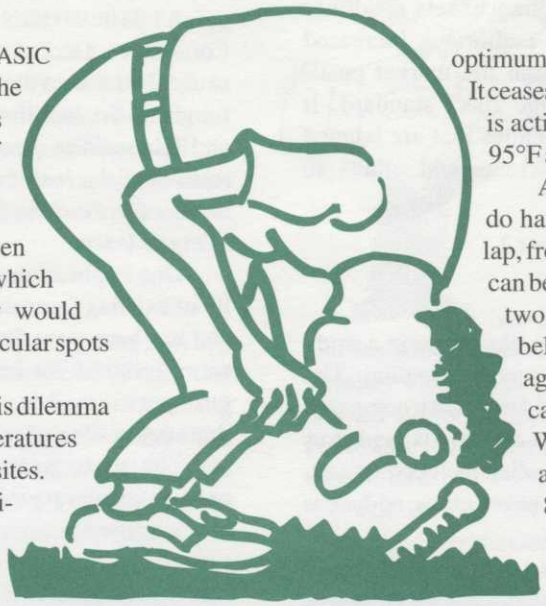
Turf diagnostic tools —temperature

by Christopher Sann



TEMPERATURE IS A BASIC parameter used in the diagnosis of turf grass problems, but how many turf managers keep records of soil temperatures at the facilities or sites they manage? And given the all too random manner in which turf problems develop, how would anyone know from which particular spots to collect the data?

The easiest way around this dilemma is to keep track of the air temperatures at one or more problem-prone sites. Depending on a number of variables, day-time air temperatures roughly approximate soil temperatures taken in the top inch of soil. Certainly, this is only a rough approximation, but environmental regulations now require that turf managers keep records of "site specific" weather conditions—particularly the air temperature and the wind speed—when making pesticide applications. So let's put those data to good use!

Many turf grass diseases—including killers like summer patch, leaf spot and anthracnose—are caused by fungi that grow and reproduce only within specific temperature ranges (*see page 9*). You can use this information and your new site temperature data to reduce the number of potential causes for problems at particular "recorded" site.

Example

For example, the two leaf spotting pathogens of bluegrasses, *Dreschlera* and *Bipolaris*, induce symptoms that are difficult to distinguish. They have:

- LATE STAGE OVERALL SYMPTOMS that are virtually identical,
- EARLY AND LATE STAGE plant symptoms that are quite similar,
- AND THEY BOTH CAUSE characteristic lesions on bluegrass leaves that have very similar shapes and coloration—particularly in the more advanced stages.

But they differ substantially in the temperature ranges over which they grow and reproduce. *Dreschlera* is active from 43°F to 81°F. with an optimum growth range of 59°F to 65°F. It ceases activity above 81°F *Bipolaris* is active in a range of from 68°F to 95°F and is most active above 80°F.

Although these two pathogens do have a temperature range overlap, from 68 °F to 81°F, temperature can be an aid in distinguishing these two diseases. At temperatures below 70 °F, new leaf spot damage almost certainly will be caused by *Dreschlera* species. While any new damage that appears at temperatures above 82° F probably will be caused by *Bipolaris* species. Microscopic examination may required to confirm identification of which pathogen is causing new damage that appears between 70°F and 82° F. Contact your local, regional, or state turf grass specialist or turf grass pathologist to assist in microscopic examinations.

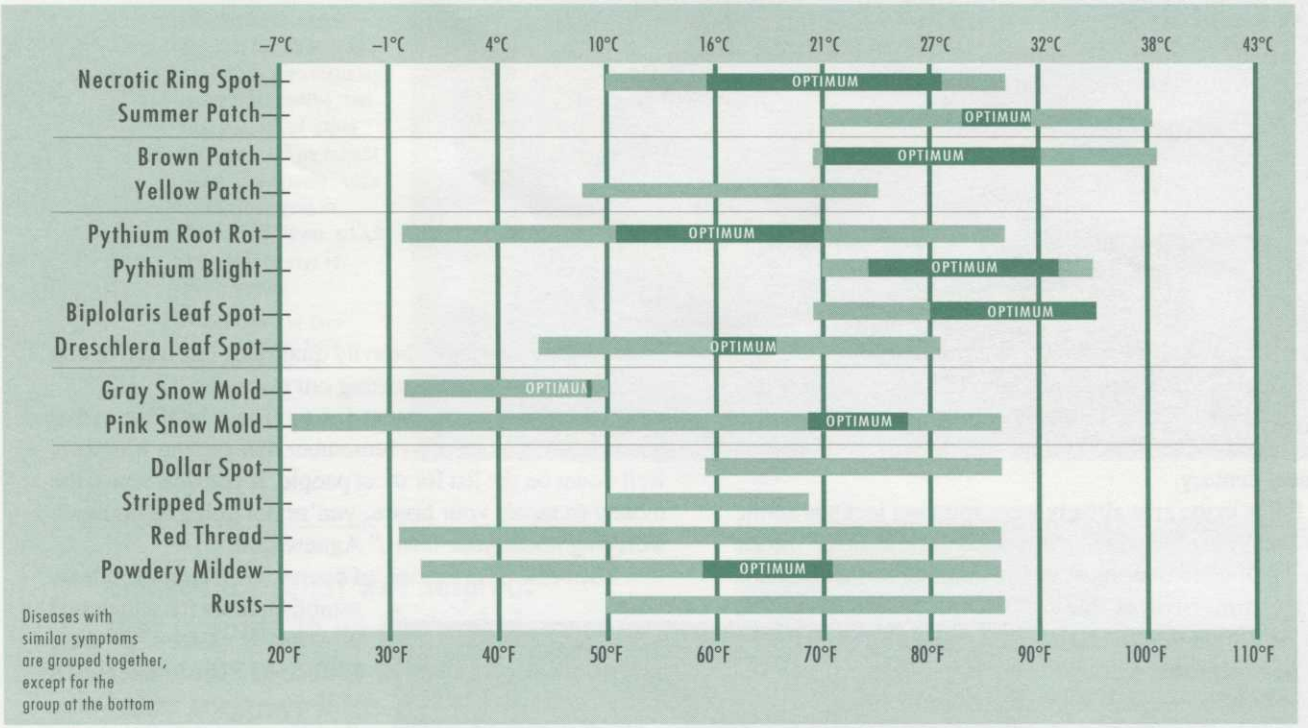
From a chemical control stand point, the use of materials specifically labeled for either *Dreschlera* or *Bipolaris* should be used when the temperatures are appropriate for the activity of the respective pathogens. When the symptoms appear in the overlap of the two temperature ranges, and a suitable microscopic examination cannot be made, then a material that controls both *Dreschlera* and *Bipolaris* should be used.

Temperature ranges also may help you to differentiate between turf damage caused by summer patch and necrotic ring spot. The temperature range for summer patch is slightly higher than the range for necrotic ring spot as is its optimum range.

Temperature may not be a useful diagnostic tool in some situations— such as where a disease (like pythium root rot or pythium blight) may be caused by a number of different strains of the pathogen. In these cases, microscopic examination is required for accurate identification.

Temperature differentiation also may not be useful when a single pathogen or group of closely related pathogens has a wide growth range or substantial overlapping—such as occurs with *Rhizoctonia* species that cause brown patch and yellow patch. ■

Turf grass diseases with pathogens, growth and temperature ranges



DISEASE	PATHOGEN	TEMP. RANGE OF GROWTH		TEMP. OPTIMUM GROWTH	
Necrotic Ring Spot	*Leptosphaeria korrae*	50–86 °F	(10–30°C)	59–82 °F	(15–28°C)
Summer Patch	*Magnaporthae poae*	70–105 °F	(21–41°C)	83–87 °F	(28–31°C)
Brown Patch	*Rhizoctonia* spp.	68–105°F	(20–41°C)	70–90 °F	(21–32°C)
Yellow Patch	*Rhizoctonia cerealis*	47–75 °F	(8–24°C)	Not determined	
Pythium Root Rot	*Pythium* spp.	32–86 °F	(0–30°C)	52–70 °F	(11–21°C)
Pythium Blight	*Pythium* spp.	70–95 °F	(21–35°C)	74–93 °F	(23–2°C)
Bipolaris Leaf Spot	*Bipolaris sorokiniana*	68–95 °F	(20–35°C)	>80 °F	(>27°C)
Dreschlera Leaf Spot	*Dreschlera* spp.	43–81 °F	(6–27°C)	59–65 °F	(15–18°C)
Gray Snow Mold	*Typhula* spp.	32–50 °F	(0–10°C)	48 °F	(8°C)
Pink Snow Mold	*Microdochium nivale*	22–86 °F	(5–30°C)	68–77 °F	(20–25°C)
Dollar Spot	*Sclerotinia homoeocarpa*	59–86 °F	(15–30°C)	Not determined	
Stripped Smut	*Ustilago* spp.	50–68 °F	(10–20°C)	Not determined	
Red Thread	*Laetisaria fuciformis*	32–86 °F	(0–30°C)	Not determined	
Powdery Mildew	*Erysiphe graminis*	34–86 °F	(1–30°C)	59–72 °F	(15–22°C)
Rusts	*Puccinia* spp.	50–86 °F	(10–30°C)	Not determined	

spp. = species

AS YOU CAN SEE FROM THE ABOVE TABLE AND CHART, temperature ranges can be, in some cases, a definitive diagnostic tool when identifying fungal pathogen damage in turf and in others case at least helpful. But in order to use temperature ranges as a diagnostic tool it is necessary that precise data on air or soil temperatures be kept on a systematic basis.