Using Composts to Re-establish Bermudagrass on Compacted Bermudagrass Turf

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Summary. Re-establishment of golf course turf is often necessary due to the stress of wear and compaction from intense traffic. The objective of the following study was to determine the effects of amending compacted golf course soils with various sand-compost-fertilizer combinations on the recovery of damaged turf areas. Three compost sources were compared to sand as amending agents on core-cultivated plots at two different golf courses where re-establishment of bermudagrass (*Cynodon dactylon*) was desired. Humalfa, poultry compost, and lawn compost all marginally increased turf recovery when compared to sand alone.

Soil compaction is a common problem on golf courses as a result of excessive wear, primarily from foot and golf cart traffic (Vavrek 2002). This often results in areas of thin turf and in extreme cases, exposed soil, which can be difficult to re-establish with turf. A typical management program for turf re-establishment might include practices such as core-cultivation, topdressing, reseeding, sprigging, or sodding. Some golf course superintendents have also experimented with using various forms of compost as topdressing material to aid in the re-establishment of damaged turf .

Studies on the use of compost as a soil amendment have shown that the increase in organic matter content from the addition of organic composts has several positive attributes. These include increased water holding capacity and higher nutrient retention, which might aid in the turf re-establishment process (McCarty 2001).

The objective of this study was to determine the impact of composts on turf recovery when applied with or without synthetic or organic fertilizer and either in combination with sand or alone when amending compacted soil.

Materials and methods

A study was initiated on 20 May 2002 on two Fayetteville, Ark. golf courses: Fayetteville Country Club and Stonebridge Meadows Golf Club. Experimental areas at each golf course were selected based on compacted soil conditions and had minimal turf coverage. The experimental area at Fayetteville Country Club was in play at the edge of a fairway. It was core-cultivated with 0.5 in. (1.3 cm) diameter hollow tines spaced 3 x 3 in. (7.5 x 7.5 cm) to a 4 in. (10 cm) depth. The experimental area at Stonebridge Meadows was out of play and was core cultivated with 0.5 in. (1.3 cm) diameter tines spaced 6 x 6 in. (15 x 15 cm) to a depth of 4 in. (10 cm). At both experimental areas, 27 plots measuring 2 x 2 ft (0.6 x 0.6 m) were created. In the center of each plot, a 2 in. (5 cm) diameter bermudagrass (*Cynodon dactylon*) plug was planted.

Nine soil amendment treatments consisting of lawn compost, poultry compost, Humalfa, sand, lawn compost + 1 lb N / 1000 ft^2 (48 kg N / ha) of synthetic fertilizer (Anderson's 18-6-15), lawn compost + 1 lb N / 1000 ft^2 (48 kg N / ha) of organic fertilizer (Honey Crest 4-2-2), sand + lawn compost (1:1 by volume), sand + poultry compost (1:1 by volume), and sand + Humalfa (1:1 by volume). Treatments were applied to each plot sufficient to fill the aeration holes and completely cover the plot with 0.25 in. (0.6 cm) of topdressing material. At both golf courses, treatments were arranged in a randomized complete block design with three replications.

Following treatment application, the area at Fayetteville Country Club received 0.25 in. (0.6 cm) irrigation every 2 days and a total of 2.75 lb N / 1000 ft^2 (134 kg N / ha) during the study using a 24-8-16 fertilizer. The area at Stonebridge Meadows received 0.2 in (0.5 cm) irrigation every 3 days and a total of 1.0 lb N / 1000 ft^2 (48 kg N / ha) from a 18-4-12 fertilizer and 1.5 N / 1000 ft^2 (73 kg N / ha) from a 34-0-0 fertilizer throughout the study.

Digital pictures were taken once a week for 10 weeks beginning at plot establishment on 20 May 2002. The pictures allowed for a consistent, quantifiable measurement on the progression of turf coverage in the plots from the initial 2 in. (5 cm) plug. Data were analyzed separately for each golf course using ANOVA techniques. When treatment effects were significant ($P < 0.05$), means were separated using Fisher's Least Significant Difference procedure.

Results and discussion

Re-establishment of bermudagrass in the plots at Fayetteville Country Club was minimal (Fig. 1). Plots in the primary rough replica-

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tion (open sun) recovered the most after 10 weeks (approximately 20% turf coverage), but recovery at this golf course was limited due to continued traffic over the plots throughout the study period. This demonstrated the negative impact of traffic on turfgrass recovery and re-establishment.

Plots at Stonebridge Meadows were out of play and no traffic occurred on the plots throughout this study. This lack of traffic greatly increased the percent turf coverage on these plots. By the end of the study, the overall treatment average was 86% with treatment averages ranging from 73% turf coverage for the sand + lawn compost mix to 92% coverage for both the Humalfa and the poultry compost treatments.

Differences in turf coverage among the composts (when applied alone) were noted (Fig. 2). The poultry compost plot means were significantly higher than Humalfa on 8 July and 15 July. The poultry compost plot means were significantly higher than the lawn compost from 23 June through the end of the study on 22 July. Although these differences in means were statistically significant, the actual percentage difference in turf coverage between these treatments (9-16%) would be considered negligible by most superintendents.

When compost was blended with sand (1:1 by volume) the percent turf cover was lower when compared to compost alone (Fig. 3). This difference in turf coverage became significant on 1 July.

Turf coverage was highest when the lawn compost was used in conjunction with the organic fertilizer (Fig. 4), but was only significantly higher on 8 July. This indicates that mixing fertilizer into a topdressing mix may be only slightly beneficial.

Conclusions

Limiting traffic in areas being re-established is not always practical on a golf course. When it can be done, quicker recovery and more complete coverage can be expected, as demonstrated by the differences in turf recovery among the replications at Fayetteville Country Club. When limiting traffic is difficult, possible solutions might be either closer spacing of plugs or sodding damaged areas.

In this study, plots topdressed with sand had the lowest recovery compared to topdressing with any of the composts. Plots topdressed with either Humalfa or poultry compost had the highest turf coverage by the end of this study. Although this difference was statistically significant in some instances, the actual increase in percent recovery from using composts was minimal. The additional cost of the compost might not be justified based on a small gain in recovery of the turf. Addition of fertilizer to the topdressing mix appeared to have only a minimal impact on turf recovery.

Literature cited

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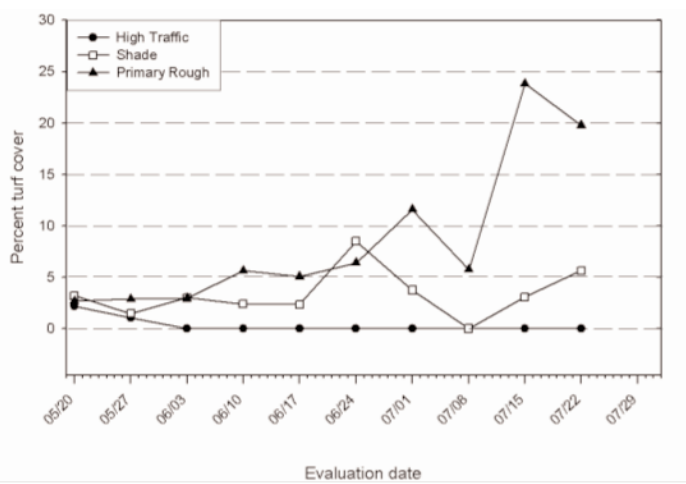

Fig. 1. Turf recovery of three treatment replications at Fayetteville Country Club.

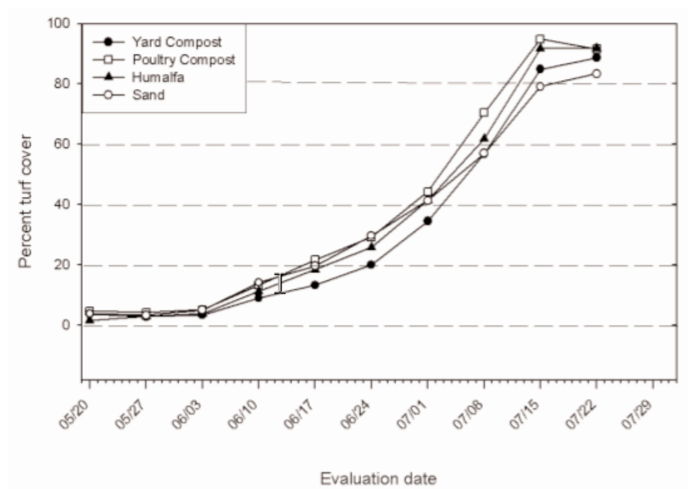

Fig. 2. Compost source effects on turf recovery at Stonebridge Meadows Golf Club. Fisher's least significant difference value (*P* = 0.05) equals 9.7.

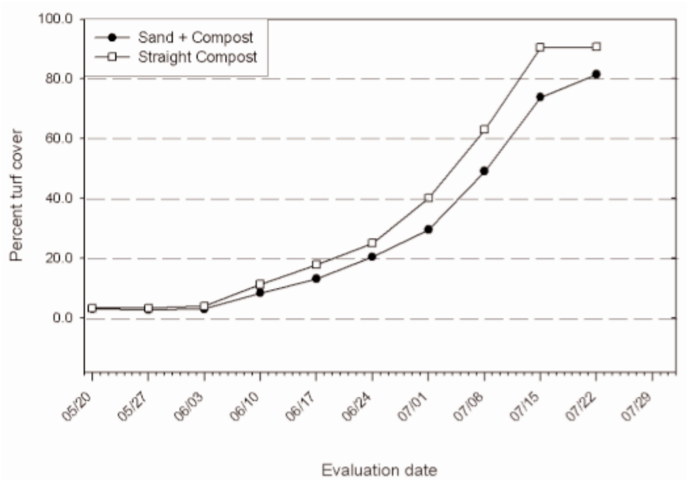

Fig. 3. Effects of blending sand with compost on turf recovery at Stonebridge Meadows Golf Club. Fisher's least significant difference value (*P* = 0.05) equals 9.1.

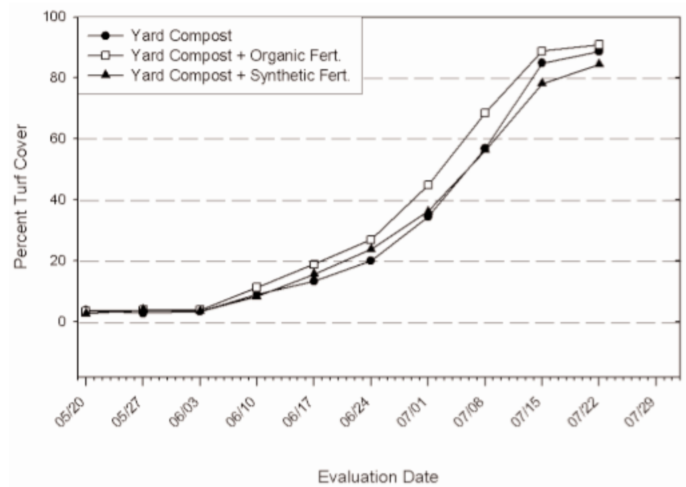

Fig. 4. Effects of blending fertilizer with compost on turf recovery at Stonebridge Meadows Golf Club. Fisher's least significant difference value (*P* = 0.05) equals 9.7.