

Handle the worst warm-season diseases

Serious fungal diseases are hard to control. Follow these steps to keep turf plants healthy

By ED A. BROWN, Ph.D.

Injury to warm-season turf by disease fungi can be significant, depending on the susceptibility of the grasses. The impact of the disease depends on the cultivars you grow and the environmental conditions.

First, consider disease control *before* you establish the turf. Select cultivars that are adapted for your area. Keep in mind that there are differences in disease susceptibility between different cultivars and even between varieties of the same cultivar.

The five following fungal diseases are serious problems for warm-season turf and are hard to control for some turf types.

1. Brown patch

Brown patch, caused by the fungus *Rhizoctonia solani*, attacks all major warm-season grasses in the South and is the most common disease fungus of turfgrass. St. Augustinegrass and zoysiagrass are the most susceptible, partly due to the way the grasses are managed, making this disease more difficult to control.

Even the slightly more resistant centipedegrass and bermudagrass are frequently damaged by this fungus disease, although they recover better.

Brown patch develops with:

- ▶ favorable environmental conditions which can occur from late April through October,
- ▶ heavy nitrogen applications,
- ▶ high moisture content in the turf and soil,
- ▶ favorable combination of temperature, 80° to 85°F (but infection may occur at 73°F).

The fungus remains active until the air temperature reaches 90°F. Since air temperatures usually drop below 90°F for much of any 24-hour period, the fungus may continue to be active all summer, awaiting only a more favorable combination of temperature, nitrogen applications and water to cause visible symptoms.

Brown patch symptoms

This fungus kills the grass in a circular pattern a few inches to several feet in diameter. Affected areas in bermudagrass, centipedegrass and ryegrass are brownish in color and straw-colored in St. Augustinegrass. In the early morning, during hot, humid weather, you may see smoky gray to black, wilted, webbed grass around the brownish, diseased area.

A limited attack may kill only the blades and the turf will recover in two or three weeks. However, if the temperature, nitrogen levels and water applications combine favorably for disease development, the attack may kill the affected areas of all the grasses except bermudagrass, which usually recovers through new growth of

Bermudagrass with brown patch. Note the reddish brown discolored margin around the diseased area.

◀ **brown patch**



the underground rhizomes.

Occasionally, the fungus may thin a large area of turf and eventually kill it without the circular pattern being evident. This type of symptom occurs primarily under shady, moist conditions.

Control brown patch

► Don't apply excessive nitrogen — use only enough to maintain a reasonably green, attractive turf.

► Water only when the soil is dry, then soak the soil to a depth of 5 to 7 inches. Water in the early morning to allow the foliage to dry as quickly as possible.

► Begin fungicide applications as soon as you observe the disease. A preventive spray schedule is usually not recommended for lawn grass disease control in home grounds because of the expense. Only two or three applications are necessary for effective control, if you monitor the turf closely and make applications as soon as you notice the disease.

2. Dollar spot

The fungus that causes dollar spot, *Sclerotinia homeocarpa*, can attack a large number of grasses. However, it is serious only on bermudagrass and zoysiagrass in the south. Soil moisture, nitrogen levels and temperature determine the severity of dollar spot.

This disease develops with:

► turfgrass growing under dry soil moisture conditions, which is more susceptible than when adequate soil moisture is provided,

► low nitrogen,

► sufficient surface moisture for disease, provided by dew, fog or watering,



Dollar spot causes small circular (1 to 3 inches) straw-colored areas which may coalesce, causing large irregular diseased areas.

dollar spot

► mild weather (60° to 80°F) during spring and fall.

However, dollar spot can

occur throughout the summer.

Ideal conditions for dollar spot development would be bermudagrass growing under low nitrogen levels with low soil moisture, a temperature of 60° to 80°F and early morning fog or dew.

Dollar spot is characterized by circular areas only a few inches in diameter. Where infection is severe, spots may run together, causing large, irregular patterns covering several square yards. Infected areas take on a straw color.

Controlling dollar spot

► Add nitrogen but be aware that high nitrogen tends to favor the development of brown patch. Use discretion in applying nitrogen.

► Soil moisture should be adequate enough for good growth of the turf as an aid in reducing disease severity; however, water only in the early morning so the foliage can dry quickly.

► If soil moisture and nitrogen levels are adequate, two or three fungicide applications at recommended intervals should be sufficient to control dollar spot.

3. Pythium blight (Cottony Blight)

Pythium blight is becoming more wide-

spread in the South, and this may be attributed to increased watering practices. There are several *Pythium* species which can cause disease on turf. Susceptible grasses include bermudagrass and zoysiagrass, but the most affected turf types are the overseeded cool-season grasses, which can cause a problem for golf courses and athletic turf areas.

This disease develops with:

► an abundance of moisture,

► warm temperatures — the disease is negligible below 68°F, but increases with rising temperatures; maximum damage occurs at 90° to 95°F,

► fall and warm winter days on cool-season overseeded grasses. Pythium blight is usually halted by cooler temperatures.

Pythium blight occurs in small, irregular spots which may enlarge and appear dark and water soaked in the early stages. If it is active, there may be a white, cottony growth in the affected spots. The grass in affected spots dies rapidly, collapses and appears matted.

Managing Pythium blight

► Use treated seed.

► Delay overseeding until the onset of cool weather or as late as possible. Water as little as possible during periods favoring disease activity.

4. Gray leaf spot

St. Augustinegrass is susceptible to the fungus *Pyricularia grisea*, a serious problem that has recently become the focus of concern for many turf managers.

Conditions favoring gray leaf spot include:

► high humidity, warm temperatures and high nitrogen rates,

► semi-shade, when frequent showers occur or where frequent irrigation produces high relative humidity,

► higher amounts of nitrogen.

Gray leaf spot causes round to oblong,

cont. on page 46



gray leaf spot ▶

Gray leaf spot on St. Augustine-grass can cause significant damage and turf decline.

cont. from page 43

straw-colored leaf blades with purple to brown margins. Severely affected leaf blades wither and turn brown. Death of the turf slows lawn recovery from this disease.

Controlling gray leaf spot

- ▶ Use nitrogen as sparingly as possible to give the desired turf appearance.
- ▶ Water in the morning. Water as infrequently as possible and then water thoroughly.
- ▶ If disease appears, use one of the fungicides recommended by your local cooperative extension service.

5. Spring dead spot

Spring dead spot (SDS), *Leptosphaeria korrae*, is a serious disease of bermudagrass in the northern range of the southern United States, as it kills the entire turf plant. It occurs more often than in the past due to the increase in overmanaged bermudagrass, a result of increasing turf quality expectations.

Once established on a site, the disease will occur year after year. It occurs in bermudagrass growing areas where freezing temperatures are typical. It has not been observed in Florida or the southernmost regions of Georgia.

Spring dead spot develops with:

- ▶ high nitrogen applications and potassium deficiency,
- ▶ heavy thatch, which encourages shallow

root development and weakens turf, allowing winter injury.

Spring dead spot appears as circular dead areas ranging from 6 inches to several feet in diameter. While the damage actually occurs in the fall, the symptoms are not apparent until the early spring, when the bermudagrass starts to come out of dormancy and add green growth.

Initial symptoms are a bleached color in greening bermuda turf. These areas may remain brown throughout the summer and may reoccur for several years in succession. The turf may cover these bare areas during the summer but the roots will not peg into the soil.

These weak areas

Spring dead spot causes bleached white circular patches 6 to 18 inches in diameter.

◀ spring dead spot



also allow weeds to establish and further complicate recovery by competition during reestablishment.

Spring dead spot control

▶ Remove thatch as needed to help prevent the buildup of disease-causing fungi. But avoid heavy thatch removal in early summer since stolons growing over affected areas may be removed.

- ▶ Avoid excessive nitrogen.
- ▶ Promote management practices to encourage slow, even growth to improve winter hardiness.
- ▶ If the other management practices are not corrected, they can affect the results of fungicide treatments.

▶ Aerifying and irrigation may help in reestablishment; follow soil test recommendations and do not overfertilize.

▶ There are specific fungicides that are labeled for control of spring dead spot.

Other diseases that are a problem on warm-season turf include rust and Helminthosporium disease. They do not kill the plants but are common enough to cause management headaches. Remember, disease may still become a problem, even under the best management conditions. Fungicides should only be used along with good management practices to help encourage healthy growth.

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Cool-season diseases: the bad & the ugly

Sometimes the most annoying turf problem isn't your worst nightmare

By JOSEPH W. RIMELSPACH Ph.D. and MICHAEL J. BOEHM, Ph.D.



brown patch

dollar spot

On left, brown patch on tall fescue. On right, dollar spot on Kentucky bluegrass, comparing leaf lesions.

A turfgrass disease that kills turfgrass plants' crowns and roots is generally a bigger problem than a disease that merely affects the leaf blades. Keep in mind that the most frequent fungal disease is not necessarily the most severe, and the most damaging may not occur often. Here are some to watch for on the leading grasses:

Kentucky bluegrass diseases

Twenty years ago, leaf spot/melting out was the most common disease on Kentucky bluegrass. Still common, its importance has decreased with the use of improved Kentucky bluegrasses and increased use of other types of turfgrass. Also, applying higher rates of nitrogen in the fall rather than in the spring and avoiding lush spring growth in common bluegrass lessens the severity of this disease. So there is less leaf spot in the spring and fewer problems of melting out (the summer stage of this disease).

Patch diseases occur less frequently, but with more severity. Patch diseases kill grass, as opposed to leaf spot/melting out, which simply affects the cosmetic appearance of the turf. Patch disease fungi invade the roots and crowns. Recovery is poor and often slow.

Patch diseases occur in late spring or early summer under stressful weather conditions. Once the disease is present it will



gray leaf spot

Tip dieback of perennial ryegrass from gray leaf spot.

continue to occur, although the severity will depend on the annual stresses on the turf.

Sodded lawns with excessive thatch, poor quality soils and poorly prepared sites are often the first to show patch diseases and the most severe damage. Older seeded bluegrass lawns with excessive thatch, poor soils and poor management are also at high risk.

Keep the lawn healthy, avoid environmental stress and encourage a deep, healthy root system. Maintain high mowing heights, managing thatch through extensive core aeration (several times a year) and monitoring soil moisture to avoid drought stress. Soluble fertilizers are not recommended since surge growth may accelerate disease development. Slow-release

fertilizers (greater than 50% slow release) are recommended; the slower the better!

Perennial ryegrass problems

Red thread can occur on all cool-season grasses but, with the increased use of perennial ryegrass in home lawns, athletic fields and commercial landscapes, the occurrence of red thread has increased. There is variable susceptibility to red thread, but many cultivars of perennial ryegrass can have severe outbreaks of this disease.

Cool to moderate temperatures, with long periods of wet leaves from heavy dew, light rain, fog and drizzle, are ideal for this fungus. Red thread is more severe under low soil fertility conditions, especially with low nitrogen, phosphorous, potassium and calcium. It is reported to occur every month of the year in many areas of the northern United States. The disease does not kill plants but may damage leaves back to the ground.

Evaluate the soil fertility levels and the fertilizer maintenance program. Promote turf growth through core aeration, proper mowing and irrigation. On new installations where the soil is of poor quality, modify the soil with organic matter and select resistant varieties. Consider preventive fungicide applications on lawns with a history of the disease and where there are expectations for high quality.

Gray leaf spot is a relatively new disease on perennial ryegrass (and other turfgrasses) and has been severe in some areas of the East Coast and mid-Atlantic states. Last year, the disease was found over much of the Midwest, to a lesser extent than the East Coast, but it is expected to increase. First reported on golf courses in the roughs and fairways, it can also be found on home lawns. This disease kills turf.

Gray leaf spot usually develops in the summer and fall. It thrives under hot, humid weather when the leaves are wet for long periods of time. The entire plant may be killed in 48 hours. The disease may be a problem in the fall on new seedlings.

Be on the lookout if:

▶ turf appears to be under drought stress, even with adequate soil moisture

▶ perennial ryegrass is brown while any patches of bluegrass, bentgrass or fescue are not affected

▶ leaf tips have dieback and a twisting or hooked appearance, like a fish hook

▶ individual leaves may have dark spots or lesions which develop into tip dieback.

Since this is a newly emerging disease, specific management strategies are not well understood, but maintain lawns to minimize summer stress with proper irrigation (allow turf to dry between waterings) and core aeration. For severely damaged or dead turf, consider a different type of turfgrass to limit the recurrence of the disease.

Tall fescue troubles

Brown patch on tall fescue can be a considerable disease problem during hot, wet and humid conditions, especially in the transition states. In northern areas, brown patch is usually only a problem on overirrigated lawns or during extremely wet summers.

The disease is not usually a turf killer north of the Mason-Dixon line, although in the South, it may result in turf thinning so that reseeded is necessary. Avoid high levels or excessive soluble nitrogen in the summer. Manage irrigation to promote the

continued on page 52

TURFGRASS DISEASES BY SEASON

KENTUCKY BLUEGRASS

Spring
snow mold
leaf spot
yellow patch
red thread
fairy ring

Summer
melting out
necrotic ring spot/summer patch
dollar spot
brown patch
powdery mildew
rust

Fall
leaf spot
red thread
rust
powdery mildew

PERENNIAL RYEGRASS

Spring
snow mold
red thread
leaf spot/blight
fairy ring

Summer
brown patch
dollar spot
pythium
rust
red thread
leaf spot/blight
gray leaf spot

Fall
rust
red thread
leaf spot/blight
gray leaf spot

TALL FESCUE

Spring
snow mold
leaf spot
fairy ring

Summer
brown patch

Fall
leaf spot

FINE FESCUE

Spring
red thread
leaf spots
fairy ring

Summer
red thread
dollar spot

Fall
red thread
leaf spots

*These are general time frames for disease occurrence. Depending on local weather and site conditions, disease outbreaks and the duration of activity may vary. Remember the genetic susceptibility of the grass and the environment are the predominant factors driving the occurrence of disease development.

Note: All the above turfgrasses are prone to fairy ring when there are favorable weather conditions.

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.

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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.

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

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