



Abstract

Vehicles can leave tracks or ruts in turfgrass especially if the traffic is frequent or the soil is moist. However, mats, grids, meshes, or pavers which distribute the weight of a vehicle over a larger "footprint" may protect the turfgrass crown from injury and soil from compaction/rutting while providing for storm-water infiltration and less runoff than hardscapes. Seven turfgrass traffic injury abatement systems: Drivablegrass, Ecogrid, GrassPave2, Permaturf, SofPath, The Grid System, and Tenax were evaluated using 4' x 4' plots on a 2" base that was 75% sand, 20% Axis, and 5% organic matter which were seeded with Riviera bermudagrass and maintained at 0.5". Five additional treatments without a traffic injury abatement system include: 75% sand, 20% Axis, and 5% organic matter root zone with and without conventional hollow tine aeration twice per year, and 95% sand+5 % organic matter (no Axis) root zone, native soil+Axis root zone, and native soil root zone as a control. Traffic was inflicted 1 time/week by making 4 passes with a Caterpillar 216B skid steer loader. Visual turfgrass quality, injury, and visibility of the traffic injury abatement system estimates based on a 1-9 scale were taken weekly. Chlorophyll content was measured weekly with a FieldScout CM1000 from 10 locations in each plot inside and outside the rut before traffic. All treatments on the 2" sand base performed better than the native soil control.

Introduction

Turfgrass traffic injury abatement systems are mats, trays, grids, panels, meshes, pavers, or modules that are installed at the soil surface to protect the turfgrass growing point (crown) from vehicle traffic injury, to reduce soil compaction/rutting, and to increase surface-water infiltration which reduces storm water runoff.

Objectives

Evaluate Axis and seven turfgrass traffic injury abatement systems' ability to provide acceptable level of quality of bermudagrass under heavy, year round vehicular traffic.

Methods & Materials

Seven turfgrass traffic injury abatement systems: Drivablegrass, Ecogrid, GrassPave2, Permaturf, SofPath, The Grid System, and Tenax were evaluated using 4' x 4' plots on a 2" base that was 75% sand, 20% Axis, and 5% organic matter which were seeded with Riviera bermudagrass and maintained at 0.5". Five additional treatments without a traffic injury abatement system include: 75% sand, 20% Axis, and 5% organic matter root zone with and without conventional hollow tine aeration twice per year, and 95% sand+5 % organic matter (no Axis) root zone, native soil+Axis root zone, and native soil root zone as a control. Axis is a diatomaceous Earth product which is very porous and absorbs a large quantity of water like clay, but it is able to release the water to plants easily unlike clay. Axis is added to sand-based root zones to improve the water holding capacity. Traffic was inflicted 1 time/week by making 4 passes with a Caterpillar 216B skid steer loader. Visual turfgrass quality, injury, and visibility of the traffic injury abatement system estimates based on a 1-9 scale were taken weekly. Chlorophyll content was measured weekly with a FieldScout CM1000 from 10 locations in each plot inside and outside the rut.

Figure 1. Chlorophyll Indices as a Measure of Bermudagrass Quality, Year 1, Inside Rut, Tarleton State University, Stephenville, TX.

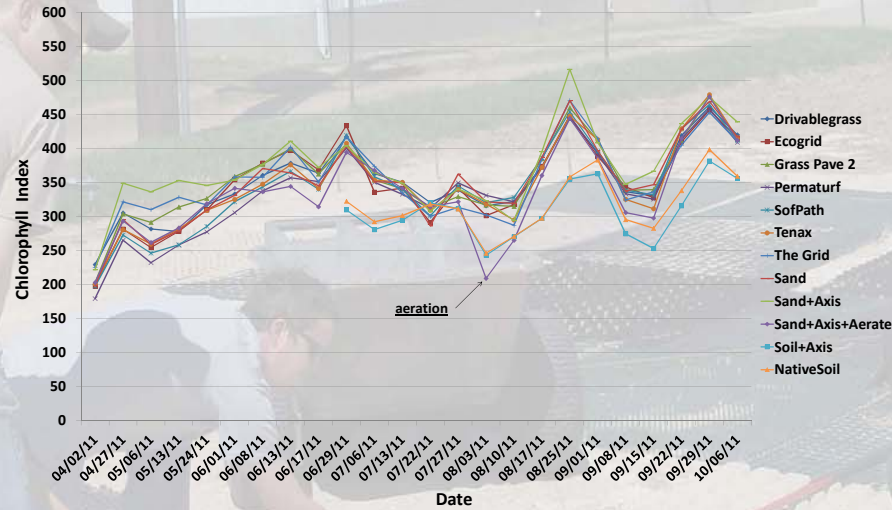


Figure 2. Chlorophyll Indices as a Measure of Bermudagrass Quality, Year 1, Outside Rut, Tarleton State University, Stephenville, TX.

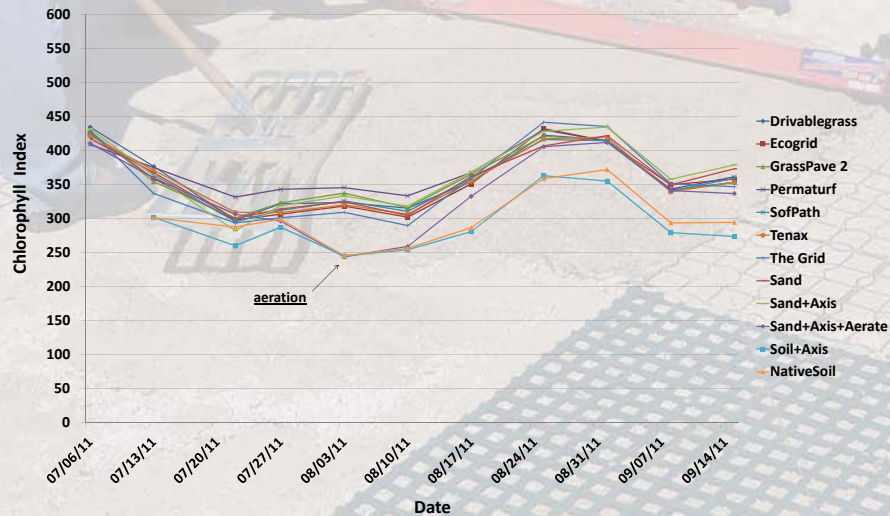
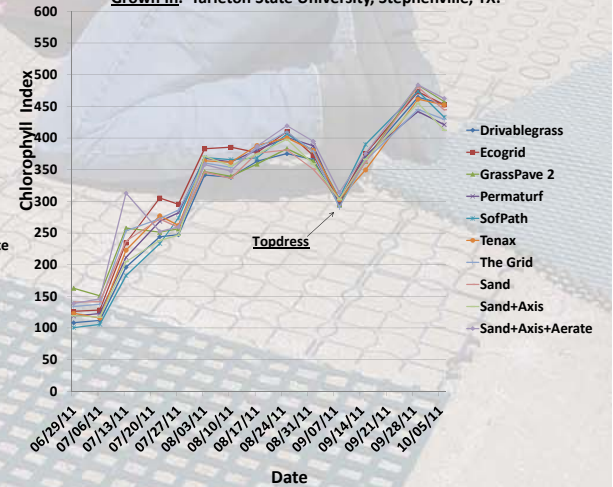


Figure 3. Chlorophyll Indices as a Measure of Bermudagrass Quality, Year 2, Grown In, Tarleton State University, Stephenville, TX.



Results & Conclusions

- Native soil and native soil+Axis reported lower chlorophyll indices than the other treatments for both inside and out the rut.
- Sand+Axis tended to report the greatest chlorophyll indices for both inside and out the rut.
- On many occasions, chlorophyll tended to be greater inside than outside the rut which was unexpected.
- Sand-based root zones are more difficult to compact than native soil root zones.
- Drivablegrass, SofPath, and The Grid System took longer to establish than the other treatments.
- Hollow tine aeration lowers chlorophyll indices temporarily but is necessary to reduce compaction.
- Aeration temporarily lowered the chlorophyll indices for both inside and out the rut.
- Chlorophyll indices may not be the best method to evaluate traffic injury abatement systems especially in winter in bermudagrass.

References

Beard, J.B. and Sifers, S.I. 1993. Stabilization and Enhancement of Sand-modified Root Zones for High Traffic Sport Turfs with Mesh Elements, A Randomly Oriented Interlocking Mesh Inclusion System. Texas Agricultural Experiment Station B-1710. 40 pp.

Day, G.E. 1980. Investigation of Concrete Grid Pavements. Environmental Protection Agency Report EPA-905/9-80-002, January, 127-136.

Day, G.E., D.R. Smith, J. Bowers. 1981. Runoff and Pollution Abatement Characteristics of Concrete Grid Pavements. National Technical Information Service, Springfield VA 22161. Bulletin 135. p. 59. October.

Ferguson, B.K. 2005. "Porous Pavements". CRC. 600 p.

Gentilucci, G. 1997. Putting Green Characteristics Associated with Surface Depressions Caused by Selected Forms of Traffic. Thesis under James Murphy, Rutgers University.

Shearman, R.C., E.J. Kinacher, and T.P. Riordan. 1980. Turfgrass-Paver Complex for Intensively Trafficked Areas. Agron. J. 72:372-374. March.

