RESEARCH SUMMARY

Turfgrass Wear Stress: Effects of Golf Cart and Tire Design

Two types of golf cart tire design were assessed in terms of wear stress on Tifway hybrid bermudagrass (*Cynodon dactylon* x *C. transvaalensis*) mowed at 0.5 inch (13 mm). The stress treatments involved 85 passes of a golf cart over 4 replicated plots utilizing a 22 foot (6.7 m) radius semicircle pattern. This operational procedure resulted in both vertical and lateral pressures from the tires on the turfgrass shoots, which is a more significant wear stress than straight-line operation. Turfgrass effects were observed for a subsequent two-week period, including visual turf quality, percent green coverage, leaf bruising, and verdure or green biomass per unit area.

Significantly less turfgrass wear resulted from the tubeless, 4-ply, 4.8 mm v-shaped tread tire (Power Rib—0F0220) with more rigid sidewalls operated at an air pressure of 18 psi (124 kPa). The 2-ply, radial, 1.0 mm deep dimpled tread tire (Bogie Buster—0F0510C) with flexible sidewalls operated at a low pressure of 7 psi (48 kPa) created consistently more turfgrass wear when operated on each of three different golf cart models. In contrast, the three different golf cart models tested did not produce significant wear stress differences under the condition of this study.

These data indicate that **tire design can significantly affect the degree of turfgrass wear stress, and should be considered in tire selection for golf carts.** Further research is required to define the tire design components that contribute to less turfgrass wear. For example, how much is attributed to the tread design versus the degree of sidewall rigidity? ***By R.N. Carrow and B.J. Johnson, HortScience* 31(6):968–971**

JB COMMENTS

Avoid Soil Organic Layers

Fully decomposed organic matter intermixed into a root zone is a vital soil component, especially in high-sand mixes. It contributes substantially to enhanced nutrient and water retention and to physical attributes that are important for a quality root zone. However, **a concentrated organic matter layer with minimal mineral content within the root zone can result in major problems.**

Typically an organic layer within a root zone is a man-made problem. It may occur during renovation of a turf, where the existing unwanted grass stand is killed off with a translocated grass herbicide, such as glyphosate or glufosinate, followed by the addition of a root zone soil layer and/or transplanted sod with attached soil layer. The result is an organic layer that becomes dense and relatively impermeable, with a subsequent **blockage of downward water movement and a water saturated zone that impairs root growth as well.** This problem commonly occurs on greens, but it also occurs on sports fields and other intensely used recreational turfs.

I have also observed organic layer problems where the sod has been killed off, left in place, and then a 10-inch (250 mm) high-sand root zone placed over the top. The resulting problems are similar to those previously described. Another problem situation observed is where a high-sand root zone is constructed over a clay base with a concentrated organic layer of seaweed placed between the two.

It is amazing how often I observe these organic layer problems where turf renovation has been attempted. **It is extraordinarily difficult to provide a root zone microenvironment that will encourage the decomposition of such an organic matter layer.** Very intensive coring over an extended period of time is generally required, and still the problem may linger. The best approach in turf renovation is to:

- Treat the unwanted live, green sod with a nonselective herbicide, such as glyphosate and glufosinate.
- Remove all sod with a mechanical sod cutter.
- Conduct root zone fumigation, as appropriate.
- Initiate reestablishment of the turf.

Ask Dr. Beard

Q The temperature fell to 10°F (–12°C) in Dallas, Texas. Have my putting greens of Tifdwarf bermudagrass been killed?

A **There is not a specific, meaningful soil temperature at which each turfgrass species or cultivar is killed that can be predicted reliably.** This is because the temperature at which low temperature kill occurs varies greatly depending on the hydration level of the tissue. In addition, a faster rate of freezing, a faster rate of thawing, and a greater number of times freezing and thawing occurs will result in a higher killing temperature. Note that the soil temperature adjacent to the meristematic area of the plant crowns and the nodes of lateral stems is the more critical temperature, and not the above air temperature. Obviously the lower the temperature decline that occurs, the greater the potential or probability for kill.

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