FEATURE ARTICLE

Compass®: A New Turf Fungicide for 1999

Peter H. Dernoeden

Compass®50WDG (trifloxystrobin) was registered by the U.S. EPA in late 1998 and should be available for sale by the summer of 1999. Compass is a stobilurin-type fungicide and therefore it is in the same class as Heritage® (azoxystrobin). Both Compass and Heritage have similar modes of action and generally target the same diseases (i.e., brown patch, anthracnose, *Helminthosporium* leaf spot, gray leaf spot, summer patch, and *Pythium* blight). Like Heritage, however, Compass only provides about seven days of residual effectiveness on *Pythium* blight, and both fungicides are marginally effective in controlling snow molds.

Both Compass and Heritage interfere with respiration in sensitive fungi. By disrupting the flow of electrons in mitochondria during respiration, the production of the key energy compound known as ATP is reduced. ATP provides energy that drives many biochemical reactions in all living cells. When ATP production becomes limited, many vital cell reactions stop and sensitive fungi cannot grow or reproduce. Indeed, most fungicides do not kill fungi, but act as fungistats that inhabit their ability to grow.

According to Novartis, the company that developed Compass, the chemical has some very unique characteristics, which distinguishes it from other fungicides. Unlike other contacts or penetrants, Compass becomes tightly fixed within the waxy portion of cuticle, and most of the active ingredient remains outside of and embedded in the surface of leaves. Compass can be redistributed by dew or rain on leaves for several days after application. Furthermore, some molecules in the vapor phase can move 2 to 3 inches (50–75 mm) within the turf canopy, thereby redistributing the product to nearby leaves that can reabsorb the fungicide. Hence, adjacent untreated leaves can indirectly pick up the compound. The length of time and the conditions under which Compass can remain in a vapor phase are not clearly understood. A small, but biologically active number of molecules penetrate leaves and move across the mesophyll from the upper to lower leaf surfaces and vice versa. Compass, however, does not move within the transpiration stream. That is, there is no upward or downward movement of the fungicide as in the xylem of plants. In this regard, it is similar to localized penetrants such as Chipco 26GT® (iprodione) and Curalan® (vinclozolin). Evidently, there exists an equilibrium between Compass molecules in the wax and the Compass molecules inside the leaf. As molecules in the leaf are metabolized or otherwise broken down, additional molecules will move into the leaf from the wax to maintain the equilibrium. This dynamic accounts in part for the generally long residual effectiveness (14 to 21 days of disease control depending on rate, disease, and disease pressure) of Compass. Most of the fungicide therefore is lost as a result of mowing. The application of the plant growth regulator Primo (another Novartis product) and possibly other plant growth regulators may help extend the residual effectiveness of Compass by reducing mowing frequency. Most other penetrants, including Banner®, Bayleton®, CL 3336®, Heritage, etc. do move upward in the transpiration stream, and are often described as acropetal (i.e., upward moving) penetrants.

Scientists in both the agro-chemical industry and the academic community are concerned that golf course superintendents will over-apply fungicides from the same chemical class. This has the potential to limit the long term value of Compass and Heritage as well as other fungicides. As with most fungicides, turf pathogens can become insensitive to Compass and Heritage. Compass and Heritage would exhibit cross resistance; that is, if a pathogen is resistant to Compass it will be resistant to Heritage and vice versa. The resistance problem in turf, however, is largely restricted to *Pythium* blight and dollar spot. Neither Compass nor Heritage will control dollar spot and therefore they are not used for managing this disease. However, if dollar spot is active at the time Compass or Heritage are to be applied, the aforementioned materials must be tank-mixed with a fungicide with activity against dollar spot. In *Pythium* control programs, Compass (0.15 oz/1,000 ft^2; 4.3 g/93 m^2) performs better when tank-mixed with Subdue MAXX® (0.5 fl. oz/1,000 ft^2; 14.5 mL/93 m^2). Regardless, it is generally best to alternate fungicides with different modes of action. Tank-mixing fungicides with different modes of action also delays the potential for resistance and many combinations tend to provide a broader spectrum of diseases controlled as well as improved residual effectiveness. Other good reasons to alternate fungicides with different modes of action would include avoiding disease resurgence and reduced residual effectiveness due to enhanced microbial degradation.

While Compass has curative activity, it should be used at higher rates once disease symptoms appear. Compass therefore is better utilized in preventive programs. The label use rates range from 0.10 to 0.25 oz of product/1,000 ft^2 (2.9–7.2 g/93 m^2). Brown patch (*Rhizoctonia* spp.), anthracnose (*Colletotrichum graminicola*), and red

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A Promising Topdressing Approach for High-Density Cultivars

James B Beard

A concern in the culture of the new high-density cultivars of both creeping bentgrass (*Agrostis stolonifera*) and dwarf hybrid bermudagrass (*Cynodon dactylon* x *C. transvaalensis*) under very-close mowing heights of 1/8 inch (3.2 mm) or less on putting greens **has been the difficulty in getting topdressing material down into and through the turfgrass canopy.** Now a few superintendents report a new approach that shows promise. Specifically, it involves **topdressing followed by a light/shallow vertical cutting which greatly accentuates the movement of sand topdressing material into the turf canopy.** The higher the topdressing rate applied, the deeper the vertical cutting that should be considered. It also should be indicated that **using sand particles in the lower two-thirds of the USGA particle size distribution range is helpful.**

Comments: When using vertical cutting in combination with topdressing, one should be aware of the potential for added abrasive effects on the grass leaves which could accelerate the occurrence of certain diseases, as the wounds serve as invasion sites for causal pathogens. **For this reason, scheduling the vertical cutting-topdressing combination for periods when disease activity is minimal may prove advisable.** Please note that this technique is in its early phase of development and has shown promise, but it probably will require further use under a diversity of situations to completely understand the proper application and long-term success as a part of a routine cultural program. If you are interested in testing the approach, try it first on a nursery green or the back portion of a large regular putting green.

ASK DR. BEARD

Q *Are there preferred times to schedule foliar feeding applications?*

A It should be noted that foliar feeding involves the application of a small amount of nutrients in a quantity of water such that there is no run-off from the leaves. This maximizes uptake of the nutrients primarily through the stomatal openings in the leaves and stems. Since a majority of the foliar applied nutrients are taken up through the stomatal, it is best to make the application when the stomata are open. The main prerequisite for stomatal opening is light. The stomata are open only during the daylight hours. A second controlling factor is the potential for internal plant water stress. When the evapotranspiration rate exceeds the water uptake rate from the roots, a negative internal water stress develops, with one of the first plant responses being closure of the stomata. It is not uncommon for stomatal closure to occur daily at midday during periods of peak evapotranspiration. Thus, it is advisable to avoid foliar feeding applications during this midday period when the potential for stomatal closure is great, especially under conditions of peak evapotranspiration and limited root growth.

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Compass®...

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thread (*Laetisaria fuciformis*) are effectively controlled for 14 or more days at 0.10 to 0.15 oz/1,000 ft^2; whereas, the 0.15 to 0.25 oz/1,000 ft^2 range is preferred for gray leaf spot (*Pyricularia grisea*) management. The higher rate range of 0.20 to 0.25/1,000 ft^2 is recommended for controlling summer patch (*Magnaporthe poae*) and *Pythium* blight. Rust (*Puccinia* spp.) and *Helminthosporium* leaf spot also are controlled, but Compass appears to be less effective against snow molds (*Microdochium nivale* and *Typhula* spp.)

Reference

Compass Technical Bulletin. 1999. Novartis Crop Protection, Inc., Turf & Ornamental Products, Greensboro, NC 27419.