Painting dormant bermudagrass putting greens

Painting bermudagrass greens in winter is a viable option for some superintendents.

Environmental Institute for Golf

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Bermudagrass greens traditionally have been overseeded to provide winter color. Preparation for overseeding includes aggressive verticutting, scalping and watering and is destructive to bermudagrass greens. Although it is dormant in winter, the bermudagrass is still alive. After overseeding, the shade from the overseeded turf usually causes the bermudagrass to decline. This competition also can lead to catastrophic problems in spring transition. In the worst case, a course will transition from an overseeded cool-season grass to dead turf. Other problems associated with overseeding include the increased susceptibility of bermudagrass to diseases, increased weed pressure, delayed spring green-up and the inability to remove the overseeded grass. Overseeding also can be expensive. For all these reasons, superintendents have searched for alternatives and found a simple, quick and inexpensive way to instantly transform brown putting greens: painting.

Painting greens recently has become the No. 1 alternative to overseeding greens for winter color. The practice is gaining popularity because it is relatively inexpensive and attractive and provides playability. When compared to the cost of overseeding — usually $2,500 to $5,000 per acre plus the post-overseeding maintenance costs including labor, mowing and fuel — painting greens appears to be a less expensive alternative. The cost of painting greens usually ranges from about $1,600 to $1,800 for two applications per season per acre. Considering that most courses have about 3 acres (1.2 hectares) of greens, painting costs would be about $6,000-$9,000 per season, which could be considerably less than the cost of overseeding, depending on the number of applications and the price of paint (1,2). Additional research is necessary because little information on painting greens in winter is available.

Objectives

This study had several objectives: to evaluate the effects of three paints, three fall mowing heights before painting and applications of a plant growth regulator and foliar and granular fertilizers on ball-roll distance in winter, soil and surface temperatures, spring green-up, bermudagrass recovery and summer turf performance.

Materials and methods

The study was conducted from May 2005 to May 2007 at Clemson University, Clemson, S.C., on TifEagle bermudagrass (*Cynodon dactylon* Burtt-Davey × *C. transvaalensis* L.) established with sprigs in summer 2002 on a green constructed according to USGA recommendations. Normal management practices were followed, including irrigation, fertilizer and pesticide applications.

Mowing treatments

During the growing season, the green was mowed daily at 0.13 inch (3.2 millimeters) with a triplex mower. Four weeks before painting, the research

plots were mowed at 0.13, 0.16 and 0.19 inch (3.2, 4.0 and 4.8 millimeters) with walking mowers.

The experiment was a split-split-split block design with three replications of all treatments (Table 1). The study included three main blocks: control without painting or overseeding, painted, and overseeded.

Fertilizer treatments

Each of the three main blocks was divided into two sub-blocks (for a total of six sub-blocks) treated with either 100% granular fertilizer (18-3-18) or with 100% liquid fertilizer (a 1:2 ratio of Turf Foundation 10-3-5 and Greater Green 5-0-7). The fertilizers were applied at two-week intervals from May to October in 2005 and 2006 at a rate of 0.2 pound nitrogen/1,000 square feet (0.98 gram/square meter). The overseeded plots received similar fertilizer applications from October to April in 2005-2006 and 2006-2007. No fertilizer was applied in January of either year, and only one application was made in December and February each year. Foliar fertilizers were applied using a sprayer with a carrier volume of 100 gallons/acre (93.5 milliliters/square meter). No water was applied for at least three hours after the foliar fertilizer application. In winter and spring, a backpack carbon-dioxide-powered sprayer was used to apply foliar fertilizers to the overseeded plots. Granular fertilizer was applied with a rotary spreader, and light irrigation immediately followed each application.

Primo

A backpack carbon-dioxide-powered sprayer was used to apply the plant growth regulator Primo (trinexapac-ethyl, Syngenta) at 3 ounces/acre (0.02 milliliter/square meter) every two weeks from June to August 2005 and 2006. Irrigation was applied as needed, and no pesticides were used during the study.

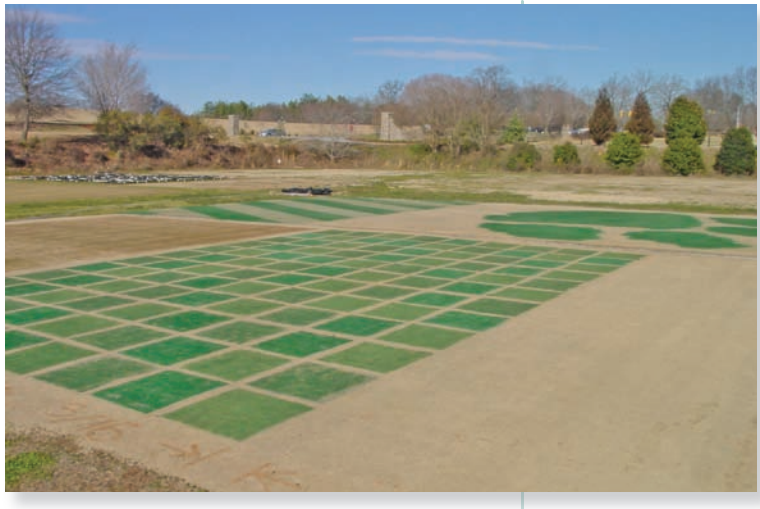
Overseeding treatment

Roughstalk bluegrass (*Poa travialis* L.) was seeded on Oct. 5, 2005, and Oct. 8, 2006, at a rate of 8 pounds of seed/1,000 square feet (39 grams/square meter). Plots were kept moist through frequent irrigation for 14 days from overseeding until seedling emergence.

Turf paint

Turf paints included Titan (Burnett Lime Co.), Green Lawnger (Product No. 109955, Gempler's) and Regreen Turfgrass Colorant (Product No. 643-25, Precision Laboratories). The paint initially was applied to dormant bermudagrass turf on Dec. 6, 2005, and Dec. 7, 2006, and repainted on Feb. 3, 2006, and Feb. 7, 2007. Paints were applied with a regular wall-painting roller with an electrical pump. Paints were mixed according to label recommendations in a 10:1 ratio (water:paint). Each plot was painted in different directions to reach uniform coverage at an approximate rate of 6.5 gallons water-paint mixture/1,000 square feet (264.8 milliliters/square meter) (or 0.6 gallon paint/1,000 square feet [20 milliliters/square meter]).

To determine the effect of traffic on painted turf, all plots received light to moderate foot traffic (four passes with golf shoes every day except for rain days) from December to April in 2005-2006 and 2006-2007.



The research site at Clemson University was a TifEagle putting green built according to USGA recommendations. **Photos by H. Liu**

Treatments

Control - dormant green	
With Primo	**Without Primo**
100% foliar fertilizer	100% foliar fertilizer
100% granular fertilizer	100% granular fertilizer
Treatments - painted green	
With Primo	**Without Primo**
0.13-inch mowing height before painting	0.13-inch mowing height before painting
0.16-inch mowing height before painting	0.16-inch mowing height before painting
0.19-inch mowing height before painting	0.19-inch mowing height before painting
Titan	Titan
Regreen	Regreen
Lawnger	Lawnger
100% foliar fertilizer	100% foliar fertilizer
100% granular fertilizer	100% granular fertilizer
Treatments - overseeded green	
With Primo	**Without Primo**
0.13-inch mowing height after overseeding	0.13-inch mowing height after overseeding
0.16-inch mowing height after overseeding	0.16-inch mowing height after overseeding
0.19-inch mowing height after overseeding	0.19-inch mowing height after overseeding
100% foliar fertilizer	100% foliar fertilizer
100% granular fertilizer	100% granular fertilizer

Table 1. Treatments on TifEagle bermudagrass putting greens.

A regular paint roller with an electric pump was used to paint the research plots.

Data collection

Data, including year-round visual turfgrass quality based on a 1-9 scale, were collected every two weeks for each treatment. In winter, paint quality was rated on a 1-9 scale, where 1 = no paint present on the grass and 9 = paint color closest to natural turf. Ball-roll-distance measurements were collected every two weeks from December to April in 2005-2006 and 2006-2007. A modified Stimpmeter was used because plot size was small (3.3 × 3 feet [1.0 × 0.9 meter]).

Bermudagrass recovery during spring green-up was recorded as percent visual turf cover, and summer turf performance was recorded as turf quality.

Soil temperatures at a 3-inch (7.6-centimeter) depth and turf surface temperatures were recorded from December to April in both years every two weeks on days with full sun from 1:00 p.m. to 3:00 p.m.

Results and discussion

Turf and paint quality

During the winter months, all painted plots and the foliar-fertilized overseeded plots provided statistically equal turfgrass or paint quality with average visual ratings of 6.6 or higher. The granular fertilized overseeded plots had significantly lower turfgrass or paint quality with an average visual rating of 5.4. The dormant control had the lowest turf or paint quality with an average visual rating of 1. In spring, the painted plots and foliar- and granular-fertilized overseeded plots provided statistically equal turfgrass visual quality with turf or paint quality ratings of 6.2 or higher. Only the dormant control had unacceptable turf or paint quality in spring with an average rating of 4.5. In summer, all treatments provided turf or paint quality ratings of 7.9 or higher.

Clemson turfgrass students conducted four evaluations of turf or paint quality in February

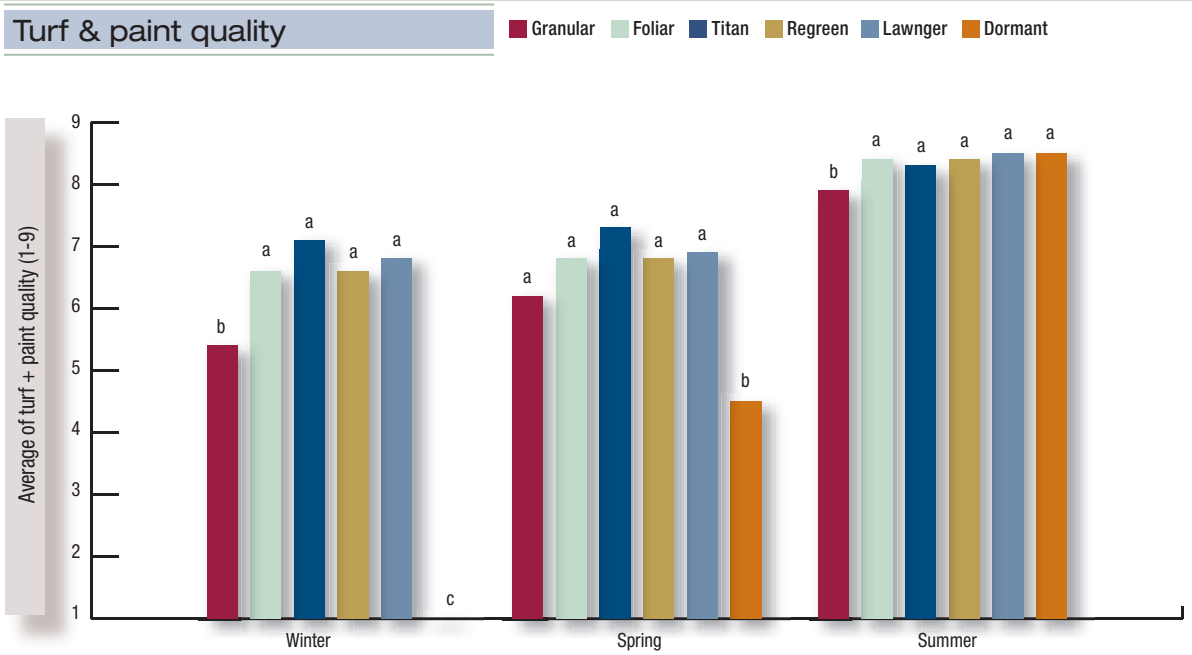


Figure 1. The average of turf quality (1-9 scale) and paint quality (1-9 scale) data collected every two weeks. Granular = overseeded with 100% granular fertilizer; foliar = overseeded with 100% foliar fertilizer; Titan = painted with Titan; Regreen = painted with Regreen; Lawnger = painted with Lawnger; Dormant = Dormant control. Winter = December 2005, January 2006 and February 2006, December 2006, January 2007 and February 2007; Spring = March, April and May 2006 and 2007; and Summer = June, July and August 2005 and 2006.

and March 2006 and February and March 2007 and found that Titan had the highest paint quality, but the other paints, Lawnger and Regreen, also had acceptable quality (data not shown; the average class was 21 students).

Evaluating painted turf for paint quality is a relatively new exercise, but based on our observations, all the paints changed color slightly from true green to slightly blue, which is much easier to recognize as paint and an artificial color.

Using proper equipment for paint application is critical for maintaining precise borders and avoiding the stripes that may result from using high-pressure nozzles. Once during our study, paint rollers removed dormant turf tissue. When painting large areas, it is best to use a technique that does not require touching dormant grass.

For all three paints, the color of the painted turf was much darker than natural turf when it was wet from rain or irrigation. However, painted turf dried within an hour after rainfall.

Pre-painting mowing heights of 0.13 inch (3.2 millimeters) to 0.19 inch (4.8 millimeters) had no effect on paint quality.

Ball-roll distance

Mowing height affected ball-roll distance, but there were no significant differences in ball-roll distance between painted treatments and dormant control treatments at the same mowing height. Ball-roll distance was shorter for overseeded treatments than for dormant and painted treatments at the same mowing height (Figure 2). These results are in agreement with a previous study (2). Ball-roll distance was shorter during spring green-up for all treatments and longer for the dormant control in winter. To maintain adequate ball-roll distance on overseeded and painted treatments, we recommend mowing heights less than 0.19-inch (4.8 millimeters).

Senior turfgrass students in the turfgrass stress physiology class at Clemson rated the test plots in spring 2006 and 2007.

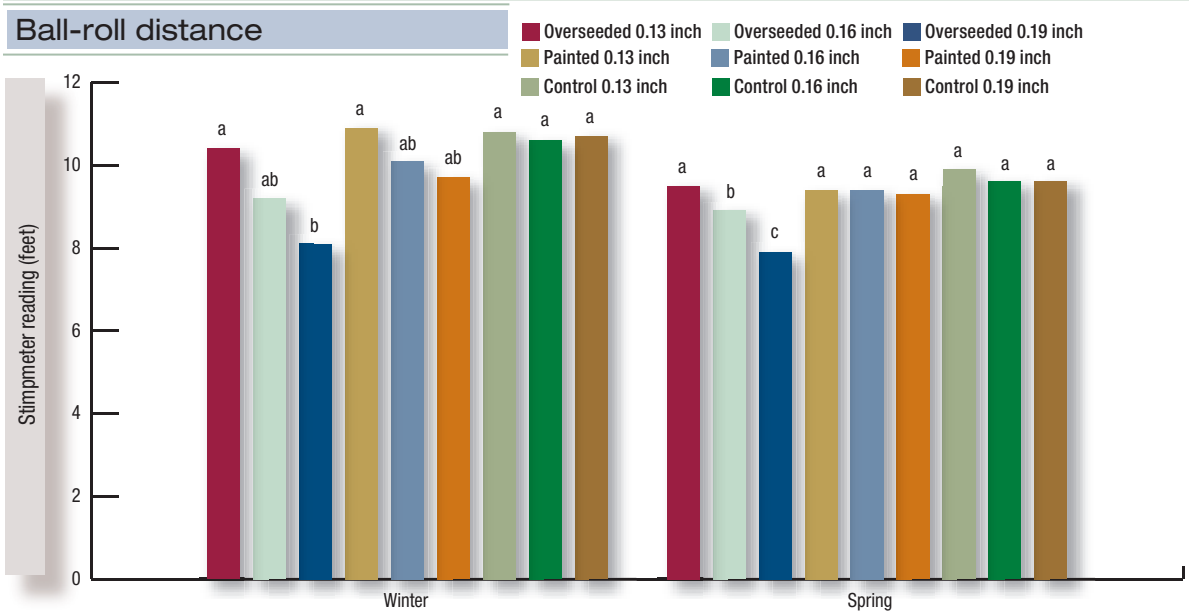
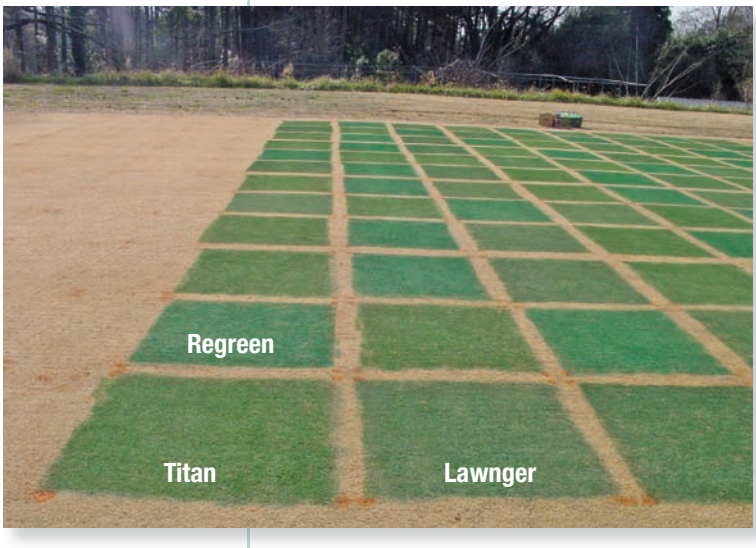


Figure 2. Averages of the ball-roll-distance measurements collected every two weeks in winter 2005 and 2006 and spring 2006 and 2007. Measurements were taken with a mini-Stimpmeter and converted using a conversion constant of 2.5 to calculate the results (a 1-foot reading on the mini-Stimpmeter = 2.5 feet of actual ball-roll distance). Overseeded 0.13 = the average of overseeded treatments mowed at 0.13 inch; Overseeded 0.16 = the average of overseeded treatments mowed at 0.16 inch; Overseeded 0.19 = the average of overseeded treatments mowed at 0.19 inch; Painted 0.13 = the average of painted treatments mowed at 0.13 inch; Painted 0.16 = the average of painted treatments mowed at 0.16 inch; Painted 0.19 = the average of painted treatments mowed at 0.19 inch; Control 0.13 = the average of the dormant controls mowed at 0.13 inch; Control 0.16 = the average of the dormant controls mowed at 0.16 inch; Control 0.19 = the average of the dormant controls mowed at 0.19 inch. The control and painted plots were not mowed from Dec. 7 to April 30 in both seasons.



Titan was the paint judged to have the best color and quality, although Regreen and Lawnger also were considered acceptable.

Soil and surface temperature

Relatively dark painted treatments helped plots absorb more solar radiation in winter and spring, resulting in higher surface and soil temperatures. The painted treatments with higher temperatures enhanced spring green-up, but no differences were found among paints in relation to the soil and surface temperatures. The lowest soil and surface temperatures were found in dormant control plots in winter and spring (data not shown).

Relative to soil temperatures, surface temperatures fluctuated with cloud cover, although surface temperatures were much higher than the air temperatures. The surface temperature in spring was higher than 100 F (37.8 C) in March of both years. The overseeded treatments showed fewer fluctuations in surface temperature.

Spring green-up

Painting enhanced spring green-up, and both painted and overseeded treatments showed enhanced turf quality compared to the dormant control (Figure 3). Paint brand had no effect on spring green-up. Dormant controls and overseeded plots with 100% granular fertilizers had poor spring green-up in March in terms of percent turf coverage. However, toward late spring, green-up sped up, and by May in both years, differences in turfgrass coverage disappeared and all plots had reached full or more than 95% coverage. Spring green-up can be significantly disrupted by cold temperatures in late spring (for example, on April 10, 2007, the air temperature was 27 F [2.8 C] at 7 a.m.). No evidence was found that painting protected turf from cold stress.

Summer turf performance

Foliar-fertilized plots that received Primo applications showed the best turf quality during the summer in 2005 and 2006 (data not shown). Painting turf the preceding winter did not affect turf quality in the summers of 2006 and 2007. In

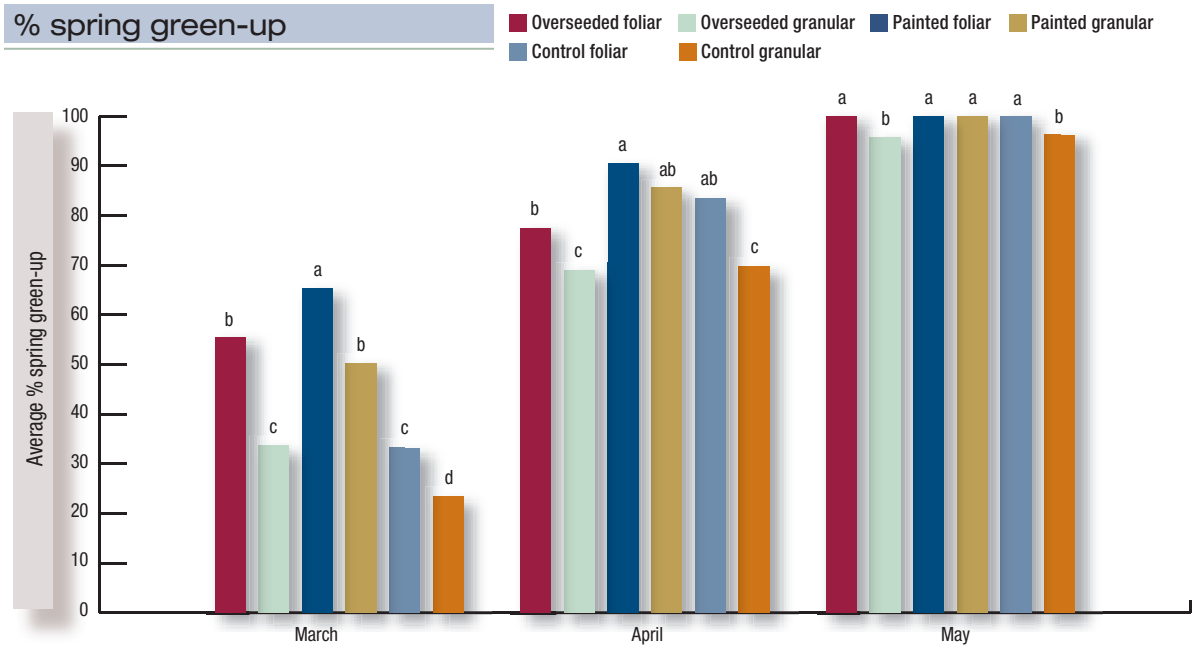


Figure 3. Average of percent spring green-up in 2006 and 2007. Overseeded foliar = overseeded treatments with 100% foliar fertilizers; Overseeded granular = overseeded treatments with 100% granular fertilizers; Painted foliar = painted treatments with 100% foliar fertilizers; Painted granular = painted treatments with 100% granular fertilizers; Control foliar = dormant control with 100% foliar fertilizers; and Control granular = dormant control with 100% granular fertilizers.

Soil temperatures taken at a depth of 3 inches on March 25, 2007 at 2 p.m. **Left,** painted; **Middle,** overseeded; and **Right,** control without painting and overseeding.

2005 and 2006, the two summer treatments of 100% foliar fertilizer or 100% granular fertilizer with or without Primo did not affect paint quality but did have a significant effect on the quality of the overseeded turf. Among the overseeded treatments, turf treated with 100% foliar fertilizers in summer and winter had the best turf quality. Mowing heights of overseeded treatments did not affect winter turf quality.

Conclusions

Painting bermudagrass greens in winter provides adequate green color and playability and longer ball-roll distance compared to overseeded grass mowed at the same height. No differences in ball-roll distance were found between winter dormant treatments and painted treatments, but ball-roll distance was shorter for overseeded treatments than for the painted treatments and the dormant control.

Different paint brands provided different color quality and longevity. Of the three paints in the study, Titan was considered the best, but the two other paints provided adequate quality. Lower mowing heights of 0.13 inch and 0.16 inch provided slightly better paint quality.

Neither Primo nor foliar fertilizer affected winter paint quality, but they did significantly enhance summer turf performance. Foliar fertilizers also enhanced the quality of overseeded turf in winter. The 100% granular fertilizer treatments on overseeded turf and on the dormant control had the poorest spring green-up and the shortest ball-roll distance.

All painted treatments had slightly higher surface and soil temperatures, which were significant enough to enhance spring green-up in comparison with overseeded and dormant treatments. Surface and soil temperatures for the three paint treatments were not significantly different.

Because painted greens have an acceptable appearance and offer longer ball-roll distance and better spring green-up than overseeded and dormant greens, painting appears to be a viable alternative to overseeding.

Future research

Further research is needed to study the effects of winter painting on putting greens, tees and, possibly, fairways. Research should be undertaken to compare the economic impacts of painting and overseeding, to develop better painting techniques and to determine the best painting equipment for the job. Other possible uses for painting, including painting stressed turf during the growing season, also should be evaluated.

In the course of this study, light to moderate foot traffic did not damage the paint on the green, the painted plots were weed-free even though they had not been treated with pesticide, and snow fell in both of the winter seasons. Therefore, we believe that future research should examine the effect of painting on weed control, and the effect of snow and heavy traffic in winter on painted greens.

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Acknowledgments

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Literature cited

1. Carson, T. 2004. Overseed or paint? *Golf Course Management* 72(12):22.
2. Long, S.H. 2006. Thatch control, winter painting, and plant regulator management on golf course putting greens. M.S. thesis. Clemson University, Clemson, S.C.

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The research says

- In order to avoid the problems caused by overseeding, some superintendents are painting bermudagrass greens in winter.
- Among the overseeded treatments, plots receiving granular fertilizers had poor turf coverage and turf quality, but turf treated with 100% foliar fertilizers in summer and winter had the best turf quality.
- Titan had the best paint quality, although the quality of the other paints was acceptable; fall mowing height had no effect on the quality of painted turf.
- Painted turf had longer ball-roll distance than overseeded turf at the same mowing height.
- Painted treatments had slightly higher surface and soil temperatures, which enhanced spring green-up.