the source or basis of problems. The conditions of athletic field turfgrass always reflects past management practices. Good or bad management shows up to a greater extent in the spring of the year than at any other time except perhaps on color television. Solving athletic field problems may be arbitrarily placed in two categories; 1) prevention programs and practices that prevent problems and, 2) corrective procedures that correct problems that arise from basic causes like poor construction.

Play: From a playing standpoint, good athletic field turfgrass should be tough, wear-resistant and not easily torn by cleats. It should be soft and resilient enough to prevent abrasions when players fall, yet firm enough to permit good footing. It should be clipped short enough to prevent hanging of cleats or shoes yet tall enough to ensure healthy plant growth and rapid recovery when torn by shoe cleats. In cold climates, Kentucky Bluegrass mixed with Perennial Ryegrass and cut to 1 to 1-1/2 inches will meet these qualifications. Likewise the new fine leaf tall fescues may qualify under certain conditions. Adapted cultivars of each species should be selected. Consultation with local turf specialists -- extension personnel, golf course superintendents and seedsmen -- is beneficial.

Firmness and uniformity of footing are usually present if the condition of the turfgrass is satisfactory. But, with or without good grass, a firm, even and resilient footing is absolutely necessary and should be mandatory on all playing fields. Skinned areas of baseball infields provide these conditions. The same general techniques and procedures may be employed to assure footing on football fields. Players recover from skin abrasions relatively easy -- certainly more easily than from twisted knees and ankles. Dust may be controlled on bare areas by the use of water. Turf cover is, of course, preferred.

The use of sand and partially pregerminated seed; or, sod if damage warrants, after each game to repair torn grass or displaced soil is a highly recommended preventative technique. And, if practiced, helps to solve a major accumulative problem. This is similar to divot repair on golf courses.

Spectator Appeal: With the advent of color telecasting of major spring events, field color and grooming have taken on new significance. Spectators and parents of junior and senior high school players have come to expect uniformity and compatibility of color. Color is important from an aesthetic standpoint and, right or wrong, is apparently one of the major criteria by which the general public judges the quality of turf.

Mowing to produce a pattern or "ribboning" effect is a rather standard procedure on most major league playing fields. George Toma, Groundskeeper for Kansas Royals and Chiefs was an early proponent of this technique and used it effectively to improve the appearance of his fields. On football fields, each five (5) yard strip is cut in an opposite direction. Another technique that

is sometimes used when the grass loses color or goes dormant is to color alternative five years strips with a different colorant, a diluted solution of the same colorant or the same colorants to which some white has been added. Both techniques enhance the appearance of the field and have earned well-deserved praise and recognition for the turf managers who have used them. Enhancement of aesthetic appeal or grooming is likewise affected by the sweeping or using of mowers equipped with baskets to pick up plant parts torn out by play during a game. If not removed these become brown and give a discolored appearance to the fields.

Poor Fields: Good turfgrass conditions, firm, uniform footing and a pleasing color are characteristics of a good football field. Poor fields are also readily recognized under most circumstances. Annual weeds, undesirable grasses and clover often make up a major part of the vegetation. The center of the field often is bare and the soil is bumpy, uneven and usually compacted and poorly aerated. Compacted and poorly aerated soil supports only shallow-rooted, tender grasses that are easily torn by cleats during play. Injury to players, particularly around the ankles and knees, are more likely to happen on this type of turf.

Quite often weedy turfgrass indicates mismanagement of water and improper fertilization, in addition to reflecting soil compaction. Mismanagement of water occurs when it is applied at rates incompatible with soil properties -- infiltration rate (won't go in), percolation rate (won't go through), or storage capacity (holds too much - too little). Improper fertilization may mean the wrong pH, or too little total fertilizer, an improper balance of the major fertilizer elements -- nitrogen, phosphorus and potassium -- or a deficiency (or excess) or trace elements.

Fertilization is a process of supplementation -- supplementing the soil nutrients in accordance with the requirements of the grass for growth and for the prevailing use conditions. And, no element should be applied in excess of the needs of the plants. This is particularly true of the soluble or inorganic types of nitrogen such as ammonium nitrate, ammonium sulfate and urea. Soluble forms of nitrogen give a plant a "quick" start - a spurt of growth - but when supplied in excess, produce tender succulent growth that increases the chances for player injury and increases susceptibility of the turfgrass to attacks of insects and disease producing organisms. One exception to this is when there is a need for quick "pick up" in color or growth at mid-season or for special games -- homecoming or for bowl games.

Grasses: Kentucky Bluegrass (Touchdown, Parade, Adelphi, Rugby, Victa and others), perennial ryegrass (NK-200, Pennfine, Manhattan, Game) are considered among the best grasses for athletic fields. Blends of each species composed of superior (well adapted) cultivars are preferred to use of a single cultivar. Sometimes blends of Kentucky Bluegrass and perennial ryegrass or Kentucky Bluegrass and fine leaf tall fescue may be preferred. Consult local authorities for the best adapted cultivars and for the percentage of each species and for the rate of seeding per 1,000 square feet.

Tall fescue when used alone, and seeded at low rates, tends to clump after a few years; hence, it is not desirable under most conditions. It should be recommended only for special situations. If used, seed at a rate of 10 to 12 pounds per 1,000 square feet and plan to overseed each spring at a rate of 3 to 5 pounds per 1,000 square feet. Also, under most conditions blending with Kentucky Bluegrass is beneficial. Fine leaf tall fescue is especially suitable for fields that cannot be irrigated. However, do not overlook red or chewings fescue blended with Kentucky bluegrass for these situations.

Perennial ryegrass is a temporary, and increasingly a permanent grass that may be used to advantage on areas that tend to become thinned out by concentrated play. It helps to solve many problems! Seed ryegrass after each game on these areas. Pre-germination will speed establishment. The light apple green color of the early domestic ryegrass types was not compatible with the dark green color of many Kentucky Bluegrasses and was objectionable from a viewing standpoint. This is not true of the "new", currently available types; and, therefore, uniformity of color may be improved by selecting strains like NK-200, Pennfine, Manhattan, Yorktown, Game and others which possess a darker color than domestic ryegrass. Consideration should always be given to these new improved cultivars.

Sodding is an effective means of establishing an athletic field; however, timing is critical on football fields. They should be sodded by June if play is anticipated in September. Late (July-August) sodding may fail to establish sufficient root system to support play. Especially is this the case when adequate moisture is not present and high temperatures prevail for extended periods.

In season sodding to correct severely damaged areas -- center and in front of goal posts -- is effective only if sod is cut thick (2-1/2 inches) and laid in a brick locking pattern. Sod should be stamped into place, topdressed to fill cracks and to avoid desiccation of sod roll edges.

CULTURAL PRACTICES

Good athletic field turfgrass must be cultivated (aerated), fertilized, watered, and mowed properly. In addition, programs to control disease, insects, weeds and, often, soil compaction and thatch should be developed and used as needed. Attention to these fundamentals will ensure the establishment, development and maintenance of tough, wear-resistant turfgrass. Cultivation, fertilization, controlled watering and proper mowing are so closely inter-related that it is difficult to separate their individual effects. Those are the essentials in the production of good athletic turfgrass. They, also, are the practices that, assuming proper construction and correct selection of grasses, prevent problems and that help to solve problems as they arise pre and post season as well as in season.

Improvement of Physical Condition

Cultivation (Aeration): Cultivate the field with some type of aerating equipment at least twice lengthwise and once crosswise. Add sufficient weight to ensure penetration to a depth of two to three inches. In many cases it may be necessary to sprinkle in order to bring the soil to the proper moisture level for maximum penetration. Soil should be moist but not soggy. Cultivation alleviates soil compaction and aids the interchange of gases, particularly oxygen and carbon dioxide, between the soil and atmosphere. Aeration, likewise, permits placement of calcium, phosphorus and potassium in the zone of root growth, thus aiding in the development of deep root systems.

Football fields that are cultivated in early spring do not necessarily require topdressing to fill in aeration holes. Roots and stems of the grass fill in these holes rapidly, and there usually is no evidence of pitting. Cultivation of baseball fields will be determined by playing schedules and the rapidity with which the grass is growing. Breaking or removing cores of poor soil often is necessary if cultivation is practiced in season.

Topdressing: Topdressing serves a dual purpose -- correction of basic construction problems arising from use of poor soil and as a preventative

problem solving technique. On fields where topdressing is required, consideration should be given to the type of materials used. A mixture similar to that used for putting greens may be considered. Usually a mixture of 80 to 90 percent sand or which 75 to 85 percent is medium sand (0.25 to 0.50 mm), and the remainder falling between 0.15 mm and 1.0 mm; 10 to 12 percent clay and, under some conditions, a similar content of peat or other sources of organic matter is considered a good topdressing material. And, where play is exceptionally heavy just a straight "dirty" medium sand is often used. Silt is undesirable and quantities greater than the amount of clay should not be used.

Peats are the preferred form of organic matter. Properly processed sphagnum, raw sedge or cultivated peat are satisfactory. They should contain 90 percent or greater of organic matter. Other types of organic matter that may be used are well decomposed leaves, gin trash, sawdust, ground corn cobs, straw and any other readily available source of organic refuse. Manure or raw sewage sludge can be used; however, they decompose readily. When decomposing, these materials have an offensive odor that may make them objectionable in many cases. (Proper composting will eliminate this condition). Neither of these should be used later than eight weeks prior to play on the field. Manures may be a potential source of tetanus, so their use as a surface dressing should be avoided, unless the materials are sterilized.

Topdressing materials, if a combination, should be thoroughly mixed with a grinder or mixer. After mixing, the material should be screened through a one-quarter inch mesh screen. Sterilization -- chemical or heat -- to kill weed seeds is desirable.

This topdressing mixture should be used to fill and level depressions during and at the close of the playing season. If used as a topping over the entire field, it may have to be applied in the spring. In this case, the field should be topped after cultivation and fertilization.

Fertilization: Fertilizers are applied to supplement the natural nutrient supplies in the soil rather than to constitute the only source of nutrients. In addition, another major function of fertilizer is to balance the soil nutrient supply with the needs of the plant. Fertilization of athletic field turfgrass begins with the determination of the plant food supplies in the soil. This is accomplished by obtaining a properly interpreted soil test. The soil test will provide a record of the soil reaction (pH) and the level of phosphorus, potash, calcium, and magnesium. In addition, most tests will show soluble salts if they are present in toxic levels.

Knowledge of the soil reserves, coupled with the knowledge of the requirements of the turfgrass and the intensity of usage expected, will serve as a basis for development of a preventative problem solving fertilization program. And, often is among the first corrective problem solving techniques. Keep in mind that turfgrasses require several times as much nitrogen as phosphorus and potash on a growing season basis. Soil tests usually do not give an accurate evaluation of available nitrogen; rather, color, growth, vigor and condition of the grass must be used as guide for nitrogen fertilization.

In general, bluegrasses will need four to six pounds of nitrogen, two to three pounds of phosphorus and three to four pounds of potash annually. Lime, if needed, should be applied in amounts indicated by soil tests. Lime (calcium) is an important plant nutrient and, in addition, renders other elements more available. Lime when pH reaches 6.2. A pH of 6.5 to 7.2 is most desirable for athletic field turfgrasses.

Intensity of use is also a major factor when developing a problem solving

fertilizer program. More fertilizer, especially nitrogen, is required on heavily used fields.

Timing of fertilizer applications need to be keyed to growth activity and the necessity of obtaining color for special events. Complete fertilizers should be applied in late summer or early fall before the season starts. A "late" application of a complete fertilizer is beneficial and may preclude the spring feeding. The early fall feeding is needed in either case. Organic (slow release) forms of nitrogen are suggested for supplemental feedings. Inorganic (quickly available) sources of nitrogen are suggested for use when the turfgrass needs a quick pick up in growth or color.

Watering: Controlled watering is one of the most important considerations in the development of good turfgrass. Water must be applied on the basis of turfgrass need (evapotranspiration) and in accordance with soil properties. Judicious use of water, coupled with aeration and proper fertilization, develops deep rooted turf that is wear resistant, tough and not easily torn by player cleats. Removal of excess water by means of surface and internal drainage is necessary. Plants growing in waterlogged soil cannot function properly because of the reduced amount of oxygen available to the root systems. Poor root systems become problems that are not always easily solved.

On new seedings, the field should be sprinkled lightly each day until the seed germinates and is well established. Thereafter, the amount of water applied should be increased in accordance with the grass need and the frequency of application adjusted to conform with soil characteristics.

Soils differ in their ability to absorb and hold moisture. Water should not be applied in excess of that which a given soil can take in and hold. If the soil is not wet to the required depth (depth of root zone), wait until the moisture has percolated downward and apply additional water.

Consideration should be given to the installation of automatic watering systems on old fields as well as new. The improved quality of the turfgrass along with the savings in labor and water cost, and the control such a system permits, are sufficient justification to warrant installation.

Mowing. Reel type mowers are preferred for athletic fields. For young turf it is essential that the mower be sharp and properly adjusted, and a mature turfgrass will be maintained in a far more satisfactory conditions if the mower is kept in the same condition. New seedlings should not be cut until they are approximately two inches in height. Only about one-quarter inch of leaf surface should be removed at any one clipping.

Mature football turf may be maintained at a height of one (1) to one and a half (1-1/2) inches. Sometimes under unusual conditions, two (2) inches. During summer months, two to three inch heights are advantageous.

A few weeks prior to fall play, adjust the height of cut to that preferred by the coach and players. Do not make reductions in one clipping -- reduce the height of cut gradually (one-fourth inch) at successive mowings. Increase frequency of cutting if necessary. Generally, turf that has been properly managed will require mowing at least twice a week in early fall.

Grooming. Two of the more important grooming techniques relate to the collection of clippings and to the sweeping or bagging of blades, stems and leaves -- plant parts torn up or severed during games. Collection and removal of excess clippings serves a sanitary purpose as well as an aesthetic one. Routine collection of all clippings will add greatly to the appearance of the field. Collection and removal of plant parts improves appearance and permits easier assessment of game damage. And, eliminates or helps to solve a major, often perceived, serious problem.

Vertical mowing to control grain and to reduce thatch may be required. Grass may be cut lightly in this manner at any time; however, if deep cutting (renovating) is to be practiced, then the grass should be growing actively.

For best results, one mower (preferably a reel type) should be set aside and used exclusively on the field. Always keep mowing equipment sharp, properly adjusted, oiled and greased. Rely on service facilities available from the manufacturer to see that equipment performs satisfactorily.

Programs for Disease, Insect and Weed Control

Disease. For the most part, control of disease on athletic fields and playing grounds is not as critical as that on, for example, a putting green. Leafspot is serious during spring months and may cause loss of grass. Root diseases like Take All and spring dead spot sometimes attack grass roots. Isolation and identification may be the major problem to be solved in this situation. Chemicals are available if their use is deemed advisable. Check with your turfgrass extension specialist or distributor and follow manufacturer's recommendations for use of the selected chemical.

Insects. Insects that attack grass may be classified in two groups: (1) surface feeders - those insects such as sod webworms, cutworms and army worms that eat the leaves; and (2) sub-surface feeders such as grubs and bill bugs that eat the roots of grass. For root feeders water control materials in thoroughly to bring the insecticide in contact with the insect.

Chemicals are available for control of both groups of insects. For surface feeders, spray insecticide in the afternoon, leave material on over night, then water in thoroughly.

When spraying insecticides on shrubs and flowers that may be in the vicinity do not use a sprayer in which 2,4-D or similar materials have been used. These materials are difficult to clean out of a sprayer and may damage shrubs and flowers.

Weeds. Chemicals are available for control of most weeds. There are both pre and post emergence types and when used correctly, broadleaf weeds and crabgrass will be selectively removed from permanent grasses without damage to the desirable grass. Chemicals should be considered only as tools or aids in a permanent weed control program. Weeds invade turfgrass areas only when the grass is weakened for some reason. The first step in a successful weed control program is to correct the basic cause or reason for the presence of weeds, then use chemicals to eliminate them. Grass may be weakened because of inadequate fertility, poor mowing, poor drainage or damage from disease or insects.

Early spring when weeds are young and growing actively is the preferred time to treat. This is particularly true of knotweed and chickweed. Chemicals for both pre and post emergence control of crabgrass and other weeds are available.

New chemicals are being developed constantly for control of disease, insects and weeds. Keep in touch with your university personnel and with the local turfgrass supply house for new materials and always follow the pesticide manufacturers recommendations for their use.

SUMMARY OF RECOMMENDATIONS FOR ONE SEASON

1. Cultivate the field twice lengthwise and once crosswise when grass is growing actively. Severely compacted fields will need cultivation on a frequent basis.

2. Break up soil plugs, fill, level and grade with topdressing mixture. May be required during playing season. Should always be at end of playing season
3. Apply fertilizer and lime in accordance with recommendations based on properly interpreted soil tests. Use nitrogen to control the rate and level of growth.
4. Seed or sod thin, unthrifty and bare areas. Use pregerminated seed during the playing season and when rapid establishment is necessary.
5. After seeding, top lightly with topdressing mixture. This is to cover seed and should be done unless the field has been aerated or scarified prior to seeding. Seed contact with soil is necessary for establishment. Topdressing newly lain sod is beneficial and helps to avoid desiccation along edges.
6. Roll lightly to press seed in contact with soil and sprinkle lightly.
7. Water as per discussion. Automatic systems permit more accurate application and conserve water.
8. Mow as per discussion.
9. Apply additional nitrogen as per discussion. Use soluble nitrogen in small amounts to "pick up" color prior to major games or events.
10. Develop programs for disease, insect and weed control when needed.