

## PROGRAM UPDATE

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### EFFECT OF MULCH TYPE FOR TURF ESTABLISHMENT

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#### Introduction

Mulches have a demonstrated ability to provide favorable growing conditions for turfgrass establishment. The use of mulch benefits turfgrass establishment by maintaining consistent moisture levels. Moisture is important for seed germination, especially during imbibition. Mulches also reduce the potential of seeds lost to either runoff or wind erosion. One disadvantage to mulching is the method of application, as it often requires large machinery or bulky materials (straw and hydro mulch). The objective of this study was to determine the effect of different mulches on turfgrass establishment. The mulches studied were: Germinator, straw, fine grade compost, crumb rubber, hydro mulch, PennMulch, and a clay loam native soil. Germinator is a new product that acts as a polymer and sticking agent intended to maintain moisture levels and prevent erosion. Straw is a traditional mulch that allows good air movement and is relatively low cost but has the potential to introduce weed seed through its use. A fine grade compost as a mulch provides additional nutrients in organic forms and holds moisture. Crumb rubber (0.25 inches) is a mulch that demonstrates the ability to provide higher temperatures for longer periods of time as a result of its black color. Easily applied, crumb rubber also provides protection for the crown of the turfgrass plant, important after establishment in traffic situations. Hydro mulch is shredded paper that is pre-mixed with water, and is very effective at maintaining soil moistures. PennMulch is a new product in the form of compressed pellets of shredded paper, and can be applied by using a drop spreader. After applying the PennMulch, water applications break up the pellets and provide a swollen uniform cover. A clay loam native soil contains nutrients and has good water holding capacity, as well as a plot with no mulch (control) was used for comparison. Ecomat is a recycled wood fiber mat and was used as the growth medium on plastic sheeting for the turfgrass establishment. Sod production on plastic is a relatively new practice and demonstrates many advantages versus traditional sod production. Root shearing during sod harvesting is eliminated when grown on plastic which allows the sod to establish faster when laid. The sod is light weight due to the absence of soil allowing for cheaper shipping costs and larger sod pieces. The sod pieces are held together by the binding of the roots, thus enabling the production of turfgrasses with bunch type growth habits. A comparison of mulch types allowed for a direct determination of their effectiveness during establishment of grasses with different growth habits.

#### Materials and Methods

The experimental design was a 2 by 8 factorial randomized complete block design with three replications. Each of the 48 plots were 4 foot by 3 foot, and the studies were done at the Hancock Turfgrass Research Center on the Michigan State University campus. *Poa supina* (supina bluegrass) and *Lolium perenne* (perennial ryegrass) were the two types of turfgrasses studied, and were seeded at 1.5 lbs. / 1000 ft.<sup>2</sup> and 6 lbs. / 1000 ft.<sup>2</sup> respectively. The mulches included: Germinator, straw, crumb rubber, hydro mulch, PennMulch, clay loam native soil, fine grade compost, and a control (no mulch). Each mulch was applied at rates which equaled coverage at 0.25 inches. The study began 3 July 1995 and was repeated on 29 Sept. 1995 to represent both an adverse and ideal seeding time for turfgrass establishment of cool season grasses. The summer study concluded on 3 Sept. 1995 after receiving a total of 3.21 lbs. N / 1000 ft.<sup>2</sup>, 4.99 lbs. P<sub>2</sub>O<sub>5</sub> / 1000 ft.<sup>2</sup> and 2.80 lbs K<sub>2</sub>O / 1000 ft.<sup>2</sup>. Lebanon Country Club 13-25-12 'Starter Fertilizer', was used for the first two applications at 1 lb. N / 1000 ft.<sup>2</sup>. The third application was with Scotts 19-26-12 'Starter Fertilizer' at 0.68 lbs. N / 1000 ft.<sup>2</sup>, and the final application was with Scotts 21-3-21 basic fertilizer at 0.45 lbs. N / 1000 ft.<sup>2</sup>. The autumn study concluded on 9 Nov. 1995 after receiving a total of 3.00 lbs N / 1000 ft.<sup>2</sup>, 4.11 lbs. P<sub>2</sub>O<sub>5</sub> / 1000 ft.<sup>2</sup>, and 1.89 lbs. K<sub>2</sub>O / 1000 ft.<sup>2</sup>. The autumn study only received Scotts 19-26-12 'Starter Fertilizer' at 1 lb. N / 1000 ft.<sup>2</sup>. The fertilizers used provided enough macro and micro nutrients essential for turfgrass growth and establishment. The high fertility schedule was a result of the absence of a soil medium to hold the nutrients for the developing turfgrass plants. Percent cover was recorded to determine turfgrass density (0-100%). Surface temperatures were recorded throughout the studies. Irrigation was applied as needed. The data collected was analyzed for statistical differences using the MSTAT program.

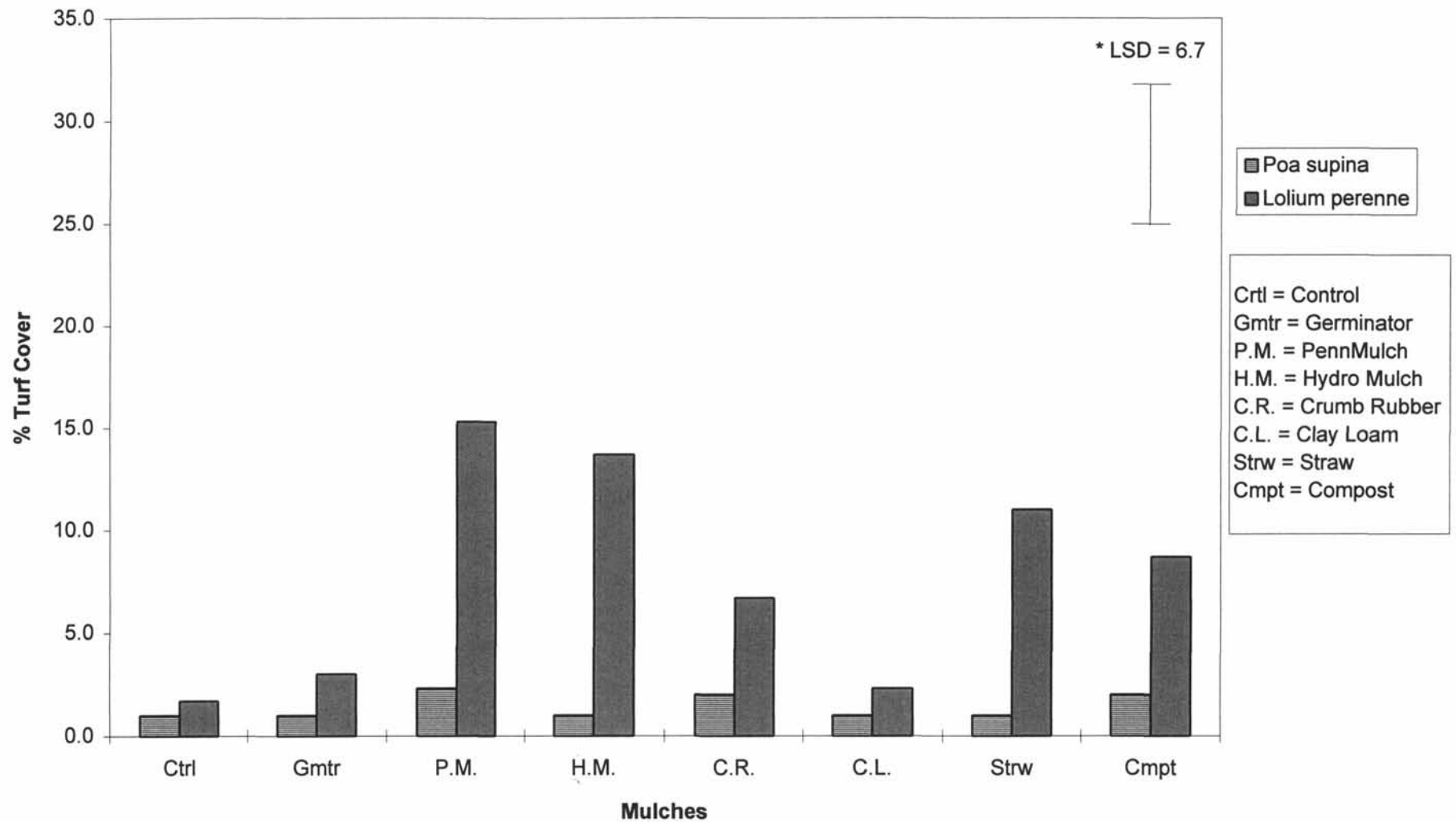
## Results and Discussion

Data from the two studies showed significant differences between the two turfgrass species studied and the eight mulch treatments. In both the summer and fall studies the *Lolium perenne* showed significantly greater growth than the *Poa supina* due to its faster germination potential. In the summer study, all mulches had significantly better *Lolium perenne* turf coverage compared to the control except for the crumb rubber, clay loam, and Germinator (Fig. 1). The use of crumb rubber and Germinator as mulches in the summer exhibited poor water holding capacity, which may have affected germination. PennMulch provided the highest turf coverage for *Lolium perenne* followed by hydro mulch, straw, compost, crumb rubber, Germinator and clay loam. *Poa supina* germination was very low over all the plots thus, an interaction occurred between turf species and mulches (Fig. 1). *Lolium perenne* germination and subsequent growth varied according to the mulch type while, the type of mulch had little or no effect on *Poa supina* (all mulches less than 10% by 17 July 1995).

Observations of the autumn study showed greater turf density versus the summer study, due to the more favorable environmental growing conditions. The best mulches for the autumn study (in order) were: crumb rubber, PennMulch, straw, and hydro mulch (Fig. 2). Crumb rubber as an autumn mulch demonstrated its effectiveness during these ideal growing conditions, as the cooler temperatures helped maintained moisture levels. *Lolium perenne* germination was higher than *Poa supina* in all cases except for the compost mulch which yielded similar germination rates and thus the cause of the interaction between the two species.

It appears that PennMulch is a comparable mulch to those currently on the market (straw and hydro mulch). Easily applied with a rotary spreader, PennMulch demonstrated its effectiveness under both adverse and ideal growing conditions. Crumb rubber as a mulch has potential in the fall particularly in athletic situations where the rubber would provide some protection to the seedlings. Germinator, clay loam native soil and compost compared to the control showed no advantages to improving germination. This study will be repeated in the spring of 1996.

**Figure 1. Percent turf cover during summer establishment as affected by different mulches, 17 July 1995 (14 days after seeding)**



**Figure 2. Percent turf cover during autumn establishment as affected by different mulches, 13 Oct. 1995 (14 days after seeding)**

