

TurfGrass TRENDS

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The Basics of Turfgrass Fungicides Part 5: Record Keeping

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One of the more important aspects of maintaining highly effective fungicide programs is proper record keeping. This is also among the more critical aspects of developing successful IPM programs on golf course turf. Golf course superintendents, and other turfgrass managers for that matter, often take record keeping for granted. Even though the maintenance of fungicide and other pesticide records is required by state and federal laws, many superintendents fail to recognize the tremendous wealth of historical information and management insight that can be gained from properly prepared and maintained fungicide records. Often superintendents rely on memory for a large amount of this significant information. Unfortunately though, useful specific management knowledge is often lost as superintendents retire or move from course to course. In this article, we will explore the reasons for maintaining detailed records and show how these records can help not only in fungicide management, but in pest management in general.



Advances in spraying equipment have enabled superintendents to reduce the amount of fungicide applied while maintaining effective disease control. Photo courtesy: Smithco.

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Reasons for Record Keeping

There are a number of reasons for developing detailed records of fungicide applications and recording associated site and management factors. Perhaps most importantly, fungicide and other pesticide records are required by state and federal law. These requirements will be described later in this article.

Certainly one of the more important reasons for keeping detailed fungicide records is that they provide the only accurate historical record of fungicide applications to specific turfgrass sites. For example, documenting how the fungicide suspension was prepared, the precise rates applied, the weather conditions surrounding the application, and a detailed description of the outcome of the application may point to specific reasons for success or failure of the application as well as how such a control strategy might be improved in the future.

Proper fungicide records also provide a means of mapping important disease problems. Golf course superintendents often know where their problem disease areas are located. Keeping proper records will provide a means of tracking how disease symptoms change in these and potentially new areas with time and with fungicide application. In most cases, disease symptoms tend to appear in the same location year after year. This is due mainly to the fact that few fungicides actually eliminate pathogens from these sites. Rather, they simply stop the pathogen from growing. Some patchtype diseases, for example, tend to show increased patch diameters from year to year. Including this type of information in fungicide records will eventu-

ally allow you to map effectively disease symptoms and establish longer-term trends in control efficacy. Along those same lines, detailed records can help you keep track of other management practices, such as fertilization, irrigation, and cultivation practices, that impact disease severity and the efficacy of fungicide applications.

What Should Be Recorded?

Ideally all of the following items should be recorded in conjunction with any fungicide application. Modify them to fit your specific needs:

1. **The name of the material applied.** Include the trade name, formulation, active ingredient (common name), and EPA registration number. This is important for satisfying legal reporting requirements of pesticide usage.
2. **Date and time of application.** Of particular importance is the time of day, particularly if it varies from the usual application times
3. **The area treated.** Recorded either in square feet or in acres.
4. **Total amount of material applied.** Include the intended or measured rate of active ingredient as well as the total amount of material applied to the turf. It is also useful to record the rates of water in which the fungicide was applied (e.g. gallons/1000 ft²).
5. **Tank storage time and pH.** It is usually best to apply fungicides immediately after mixing since a number of fungicides degrade with extended storage time in the tank. In cases where the water supply comes from multiple sources, it is important routinely to

monitor and record the water pH since this too will affect fungicide degradation.

6. **The amount of post-application irrigation.** This is best expressed as gallons of water per unit area.

7. **The target disease.** This information should indicate whether this diagnosis was a personal diagnosis or a clinical diagnosis. It is important to indicate whether the diagnosis was made prior to the fungicide application or after. The date and specific

location of sampling and the date of diagnosis also should be recorded.

8. **Weather conditions.** These should include the conditions prior to the appearance of symptoms and the conditions at the time of application.

9. **Apparent results of the application.** This is one of the more important records to keep since often it is not clear whether the application was successful or if weather changes made the symptoms disappear.

Diagnostic Record

Golf Course _____

Date & Time of Problem Appearance	Hole & Section (Circle)	Specific Problem Location	Type of Diagnosis (on-site/lab)	Sample Collection Date	Diagnostic Lab Used	Date Sample Sent	Diagnosis	Response to Diagnosis
	Hole # Tee Green Fwy							
	Hole # Tee Green Fwy							
	Hole # Tee Green Fwy							
	Hole # Tee Green Fwy							
	Hole # Tee Green Fwy							
	Hole # Tee Green Fwy							

Weather Notes

Date:

Prior to Symptoms:

At Symptom Appearance:

Other Notes

Cultivation:

Irrigation:

Fertilization

Other:

Legal Aspects of Recordkeeping

In May of 1993, federal regulations went into effect that require all certified pesticide applicators to maintain records on the use of all federally-designated restricted-use pesticides. Restricted-use pesticides are those designated as such under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). The purpose of these records is to help licensed health care professionals in the event of a medical emergency. In most instances, the applicator has 30 days in which to record these applications. In the event that satisfactory records are not kept, the fine is at least \$1000 for each violation.

Many states also have requirements for reporting information on specific pesticide use levels and rates. In addition to the records on the application of restricted use pesticides, material safety data (MSD) sheets are also to be compiled and kept in a place accessible by applicators, employees, and government officials.

These changes in accountability rules for pesticide applicators are only the beginning of what is seen as an ever-increasing level of detailed record-keeping. It is certainly in the interest of all turfgrass managers to develop systems for keeping detailed records of all important and environmentally significant activities performed in the course of their turfgrass maintenance.

Computerization

Computers are having an increasing impact on turfgrass management. All new irrigation systems are now under computer control and many other pieces of equipment such as weather stations and diagnostic aids are highly computerized. Software also has been developed to the point where database development and management are easy and versatile. It should be obvious that computerized databases of fungicide records are the most valuable means of keeping track of all use-related information. Most of the programs available allow you to

search easily for specific items of interest such as: a listing of the dates and sites when fungicides were applied for brown patch control, or a listing of the weather conditions when fungicide applications failed, or a listing of sites where anthracnose was diagnosed, and any other listing that may be important to your specific method of management. Furthermore, these programs allow you to print out the records in specific formats so that the records can be prepared easily for state and federal reporting or for individual analysis of trends, etc.

Another important aspect of computerization is the ability to map and monitor trends over long periods of time so that, for example, you can keep track of increases or decreases in fungicide applications, the increase or decrease in specific disease symptoms, and trends in weather conditions related to fungicide efficacy or disease severity that will allow you to make adjustments in your management approach to disease problems. These types of data are unquestionably important and vital for the development of IPM programs.

Sample Forms

The following are sample forms suitable for recording the types of information important to your management records. They include a record for reporting specific fungicide application information, a diagnostic record for reporting information related to disease diagnosis, and a cultural record to keep track of fertilization, irrigation, seeding, sodding, and other cultivation practices. These are suggested forms only and the specific arrangement of entries on any given form can and should be modified to fit your specific needs. You should keep in mind that the format of entries in computer databases may differ substantially from these suggested forms, but they can be manipulated to be printed in almost any format you wish. Equally important for computerized records is that the fungicide, diagnostic, and cultural records be linked so that you can access each of these databases simultaneously.

Cultural Record

Date and Time	Hole & Section (Circle)	Fertilizer Applied	Rate of N	Rate of P	Rate of K	Rate of Other	Cultivation	Daily Irrigation Schedule	Turf Wetness Period	Mowing Frequency
	Hole # Tee Green Fwy									
	Hole # Tee Green Fwy									
	Hole # Tee Green Fwy									
	Hole # Tee Green Fwy									

Notes:

Fungicide Application Record

Date and Time	Hole & Section (Circle)	Fungicide Applied Name/Form.	EPA Reg. #	Rate	Area Treated	Total Material Applied	Tank pH & Storage Time	Target Disease	Results of Application
	Hole # Tee Green Fwy								
	Hole # Tee Green Fwy								
	Hole # Tee Green Fwy								
	Hole # Tee Green Fwy								

Weather Notes:

Other Notes:

Date:

Cultivation:

Prior to Application:

Irrigation:

At the Time of Application:

Fertilization:

Other: