LT 4

# SODDING STRATEGIES FOR P.A.T. AND OTHER SAND BASED ATHLETIC FIELD SYSTEMS

*T.M. Krick, J.N. Rogers, III, J.C. Stier, and J.R. Crum*
*Department of Crop and Soil Sciences*

## Introduction

Sand based athletic field systems, including Prescription Athletic Turf (P.A.T.), are becoming popular due to their resistance to compaction and rapid water infiltration rates. Unfortunately turf establishment methods on sand based systems are not well understood. Previous research showed that sodding with Kentucky bluegrass compared to seeding with perennial ryegrass produced a better quality turf one year following establishment (Krick, 1995). The objective of the current study was to compare six types of sod for establishment on the sand based rootzone of a P.A.T. system. A secondary objective was to determine the effect of a plant growth regulator (PGR), trinexepac-ethyl (Primo), to aid in establishing the turf and increasing its wear tolerance.

## Materials and Methods

The experimental design was a two-factor strip-plot randomized complete block with three replications. The main plot factor was sod type with PGR applied as a strip-plot treatment. Plot size was 10 X 20 ft. In 1995, a third factor, core cultivation, was applied as a strip-plot treatment on the other two factors but will not be further discussed in this paper. The six sod types were established on the plot area in mid-summer 1994: 1) Washed Kentucky bluegrass (KBG), 2) KBG on mineral soil, 3) KBG on compost overlaid on plastic (C-P), 4) perennial ryegrass (PRG) on C-P, 5) KBG/PRG mix on C-P, and 6) *Poa supina* on C-P.

On August 9, 1994, Primo was applied at the labeled rate of 0.75 oz/1000 $ft^2$ to all the plots as a two-strip plot treatment (Table 1). From late August to November, 1994, 24 football games were simulated on all plots using a Brinkman Traffic Simulator (BTS). Two passes with the BTS simulated the amount of traffic in the center of a football field during one football game.

Data collected included turf quality, color, and density. Quality, color, and density ratings were recorded throughout the autumn of 1994. Traction values were measured periodically using an Eijkelkamp type 1B shear apparatus.

## Results

The Kentucky bluegrass/perennial ryegrass (KBG/PRG) mix provided the best quality, color, and density of all sod types (Table 1). Although washed sod is often touted as being better able to establish in a sandy soil compared to unwashed sod, washed KBG sod provided the lowest quality turf. This was probably due to the lack of time to recuperate from damage caused to the turf by the washing system. While washed sod has been shown to root superior to unwashed sod (Davis and Pratt, 1982), the thinness of the washed sod was in this study detrimental to maintaining a quality turf under a traffic situation.

*Poa supina* consistently had the lowest color rating. This is typical of the species, however, which has a light green color. Otherwise, *P. supina* performed well, with quality and density statistically similar to the KBG/PRG mix.

The PGR application improved the quality, color, and density of all the sod types (Table 2). The PGR had the greatest effect on the KBG on compost and *P. supina*, and had the least effect on the perennial ryegrass (PRG) (Table 2).

The PGR had no significant effect on shearing values. Sod type, however, did have a significant effect on shearing values (Table 2). The KBG/PRG mix had the highest shearing values, indicating a strong sod due to the presence of rhizomes and good rooting into the sand. The KBG blend grown in compost and the washed KBG also had high shear values due to their ability to root into the sand. The PRG grown in compost and the KBG on mineral soil had the lowest shearing values. The PRG lacked rhizomes to strengthen the turf, while deep rooting of the KBG grown on mineral soil may have been inhibited due to soil layering.

## Discussion and Conclusions

Washed KBG sod had the lowest quality and density ratings, although high shearing values indicated good rooting. KBG grown on mineral soil, and PRG on compost, had relatively good quality, color, and density ratings but low shearing values indicated poor rooting and sod strength, respectively. The KBG/PRG mix grown in compost overlaid on plastic provided the best overall turf. This mixture benefits from the rhizomes of KBG and the inherent traffic tolerance of PRG. The method of growing the sod in a highly porous media such as a woody mulch compost allows for rapid water infiltration and prevents soil layering when sodding a sandy soil. Sod can be grown on sand to avoid a soil-layering problem, but harvest, transport, and laying of the sod can be more difficult than sod grown on a woody mulch compost. Since the roots are not cut from the turf, sod grown in compost over a plastic barrier does not suffer from harvest shock and can root faster than conventional sod.

*Poa supina* is a new cool-season turfgrass species from Germany. As *P. supina* does not currently have a common name, we are proposing the name of **Spartan bluegrass**. Its light green color and high seed cost currently limit its acceptance into the U.S. market. However, the stoloniferous growth habit and adaptation to cold temperatures (the parent material was collected from the German Alps) makes the species ideal for sports fields in cool season areas. The Spartan bluegrass was still growing, and required mowing, in December 1994, long after the other grasses had ceased growth. The ability to grow in cold temperatures makes the species ideal for use in sports fields subjected to late autumn and early winter traffic. Relatively little is known about management of the species, however. The current and subsequent studies will allow us to define the management, limitations, and uses of the grass.

Table 1. The effect of sod treatment and plant growth regulator on turfgrass quality, color, and density after 24 simulated football games[1].

| | Data from November 9, 1994 | | | |
|---|---|---|---|---|
| Sod treatment | Quality | Color | Density | Shear value (Nm) |
| KBG/PRG on compost-plastic | 7.3 | 6.9 | 88 | 30.9 |
| PRG on compost-plastic | 6.5 | 6.0 | 76 | 21.3 |
| KBG on compost-plastic | 6.5 | 5.6 | 85 | 29.0 |
| Washed KBG | 5.3 | 5.7 | 69 | 25.3 |
| KBG on mineral soil | 6.4 | 6.3 | 75 | 21.6 |
| *Poa supina* on compost-plastic | 6.3 | 5.5 | 78 | 23.1 |
| LSD at 0.05 level | 1.0 | NS | 12 | 1.9 |
| PGR treatment[2] | | | | |
| Trinexepac-ethyl | 6.9 | 6.5 | 81 | 25.0 |
| No trinexepac-ethyl | 5.8 | 5.5 | 76 | 26.0 |
| * = significant at 0.5 level; NS = not significant at 0.05 level | * | * | * | NS |

[1] Quality rating = 1-9 scale, 1= bare ground/brown turf, 9= ideal turf, and 5=acceptable turf.
Color rating = 1-9 scale, 1= brown turf, 9= dark green turf, and 5= acceptable color.
Density rating = percent (%) coverage.

[2] Trinexepac-ethyl (Primo) was applied at the rate of 0.75 oz/1000 ft$^2$ on August 9, 1994.

Table 2. The effect of sod treatment X PGR interaction on turfgrass color, density, and quality in 1994.

| Color | | Density | | | | Quality | |
|---|---|---|---|---|---|---|---|
| | | (Oct. 28) | | (Oct. 28) | | (Sept. 23) | |
| Sod treatment | | PGR | None | PGR | None | PGR | None |
| KBG/PRG on compost-plastic | | 7.2 | 6.2 | 7.4 | 6.6 | 91 | 87 |
| PRG on compost-plastic | | 6.8 | 6.3 | 7.3 | 7.0 | 90 | 86 |
| KBG on compost-plastic | | 7.3 | 5.2 | 7.0 | 5.2 | 94 | 89 |
| Washed KBG | | 5.8 | 5.2 | 5.6 | 5.5 | 82 | 79 |
| KBG on mineral soil | | 5.9 | 5.8 | 6.7 | 6.1 | 83 | 81 |
| *Poa supina* on compost-plastic | | 6.6 | 5.6 | 5.7 | 4.7 | 94 | 84 |
| LSD at 0.05 level | | 0.8 | | 0.5 | | 3.0 | |
| No. of simulated football games | | 22 | | 22 | | 16 | |