



# Fungicide use on athletic fields

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**L**ike every other living thing, turfgrasses suffer from disease. While many of these diseases are a minor nuisance in low maintenance turf, they can quickly become a very costly problem in high maintenance stands like athletic fields. In fact, the more uniform a stand of turf, the more susceptible it is to disease. Compounding this problem is that even a minor flaw on high maintenance turf will become readily apparent to even the most casual observer.

There are a number of different strategies for dealing with disease on athletic fields. The strategy you choose will depend upon many factors but the most important considerations are the available budget and the intensity of management. A larger budget allows for more fungicide applications and an intensely managed turfgrass will require more pesticide inputs.

Of course, the target pathogens will also have a major impact on fungicide usage. Some pathogens have a very narrow time frame in which disease is expressed and may require only a single preventative fungicide application. Other diseases may persist throughout the growing season. And geographical location has a major impact, e.g., Grey Leaf Spot is common throughout the mid-Atlantic, but it is rarely found in New England.

Regardless of the disease involved, combating them usually requires fungicides. Fungi are the primary causal agents in almost every case of turf disease. Fungicides, however, are not inexpensive. The cost of a single fungicide application can easily reach into the tens of thousands of dollars for a large athletic complex, depending upon which chemical is being applied. Consequently, the specific active ingredient, fungicide rate, timing, and host grass must all be carefully considered before committing to a fungicide application.

Even if the budget does allow for continuous application of very expensive fungicides, that in itself is not a good justification for fungicide application. Excessive fungicide applications do more harm than good by encouraging fungicide resistance unnecessarily and by causing potential non-target effects.

## Preventative vs. curative

The terms "preventative" and "curative" are often used in regards to fungicides.

Unfortunately, people regularly confuse their usage when dealing with rates and application timing. A "preventative application" is put down before fungal infection takes place. "Preventative rate" refers to the lowest recommended labeled rate. A "curative application" is put down after fungal infection takes place. The "curative rate" is the highest labeled rate. It is important to realize that a rate and an application are not the same thing. While a "preventative rate" is generally used in a "preventative application," higher labeled rates may be used when disease pressure is likely to be severe. An additional difficulty is that fungal infection occurs before disease symptoms are observed. A causal agent may be infecting tissue but not producing symptoms. In such a case, a "preventative rate" may not be successful.

Applying fungicides before disease expression is an excellent strategy on high maintenance facilities that can afford regular fungicide applications. Once a disease has established itself, it requires higher rates and careful attention to minimize the disease's impact.

The real trick is determining what disease to spray for preventatively. Environmental factors play a major role in disease expression. New England has notoriously variable weather during the growing season. In 2002, anthracnose was extremely severe. In 2003, summer patch was at its height all season long and very little anthracnose was observed.

No one reliably can predict disease severity and weather conditions 1-2 months in advance. As a result, the best predictor of disease expression is past experience and the next 2-week weather forecast. Although not foolproof, preventative applications based on these parameters can save a lot of headaches. For example, if *Pythium* has been a problem on a soccer field in previous years and the next week's forecast is calling for 80 percent humidity and 90 degree temperatures, a preventative *Pythium* application is probably warranted. The weather may turn out to be dry and cool, but a fungicide application will surely cost less than losing all your turf should the weather become favorable for the disease.

## Labeled diseases

While it is true that the label is the law, the label is not really the most reliable source for choosing the right fungicide for your particular need. It is illegal to use a product against a pathogen for which it is not labeled. But just because a product is labeled for a specific pathogen does not mean it is the best product for that particular



pathogen. When a chemical company registers a fungicide, they try to get it labeled for as many diseases as possible. The more pathogens on the label, the more widespread its use and thus the more profit for the company. While a fungicide should work against every disease or pathogen on its label, it often does not. Don't blame the manufacturer, it's not usually their fault. Some fungi have developed widespread resistance to a chemical and it just doesn't work anymore. Some chemicals only worked marginally from the start. And sometimes, newer chemicals hit the market that far surpass the performance of the others and just make them look bad.

There are a lot of fungicides available for turf use; about 30 different active



ingredients at last count. Often two or three of these individual active ingredients are combined in a single package, increasing the ability of that combination to combat fungi. Before I go into details on specific diseases, however, it is important to discuss the place of generics in the marketplace. When a manufacturer develops and registers a fungicide, they have exclusive rights to that chemical for 17 years from when it was patented. In reality, that may only give them less than 10 years of sales and marketing. Fungicide development is not a cheap prospect; it can easily cost tens of millions of dollars. When the patent runs out, anyone can then manufacture their version of the particular fungicide and sell it.

Generics usually offer a price incentive. And from our experience, the generics often work just as well as the original brand name products. But in order to keep their edge, the brand name manufacturers will constantly tinker with their product, trying to make it work a little better, a little faster, or work against more targets. This article is not intended to promote one specific manufacturer; instead we will share which active ingredients are most commonly used against specific pathogens. Trade names (both brand names and generic names) have been included but no endorsement is intended. In addition, lists of trade names are not exhaustive (new generics are constantly coming to market and it is often difficult to keep track of them all). One additional caveat: the recommendations below are specific to the Northeast. While they are likely to be applicable across most of North America, this is not always the case. Always consult with your nearest University Extension Service when in doubt.

**Dollar Spot.** Dollar Spot is the most prevalent turf pathogen around and requires constant fungicide applications to keep it in check. It is caused by *Sclerotinia homoeocarpa* and is most active in late spring and early fall but pops up throughout the summer. Both systemic fungicides and contacts are effective against the pathogen. The most commonly used systemics are thiophanate-methyl (Anderson's Systemic, Cleary's 3336, Fungo, Systec, T-Storm) and the DMI's. The DMI's are a large group of fungicides that include fenarimol (Rubigan), myclobutanil (Anderson's Golden Eagle, Eagle), propiconazole (Banner Maxx, Spectator, Propiconazole Pro) and triadimefon (Anderson's Fungicide VII, Bayleton, Lescro Systemic & Granular Fungicides). Unfortunately, resistance is most commonly seen first in these two groups of fungicides.

Other commonly used systemics include boscalid (Emerald), iprodione

(Anderson's Fungicide X, Chipco 26GT & 26019, Iprodione Pro, 18 Plus) and vinclozolin (Curalan, Touche, Vorlan). Pyraclostrobin (Insignia) has shown suppressive activity against Dollar Spot but not complete control. Chlorothalonil (ChloroStar, Concorde, Daconil, Echo, Manicure) and mancozeb (Dithane, Fore, Formec, Junction, Mancozeb) are the most commonly used and effective contact fungicides for use on Dollar Spot. These contacts can be used against Dollar Spot in the absence of a systemic but need to be applied every 14 days at a minimum and preferably every 10 days. While other products are available, those listed above are the generally the most commonly encountered and the most effective. While azoxystrobin (Heritage) is not labeled for Dollar Spot, it must be used with care when Dollar Spot pressure is high. When applied in the absence of fungicides labeled for Dollar Spot, it will actually increase Dollar Spot incidence.

**Brown Patch.** Brown Patch is often seen on many types of turf and can spread quickly. It is caused by *Rhizoctonia solani* and requires high humidity and temperature. Night temperatures usually need to be in the low 70's for this disease to pop up. While the same contacts used for Dollar Spot are effective against Brown Patch, the most effective systemic fungicides have not yet been mentioned. These include flutolanil (Prostar) and azoxystrobin (Heritage). The other strobilurins (or QOI's), trifloxystrobin (Compass) and pyraclostrobin (Insignia) are also very effective against Brown Patch. A very old fungicide, polyoxin-D, has recently been resurrected by Cleary's under the trade name Endorse and has worked very well in field trials. Fludioxonil (Medallion) has also proven very effective against Brown Patch. While the DMI's, thiophanate-methyl, iprodione and vinclozolin can be used against Brown Patch, they are simply not as consistently effective as those listed above. When these chemicals are used in an aggressive Dollar Spot prevention program, however, they will often provide sufficient control against Brown Patch.

**Pythium.** Pythium is very similar to Brown Patch in its environmental requirements and can spread even faster. However, the fungicides used to control this disease are completely different from those used for either Dollar Spot or Brown Patch. Multiple species of this organism are responsible for foliar Pythium blight. The most commonly used systemic for Pythium is mfenoxam (Anderson's Pythium Control, Subdue MAXX). Mfenoxam is actually a "refined" form of metalaxyl. Additional systemics include propamocarb (Banol) and fosetyl-Al (Aliette, Signature, Prodigy). The most commonly used contacts are chloroneb (Anderson's Fungicide V, Teremec) and etridiazole (Koban, Terrazole). All of these chemicals are very effective against foliar Pythium and also work well against cool season root Pythium. The QOI's are also labeled for Pythium and have been shown to be effective in many cases, however, they are not usually the chemicals of choice for controlling Pythium.

**Tank Mixes and Mixed Products.** Rotating fungicides is the key to delaying fungicide resistance. But for many fungicides, resistance is inevitable, regardless of how conscientious a rotation program. Faced with not being able to use a chemical to prevent resistance or using it until resistance develops, most people will choose to use it. When rotation is not an option or resistance is a major concern, tank-mixing fungicides is an additional method of reducing the likelihood of resistance development. By combining fungicides with multiple modes-of-action, resistance can be effectively blocked. In addition, a wider spectrum of fungicidal activity may be achieved.

Cost, of course, will increase with every additional component in the mix. Combining a systemic and a contact is an even better way to minimize resistance development, but care must be taken in choice of chemicals. Some systemics must be watered in. The efficacy of most contacts will be reduced when watered in. In order to simplify the process of tank mixing, many companies have developed products that combine multiple active ingredients. While none of these have been discussed in detail, they can save a lot of time and energy and are generally as effective as stand-alone products (for example, a thiophanate-methyl plus chlorothalonil product vs. just a thiophanate-methyl product), assuming that equivalent rates of active ingredient are used.

Whichever fungicide you choose to control a disease problem, make sure you have some reasonable expectation of success (in other words, use the appropriate tool for the job). Excessive applications are both costly and environmentally irresponsible. **ST**

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