



# Getting the Most Out of Fungicides

By Dr. Julie Meyer  
 Department of Plant Pathology  
 University of Wisconsin-Madison

With current attempts in keeping fungicide use to a minimum, every single application of fungicide is important. Therefore, it is a good idea to think about how to apply fungicides in a way that takes full advantage of their fungicidal properties. This will ensure greater success with disease control and will make the most out of time and money spent. There are several ways to do this.

**Use the optimum dilution rate.** The initial dilution level of the spray mix can significantly affect how effective the fungicide treatment will be. Strangely (from a plant pathologist's point-of-view), fungicide effectiveness has historically not been the criteria used to determine the optimum dilution rate of the spray mixture. For example, large amounts of water were used with the old cadmium and mercury-based fungicides because of their toxicity to turf. More recently, the practice of spraying large areas has dropped the common dilution level to 1 or 0.5 gallons of water, or even less. The most effective dilution rates for most fungicides, based on fungicide effectiveness and longevity of control, lie somewhere in between. Table 1 lists some common fungicides and their optimum dilution rates for several common foliar diseases. The optimum dilution rate for control of root diseases such as summer patch, necrotic ring spot or take-all patch is somewhat higher because the fungicide needs to reach the pathogen on the root system. For example, Bruce Clarke, turf pathologist at Rutgers University, reported at the 1994 Wisconsin Turfgrass EXPO that fungicides used to control summer patch (*Magnaporthe poae*) were more effective when applied with 4-5 gallons of water compared to lower dilution rates.

**No rainfall or irrigation after treatment.** Many of you worry about summer showers or autumn rains when planning a fungicide treatment. And worry you should! Rain that occurs after a fungicide is applied but before the leaves are dry will indeed wash away some of the material and result in a less effective treatment. Systemic fungicides are slightly less affected by rainfall after application. However, they will be more effective if allowed to dry. This raises the question of applying fungicides with a low volume of water, and then turning on the irrigation system to "water in" the material. Unfortunately, this practice is likely to reduce the effectiveness of protectant fungicides. Although it may not reduce the effectiveness of systemics very much, it will not make them more effective either. The bottom line is that the initial amount of water used in the spray formulation is likely to determine the effectiveness of the fungicide treatment.

A sticking agent will help to increase the fungicide effectiveness and longevity of control. A sticker will not keep the material on the leaves if they get wet before the fungicide has dried, but it will help keep the material on the leaves if rainfall or irrigation occurs shortly after the material dries on the leaf.

**Reduce calibration, mixing and application errors.**

Errors in mixing and applying fungicides are common. Probably the single most important thing to reduce error is to make a priority of keeping the spray equipment calibrated and in good working condition. This is common sense, but is a frequent point where errors are made, effectiveness is compromised and money is wasted. Tank mixes are popular and can work, but it is especially important to read the label for potential incompatibilities. If the materials in the mix are physically or chemically incompatible, they will not work for you and may burn the turf. Finally, attention to good technique is important when applying the fungicide, so that a thorough, even application is made.

TABLE 1

## Optimum dilution rates for some common turf fungicides

Fungicide	Optimum dilution/M <sup>1</sup>
Daconil 2787®	1 gallon
Dyrene®	1-2 gallons
Bayleton®	2 gallons
Chipco 26019®	0.5-4 gallons
Banner®	2 gallons
Vorlan®	1-2 gallons

<sup>1</sup>Materials applied at low label rates in 0.25, 0.5, 1, 2, 4, 8, 16, or 32 gallons water/M. Diseases were dollar spot, brown patch or melting out. From: Couch, H.B. 1985. *Golf Course Management* 52: 73-76.

**Good cultural practices.** Good cultural practices such as adequate and timely fertilization, timely irrigation, keeping mowing heights as high as possible, controlling thatch and managing for good soil quality keeps plants growing vigorously. Vigorous plants are naturally more resistant to plant diseases and can help keep pathogen populations in check. Over time, this will enhance the effectiveness of fungicides and reduce the number of applications needed.

Applying fungicides at an optimum dilution rate, with well-calibrated equipment, alone or in a sound, proven tank mix, with careful attention to thorough, even coverage will make these materials work for you the way they were intended. This may not only ensure greater success in disease control, but may also reduce the number of applications needed; thereby saving money and minimizing exposure to applicators and to nontarget organisms. This is the ideal situation we are striving for. 🌱