Transition Management of Overseeded Bermudagrass and Weed Impacts

Pamela M. Geisel and Michelle Le Strange
University of California Cooperative Extension

Introduction

In areas where bermudagrass has long winter dormancy it is commonly overseeded with cool season turfgrasses in the fall to maintain green color throughout winter months. Annual and perennial ryegrass and occasionally creeping red fescue are the most common overseeding species. Annual ryegrass and creeping red fescue are intolerant of warm temperatures and fade out relatively quickly in spring allowing for bermudagrass to emerge from dormancy without significant competition. Perennial ryegrass is the preferred choice for overseeding because of its darker green color and disease resistance. However, perennial ryegrass remains competitive with the bermudagrass for a much longer time period and can delay emergence from dormancy if the transition is not properly managed. Additionally, bermudagrass vigor in summer is diminished by perennial ryegrass competition, if the ryegrass remains in the turf stand.

Because of the higher quality associated with perennial ryegrass and the chemical tools that are available to large-scale commercial turf managers its popularity has increased. Pronamide (Kerb®) is the herbicide most commonly used to selectively remove perennial ryegrass from bermudagrass. This product is a restricted use material and not readily available to home gardeners and those that manage residential lawns (assuming they are unlicensed). Smaller residential landscape managers are also adopting the use of perennial ryegrass for overseeding and finding that the transition to a vigorous bermudagrass is more difficult since Kerb is not an option.

Objectives

This field study has several objectives. One is to compare overseeded grass species and their effect on the transition of bermudagrass from dormancy to spring greenup. Another objective is to compare cultural methods of transition management from perennial ryegrass to bermudagrass.

Materials and Methods

Two separate experiments were conducted on the CSU Fresno campus on a common bermudagrass turf. Experiment 1 evaluated three overseeding species compared to a check for their ease of transition back to bermudagrass. Experiment 2 investigated seven treatments on perennial ryegrass for their impact on facilitating bermudagrass spring green up. The site for both experiments was very uniform and not heavily trafficked. Some weeds were present. Each experiment was fertilized at an annual rate of 4 pounds nitrogen per 1000 square feet. Four one-pound applications were made in April, May, July and August.

Individual plot size was 5’ x 10’ and with four replications arranged in a randomized complete block design (RCBD).

Each experiment was overseeded when air temperatures averaged 58°F and soil temperatures averaged 65° for several successive days. The overseeded grasses were grown using standard cultural practices for cool season turf through the winter and early spring months. Treatment

evaluations began when air temperatures averaged 60°F and soil temperature averaged 55°F. These are temperatures when bermudagrass begins to emerge from dormancy (reference). Weather data was downloaded from the California Irrigation Management Information System (CIMIS) station located on the CSUF campus.

Experiment 1: Comparison of Three Cool Season Overseeding Species –Annual Rye, Perennial Rye and Creeping Red Fescue

On November 15, 2001 plots were overseeded with selected species at recommended rates.

- Annual ryegrass was hand seeded at 13 lbs.
- Creeping red fescue was seeded at 8 lbs.
- Perennial ryegrass (var. Pinnacle) was seeded at 10 lbs per 1000 square feet.

Experiment 2: Comparison of Transition Management Treatments in Perennial Ryegrass to Facilitate Spring Green-up

On November 15, 2001 perennial ryegrass (cultivar Pinnacle) was overseeded at 10 lbs per 1000 square feet. Cultural and management treatments using nitrogen, compost, contact herbicide and close mowing were evaluated for their effect on removing perennial ryegrass from overseeded bermudagrass to facilitate spring green up. The treatments included:

1. Two additional pounds of nitrogen per year (one pound in March and one pound in September) to encourage bermudagrass growth.
2. Two additional pounds of nitrogen per year PLUS close mowing.
3. Two additional pounds of nitrogen per year PLUS an application of Diquat.
4. Close mowing to ¼" height to open the turf canopy and encourage bermudagrass growth.
5. Application of Diquat (a contact herbicide) to burn top growth of perennial ryegrass.
6. Topdressing ¼" compost (as an alternative to synthetic nitrogen application).
7. An untreated check, i.e. bermudagrass with no perennial ryegrass overseeding and no additional management treatments.

Data Collected

Quality, weeds, and turfgrass density were evaluated over time in both experiments. The transition management treatments were initiated when the average air temperature reached 60°F and the average soil temperature reached 55°F. Evaluations began one week after initial treatment (1 WAIT).

Turf quality was visually evaluated based on a 1-9 subjective rating scale that included such factors as color, density of turf, uniformity and presence/absence of weeds or disease, irrespective of turf species. A rating of 5 is considered minimally acceptable turf quality. A rating of nine is exceptional and one is extremely poor.

Weed populations in turf plots were visually evaluated bimontly using a scale of 0 to 99 percent weed cover. Individual weed species were noted but all weed species were combined in the evaluations.

Shoot densities for all turf species within a plot were calculated by counting the actual number of shoots of each species in a 1 inch by 6 inch area (2.5 cm x 15.2 cm=39 cm2) and extrapolated to 1 square meter. Counts were made on a weekly basis to determine changes in turf density by species during the transition phase.

Results and Discussion

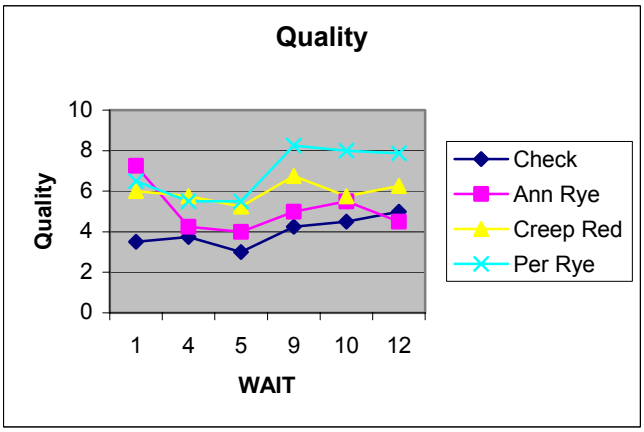
Experiment 1: Quality

In experiment 1 three overseeded grasses were compared to an unoverseeded bermudagrass check. All of the overseeded plots entered the transition period with a quality rating of 6 or better and were not significantly different from each other. Bimonthly quality evaluation of the bermudagrass check plots ranged from 4.5 to 5.5 over the twelve-week evaluation period which began on March 22nd through June 5, 2002. The quality for the check was that a minimally acceptable turf.

Perennial rye plots maintained the highest turf quality throughout the 12-week transition phase. Early in the transition phase at week 4, there was a sudden warm spell, which negatively affected quality of all overseeded species. However, by 9 WAIT perennial rye recovered and maintained a high quality (8 or above) for the remainder of the transition period.

Creeping red fescue quality was not affected by temperatures as much as the ryegrasses and was able to maintain a steady turf quality that ranged from 5.7 to 6.2 throughout the transition.

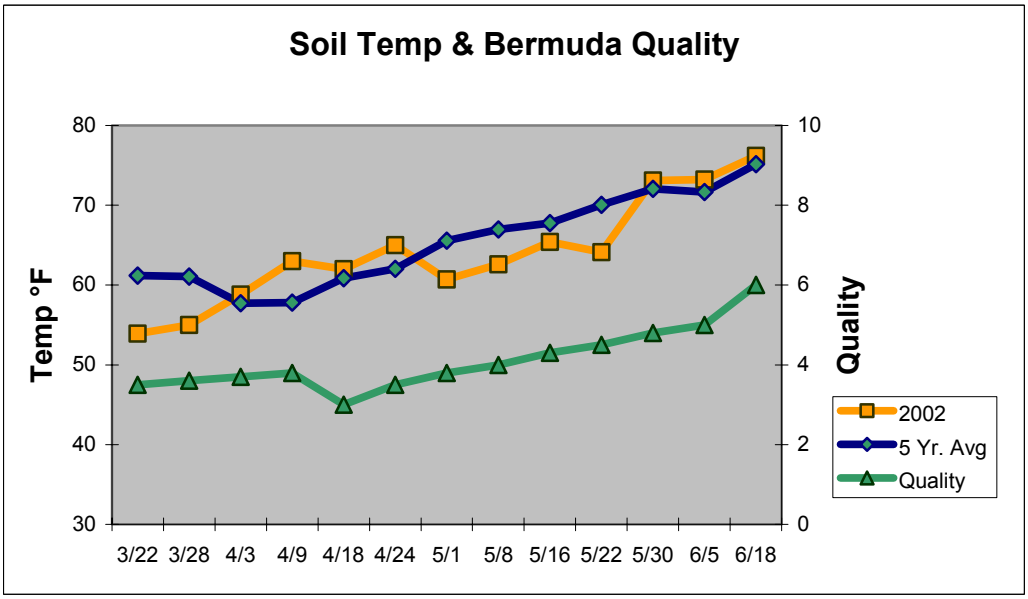
Annual ryegrass quality at 1 WAIT was high at 7.5. At 4 WAIT, when the first warm temperatures of the season developed, quality dropped to a 4. Quality of annual rye plots was not significantly different than the check throughout the remainder of the transition period.



Experiment 1: Percent Weed Cover

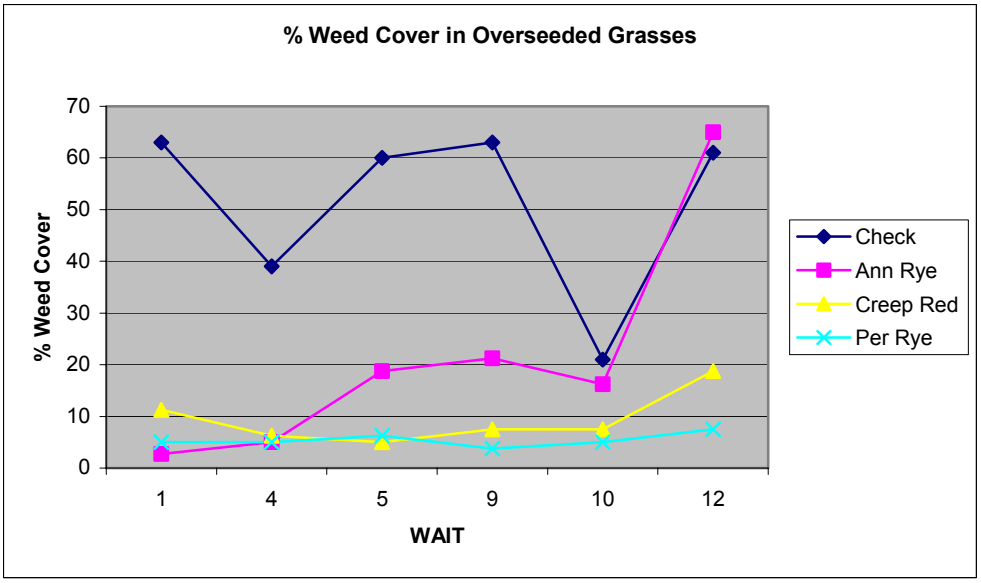
In the winter months, annual bluegrass was the dominant weed species. During the transition period bluegrass died out and crabgrass emerged as the dominant summer weed species. This trend was observed in the check plots. Weed cover remained high in the check plots reflecting bluegrass weed populations at WAIT 1-4, then dipped down at WAIT 5 as

bluegrass faded. Weed populations rose quickly to 60% with the emergence of crabgrass as temperatures increased between WAIT 9-12.



Percent weed cover was significantly less in overseeded plots compared to the bermudagrass check. The highest weed populations were in the check ranging from 65% at 1WAIT to a low of 20% at 10 WAIT. At 12 WAIT the weed population increased up to 60% and this increase was likely due to transition from winter to summer weeds. Overseeding with creeping red fescue and perennial rye kept weeds below 10 percent throughout the transition period.

Overseeding with annual rye kept weeds low for the first 5 WAIT but then weed populations increased and were as high as the check plots at the end of the transition period. Crabgrass likely had an easier time emerging in overseeded annual rye plots due to reduced competition as annual ryegrass died out with warmer temperatures.



Experiment 1-Bermudagrass Shoot Density in Overseeded Turf

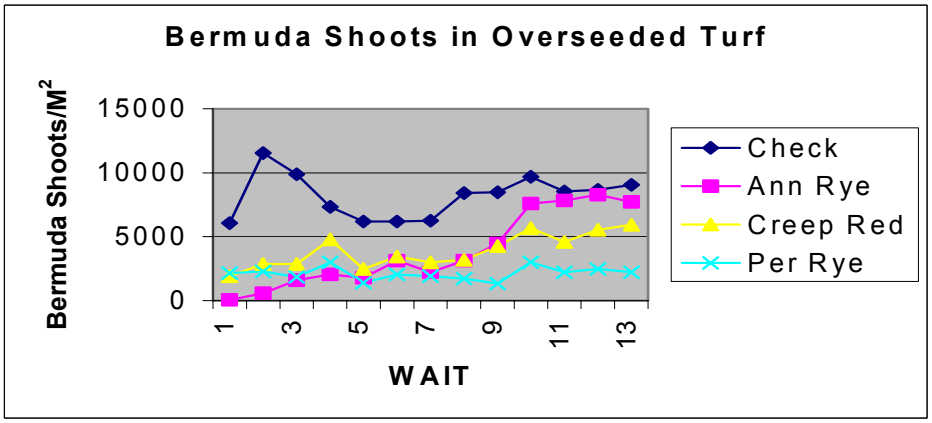
Bermudagrass shoot counts in untreated plots maintained a relatively stable shoot density from 6000-10,000 shoots per meter sq. The exception is 12,000 dip in the first 2 WAIT—perhaps this sudden shift can be explained as an error in shoot counts in the early learning phase of counting shoots.

Bermudagrass shoot density was significantly lower in overseeded plots from weeks 1-9 WAIT when compared to untreated plots. In 9-13 WAIT bermudagrass growing in overseeded annual rye plots reached shoot densities equal to the untreated check plots.

Bermudagrass shoot density in perennial rye treated plots remained constant at about 2000 shoots per meter sq. throughout the transition period. They didn't increase and were significantly less than the check throughout the entire period.

Bermudagrass shoots in creeping red fescue plots increased slowly throughout the transition and was not significantly different from the check by 12 WAIT.

In summary, overseeding with perennial ryegrass prohibited bermudagrass shoot development throughout the transition period and persisted into the summer months.



As expected, the reverse of these trends was true as well. As the transition period progressed the shoot density of the overseeded turf species decreased in all cases. At 2 WAIT, shoot densities of all overseeded grasses ranged between 30,000-40,000 shoots per meter squared. Between 4-6 WAIT there was a dramatic decrease in overseeded shoot densities with annual rye dropping from 33,000 to 5,000; creeping red fescue dropped from 39,000 to 15,600 and perennial rye went from 30,000 down to 13,000. By week 12 all overseeded grass densities decreased significantly with perennial rye shoot density stabilizing at 12,000 shoots per meter square.

Shoot Density Per Meter Square Of Overseeded Grasses

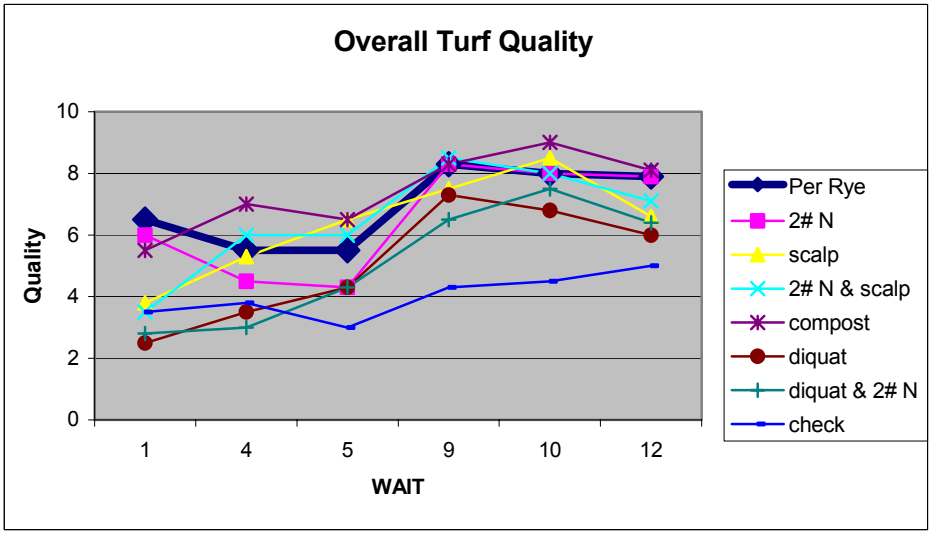
Weeks After Initial Treatment (WAIT)					
	2	**4**	**6**	**8**	**12**
Annual Rye	33,482	17,666	5,038	7,653	1,594
Creeping Red Fescue	39,158	34,949	15,625	10,842	7,589
Perennial Rye	30,931	30,229	13,074	12,819	12,627

Experiment 2: Transition Management of Perennial Rye Overseeded Plots:

Quality

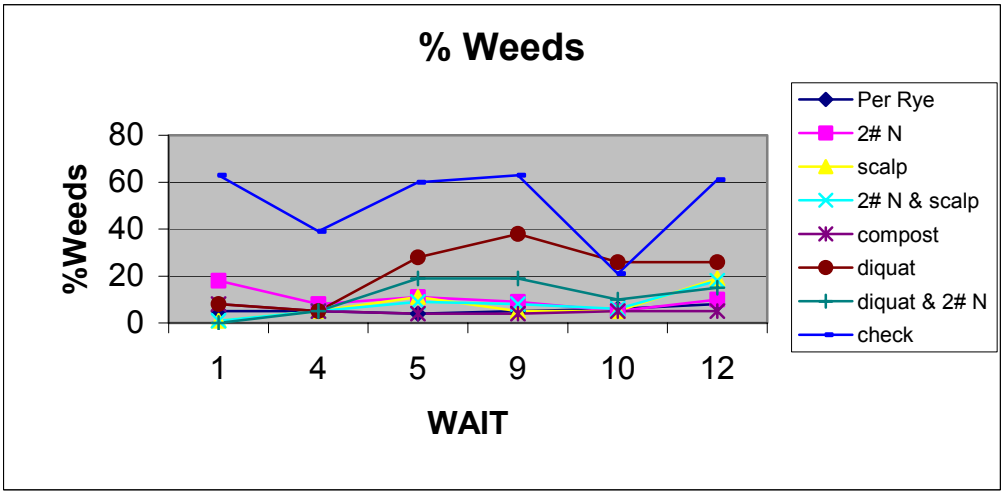
Quality was evaluated over the twelve-week transition period. Overall, the check plots had the lowest quality with a low of 3.7 to a high of 5 and were significantly lower in quality than all treatment plots. By 5 WAIT all plots overseeded with perennial rye had much higher quality than the check. All plots were fertilized at 5 WAIT and at 9 WAIT and all plots showed an increase in overall turf quality.

The highest quality ratings were observed at 10 WAIT with the best quality in plots treated with ¼ inch of compost. There were no significant differences in any of the other plots except those treated with a contact herbicide. Plots that had the least quality were those that were treated with a contact herbicide and treatment effects were observed throughout the period likely because it opened the plots to increased weed invasion. Following 11 WAIT, there was a drop off in quality of the overseeded turf, likely in response to increasing temperatures.



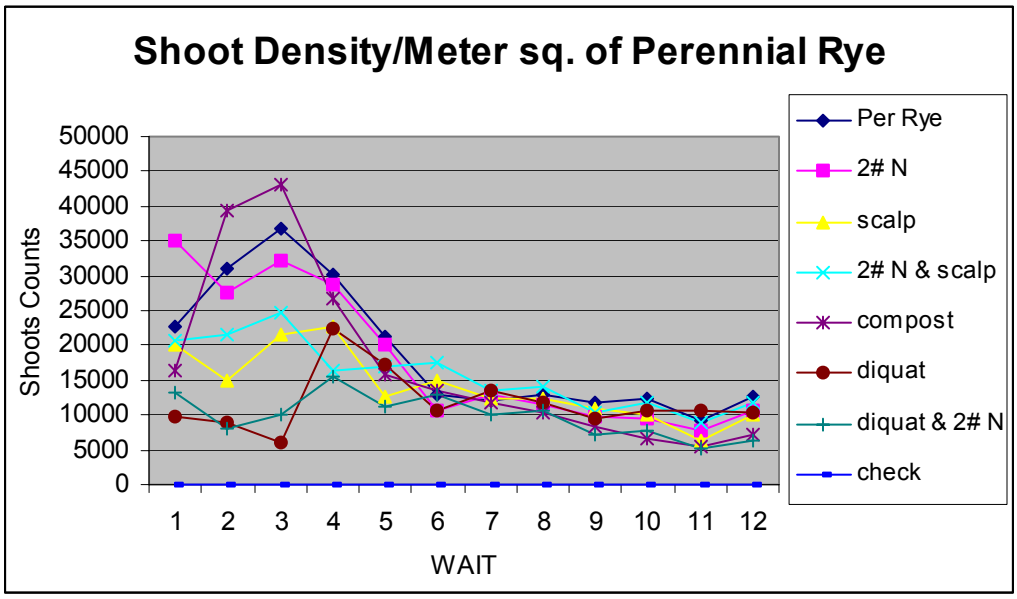
Experiment 2: Percent Weeds

In this experiment, the highest weed populations were in the check ranging from 65% at 1WAIT to a low of 20% at 10 WAIT. At 12 WAIT the weed population increased up to 60% and this increase was likely due to transition from winter to summer weeds. The next highest weed populations were found in plots treated with a contact herbicide with or without additional nitrogen. Once again, the treatment likely opened the turf to increased competition. However, scalping treatments had little effect on weed populations. Perhaps the recovery period was shorter in scalping treatments than with herbicide treatments and as such weeds did not have such a broad window for germination. There were few significant differences within the other treatments over the transition period. The key trend is that overseeding with perennial rye limits germination of competing weed species that effect is retained over time.

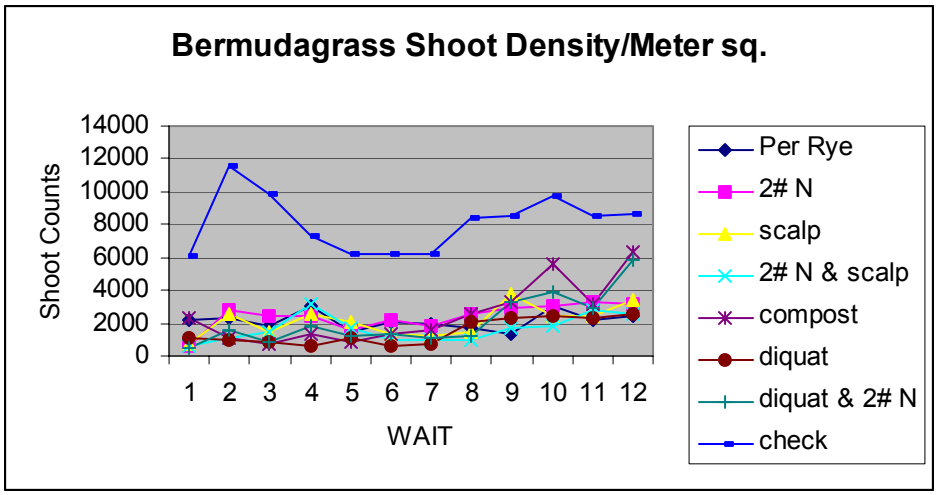


Experiment 2: Shoot Density of Perennial Rye

Shoot density per meter2, in 1-3 WAIT were highest in plots receiving some form of nitrogen with compost treated plots being highest and in just perennial rye plots. These plots retained a fairly high shoot density up until 4 WAIT at which time all plots show a marked decrease in perennial rye shoot density to a point where there was no significant difference between treatments. In the early part of the transition phase, the plots that have the lowest shoot density are those plots being treated with a contact herbicide and those that are scalped with or without additional nitrogen. These plots never recover to the point of being higher in shoot density than the perennial rye alone indicating that these treatments do impact the development of perennial rye. By the end of 12 WAIT, a significantly fewer perennial rye shoots were found in the plots treated with compost and those treated with a contact herbicide and additional nitrogen.



The inverse was also true in this experiment in that the bermudagrass shoot densities tended to increase as perennial rye decreases though the transition period. However, there are no significant differences until 10 WAIT at which time those plots treated with compost have an increase in bermudagrass shoots from a low of 1000 up to 6000. As well, those plots that were scalped and treated with additional nitrogen also show an increase in bermudagrass shoots over the other treatments and were not significantly different than the compost treated plots.



Conclusion:

In summary for Experiment 2, there was an overall improvement of turf quality and a decrease in weed populations by overseeding with Perennial rye. There was also a significant reduction in bermudagrass shoot density, which only very slowly increased over the transition period. In terms of transition management, none of the cultural treatments stood out as being exceptionally better at reducing the shoot counts of perennial rye and encouraging the growth of bermudagrass shoots with the exception of the plots treated with compost. These plots generally had the best quality during the transition period, had the most bermudagrass shoots and the least number of perennial rye shoots by the end of the transition period. Compost treated plots also had the fewest number of weeds.