

ATHLETIC FIELD GRASS ESTABLISHMENT & WEAR TOLERANCE ENDORSED BY THE SAFE FOUNDATION

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Introduction

The Ohio State University Sports Turf Program is addressing a nationwide need for information on how to build and maintain safe athletic fields used by professional athletes, and adults and youth groups, many of whom are associated with K12 grade schools. Our job is to supply research data, so that informed decisions can be made on athletic field construction and care. The definitive goal is to produce athletic field that offer player safety and performance. The key to providing a “safe” athletic field is to have adequate grass cover. The grass cover provides (1) athlete foot traction, (2) surface friction, and (3) a surface that can absorb athlete shock forces. If grass cover is poor, foot traction and friction is lost, resulting in leg injuries and falls. The loss of grass cover (shock absorbency layer) also significantly increases surface hardness, which could result in serious injury. Unfortunately, most athletic fields have excessive amounts of games, resulting in loss of grass cover. The window of opportunity to establish new grass is very small, with sometimes only a few days between games. The good news is that plant-breeding research in the USA has produced new grass varieties that may be of benefit to athletic field managers. Grass seed suppliers are stating that many of these new grasses will establish quickly and be able to tolerate athletic field wear, which ultimately means safer fields. The purpose of the study is to evaluate the germination rate of these newer grasses and to assess their suitability for athletic sports.

Materials & Methods

The plots were set up as a randomized complete block design. Each rep had 16 treatments:

1. Labarinth RTF (rhizomatous tall fescue)
2. Grande II Tall fescue (TF)
3. HB129 Texas Bluegrass x Kentucky bluegrass hybrid
4. Orfeo Kentucky bluegrass (KBG)
5. Aberelf & SR 4420 perennial ryegrass (PRG)
6. Spring Green Festulolium
7. Barfest Festulolium
8. Showcase KBG & fine fescues
9. Nexus PRG
10. Rendition TF
11. Titan, Kittyhawk & Rendition TF
12. WAF TF
13. Grande II TF & Rugby II KGB
14. Rugby II KBG & Renaissance PRG
15. Barlennium PRG
16. Bariris KBG

The trial area was seeded May 21st, 2003, at the Ohio Turfgrass Foundation research & education facility in Columbus.

Evaluation of the different grasses includes:

- (1) Germination and establishment rate
- (2) Disease susceptibility
- (3) Wear tolerance

The soil type on the plots is silt clay loam, which is similar to most athletic fields in the Midwest. To make this research relevant to both moderate-maintenance fields and high-maintenance fields, the trial plots are maintained at two mowing heights: 76mm (3") for moderate maintenance and 38mm (1.5") for high maintenance. All plots are mowed with a walk-behind rotary mower. Establishment practices included seedbed preparation, a starter fertilizer application of 12-24-14 at 50kgN/ha⁻¹, broadcast seeding and light sand topdressing. Irrigation is applied as necessary to maintain healthy turfgrass growth. Seasonal maintenance practices include 4 complete fertilizer applications.

A standard Brouwer TR224 turf roller was used to create simulated wear on the plots. The roller was modified by the Agricultural Engineering Dept. at The Ohio State University to produce differential slip-type wear. The wear simulator was equipped with four hundred 12.70 mm NCAA regulation football cleats. The wear simulator is similar in mode of action to the Brinkman Traffic simulator developed by Cockerham and Brinkman (1989). Simulated traffic was applied on 0.3 m centers across the plots in September & October 2003 to emulate fall athletic activity. According to Cockerham and Brinkman (1989), two passes of the Brinkman Traffic Simulator produces the equivalent number of cleat dents created at the 40-yard line during one National Football League game. Thus, 50 passes would be equivalent to 25 games.

Results

Preliminary results show the following:

- PRG and Festulolium treatments germinated (3-5 days) & established quickly (Figure 1).
- All treatments had germinated within 8 days, but establishment rates were varied.
- Fast establishing treatments did not have prohibitive crabgrass pressure, compared to the slower establishing treatments.
- PRG was less disease tolerant, particularly dollar spot, rust, & brown patch diseases.
- Festulolium was not wear tolerant, nor tolerant of low mowing heights (<3") but did persist for the duration of the study
- All treatments (other than Festulolium) had higher quality rating (color/density) at the lower mowing height (Table 1)
- Mowing height did not markedly affect wear tolerance (Table 2)
- PRG displayed the best color for the duration of the study.
- Some of the improved TF treatments had similar quality to PRG, particularly Grande II, which exhibited a finer texture & darker green color.

- TF at lower mowing heights had a finer textured leaf & denser sward than the higher mowing height.
- Some treatments displayed excellent wear tolerance, e.g Bariris KBG
- It is possible to produce a quality wear tolerant athletic field grass in 15 weeks

Table 1: Turfgrass Quality Rating* at 106 days – 15 weeks after seeding**		
Treatment Name	Quality 1.5” Mowing Height	Quality 3” Mowing Height
Labyrinth RTF™	7.1	6.6
Grande TF	8.6	7.8
HB129 TBG x KBG Hybrid	7.6	7.6
Orfeo KBG	7.1	7.1
Aberelf + SR4420 PRG	9.0	8.6
Spring Green Festulolium	5.0	6.6
Barfest Festulolium	5.0	6.8
Showcase KBG + fine fescues	7.1	6.8
Nexus PRG	8.6	8.3
Rendition TF	8.3	8.0
Titan, Kittyhawk + Rendition TF	8.3	8.0
Winter Active Fescue (WAF)	9.0	8.1
Grande II TF + Rugby II KBG	9.0	8.3
Rugby II KBG + Renaissance PRG	8.8	8.3
Barlennium PRG	9.0	8.5
Bariris KBG	7.6	7.3
LSD (0.05)	0.5	0.6

*Rating taken prior to traffic simulation 9-4-03. Turfgrass quality ratings are 1 through 9, with 1 representing poorest and 9 representing best. Ratings below 6 are considered unacceptable for turfgrass.

** Plots seeded 5-21-03

Table 2: Wear Tolerance Rating* after 50 passes (25 events)		
Treatment Name	Wear Tol. 1.5” Mowing Height	Wear Tol. 3” Mowing Height
Labyrinth RTF™	3.0	2.6
Grande TF	5.8	5.6
HB129 Texas BG x KBG hybrid	6.1	6.0
Orfeo KBG	4.6	5.3
Aberelf + SR4420 PRG	6.3	6.0
Spring Green Festulolium	3.6	3.3
Barfest Festulolium	3.0	3.3
Showcase KBG + fine fescues	4.3	4.3
Nexus PRG	5.8	5.3
Rendition TF	5.6	6.0
Titan, Kittyhawk + Rendition TF	4.3	5.3
Winter Active Fescue (WAF)	5.0	5.0
Grande II TF + Rugby II KBG	6.0	6.3
Rugby II KBG + Renaissance PRG	6.1	6.1
Barlennium PRG	6.5	5.6
Bariris KBG	7.6	7.8
LSD (0.05)	1.6	1.6

*Rating taken November 2003. Turfgrass quality ratings are 1 through 9, with 1 representing poorest and 9 representing best.

This study will repeat in 2004, and will include turf shear strength (Nm).