THE EFFECTS OF TURVES WITHIN A REFINED WOOD FIBER MAT (ECOMAT®) OVER PLASTIC

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ABSTRACT

THE EFFECTS OF TURVES WITHIN A REFINED WOOD FIBER MAT (ECOMAT®) OVER PLASTIC

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Establishing sod within a refined wood fiber mat (Ecomat®) over plastic was investigated at the Hancock Turfgrass Research Center, East Lansing, MI. in 1995 and 1996. Three major areas of investigation included mulching, growth media comparison, and seeding and fertilizer applications. In addition, the establishment of four different turfgrass species was investigated. These turf species included Kentucky bluegrass (*Poa pratensis* L.), Supina bluegrass (*P. supina* Schreb.), perennial ryegrass (*Lolium perenne* L.), and tall fescue (*Festuca arundinacea* Schreb.). The objectives of the research was:

1) To determine the effect of different mulch types for aiding turfgrass establishment within Ecomat®.
2) To compare different growth media for sod production on plastic, as well as their effectiveness as an established turf for athletic field use.
3) To determine optimum seeding and fertilizer rates for turfgrass establishment within Ecomat® over plastic.

In the first experiment, mulching with straw, PennMulch™, and hydromulch, respectively increased turf cover (significantly) versus the other four mulches (fine grade compost, crumb rubber, native soil, and Germinator®) and the control (no mulch). In

addition, perennial ryegrass established a greater turf cover than Supina bluegrass. In the second experiment, SportGrass™ had significantly greater turfgrass cover then the Ecomat®, pine wood mulch and sand growth media. In the third experiment, increasing the seeding rate for four-turf species studied significantly increased turf cover. The use of an organic source of nitrogen (Milorganite®) established denser Kentucky bluegrass turf than ammonium nitrate. Additionally, as the rate of nitrogen increased (g N m^{-2}) so did turf density. In conclusion, establishing sod within Ecomat® over plastic is plausible. However, the high maintenance demanded deems large-scale sod production utilizing the Ecomat® potentially cost ineffective. This is apparent as a result of the watering problems encountered in Chapters 2 and 3.

DEDICATED

To my mom and dad

Shirley Jones and Sam Sorochan

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INTRODUCTION

High quality turfgrass stands on athletic fields and golf courses are in greater demand than ever before. Not only does the quality of the turf have to be acceptable, but also there is a growing demand to provide a turf stand for immediate playability. High quality turf that immediately readies for athletic play encompasses a dense wear resistant turf that provides a uniform and stable playing surface.

The rate of establishment is important for determining a satisfactory turf field. Conventional sodding provides instant turfgrass cover, but the newly sodded area will only be ready for play once the sheared roots have regenerated, which may take as long as 2 months.

Literature describing sodding practices date as far back as 1159, to the first Japanese book on gardening entitled, "Aatu-tei-kai" (Beard, 1992). Modern sod production began with the use of mechanical operations, where turfgrass cutting machines allowed easier and more accurate sod harvesting than manual harvesting (Beard, 1992). Conventional sod harvesting limits the stability of the turfgrass stand until the sheared roots have been regenerated. The lack of a dense or deep root structure decreases nutrient and water uptake for the turfgrass plants, leading to a lower quality turfgrass stand (Decker, 1991b). This may be particularly evident if sod is harvested during sub-optimal growing conditions such as hot and dry summers. In addition, soil layering can be a problem when using conventional sod. Root growth is severely limited with sod grown on a soil of finer texture than the root zone mix it is intended to cover, and the sod layering (finer textured soil over coarser textured soil) could be a problem in

the future as macro pore space decreases. Although instant cover is provided, the turf is not immediately playable.

The shortcoming of conventional sodding practices can be avoided when turf is grown on non-soil media, over an impervious surface such as plastic. Some advantages of growing sod on plastic include the elimination of soil layering by selecting a specific growth medium, the elimination of root shearing during harvest, and producing a sod more rapidly in time for harvesting. This enables the sod to establish more quickly on the intended site (Decker, 1991b and Decker, 1975). The presence of the intact root system enables the newly laid sod to be fully established in a period much shorter than conventional sodding methods (Cairol and Chevallier, 1981). The sod produced is lightweight due to the absence of soil, allowing for cheaper shipping costs and larger sod pieces (Decker, 1991a). Sod pieces are held together by the binding of the roots and the growth media selected, making the sod very strong and easy to handle. This strength enables the production of turfgrasses with a bunch type growth habit. Typically, turfgrasses with a bunch type growth habit germinate and establish more rapidly than turves with a rhizomatous or stoloniferous growth habit allowing for an even more rapid sod to be produced. Traditional sod consists of turfgrasses with rhizomatous or stoloniferous growth habits only.

An immediately playable turf stand provided by sod grown on plastic is very beneficial to turf managers. For instance, a soccer field manager could replace the worn turf in a soccer goal area between games (Cairol and Chevallier, 1981), perhaps as frequently as once per week.

Commercially, sod grown on plastic uses either wood mulch, compost or sand as the growth medium. A refined wood fiber mat (Ecomat®) is an erosion control mat produced by Canadian Forest Products Ltd. in New Westminster, British Columbia and has the potential to be an effective growth medium. It will be placed over top of the plastic. Previous research has shown the use of an organic fiber medium can produce a sod when grown over plastic (Hensler *et al.*, 1996). Selecting a refined wood fiber mat as the growth media adds many benefits to establishing sod on plastic. For instance, the refined wood fiber mat (Ecomat®), which is made from a blend of residual wood fibers, provides an adequate seedbed without the use of soil. An adequate seedbed consists of a smooth and uniform surface for seeding. In addition, the mat layer has the ability to provide flexible support for the turfgrass during and after establishment. Used as an erosion control mat, the refined wood fiber is available in large rolls (1.2 m by 41 m). This makes it possible to establish large pieces of sod that are more light weight then conventional pieces of sod of the same size.

While there are many advantages to using sod produced on plastic over conventional sod, further research is warranted, particularly with the use of the refined wood fiber mat as a growth medium. Unlike conventional sod production, producing sod on plastic using a non-soil growth medium, like the refined wood fiber mat, presents many problems. For instance, water holding capacity is low, seeding and fertilizer recommendations have not been determined, and the actual plausibility of using the wood fiber mat as a growth medium also needs to be determined. As a result three main objectives exist to test the use of the refined wood fiber mat as a growth medium for sod production on plastic. The three main objectives are:

1) To determine the effect of different mulch types for aiding turfgrass establishment using a refined wood fiber mat (Ecomat®).
2) To compare different growth media for sod production on plastic, as well as their effectiveness as an established turf for athletic field use.
3) To determine optimum seeding and fertilizer rates for turfgrass establishment on plastic using the refined wood fiber mat (Ecomat®).