New Tools Promise Help In Dollar-Spot Battle

By Nathan R. Walker

Dollar spot is an invasive and destructive disease of many turfgrasses, especially creeping bentgrass used on putting greens. It's a persistent disease frequently encountered by turfgrass managers, and for that reason more money has been spent to suppress dollar spot than any other turfgrass disease (Vargas, 1994).

Unfortunately, many frustrated turfgrass managers have encountered fungicide-resistant strains of dollar spot that are not effectively controlled by current fungicide chemistries. The presence of resistant strains has resulted in reliance on protectant fungicide chemistries, which need to be applied frequently and usually at greater expense than fungicides with long residual activity.

Due to the notorious nature of dollar spot, any new advance in its control will be of great interest to the turfgrass pest management community. Recently, BASF Corp. discovered a new type of fungicide chemistry known as boscalid, which is extremely effective at managing dollar spot. Boscalid, under its proposed trade name Emerald, has systemic properties within the plant and is effective at inhibiting most dollar spot growth stages. Emerald inhibits a specific and vital metabolic pathway within fungal cells. More specifically, this system is referred to as the complex II within fungal mitochondria. Emerald, however, is different in that the mode of action and the metabolic site it affects are not the same as strobilurins and all other turfgrass fungicides currently on the market.

The product with the most similar (but not identical) mode of action on the shelf today is flutolanil (ProStar) in the carboximide family. ProStar does not have significant activity against dollar spot, however.

Although Emerald is not currently available on the market, its name is recognized by many superintendents because it has been evaluated for activity against dollar spot in numerous field studies conducted by university personnel across the United States. In these trials selected to evaluate its performance, Emerald performed well under a variety of conditions and environments. In cooperation with superintendents, Emerald has also been evaluated under real-world conditions at U.S. golf courses with excellent results against dollar spot, including those locations which have historically difficult to control or resistant dollar spot, such as Atlanta Athletic Club (Duluth, Ga.) and Woodholme CC (Pikesville, Md.).

As dollar spot spreads across the country, superintendents are looking for new tools to battle it.

When evaluated in trials conducted at Oklahoma State University in 2002, conditions were established to encourage dollar spot on creeping bentgrass. The creeping bentgrass cultivar SR 1020 was selected for disease susceptibility, and irrigation was used to encourage dollar spot incidence and severity. In addition, the research area was not treated with fungicides during the previous dollar spot outbreak to ensure a high incidence and uniform appearance of the disease the following spring. All of these measures were taken to evaluate the performance of materials when challenged by the most severe dollar spot disease pressures.

Fungicides were applied to the turf using a carbon dioxide (CO_2)-pressurized (40 pounds per square inch) wheelbarrow sprayer

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equipped with TX8008 flat fan nozzles and calibrated to deliver 2 gallons per 1,000 square feet. The turf was mowed at a height of .16 inches six days a week, and applications were conducted at 14-, 21-, and 28-day intervals.

Treated turfgrass was rated for quality because dollar spot lesions can range from large, sunken patches to small flecks.

Emerald was also included in a rotation program with another BASF experimental fungicide, Insignia (pyraclostrobin). Each product was alternately applied on a 14-day interval.

The number of dollar-spot diseased areas, and the overall quality of the turfgrass, was evaluated weekly until disease subsided, which typically occurs in late June.

Emerald applied at .13 ounces per 1,000 square feet provided fast and excellent suppression of dollar spot throughout the study (Figure 1). Disease suppression by Emerald was also evident when the applications were made every 21 or 28 days.

For example, when Emerald was applied every 21 days at .13 ounces per 1,000 square feet, almost no disease was detected at the end of the study. Likewise, when Emerald was applied every 28 days at a higher rate, .18 ounces per 1,000 square feet, very little disease was present in the treated areas.

When Emerald was rotated with Insignia at .9 ounces per 1,000 square feet and applied every 28 days at .13 ounces per 1,000 square feet, a similar reduction in dollar spot was also observed.

In contrast, disease severity during the evaluation period continued to increase for turfgrass treated with one of the newer chlorothalonil products applied every 14 days at 3.2 ounces per 1,000 square feet or when not treated at all by a fungicide.

The treated turfgrass was also rated for quality because dollar spot lesions can range from large, sunken patches to small flecks. To evaluate turfgrass quality, a rating scale was used where 1 equalled thin, discolored turf and 10 equalled thick, healthy desirable turf. When rated for quality, Emerald treated turfgrass was equally impressive (Figure 2).

Turfgrass treated with Emerald on a 14-day interval received a quality rating of 9.75. When the application interval was lengthened, quality ratings ranged from 9.88 for Emerald applied every 21 days to 9.63 for the 28-day interval. The turfgrasses treated with the newer chlorothalonil received a quality rating of 7.75, and the nontreated areas were rated a poor 5.5.

In addition to superb dollar spot control, Emerald has demonstrated excellent activity

FIGURE 1

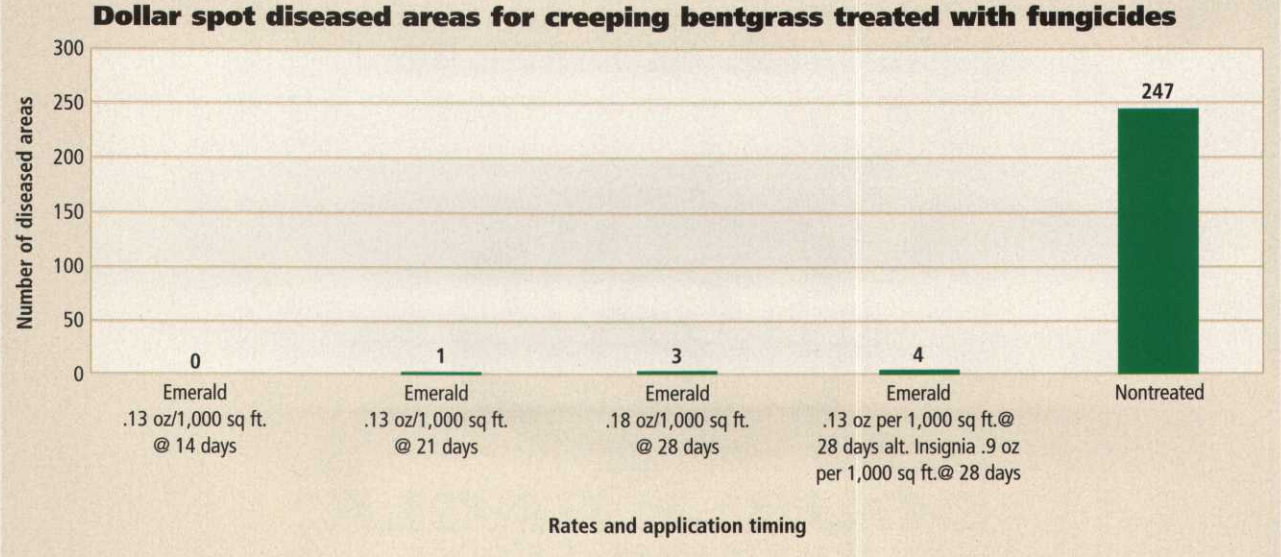
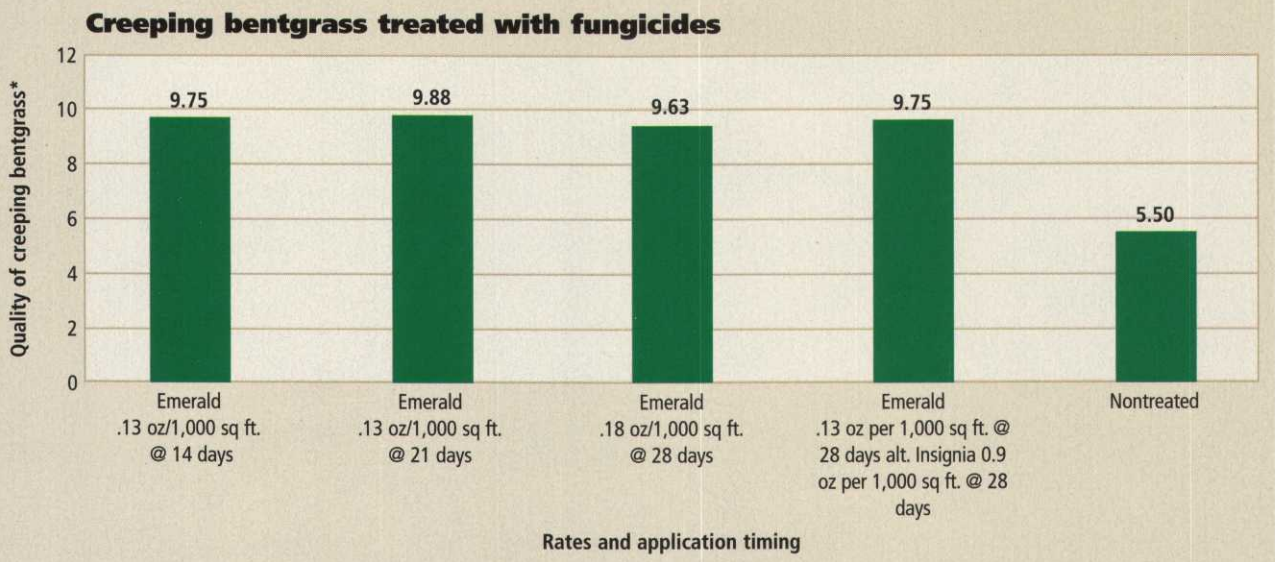


FIGURE 2



*Evaluated on a rating scale where 1 = thin, discolored turf and 10 = thick, healthy desirable turf

against a new disease, bentgrass dead spot, caused by Ophiosphaerella agrostis. In a limited number of field trials conducted over the last few years, Emerald appeared to work well against this emerging disease.

The excellent activity of Emerald against dollar spot has great implications for disease management programs. It is a new class of chemistry and is effective against dollar spot isolates, which are resistant to benzimidazoles, dicarboximides, and DMI (sterol-inhibiting) fungicides.

In addition, because Emerald is systemic within the plant, it can be used prior to the onset of disease or after disease symptoms have begun to appear.

Turfgrass managers can feel free to rotate to any different class of chemistry when managing disease because of Emerald's unique mode of action. Even though Emerald belongs to the same chemical family as ProStar, there is no reason to suspect that the inclusion of both Emerald and ProStar in disease management programs will have any negative impact on turfgrass disease management programs.

Due to the disease suppression by Emerald and the remarkable ability of the dollar spot causal agent for developing resistance to fungicides, there are concerns about future, exclusive reliance on this new chemistry for dollar spot management.

To limit the selection of isolates less sensitive to Emerald, no more than two consecutive applications of Emerald should be permitted. Once two applications of Emerald have been made, superintendents must rotate to another fungicide labeled for dollar spot before reapplying Emerald.

The great interest in Emerald has many turfgrass managers asking when can they expect to see Emerald reach the market. Emerald is undergoing an expedited review by the EPA, and BASF Corp. expects registration later this year. Emerald will be available as a 70 percent water dispersible granule and will be labeled for use on golf course turfgrasses for dollar spot and bentgrass dead spot management at the rate of .13 ounces to .18 ounces per 1,000 square feet.

As with any new product, there is, and will continue to be, great interest in Emerald. Its toxicity profile, specificity, unique mode of action and effectiveness will allow Emerald to be adopted into turfgrass-integrated pest management programs when the product becomes available on the market.

Walker is an assistant professor in the Department of Entomology and Plant Pathology at Oklahoma State University. His specialty is turfgrass integrated pest management and turfgrass pathology.

REFERENCES

Vargas, J.M. *Management of Turfgrass Diseases.* 2nd Ed. Boca Raton: CRC Press. 1994

QUICK TIP

Billbug larvae, not adults, cause most of the damage by feeding in the stems and crown of the turfgrass plant. Older insecticides relied upon controlling billbug adults in early spring, prior to egg lay or larval emergence. Preventive applications of Merit will control the damaging larval stage because of Merit's systemic activity within the plant.