EFFECTS OF TRINEXAPAC-ETHYL AND WETTING AGENT ON ESTABLISHMENT RATE OF *POA PRATENSIS* ON SAND-BASED ROOT ZONES

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Introduction

The challenge for the sports turf manager is to sustain a dense turf stand throughout the competitive season. However, often times, regardless of proper management practices, areas of the field or entire fields can be worn very thin or even bare due to their intense use. Consequently, when the turf wear resistance reaches its breaking point, the perennial focus of athletic field management is the establishment of a new turf stand, often as quickly as possible. This study is designed to evaluate various Trinexapac-ethyl rates applied at different times during the establishment process to determine effects on the establishment rate of *Poa pratensis*. Plant growth regulators have been researched for a number of uses. Plant growth regulator use on mature sod has been investigated for a variety of reasons, including installation and management (Hall and Bingham, 1993). Trinexapac-ethyl has also been investigated for its potential in aiding in establishment of mature sod (Wynne et. al., 1998, Bingaman and Christians, 1998). Trinexapac-ethyl applied to established turf has been shown to enhance the lateral growth (Watschke and Dipaola, 1995). The objectives of these studies are to evaluate the effects and interactions of both Trinexapac-ethyl and wetting agent applied during the establishment process. If density can be increased early during the establishment process, then wear tolerance could be increased (or the establishment process shortened) from this perennial activity.

Today's top athletic fields have an additional characteristic other than intense use that can make the establishment of turf difficult: high sand content root zones. High sand content root zone mixes are desirable because they drain very well and resist compaction, but these mixes can present some problems, particularly during establishment. Sand particles tend to have high surface tension causing them to be hydrophobic, making moisture retention for seed germination difficult. One way to reduce the surface tension of the sand particles and increase the moisture retention of the sand is through the application of a wetting agent, Primer™ 604. This increased moisture retention could enhance the germination process.

Materials and Methods

This two year study was initiated in May 1998 on a sand based root zone research area at the Hancock Turf Research Center located on the Michigan State University campus, East Lansing, MI. The experiment is a 5 x 2 factorial in a randomized complete block, split plot design with three replications. The main plot sizes are 3.04m (10 ft.) by 3.65m (12 ft.). *Poa pratensis*, 'Touchdown', was seeded over the entire area at 97.5 kg/ha (2.0 lbs./1000 ft^2) on 20 May 1998. The main plots are in a 5 x 2 factorial design. There are five PGR treatments: 1) 955 ml/ha (0.3 oz./1000 ft^2) Trinexapac-ethyl applied 7 days after seedling emergence, 2) 1910 ml/ha (0.6 oz./1000 ft^2)Trinexapac-ethyl applied 7 days after seedling emergence, 3) 955 ml/ha (0.3 oz./1000 ft^2) Trinexapac-ethyl applied after the first mowing, 4) 1910 ml/ha (0.6 oz./1000 ft^2) Trinexapac-ethyl applied after the first mowing, and 5) control. In 1998, treatments 1 and 2 were applied 28 days after seeding and treatments 3 and 4 were applied 52 days after seeding. The second factor is a wetting agent. Half the plots in each replication received 19082.5 ml/ha (6.0 oz./1000 ft^2), applied every 10-14 days, throughout the growing season. The other half of the plots received no wetting agent. Following establishment, the whole plots received a supplemental PGR application applied at 30 and 60 days after the initial Trinexapac-ethyl application. For treatments 1 and 2 these dates were 20 July and 21 August. For treatments 3 and 4 these dates were 12 August and 11 September. The plots received 97.5 kg P/ha (2 lbs. P/1000ft^2) using 13-25-12 at seeding and 48.75 kg P/ha (1 lb. P/1000ft^2) on 3 June. Starting 3 July, the plots received 24.37 kg N/ha (0.5 lb. N /1000$ft.^2$) every week throughout the growing season using 26-0-26. The plots were mowed three times per week at 3.175 cm (1.25 in.). The seedlings began to emerge on 4 June. Plots were evaluated weekly or as needed from April through November using color and density ratings. Once the turf was established, verdure weights were taken from each plot on 4 September and 20 November to quantify any differences in density. A cup cutter was used to take three cores from each plot. The cores were then trimmed by hand, removing all the green tissue present. The verdure was then dried and weighed. Traffic applications began 11 September using the Brinkman Traffic Simulator.

The objective was to simulate the traffic that 2-3 NFL football games would create between the hash marks per week. The traffic was applied through mid-November. On 22 October a device was used to quantify the sod strength of the untrafficked turf. The device measures the peak force it takes to completely tear a piece of sod. A second sod pull was done 25 November.

This study will be repeated in 1999. The sod will be stripped and the plots will be re-established. This past August the study was a stop at the Michigan Turfgrass Foundation Field Day and it is our intention to have this experiment as a stop at the Turfgrass Producers International Field Day in July 1999 at the Hancock Turfgrass Research Center.

First Year Results

Samples of results are presented in Figures 1 and 2. While there was some increase in density in 1998 due to the use of Trinexapac-ethyl and wetting agent separately (Figure 1), it became apparent that the combination of these two products was detrimental to turf establishment. This is further exhibited from the sod strength measurements (Figure 2). Although these measurements were recorded in late November the positive effects of Trinexapac-ethyl and the negative effects of the wetting agent used with the plant growth regulator were still apparent. The high rate of plant growth regulator applied 7 days after seeding emergence had significantly higher sod strength than the control (Figure 2). These results need to be repeated and confirmed with the 1999 study. This study will be repeated in spring 1999. The 1998 study will be removed and the plots re-established. Modifications for 1999 year will include the elimination of late August/early September Trinexapac-ethyl applications. These applications caused extreme leaf discoloration (purple) and Rust (*Puccinia spp.*), and were probably unnecessary for growth and development of the turfgrass stand.

Literature Cited

Bingaman, B.R. and N.E. Christians, 1998. Effects of Trinexapac-ethyl on Kentucky bluegrass sod establishment. Agronomy Abstracts, p.126.

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Watschke, T.L. and J.M. Dipaola, 1995. Plant Growth Regulators. Golf Course Mgt. 63(3):59-62.

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Figure 1. Effects of Wetting Agent (WA) and Plant Growth Regulators (PGR) on Density of Kentucky Bluegrass (21 July 1998)
LSD(0.1)=25

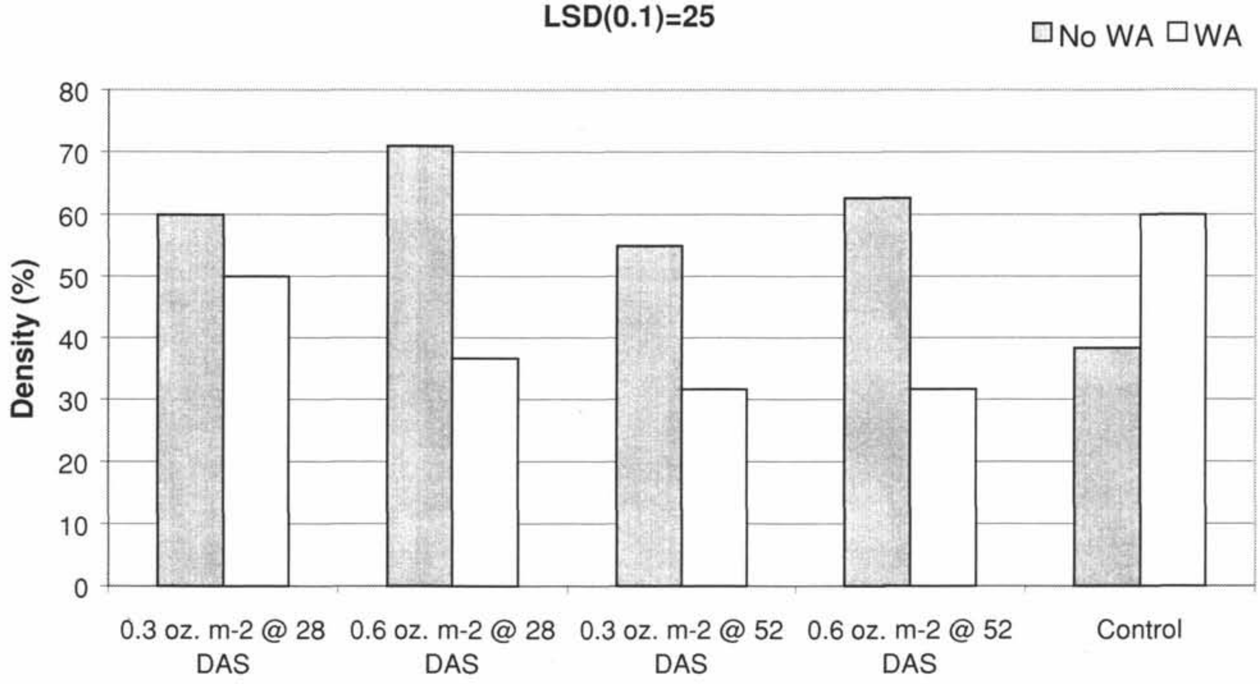

Figure 2. Effects of Wetting Agent and Plant Growth Regulator on Sod Strength of Kentucky Bluegrass