FUNGICIDE MIXTURES — *WHAT ABOUT THEM?*

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Whether fungicides should be combined in the tank for turf disease control is a question I have been asked many times. The answer I usually give is "it depends upon the situation". That's something of an evasive answer, of course, but what are some of the reasons for putting chemicals together — some advantages, and why should I *not* consider it in some other instances?

First of all, the jury is not in on the question in many situations. It becomes a matter of arm chair judging and guessing, based on a little bit of information and a whole lot of speculation. Here are some thoughts about it, from my perspective.

1. The right combinations offer the chance of broadening the number of pathogens that can be controlled at any one time. An example of this is any of the Pythium-controlling chemicals such as Aliette, Banol or Subdue with almost any other fungicide. That's an easy one, and something you might consider when the weather patterns call for it. A better example might be when you've been using a sterol inhibitor, such as Bayleton or Rubigan, and you have a hint or concern that Helminthosporium might be ready to cause some damage.

2. The right combinations might increase the efficacy of both chemicals through some form of synergistic reaction. This is often hinted at, but I really doubt if it occurs very often. In the summer trials where we've looked at combinations, the results are always about the same as the *most effective* chemical member of the mixture. This is true both from the standpoint of effectiveness and period of activity. Adding two compounds has seldom given any indication that the benefits last longer than the better of the two compounds. This doesn't say it couldn't happen, and as a matter of fact we keep looking for that possibility. But most chemicals have their own chemical mode of action, and there's little reason in my opinion to expect something unusual and beneficial to occur.

We have seen an exception to this with some regularity, and that is with snow mold control. It often happens that we get better results when any of several compounds are used together, either for gray or pink snow mold control. So I think combinations are clearly the way to go for winter disease protection. We often get better results using half-rates of two or more compounds than we get with full rates of either product alone.

3. Another reason often considered is the need to prevent buildup of resistant strains of pathogens. It's a shame we didn't know about this potential when the benzimidazoles first came on board. But this is a very difficult question to deal with. There's no sure-fire way to know what's happening. The chemical industry advocates this approach when using products that are particularly prone to this potential, such as the dicarboximides or metalaxyl. Metalaxyl has been used for several years now in potato fields as a formulated mixture with several contact fungicides for late blight control, and there's been no evidence of problems to date. And some Pennsylvania greenhouse work that looked at buildup of resistant strains of turf Pythium in alternating versus tank-mixed metalaxyl (Subdue) plus mancozeb (Fore) showed an advantage of the combinations over alternate applications to keep the resistant strain from increasing. Also suggested in some circles is to use the resistance-prone but premier fungicide *only* when the disease problem is most intense or most likely, and limiting the number of applications per season, thus leaving to other periods the fungicides that are less effective but also less subject to resistance problems.

If tank mixtures are to be used, and one wants to keep down the chance of resistance occurring, the combinations and the *rates* ought to be properly selected so that they are using different modes of action *and* so their period of efficacy covers the same time period. Using Daconil or Dyrene with lower rates of a benzimidazole or sterol inhibitor is an example. If one uses the full rate of the systemic and allows 21-30 days for dollar spot control, there will be a window of 10-20 days when the contact fungicide offers no help at all, the buildup of a resistant strain theoretically could emerge.

Alternating fungicides is certainly a simpler approach, in that one knows what to expect from each compound, including the anticipated activity period. It is likely to be the more economical approach, and in my assumptions at least, will require less total fungicide, and thus less potential insult to the environment. But you may want to look at the results we had over the past several seasons alternating between Daconil and Bayleton for Poa decline control. The failure of the alternating applications to be as effective as either product used alone throughout the season leaves us scratching our heads for an explanation.

I think we have a lot more to learn about using our fungicides most effectively. In the meantime we are extremely fortunate to have an arsenal of chemical weapons that really are quite remarkable in their capacity to give us good quality turf while we ponder what is the ideal way to use them most effectively!

The 1988 Turfgrass Conferences, sponsored by the UW Extension and the University of Wisconsin College of Agricultural and Life Sciences, are fast approaching. The meeting schedule (and location) follows:

Milwaukee — Monday, March 7, Extension Office on Watertown Plank Road.
Madison — Tuesday, March 8, Holiday Inn, SE
Appleton — Wednesday, March 9, Columbus Club
Eau Claire — Thursday, March 10, Holiday Inn

All programs bgin with 9:00 a.m. registration and conclude at 4:00 p.m.

For more information, contact Dr. Robert C. Newman, Department of Horticulture, UW-Madison.