



Kestrel[®] MEX fungicide helps you RAISE THE BAR on healthy turf.

New university testing proves that NexGen products outperform traditional formulations—and make your pesticide dollars go farther.

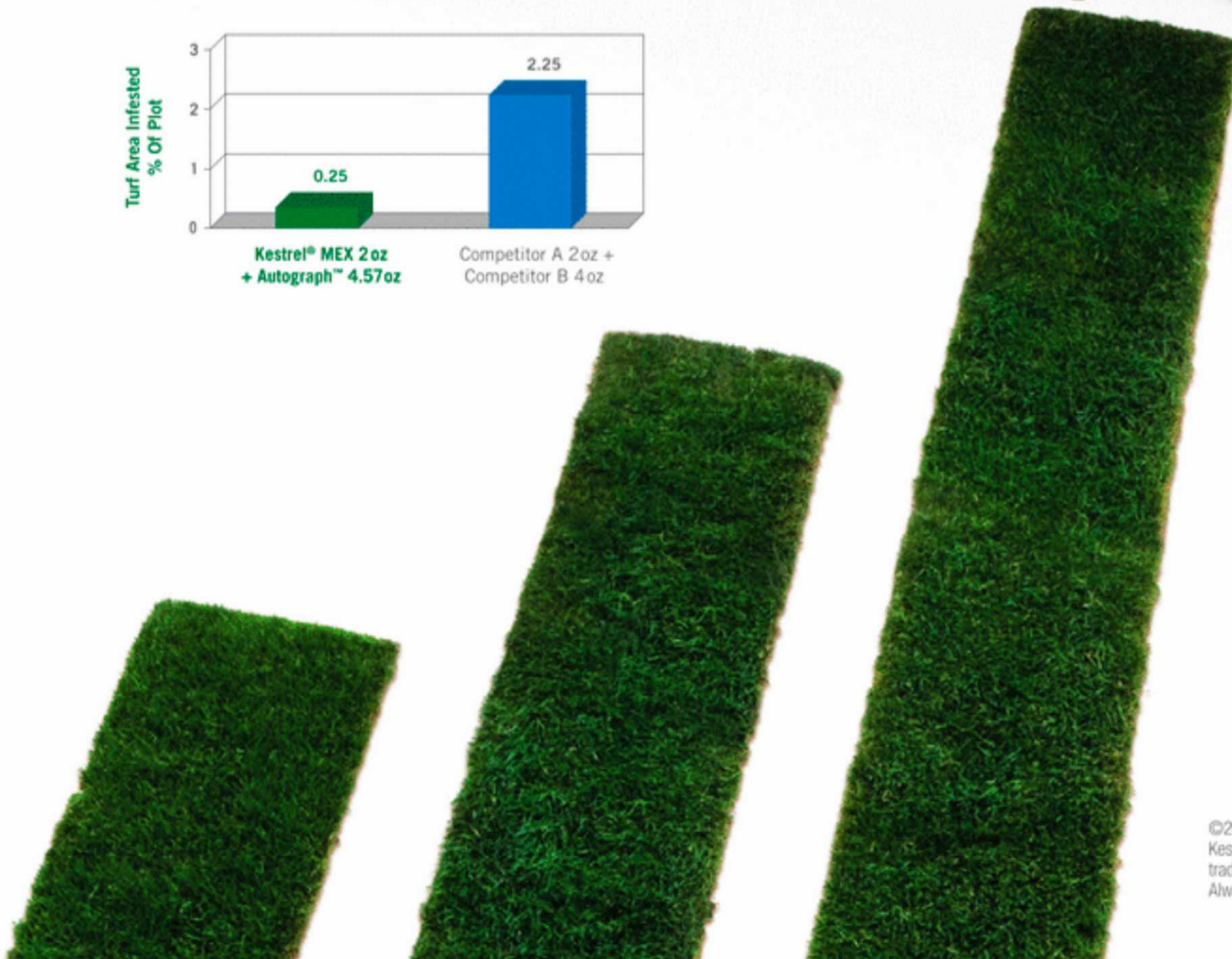
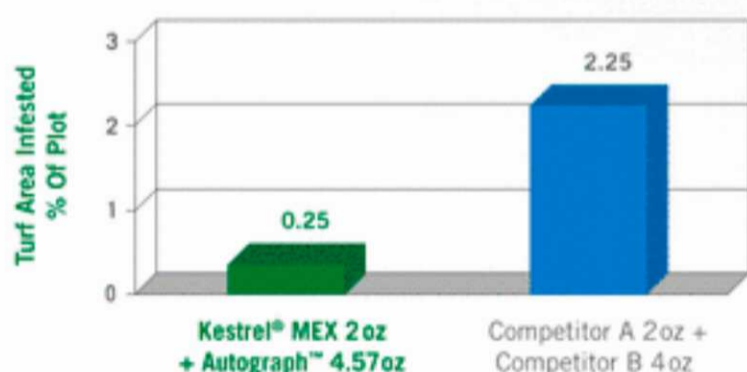
The grades are in, and NexGen products are at the top of their class. With only the best active ingredients and improved manufacturing, NexGen reformulations provide unbeatable performance—and results prove it. Kestrel[®] MEX propiconazole delivers long-lasting control of Anthracnose, Dollar Spot, Spring Dead Spot and many other troublesome turf diseases, all with low odor and only a "Caution" label.

To make the grade on your turf, call 888.240.8856 or visit www.PhoenixEnvCare.com.



RUTGERS 2007

Anthracnose



Welcome

Dear Turf Professional,

Welcome to the Disease ID Guide from Phoenix Environmental Care (PEC). It was created to help simplify some of the challenges you face in maintaining healthy, impressive playing surfaces, and we hope you'll find it to be a convenient and valuable source of information.

As the Guide shows, Phoenix Environmental Care offers a full line of premium fungicides that perform exceptionally well on your most damaging turf disease

problems. Our NexGen enhanced-technology products use only proven, high-quality ingredients trusted throughout the industry – but reformulated



for even greater value and cost-effectiveness. In fact, the Environmental Protection Agency (EPA) officially certifies that PEC products contain ingredients that are equal or superior to the original chemistries. Our fungicide line, the broadest in the industry, provides products with differing modes of action to help you manage resistance more effectively.

PEC cares about delivering real, measurable benefits to you by providing products you can depend on, all backed by unbeatable support. If you ever have questions about anything in the Guide, please contact us at phoenixenvcare.com or (888) 240-8856.

Sincerely,

A handwritten signature in black ink that reads "Owen Towne".

Owen Towne

President, Phoenix Environmental Care

TURF DISEASE

Anthracnose	D5
Bermudagrass Decline	D6
Brown Patch	D7
Copper Spot	D8
Dollar Spot	D9
Fairy Ring	D10
Fusarium Patch (Pink Snow Mold)	D11
Gray Leaf Spot	D12
Moss	D15
Nematodes	D16
Pythium Blight	D17
Pythium Root Rot	D18
Red Thread	D19
Southern Blight	D20
Spring Dead Spot	D21
Summer Patch	D22
Take-all Patch	D23

Introduction

There are many reasons why it's important to control disease in turfgrass. First and foremost, though, the presence or absence of disease plays a vital role in the success (attractiveness, vigor and playability) or failure of a turfgrass stand. Ultimately, that's how we as turfgrass managers are judged, right?

To solve disease problems on fine turfgrass we have to think like a police investigator. When a detective looks at a suspect in a particular crime, he considers three factors — opportunity, motive and means. In identifying and developing a treatment strategy for a turfgrass disease, we should consider three things as well — a susceptible host, a virulent pathogen (usually a particular species of fungi) and favorable environmental conditions for the pathogen.

Obviously, in building our disease-control strategy, we must first identify the disease, starting with

the three factors listed above, but also matching what we see in the field with the images in this handy guide.

Only after we make the correct diagnosis can we implement an effective strategy to eliminate or reduce the severity of the disease, usually employing the proper combination of cultural practices and chemical treatments.

While some diseases may, at a cursory glance, appear to be very similar (at least from eye level), a closer examination of the roots, stems and leaves of infected plants will almost always provide telltale signs leading to a correct diagnosis.

Look for foliar blight and leaf spots, rot on leaf sheaths, and dark and discolored roots. Aiding identification, the same diseases often occur in the same locations on a property from season to season, assuming similar environmental conditions develop. And that's where cultural practices come into play.

While we can't control what Mother Nature does, there are things we can do to lessen the possibility or reduce the severity of disease damage. These include using the proper amounts of fertility (especially nitrogen), irrigating for the needs of the turfgrass and not "by the clock," mowing at the desired height of the turfgrass, aerifying to improve drainage and alleviate compaction, and opening the turfgrass to more air movement and sunlight, when possible of course.

But because of the stresses we subject fine turfgrass — regardless of our best efforts to maintain it — diseases can and will sometimes develop. That's when we must employ a fungicide to provide the quality of turfgrass our customers have come to expect.

This guide contains images of common diseases and identification keys, including fungicide recommendations for solving specific disease problems. ■

Anthracnose



PATHOGEN

Colletotrichum graminicola

TURFGRASS AFFECTED

- *Poa Annua* is particularly susceptible
- Bentgrass, bluegrass, fescue, perennial ryegrass, bermudgrass, centipedegrass, St. Augustinegrass

APPEARS WHEN

In the cooler spring and early summer a basal rot develops

FAVORABLE CONDITIONS FOR DISEASE

- Basal rot anthracnose is favored by cool, wet conditions (50 – 60 F), while the foliar blight is favored by higher temperatures (80 – 95 F) and humidity

- Occurs in conditions of low soil fertility, stressed turf
- Can be particularly severe on turf exposed to soil compaction and excess thatch

IDENTIFICATION

- Plants are killed in irregularly shaped patches that are an inch to a few feet in diameter
- On bentgrass, narrow diffuse patches of stressed turf may resemble localized dry spot
- Fungus can produce fruiting structures that have fine black hair-like projections (setae)

CULTURAL CONTROLS

- Maintain balanced nutrients, concentrating on potassium and phosphorus. Fertilize the turfgrass with low rates of nitrogen (0.1 to 0.2

pound/1,000 square feet) monthly, especially during late spring and through summer

- Irrigate deeply and infrequently based on evapotranspiration needs of turfgrass early in the morning
- Reduce compaction in fall and spring
- Increase mowing heights to reduce stress on affected turf
- Avoid irrigating in the evening
- Avoid drought stress

WHAT PHOENIX OFFERS FOR CHEMICAL CONTROL



Bermudagrass Decline



PATHOGEN

Gaeumannomyces graminis
var. *graminis*

TURFGRASS AFFECTED

All warm-season turfgrasses

APPEARS WHEN

Mid summer through fall

FAVORABLE CONDITIONS FOR DISEASE

■ Saturated rootzones over a period of several days harm rootzone development making plants more susceptible to disease

■ Dense cloud cover reducing photosynthetic activity and storage of carbohydrates

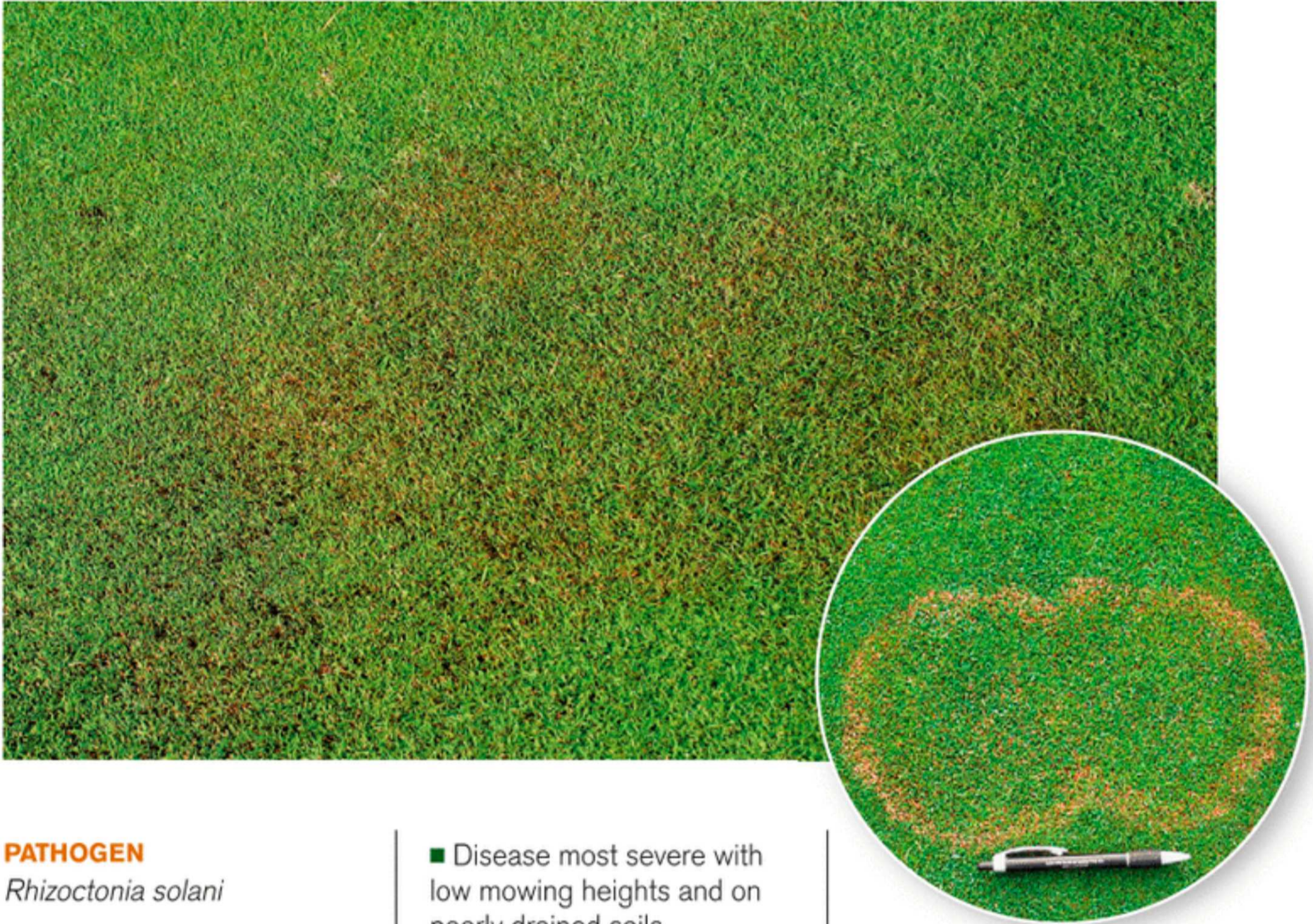
IDENTIFICATION

- Look for black or brown roots without feeder roots or root hairs in this root rot disease
- Signs of the fungus on the root surface appear as dark brown hyphal runners
- Above-ground symptoms are irregular, yellow (chlorotic) or light-green patches ranging in diameter from a few inches to a few feet

CULTURAL CONTROLS

- Raise mowing height during periods of conducive weather
- Balance nitrogen applications with equal amount of elemental potassium
- When disease is active, frequent foliar feeding of all nutrients in small amounts

Brown Patch



PATHOGEN

Rhizoctonia solani

TURFGRASS AFFECTED

- All cool-season species
- St. Augustine, bermudagrass, bahiagrass, centipedegrass

APPEARS WHEN

May through September

FAVORABLE CONDITIONS FOR DISEASE

- More than 10 hours of foliar wetness
- Night temperatures above 60 F
- Develops rapidly when temperatures are between 75 and 85 F

- Disease most severe with low mowing heights and on poorly drained soils

IDENTIFICATION

- Circular or irregularly shaped patches of light brown, thinned grass
- Turfgrass can be yellowish and may have a gray-brown smoke ring or outside edge
- Patches up to several yards in diameter, spreads rapidly

CULTURAL CONTROLS

- Improve soil drainage, remove dew in early morning by mowing, watering or whipping
- Cultivate by coring or slicing

- Avoid excessive nitrogen or irrigation
- Reduce shading and improve air movement

WHAT PHOENIX OFFERS FOR CHEMICAL CONTROL



Copper Spot



PATHOGEN

Gloeocercospora sorghi

TURFGRASS AFFECTED

Bentgrass species, velvet bentgrass particularly susceptible, annual bluegrass

APPEARS WHEN

April to September

FAVORABLE CONDITIONS FOR DISEASE

- Develops during periods of warm, wet weather

- High humidity, persistent rainfall or over-irrigation encourage infection
- Disease most severe when soil pH is below 5.5

IDENTIFICATION

- Small spots (usually less than 3 inches in diameter) that are copper or salmon in color
- When turf is wet or humidity is high, infected leaves may be covered in thin, gelatinous coatings of fungal spores

CULTURAL CONTROLS

- Avoid excessive fertilizer
- Remove dew in the morn-

ing by mowing, whipping or dragging

- Deep and infrequent irrigation
- Prune nearby trees to allow sunlight and encourage air movement

WHAT PHOENIX OFFERS FOR CHEMICAL CONTROL



Dollar Spot

PATHOGEN

Lanzia and *Moellerodiscus* species

TURFGRASS AFFECTED

All grasses

APPEARS WHEN

June through September

FAVORABLE CONDITIONS FOR DISEASE

- Problems often surface when temperature changes, such as warm days and cool nights
- Drought-stressed turf more susceptible
- Closely mowed turf is susceptible
- Can be spread by mow-

ers and other maintenance equipment

- More severe with turf under low fertility

IDENTIFICATION

- Initially, affected leaves show yellow-green blotches or bands, which gradually bleach to white or straw color
- Individual lesions on the leaves often produce a constricted area resembling an hourglass
- White mycelium may be present with early-morning dew

CULTURAL CONTROLS

- Limit thatch
- Maintain balanced fertility throughout the growing season
- Avoid irrigating in the evening
- Avoid drought stress

WHAT PHOENIX OFFERS FOR CHEMICAL CONTROL



Fairy Ring



PATHOGEN

Many varieties of *Basidiomycetes* fungi

TURFGRASS AFFECTED

All turfgrasses

APPEARS WHEN

- Year-round
- Generally during hot, dry weather

FAVORABLE CONDITIONS FOR DISEASE

- Lush turf with thick thatch
- Low to moderate soil moisture

IDENTIFICATION

- Rings in grass can range in size from a foot to 20 yards across or more, although most are a half-yard to 5-yards across
- Rings will form in same areas of turf each year
- Circles of mushrooms on the inner edge of rings, or wilted, dead or dark green turf
- White mat of fungal mycelium may be found in thatch or soil associated with the circles

■ Rings often characterized by lush growth caused by release of nitrogen by the activity of the fungus living on the organic matter in the soil

CULTURAL CONTROLS

- Maintain moderate fertility levels
- Excavate ring and soil 12 inches deep and 24 inches beyond ring of arc and replace with new soil
- Remove sod, cultivate 6 to 8 inches deep in several directions, add wetting agent to soil, reseed or sod