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# TURF DISEASE GUIDE

continued from page 49

maximum time to dry the turf. If soils are poorly drained or areas of the lawn stay wet, improve the drainage. Monitor lawns that have automatic irrigation systems so that the system does not automatically come on every day and create an overwatered environment, ideal for the disease. More resistant new cultivars of tall fescue are being introduced.

## Fine fescue failures

Red thread is a major disease problem on fine fescue. The general symptoms and weather conditions described under perennial ryegrass pertain to fine fescue. With low maintenance, these turfgrasses grow slowly. If they're damaged by red thread, recovery may be slow and patches may linger for weeks.

Leaf spot may occasionally occur on

fine fescue, most frequently in overirrigated or wet conditions. Improve drainage in low-lying areas to lessen incidence.

There are no disease-free turfgrasses. Make the best selection to match the factors at your site, maintenance programs and clients' needs.

—The authors are with the Department of Plant Pathology at The Ohio State University, Columbus, OH.

## DISEASES OF COOL-SEASON TURFGRASSES

### BROWN PATCH/RHIZOCTONIA BLIGHT (*Rhizoctonia solani*)

#### Susceptible Grass\*

TALL FESCUE, Ryegrass, Kentucky bluegrass, Fine fescue

**Temperature/Moisture** (that encourages disease development) hot/wet

#### Management Strategies\*\*

- 1) avoid excessive nitrogen
- 2) avoid excessive watering and poor drainage
- 3) increase air circulation; remove surrounding vegetation and increase sunlight

### DOLLAR SPOT (*Sclerotinia homeocarpa*)

#### Susceptible Grass\*

BLUEGRASS, Fine fescue, Ryegrass

**Temperature/Moisture** (that encourages disease development) moderate/wet leaves and dry soil

#### Management Strategies\*\*

- 1) avoid nitrogen deficiency
- 2) choose resistant grass varieties
- 3) water to increase growth

### GRAY LEAF SPOT (*Pyricularia grisea*)

#### Susceptible Grass\*

PERENNIAL RYEGRASS, Tall fescue

**Temperature/Moisture** (that encourages disease development) warm/humid; wet foliage (often a late summer and fall disease)

#### Management Strategies\*\*

- 1) avoid stress on turfgrass, a difficult disease to manage

- 2) provide adequate water, but avoid extending time foliage is wet
- 3) avoid high fertilizer in summer
- 4) reduce soil compaction
- 5) young plantings of ryegrass more sensitive than established stands

### LEAF SPOT/MELTING OUT (*Drechsler & Bipolaris spp.*)

#### Susceptible Grass\*

KENTUCKY BLUEGRASS, Fine fescue, Ryegrass, Tall fescue

**Temperature/Moisture** (that encourages disease development) leaf spot — cool/wet (spring/fall); melting out — hot, dry (summer)

#### Management Strategies\*\*

- 1) raise cutting height
- 2) mow frequently to avoid stress
- 3) avoid excessive nitrogen
- 4) avoid light frequent watering and prolonged wet grass

### NECROTIC RING SPOT (*Leptosphaeria korrae*) (previously called *Fusarium Blight*)

#### Susceptible Grass\*

KENTUCKY BLUEGRASS, Fine fescue

**Temperature/Moisture** (that encourages disease development) warm/extremes in soil moisture (fluctuating from wet to dry soils)

#### Management Strategies\*\*

- 1) avoid low mowing heights
- 2) reduce excessive thatch
- 3) use Kentucky bluegrass and perennial mixtures
- 4) avoid excessive watering or drought stress
- 5) use slow-release fertilizer

### POWDERY MILDEW (*Erysiphe graminis*)

#### Susceptible Grass\*

KENTUCKY BLUEGRASS, Fine fescue

**Temperature/Moisture** (that encourages disease development) moderate/high humidity; shade

#### Management Strategies\*\*

- 1) reduce shade
- 2) increase air circulation by removing surrounding vegetation
- 3) use resistant Kentucky bluegrass varieties

### PYTHIUM BLIGHT (*Pythium spp.*)

#### Susceptible Grass\*

PERENNIAL RYEGRASS - new seedling plants of all types

**Temperature/Moisture** (that encourages disease development) very hot/wet

#### Management Strategies\*\*

- 1) improve soil drainage
- 2) increase air circulation by removing surrounding vegetation
- 3) avoid excess watering
- 4) avoid high rates of nitrogen

### RED THREAD (*Laetisaria fusiformis*)

#### Susceptible Grass\*

PERENNIAL RYEGRASS, FINE FESCUE (reported on all cool-season grasses)

**Temperature/Moisture** (that encourages disease development) moderate/wet foliage

#### Management Strategies\*\*

- 1) balanced fertilization program

- 2) promote growth by aeration, watering, etc.
- 3) use resistant varieties

### RUST (*Puccini spp.*)

#### Susceptible Grass\*

PERENNIAL RYEGRASS, Kentucky bluegrass

**Temperature/Moisture** (that encourages disease development) moderate/wet foliage; dry soil

#### Management Strategies\*\*

- 1) avoid nitrogen deficiency
- 2) use resistant varieties
- 3) water if dry, promote growth

### SUMMER PATCH (*Magnaporthe poae*) (previously called *Fusarium Blight*)

#### Susceptible Grass\*

KENTUCKY BLUEGRASS, Fine fescue


**Temperature/Moisture** (that encourages disease development) warm/extremes in soil moisture, (fluctuating from wet to dry)

#### Management Strategies\*\*

- 1) avoid low mowing thatch buildup
- 2) maintain soil pH between 6 and 7
- 3) frequent watering during dry periods to avoid heat stress
- 4) use slow-release nitrogen
- 5) use Kentucky bluegrass and perennial ryegrass mix

\*Turfgrass(es) in all capital letters, highest potential for severe problems

\*\*For fungicide recommendations check with county cooperative extension office and state Land Grant university in your area.



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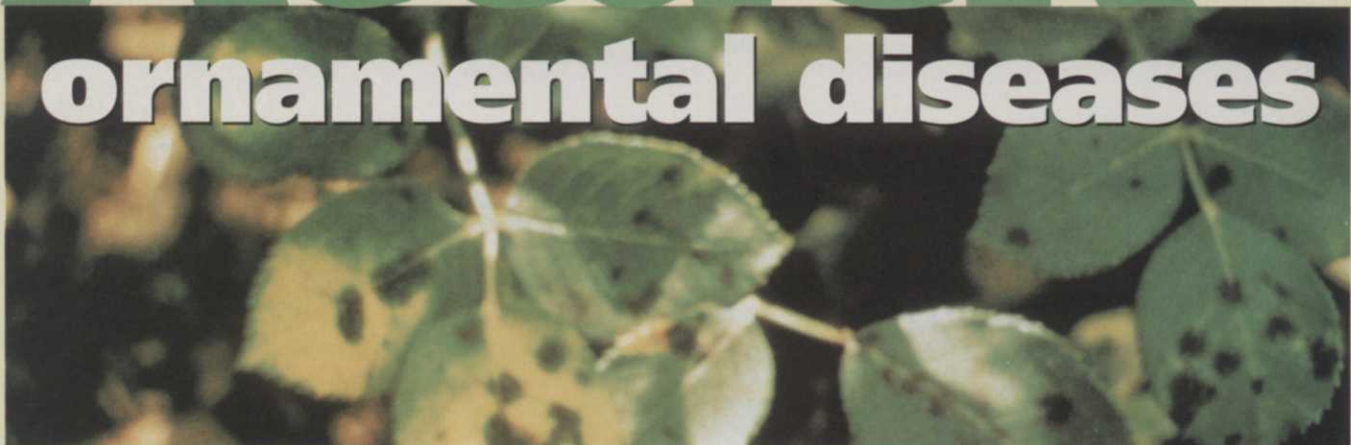
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# Attack

## ornamental diseases



### Use the “disease triangle” to help you protect valuable ornamentals

By JAMES A. CHATFIELD

**A** key concept in understanding infectious diseases (those involving pathogens such as fungi, bacteria and viruses) is the disease triangle. This concept is simple, yet powerful. It includes:

- ▶ a host plant susceptible to a particular disease
- ▶ a virulent disease-causing organism (pathogen)
- ▶ an environment conducive to that disease.

Without all three components, infectious disease will not occur. For example:

- For many fungal diseases, the number of hours of leaf wetness is the key environmental condition necessary for infection. Imagine the pathogen involved in black spot of rose (*Diplocarpon rosae*) present on

last year's leaves, which remain on the ground, where black-spot susceptible roses are grown. Two components of the disease triangle are present. However, if the weather is dry for two months, irrigation water is kept off the foliage and good air movement is provided by pruning and proper plant siting, black spot will not be severe, because the key environmental element — leaf wetness — is absent.

• If apple scab fungus is abundant, it is a very moist spring and there is a susceptible crabapple such as *Malus* 'Radiant,' all three components of the disease triangle are present and significant scab disease will occur. However, if the cultivar is *M.* 'Prairifire,' with excellent genetic resistance, scab will not generally occur. The susceptible host is the missing component of the triangle.

All three components of the disease triangle must be present for disease to occur.

### ▲ rose black spot

Using the disease triangle to highlight different control strategies in these cases, would involve using:

- ▶ resistant varieties
- ▶ quarantines to exclude the pathogen
- ▶ cultural practices to modify the environment.

The disease triangle concept is a powerful tool, not only to understand disease, but to think about multiple ways to control diseases.

#### Case study: Rose black spot

As an example, here are some disease management strategies for rose black spot disease, caused by *Diplocarpon rosae*.

Black spot is the most important infectious disease of roses. It occurs only on roses (*Rosa spp.*), and is widespread among most rose species and cultivars. Many hybrid tea roses are very susceptible. Lists of black spot-resistant roses



often are variable due to localized races of the pathogen.

The round to irregular black splotches with fringed margins occur mostly on upper leaf surfaces, and defoliation of infected leaves is common. Repeated defoliation weakens plants, leading to poorer blooming and greater sensitivity to other stresses.

The fungus overwinters on fallen leaves and diseased canes. Microscopic spores are then splashed to newly emerged leaf and stem tissue in the spring. Under ideal conditions of leaf wetness, humidity and temperature, the spores can germinate and infect in one day, cause symptoms in four to five days, and produce spores that can infect additional leaf, flower and cane tissue within 10 to 11 days. Spores can easily spread to new locations by air currents.

• **Strategy 1: Keep foliage dry.** Plant roses in sunny locations to encourage drying. Avoid sites with dense surrounding vegetation. Avoid overhead irrigation, especially late in the day. Black spot is most severe with sustained rainy periods.

• **Strategy 2. Keep it neat.** Remove all black spotted leaves from and around plants, throughout the season. Before winter or before leaves emerge in the spring, remove and clean up all diseased leaves and remove diseased canes where possible.

• **Strategy 3. Select for resistance.** In spite of localized races of the fungus, lists of disease-resistant varieties should always be a part of plant selection decisions. For these lists, check references such as "Pest Resistant Ornamental Plants," by D.C. Smith-Fiola of Rutgers Cooperative Extension.

• **Strategy 4: Use preventive fungicide sprays.** Fungicide controls are not successful if you don't follow cultural and sanitation practices. Make applications preventively, providing a protective fungicide barrier to kill germinating fungal spores landed on plant tissue. If conditions for infection are present and a high level of control is desired, start preventive spray programs as soon as rose foliage emerges in the spring and continue throughout the summer at frequent intervals (as frequently as every 7-10 days in wet weather).

#### Case Study: Apple scab.

It might be tempting to look at the disease triangle and ask, "Why not just use disease-resistant hosts — then you need not worry about anything else?" First, there is no such thing as a completely disease-resistant plant. Second, even with a single disease, there may be no readily available cultivars with good resistance (like *Botrytis* gray mold on geranium). Third, disease resistance is not the only consideration when selecting a particular cultivar.

At Secrest Arboretum in Wooster, OH, we looked at 47 crabapple selections for the past six years. We have a replicated, randomized plot rate them on a scale of 0 to 5, with 0 being no scab and 5 being extreme scab, defoliation complete or near complete. We came up with a list of eight crabapples with no scab.

We also rated the crabapples monthly for overall aesthetics, with 1 being an exceptionally ornamental crabapple (flower, foliage, fruit or form at time of rating) to 5 as an ornamentally unacceptable crabapple.

The monthly ratings were averaged, and the top eight crabapples listed. Apple scab, with its obvious effects on foliage, fruit and overall aesthetics, was a factor in these overall ratings.

Many of the overall, top-rated crabapples did get some scab over the years and only one of the top eight had no scab. Most of the crabapples with no scab were not the best in terms of overall ratings, most being rated as less attractive than many of the nonscab-resistant crabapples. For example, 'Dolgo' was one of the worst in the entire plot; no scab but large, messy fruits which severely restrict its use as an ornamental. Obviously, ratings for a particular disease are only part of the story.

The disease triangle is central, not only to understanding how disease occurs but also in how to limit its occurrence. Like a three-legged table, the removal of one side of the disease triangle will reduce the occurrence and severity of a disease. But, as always, the best way to do that is to consider these factors *before* installation of the plant in the landscape.

## apple scab ▼

### TOP AESTHETICALLY RATED CRABAPPLES WITH THEIR SCAB RATINGS

Crabapple	Aesthetics	Scab
M. 'Molten Lava'	1.8	1.3
M. 'Mary Potter'	2.2	1.3
M. 'Red Jade'	2.2	1.2
M. 'Prairifire'	2.3	0.0
M. 'Strawberry Parfait'	2.3	0.1
M. 'Sugar Tyme'	2.4	0.7
M. 'Donald Wyman'	2.4	1.3

### SCAB-FREE CRABAPPLES WITH THEIR AESTHETIC RATINGS

Crabapple	Aesthetics	Scab
M. <i>baccata</i> 'Jackii'	2.8	0.0
M. 'Beverly'	3.5	0.0
M. 'Bob White'	2.9	0.0
M. 'Dolgo'	3.9	0.0
M. 'Prairifire'	2.3	0.0
M. <i>sargentii</i>	2.8	0.0
M. 'Silver Moon'	3.0	0.0
M. 'White Angel'	3.2	0.0

—James A. Chatfield is the Northeast District Horticulture Specialist with the Ohio State University Extension.



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# Award-winning landscape

## Property at a glance:

Location: Boise, ID

Staff: in-house

Category: Government Building or Complex

Year site built: Statehouse, 1905;  
Capitol Mall 1960 - 1980

Total acres maintained: 35

Acres of turf: 12

Acres of woody ornamentals: 5

Acres of display beds: 2.5

Total man-hours/week: 240

*The 1998 Grand Award Winner of the Professional Grounds Management Society for Government Building or Complex.*

**T**he Idaho Statehouse and Capitol Mall is located in downtown Boise, and is comprised of 11 state government office buildings within a 16-block parcel. The statehouse construction began in 1905 and the mall was built between 1960 and 1980. An historic home, Alexander House, with a formal rose garden and gazebo, is also part of the property.

Visitors and employees alike enjoy touring the well-manicured grounds. The heavy clay soils are prone to compaction and are aerified three to four times a year and spread with gypsum. The 35-acre site is maintained by a six-person crew during the growing season.

## Idaho Statehouse and Capitol Mall





# management



▲ A formal rose garden and gazebo near the historic Alexander House.

◀ The Idaho Statehouse in downtown Boise, Idaho.

▶ A worker sweeps debris that was left behind after edging the sidewalks. They also clean parking lots and garages with this machine.

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## Maintenance challenges

- ▶ cleaning up after vandalism, including resetting monuments
- ▶ keeping up with the sheer volume of traffic seven days a week
- ▶ Christmas decorating
- ▶ maintaining numerous upright planters through dry season

## Project checklist

(Completed in last two years):

- ▶ total landscape renovation of the park area directly to the front of the Capitol
- ▶ installation of computer-controlled irrigation systems
- ▶ installation of 2,500 feet of concrete edging

## On the job

- ▶ 2 full-time staff, 4 seasonal, 1 licensed pesticide applicator





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