Topdressing Compost on Turfgrass: Its Effect on Turf Quality and Weeds

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Introduction

California's Integrated Waste Management Act (AB 939) requires California to reduce landfill waste by 50% by the year 2000. Since yard waste comprises approximately 25% of the solid waste sent to landfills, many municipalities have implemented a green waste pick-up and composting program. This has generated tons of compost, and ways to use it efficiently and effectively are now being sought. Possible applications of compost could include topdressings for school grounds, golf courses, community recreation fields, and parks.

Field studies were conducted from October 1994 to December 1997 in Fresno, CA to assess the feasibility of compost topdressing on turfgrass, compare compost topdressing with conventional fertilizer applications, determine optimum depth and timing of compost applications, and evaluate the benefits and risks of compost topdressings from cultural and financial perspectives.

The primary objective was to evaluate the utility of fall applications of varying depths of compost as compared to a check, conventional fertilizers, steer manure, and slow release fertilizer applications over a three year period, with and without aeration. Shifts in weed populations, turfgrass quality, density and color were evaluated regularly throughout the year. Preliminary reports presenting research results from 1994-95 and 1995-96 were published in the 48th and 49th Conference Proceedings of the CA Weed Science Society. This report summarizes some of the results obtained over the last three years.

Materials and Methods

The trial was initiated in October 1994 at California State University, Fresno. This site has overhead sprinklers and is uniformly irrigated. It consists of a well established common bermuda grass lawn planted in a sandy loam soil. The site is occasionally utilized as a practice band field. The field was uniform in weed population density and composition at the beginning of the trial. Plots were 10' X 18' and were arranged in a split plot design with four replications of each treatment. The main plots were either aerified or not. The subplots were either a fertilizer treatment, compost treatment, or an untreated check.

The fertilizer treatments were applied to yield 4 pounds of actual nitrogen per 1000 square feet per year. A single application of steer manure and slow release fertilizer (Once® by Sierra) were made in October of 1994, 1995, and 1996, while ammonium sulfate applications were made in October, April, July and September of each year. The compost treatments included single and multiple applications. The single application compost treatments were applied at 1/8, 1/4, ½ and 1 inch depths. It is estimated that a 1-inch topdressing equals 9.2 pounds nitrogen per 1000 square feet (1/2" = 4.6, 1/4 = 2.3 and 1/8"=1.2 pounds). Multiple applications were also applied two or four times per year to equal a total of 1 inch of compost applied annually. They were 1/2 inch applied 2 times per year in October and July, and 1/4 inch of compost applied 4 times per year in October, April, July, and September.

Results

Turf Color and Dormancy (Figure 1): All plots were visually evaluated on a scale of 1 to 9 (9 being the best) for green color throughout the year and for the onset of dormancy in the late fall. The three year average overall seasons revealed that all treated plots were greener color than the untreated check plots and that dormancy was delayed. The untreated check plots ranged from a winter low of 2.25 to a summer high of 3.5. The average of all fertilizer treatments (represented by the shaded area in the figure) ranged from a winter low of 3.5 to a summer high of 5.5. The 1/8" compost application closely resembled the fertilizer applications in the fall and winter, while the 1/4" compost application closely resembled the fertilized plots in the spring. As more compost topdressing was applied (1/4, ½, and 1") turf color improved and the onset of dormancy was delayed.

Turf Quality (Figures 2 & 3): Turf quality includes stand uniformity, density, turf color, and the presence/absence of weeds. The visual rating scale ranged from 1 to 9. (A rating of 9 is most desirable; 5 is considered marginally acceptable). Untreated check plots averaged a rating of 4 in quality over all seasons. Fertilized plots (represented by the shaded area on the figure) were higher in quality than the untreated check plots and averaged close to a rating of 5 with a slight decrease in winter. The 1/8", 1/4", and 1/2" compost applications were nearly equal in quality to the fertilizer treatments. All 1" compost plots were higher in quality than the check plots throughout the entire year except in winter, when there was a short term negative effect on density and stand uniformity. It was also observed that a weekly mow schedule was sometimes too infrequent in the 1/2" and 1" compost applications. Scalping resulted and turf quality declined. Shifting from a single 1" application to multiple (2 x 1/2" and 4 x 1/4") applications increased turf quality ratings over the year. (Figure 3). The most consistent and highest quality ratings were achieved with 4 X 1/4" compost applications.

Weed Populations (Figures 4-6): Two weed population peaks were observed per year. (Figure 4). These were associated with winter populations of annual bluegrass (*Poa annua*) and summer populations of crabgrass (*Digitaria spp.*) Weed populations were lowest in fall as this was the time between summer and winter annual growth cycles. The 1" and ½" compost plots had lower winter weed populations than the check, fertilizer treatments (shaded area in figure), and 1/8" and 1/4" compost applications. (Figure 5). All plots were abundant with crabgrass, however fertilizer treatments averaged significantly lower percentages than the check in summer. The lowest weed populations were observed in the 4 X 1/4" compost applications. (Figure 6). This treatment was optimal for keeping summer annual weed populations at 20% or less, winter weed populations at lower percentages than the check and fertilized plots, and simultaneously maintained the highest turf quality ratings.

Conclusions

It is feasible to apply compost topdressing on municipal turfgrass sites and experience a positive cultural effect. Compost applications of 1/4, 1/2, and 1" depths applied to turf in late fall resulted in an improvement of turf color throughout the year and delayed the onset of dormancy. Consistently high quality turfgrass ratings and low weed populations of annual bluegrass and crabgrass were obtained when 4 X 1/4" compost topdressings were applied throughout the year (October, April, June, and August).

Figure 1

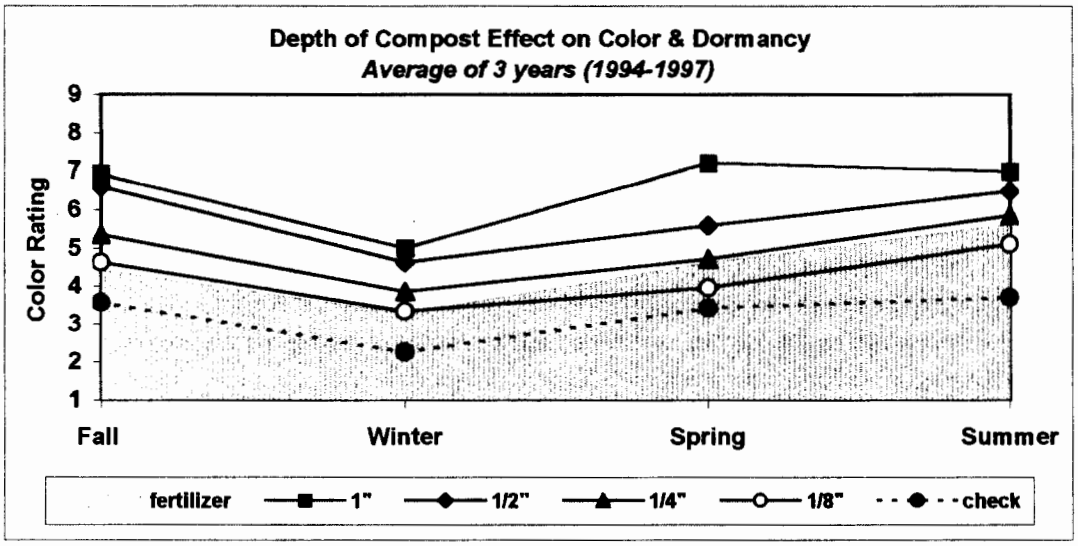

Figure 2

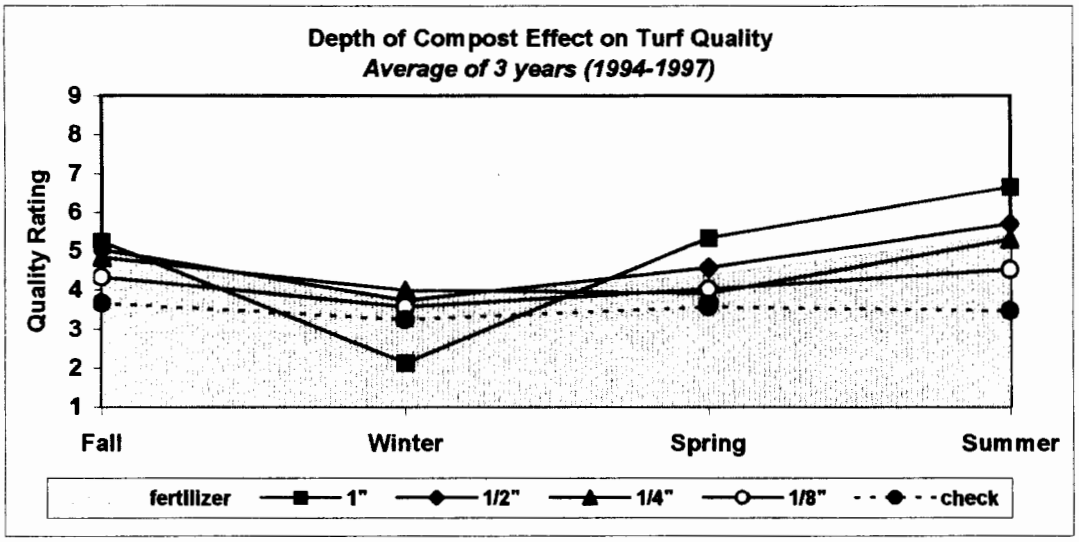

Figure 3

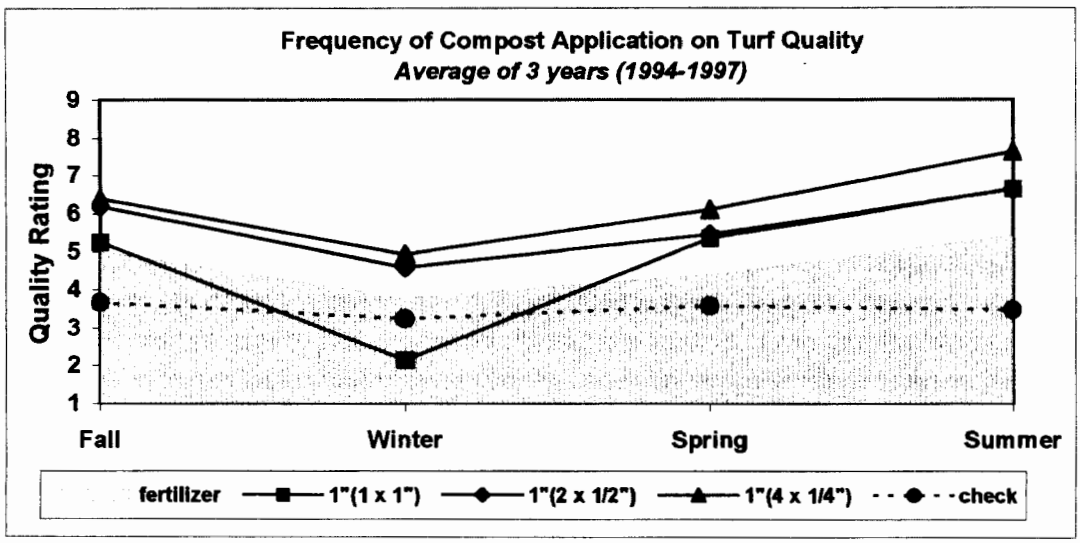

Figure 4

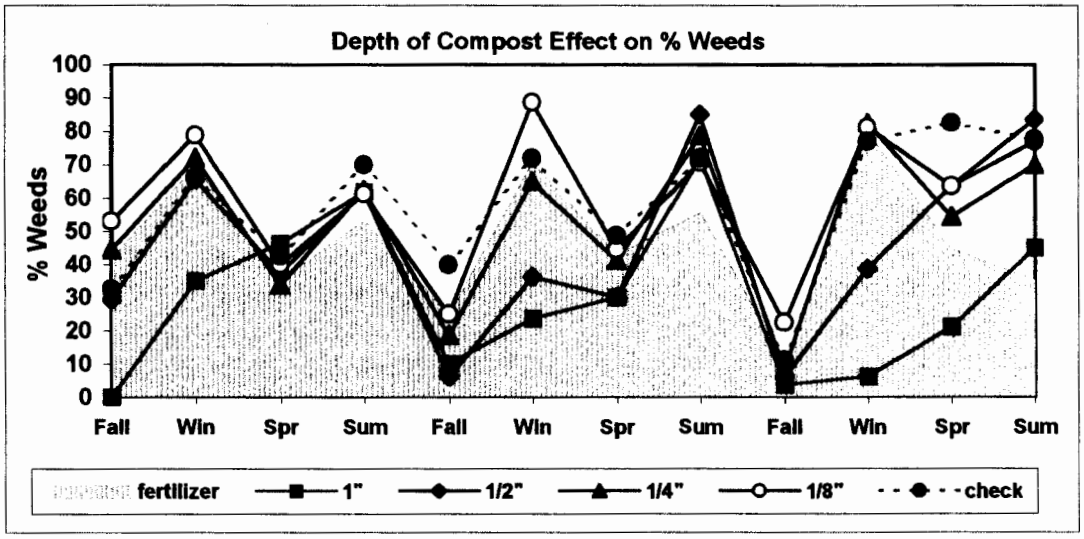

Figure 5

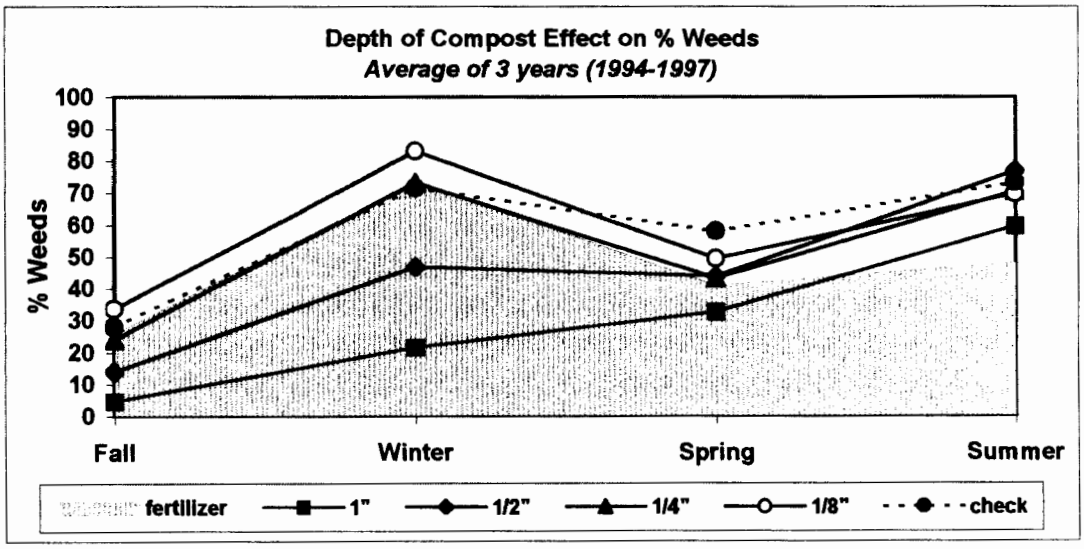

Figure 6