TURFGRASS TRENDS

SPRING GREENUP

Study Tells if Paint, Polyethylene Covers Can Enhance Greenup

By John M. Kauffman and John C. Sorochan

Low-temperature injury, winterkill and slow spring greenup are common problems facing managers of warm-season putting greens in the transition zone. Putting greens are often covered with polyethylene blankets during cold periods to protect against low temperature injury. Green latex paint also adds color during the dormancy period and may hasten turf greenup in the spring.

The objective of this study was to determine the impact of polyethylene covers and painting on low-temperature injury and pace of spring greenup of four warm-season putting green turfs in the transition zone. Covering alone, painting alone, covering plus painting, and no treatment were applied to Champion and TifEagle bermudagrass, SeaDwarf seashore paspalum and Diamond zoysiagrass in 2009 at Knoxville, Tenn. Covering plots caused turf to emerge from dormancy sooner than painting, and the covered plots maintained higher surface and soil temperatures than uncovered plots. Covered bermudagrass plots emerged from dormancy a full three weeks sooner than uncovered plots. Using polyethylene turf blankets can improve winter survival and hasten spring greenup for ultradwarf bermudagrass and seashore paspalum in the transition zone.

Cold hardiness and winterkill are concerns of golf course superintendents who manage warm-season putting greens in the transition zone. The increasing use of ultradwarf bermudagrass putting greens in the transition zone has made practices to enhance winter survival more important. Therefore, superintendents must find methods of managing the off-color winter-playing surfaces that accompany the lengthy dormant period of warm-season putting greens in the transition zone. Finding methods to improve spring greenup may allow play to resume earlier in the spring and allow the turfgrass plant to begin producing photosynthates earlier in the year, which can stimulate growth and produce a healthier turf stand.

Covering warm-season turf is a common method used to increase winter survival. Bermudagrass greens were covered with pine straw in the 1920s to promote winter survival. More recently, wooden mats, straw mulch or impermeable synthetic blankets installed for consecutive months during the winter have been shown to improve winter survival of annual bluegrass and creeping bentgrass putting greens. However, the demand for year-round play has made using these winter-long covers unfeasible.

Temporary and moveable winter covers, such as woven fiber and plastic blankets, are another option that can be used to trap heat energy near the soil surface and

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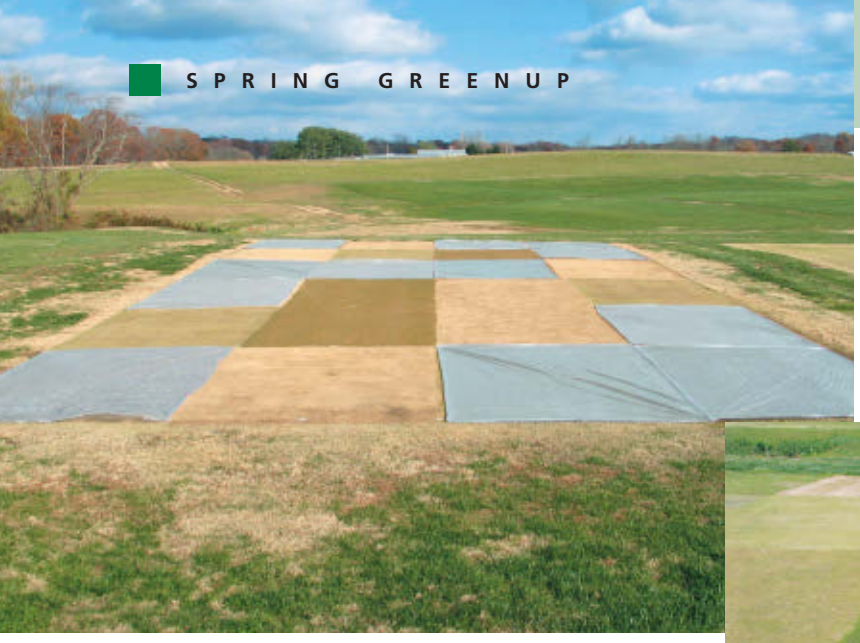
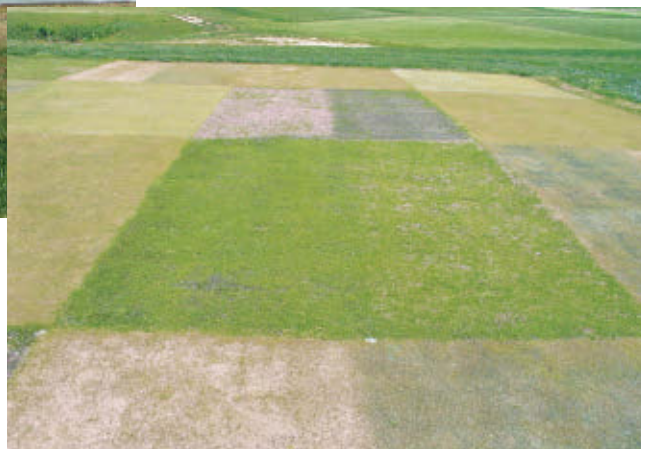


(Above) The plot area in November 2008. Covers were in place because temperatures were below 25 degrees F, but paint had not yet been applied.



(Below) Seashore paspalum plots in April 2009. The lower plot was covered throughout the winter. The covered paspalum plot had much more green turf cover at this late April date than the uncovered plot.

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keep the soil and air temperatures around the turf surface warmer than the ambient air temperature, which can protect turf from winter injury. Previous research has shown moveable covers to enhance fall color retention, winter survival and spring regrowth of bermudagrass maintained at heights above 0.75 inches and on MS-Express bermudagrass maintained at putting green height. However, no research has been conducted regarding the effects of temporary winter covers on the more commonly used ultradwarf bermudagrass cultivars like Champion and TifEagle, or other species.

Historically, superintendents have overseeded warm-season greens to help maintain acceptable aesthetics. However, surface quality and aesthetics often decrease during fall establishment of the overseeded turf and spring transition back to the warm-season turf. Additionally, overseeded surfaces require more fertilizer, water and pesticide inputs than nonoverseeded turf and the shade created from the overseeded turf can impede spring greenup of the warm-season turf. To provide green color on the putting surface during the dormancy period without the drawbacks of overseeding, warm-season putting greens are often painted with a green latex paint. However, the impact of painting the surfaces on soil temperature, turf surface temperature and winter survival is unknown.

To those ends, the objective of this research was to determine the impact of polyethylene covers used during periods of low temperature and the use of latex paint on low temperature injury and pace of spring greenup of warm-season putting green species in the transition zone.

This study was conducted on a sand-based putting green at the East Tennessee Research and Education Center in Knoxville. Champion and TifEagle bermudagrass, SeaDwarf seashore paspalum and Diamond zoysiagrass were established from sod in 10-foot by 5-foot plots in July 2008 and maintained under putting green conditions, including mowing at 0.125 inches six times per week and irrigating two to three times per week. Bermudagrass and seashore paspalum plots received 6 pounds, 1.5 pounds and 2.5 pounds of nitrogen (N), phosphorus (P) and potassium (K) per 1,000 square feet, respectively, for the year, while the zoysiagrass plots received 3 pounds, 1.5 pounds and 2 pounds of N, P, and K per 1,000 square feet respectively.

Polyethylene covers (Evergreen, Covermaster Inc., Rexdale, Ont., Canada) were randomly applied to one half of the plots for each of the green variety/species when the forecast low temperature was to be ≤ 26 degrees Fahrenheit. Covers remained in place if temperatures were forecast to be ≤ 37 F, but were removed if temperatures were forecast to be >37 F. A green latex paint (MatchPlay Ultra Dwarf Super from Pioneer Athletics

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in Cleveland) was also randomly applied to one-half of the plots for each putting green variety/species. The paint was mixed using a 1 to 10 paint/water mixture applied in three directions. Covers and paint were applied in factorial fashion. So the four main treatments were covers and paint, covers without paint, paint without covers, and the untreated control that didn't receive covers or paint for each of the four varieties/species.

Turf surface temperature underneath the covers was measured weekly using an infrared surface thermometer. Soil temperatures at a 1-inch depth were collected weekly with a soil temperature probe. A visual observation of green turf covers was taken weekly to assess how long different varieties/species took to emerge from dormancy.

Polyethylene covers and turf variety/species significantly impacted turf surface temperature in 2008, although the presence or absence of latex paint didn't significantly alter surface temperature. Covered plots tended to have a higher surface temperature than uncovered plots. Diamond zoysiagrass and SeaDwarf seashore paspalum generally had higher surface temperatures than the bermudagrasses, both when covered or uncovered. SeaDwarf had a much darker dormant color than the ultradwarf bermudagrasses, while Diamond zoysiagrass did not entirely go dormant and maintained some green color. Latex paint applications did tend to increase surface temperatures slightly over nonpainted, noncovered plots, but the change was not statistically significant.

Covers and turf variety/species also significantly impacted soil temperature in 2008. Covered plots returned significantly higher soil temperatures than uncovered plots on nearly all rating dates. Among the uncovered plots, SeaDwarf seashore paspalum often returned the highest soil temperatures, likely because of its longer color retention in the fall and dark dormant color. Latex paint applications had no effect on soil temperatures.

Additionally, covers and turf variety/species significantly impacted the time of complete spring greenup. Covered Diamond zoysiagrass fully recovered from dormancy in early April, four weeks before any other variety/species. Both Champion and TifEagle fully recovered in May when covered, but didn't fully greenup for an additional three weeks when not covered. Covered SeaDwarf completely recovered in May, as did the bermudagrass varieties, but had significant winter injury when not covered, delaying its complete greenup until August. Non-covered plots treated with latex paint applications tended to have greater amounts of green turf cover than non-covered, non-painted plots in the first two weeks after dormancy had broken, but green turf cover was similar for all plots two weeks after dormancy emergence.

Polyethylene covers increased turf surface temperature and soil temperature when used during cold periods. Polyethylene covers also enhanced spring greenup of all varieties/species except for Diamond zoysiagrass, which emerged from dormancy earlier than all other varieties/species, regardless of cover application. Latex paint applications had a slight effect on surface temperature and spring greenup, but not enough to be statistically significant.

Painting warm-season greens is a viable practice and a cost-effective alternative to overseeding in the transition zone. But painting alone is not enough to protect warm-season putting greens from winter injury. Golf courses in the transition zone seeking to regrass their putting greens to a warm-season species should consider purchasing some sort of turf cover to ensure their greens survive the winter and emerge from dormancy quickly.

Painting alone is not enough to protect warm-season putting greens from winter injury.

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REFERENCES

Beckett, H. 1929. Covering bermudagrass greens for winter protection. Bull. USGA Green Sect. 9:175.

Dionne, J., Dubé, P., Laganiére, M., and Desjardins, Y. 1999. Golf green soil and crown-level temperatures under winter protective covers. Agron. J. 91:227-233.

Goatley, J.M., J.P. Sneed, V.L. Maddox, B.R. Stewart, D.W. Wells, H.W. Philley. 2007. Turf covers for winter protection of bermudagrass golf greens. Applied Turf. Sci. 1-9.

Goatley, J.M., V.L. Maddox, D.L. Lang, R.E. Elmore, and B.R. Stewart. 2005. Temporary covers maintain fall bermudagrass quality, enhance spring greenup, and increase stem carbohydrate levels. Hort Science. 40:227-231

Johnston, W. J., and Golob, C. T. 1997. Using a turf cover in combination with winter applied plant growth regulators on putting greens. Int. Turf Soc. Res. J. 9:328-333.