

# Diagnosing Common Lawn Problems



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# MOST Lawn Problems Result from Poor Turf Management Decisions

**Mowing** wrong height, not often enough

**Fertilizer** wrong time, too little...too much

**Irrigation** too much/little...poor coverage

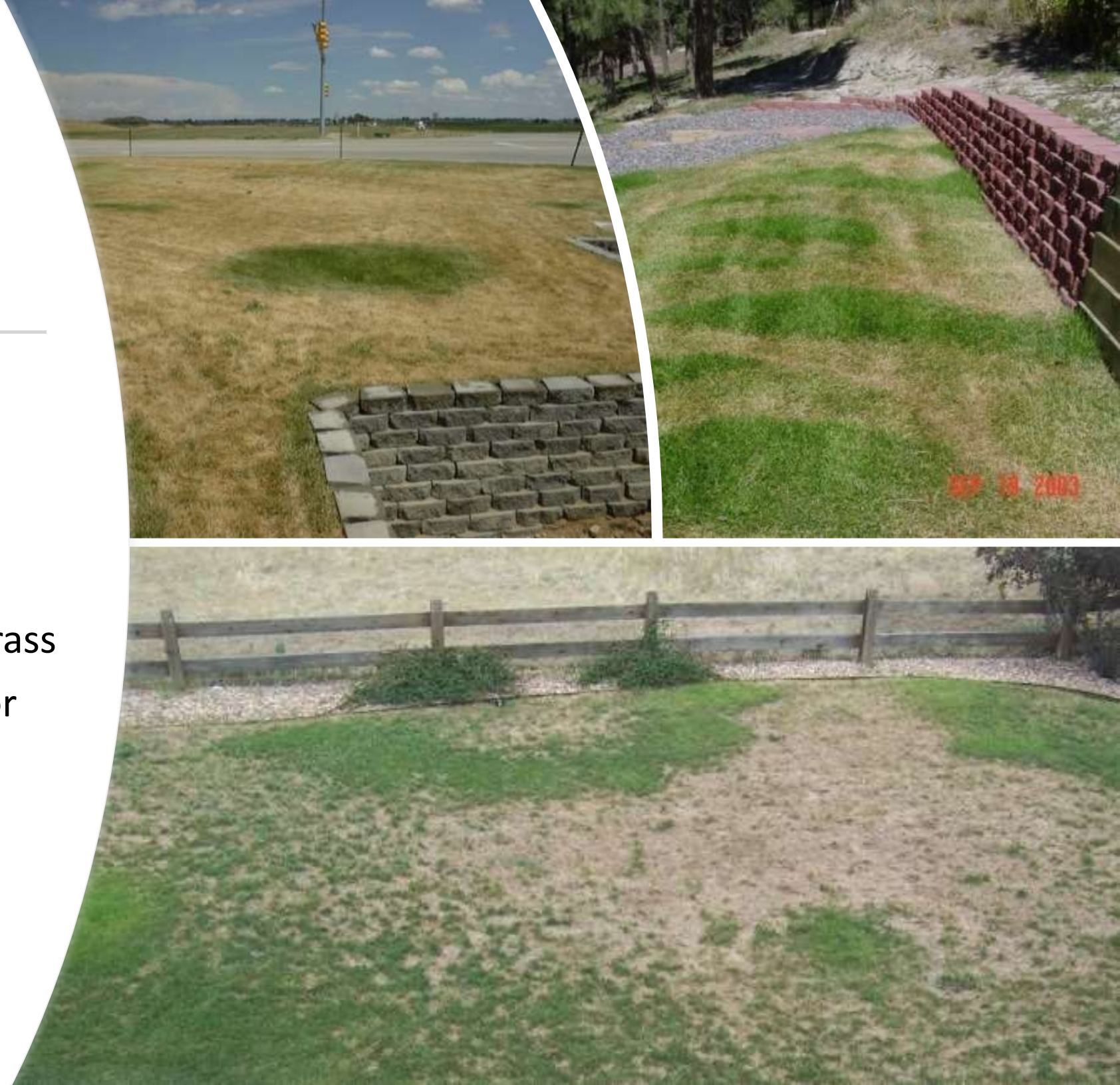
**Thatch** makes lawn care more difficult

**Compaction** unhappy roots = unhealthy grass

**Pests** healthy turf = fewer weed, disease or insect problems = minimal pesticide use

**Species Selection** – wrong grass

**Correction of poor management will often eliminate the turf problem or make it easier to manage – especially if pesticides are required.**



# The Diagnostic Process

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- Identify the plant
- Identify the problem(s)
  - What are the signs/symptoms?
  - What MIGHT it be?
  - What is it UNLIKELY to be?
- Significance of the problem?
  - Need for management
  - Will it just go away – without any treatment?
- What are the management options?



# Things I've Learned Diagnosing Turf Problems



# Grass ID is Essential for Accurate Diagnostics

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- For diagnosing disease, insect, herbicide injury and stress-related injury
- For making herbicide and other pesticide recommendations
  - Effectiveness of weed control
  - Safety of the desirable turf
  - Legality of recommendation
- For making cultural recommendations (watering, fertilization)
- For making overseeding/sod patching recommendations



# Rough bluegrass (*Poa trivialis*)



# Important to ID Dead Grass! Don't Assume!



Dormant *Poa trivialis*  
in a bluegrass lawn

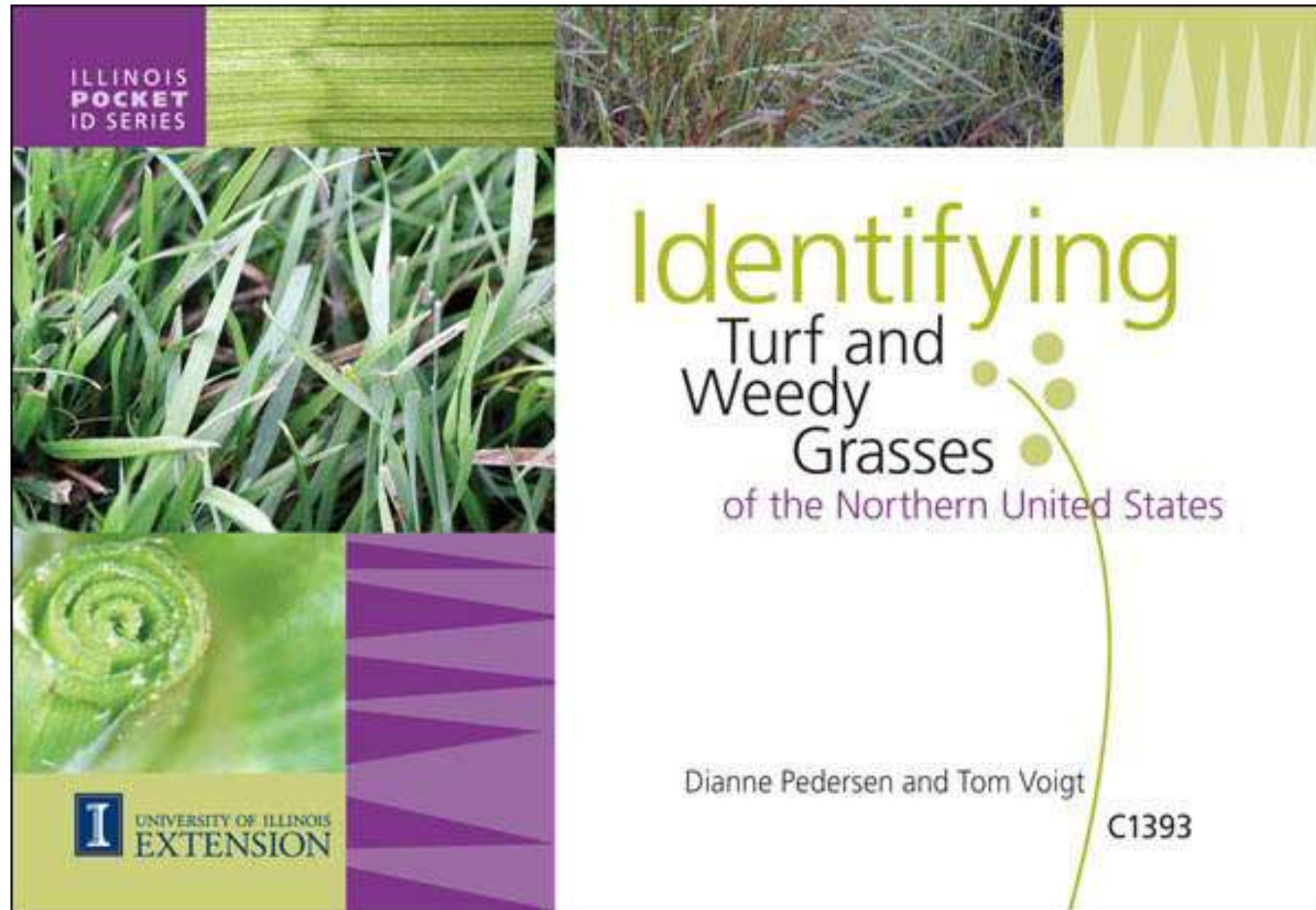


Necrotic ring spot in  
bluegrass lawn



# University of Illinois "Identifying Turf and Weedy Grasses of the Northern United States"

Cost \$11.75, including postage





Book contains excellent photos of important plant parts used for grass identification

Contains nearly every grass species used for lawns in Colorado, and most weedy grasses as well.

This book uses a dichotomous key, making grass identification relatively easy to do – with practice.

### Redtop *Agrostis alba*

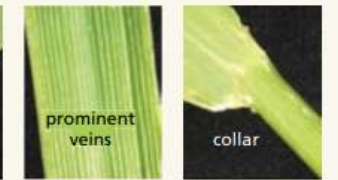
**KEY FEATURES:** blue-green blade with prominent veins on the upper surface; tall, membranous ligule; short rhizomes; forms an open turf

redtop in flower



**LIFE CYCLE/HABIT:** cool-season perennial, mostly with short rhizomes  
**OCCURRENCE:** used in utility settings such as roadsides and naturalized areas; adapted to moist and wet sites  
**LIGULE:** membranous, up to 1/5 in., rounded to pointed  
**AURICLES:** absent  
**VERNATION:** rolled  
**COLLAR:** medium-broad, divided, smooth  
**SHEATH:** round, smooth, split  
**BLADE:** blue-green, up to 1/5 in. wide, veins prominent on upper surface, upper and lower surfaces rough, margins rough, flat and pointed tip

18



19

### Colonial Bentgrass *Agrostis capillaris* (*A. tenuis*)

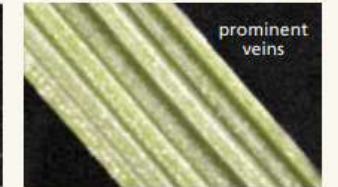
**KEY FEATURES:** dark yellow-green blade with prominent veins; short, membranous ligule; weak stolons and/or rhizomes (creeping bentgrass is similar, but has blue-green blade and long stolons)

lateral growth



**LIFE CYCLE/HABIT:** cool-season perennial, sometimes with weak stolons and/or rhizomes  
**OCCURRENCE:** used on golf course fairways  
**LIGULE:** membranous, usually flat-topped up to 1/8 in., may be finely toothed  
**AURICLES:** absent  
**VERNATION:** rolled  
**COLLAR:** narrow to medium-broad  
**SHEATH:** round, smooth, split  
**BLADE:** dark yellow-green, up to 1/8 in. wide, distinctly ridged on upper surface, flat, rough margins, pointed tip

20



21

### Creeping Bentgrass *Agrostis palustris* (*A. stolonifera*)

**KEY FEATURES:** soft, blue-green blade with prominent veins and a flat, pointed tip; tall, membranous ligule; aggressive stolons

creeping bentgrass, 1/2 in.



**LIFE CYCLE/HABIT:** cool-season perennial with aggressive stolons  
**OCCURRENCE:** commonly used on golf course putting greens, fairways, and tees; can form weedy patches in tall-cut turf  
**LIGULE:** membranous, up to 1/8 in., rounded, may be finely toothed  
**AURICLES:** absent  
**VERNATION:** rolled  
**COLLAR:** variable  
**SHEATH:** round, smooth, split  
**BLADE:** blue-green, up to 1/8 in. wide, distinct veins on upper surface, rough margins, flat and pointed tip  
**NOTE:** Often grows with annual bluegrass in golf courses.

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23

# Folded Vernation *Grass Identification Key*

## AURICLES PRESENT

- Auricles blunt, leaf underside glossy.....perennial ryegrass

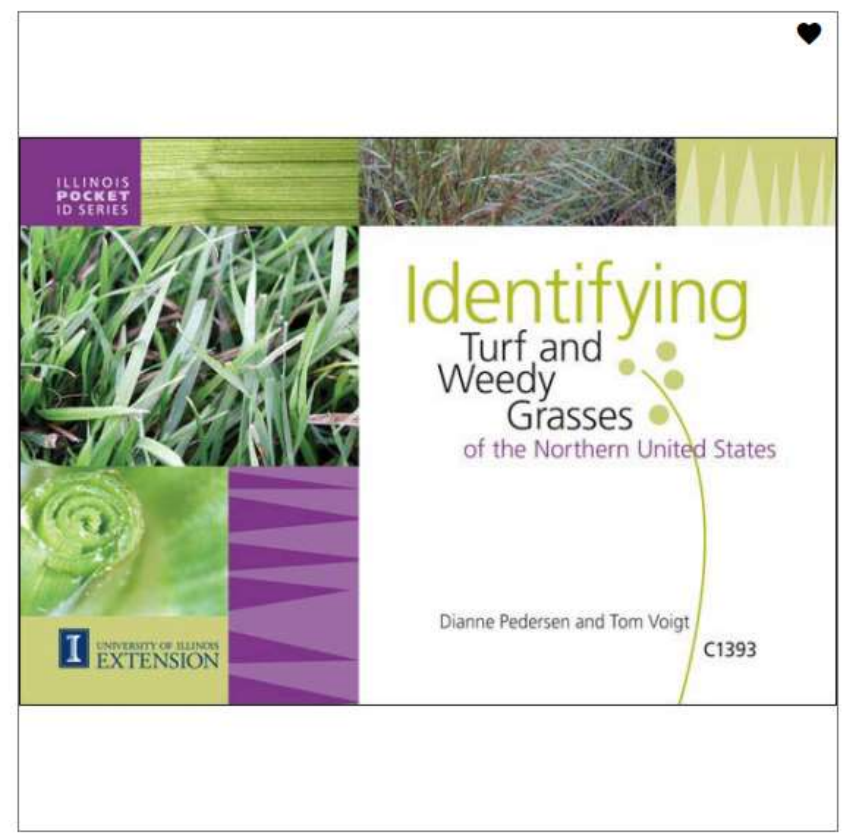
## AURICLES ABSENT

- Hairy ligule..... bermudagrass
- Membranous ligule less than 1/25 in.
  - Leaves very narrow with bristlelike tip
    - Short rhizomes present.....creeping red fescue
    - Rhizomes absent.....Chewings, hard, or sheep fescue
  - Leaves medium width, smooth upper leaf surface, strong rhizomes..... Kentucky bluegrass
- Membranous ligule more than 1/25 in.
  - Leaves more than 1/6 in. wide
    - Horizontal stems radiate from crown, leaves dark green, zipperlike seedheads in summer..... goosegrass
    - Stems mostly vertical, leaves blue-green..... orchardgrass
  - Leaves medium with boat-shaped tips
    - Apple-green, seedheads often present..... annual bluegrass
    - Rhizomes present, gray-green leaves, stems strongly compressed..... Canada bluegrass
    - Yellow-green foliage, creeping stems.....rough bluegrass

Most turfgrass/grassy weed identification keys will use vernation as one of the first botanical features for ID.

Most hard copy (paper keys, books) will use vernation as the first “fork in the road” for ID purposes.

Electronic ID keys (website, phone apps) often allow you to use other botanical characteristics for ID – and are not locked in to using vernation as the first characteristic in the ID process



UEX-C1393  
\$6.75

### Identifying Turf/Weedy Grasses of Northern US

Being able to identify types of turf and the grassy weeds that invade turf is a key skill for turf professionals; lawn weeds are also a topic of interest for most homeowners. This portable identification guide from University of Illinois Extension equips you with all the knowledge you need to differentiate turf and grassy weeds.

*Identifying Turf and Weedy Grasses of the Northern United States* combines detailed color photos with descriptions of 23 plants in one pocket-sized package. The identification keys walk you through the process of examining plant characteristics to narrow in on the right answer to your "What is it?" question.

Need more than one? Get the specially priced package of 10 guides.

Unit of Issue: EA/1

 **ADD TO CART**

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<https://uipubspplus.martinonesource.com/>

But you will have to register to use the site: to even browse the publications, much less purchase anything.

# Causes of Turf Problems

- Biotic  
Fungi, insects, weeds, nematodes
- Abiotic  
Chemical/pesticide injury, temperature extremes, traffic, mower injury, drought, excess water, compaction

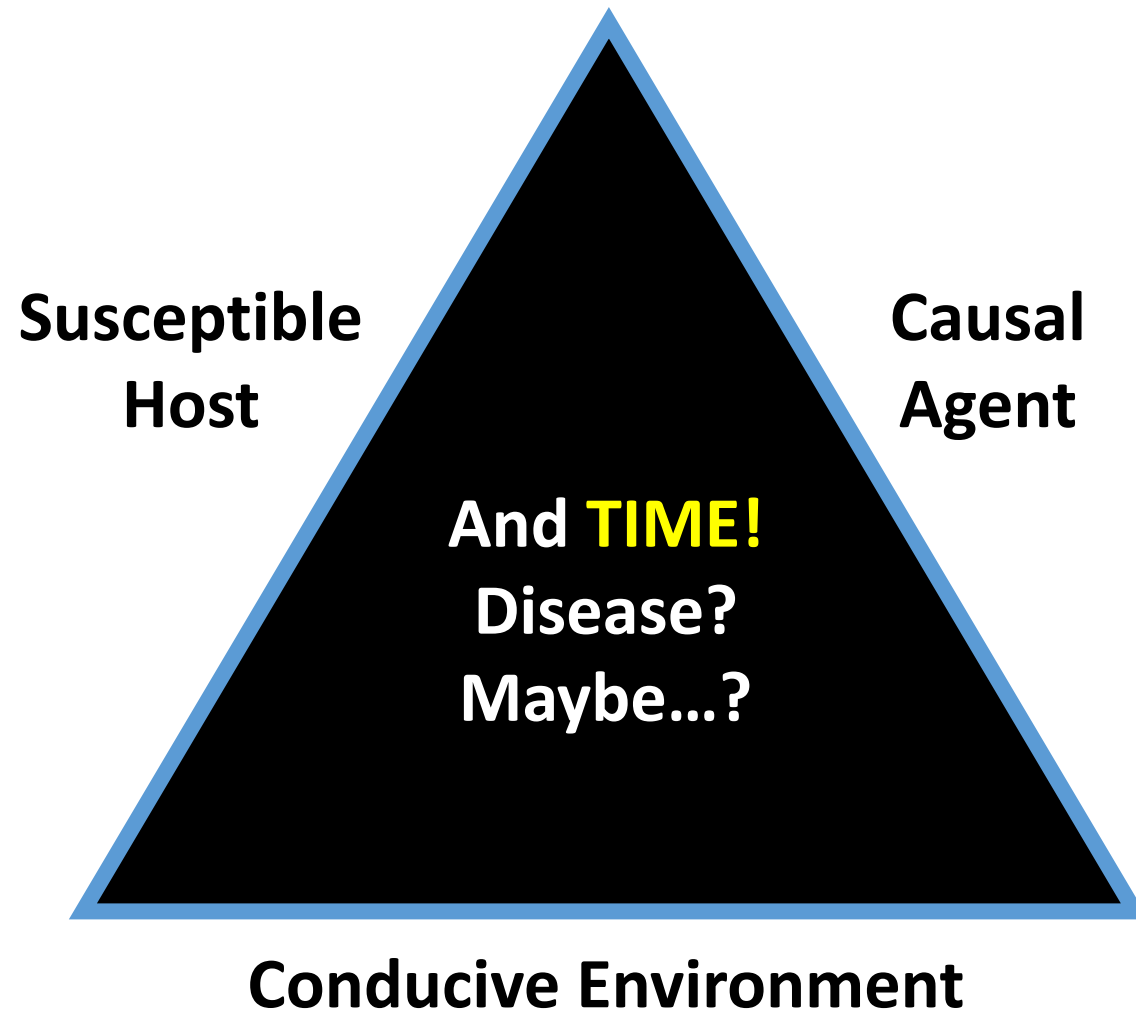


Dollar Spot Fungal Mycelium



Mowing Injury on Drought/Heat-Stressed Turf

# The Disease Pyramid



Relationship between the host, pathogen, and environment – over a certain amount of time



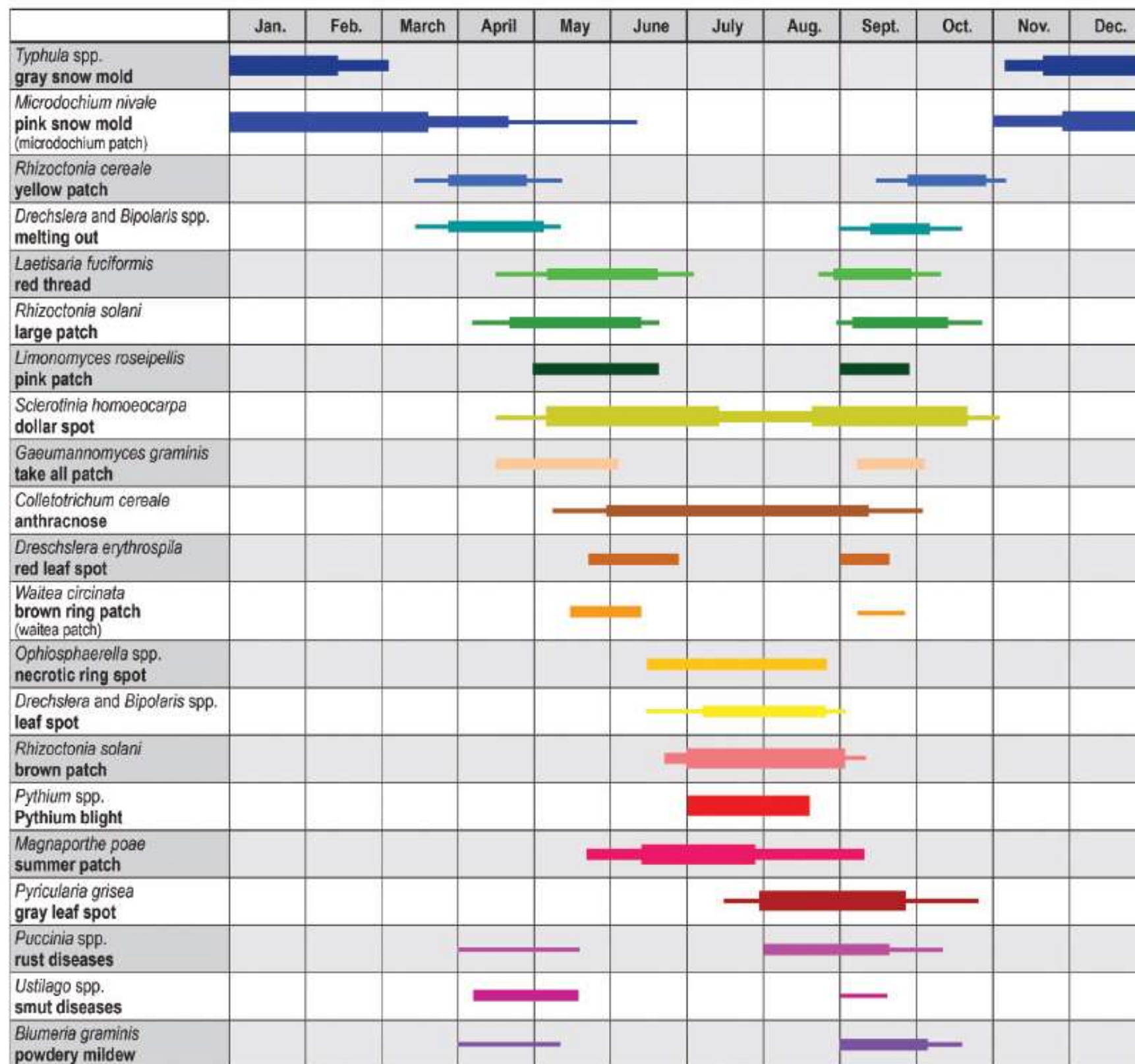
Drought stress = disease

No drought stress = no disease

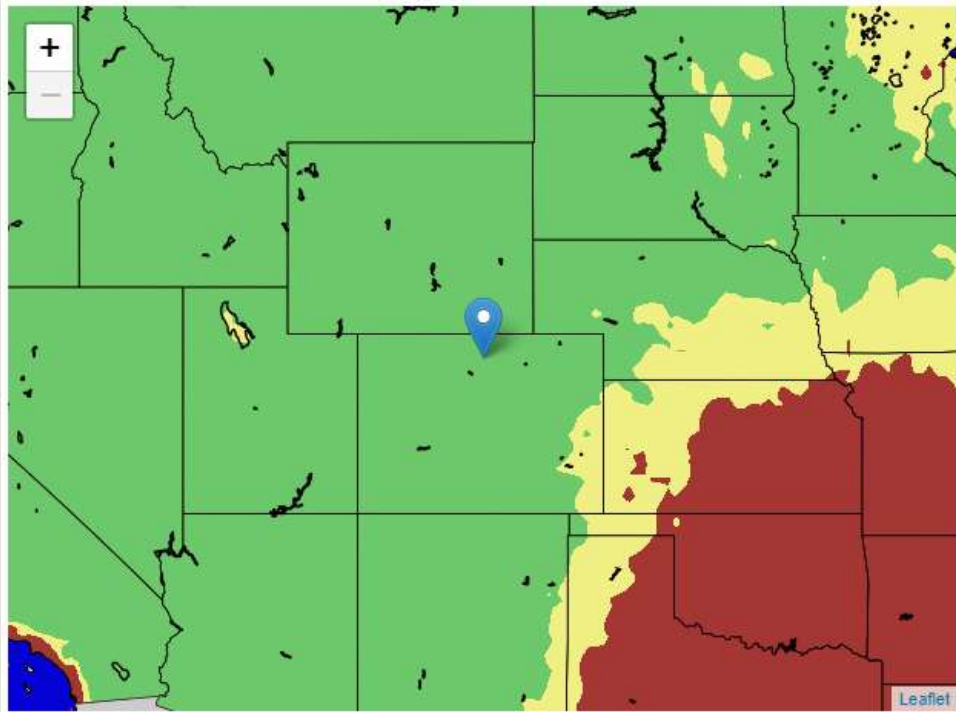
*Ascochyta* leaf blight

Environment can alter the susceptibility of the host and/or the pathogenic capabilities of the pathogen

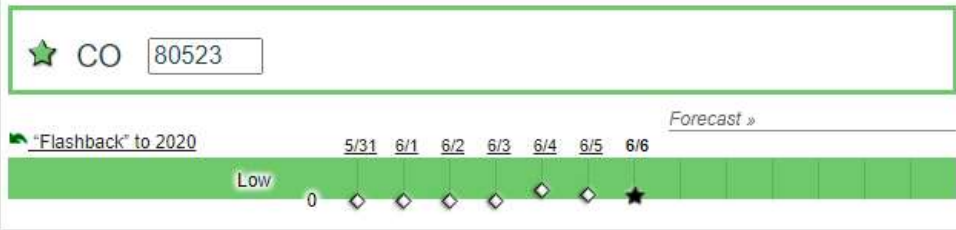
While a disease, *Ascochyta* almost always occurs when turf is drought/heat-stressed.



Dollar Spot  
through Sun, Jun. 6, 2021

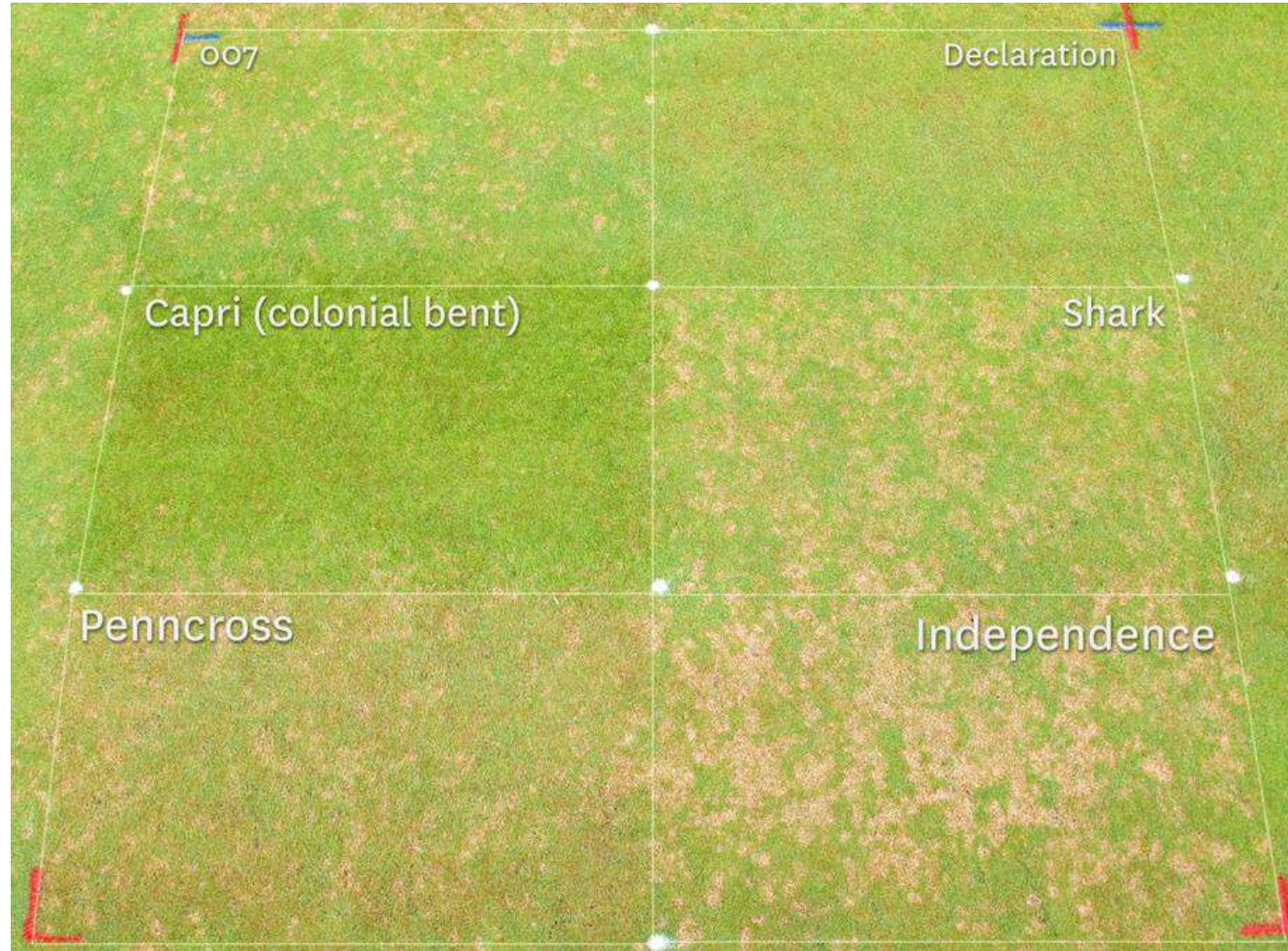


- Air Temperature
- Dollar Spot
- MSU Embark Timer
- Proxy/Primo Timer
- Seedhead Flush
- Early Season DMI
- Crabgrass PRE
- Spring Broadleaf
- Weed Flowering
- Crab Germination
- Japanese Beetle
- Bluegrass Billbug
- BTA Egg Lay



Tabular Data

Date	Air Temp (F) 5 day avg.	Rel. Humidity 5 day avg.	DS Probability
2021-06-06	60°	47	1.5%
2021-06-05	57°	50	1.5%
2021-06-04	53°	63	2.7%
2021-06-03	49°	73	0%
2021-06-02	48°	74	0%
2021-06-01	48°	72	0%
2021-05-31	49°	69	0%





Brown spots can look alike – but have completely different causes

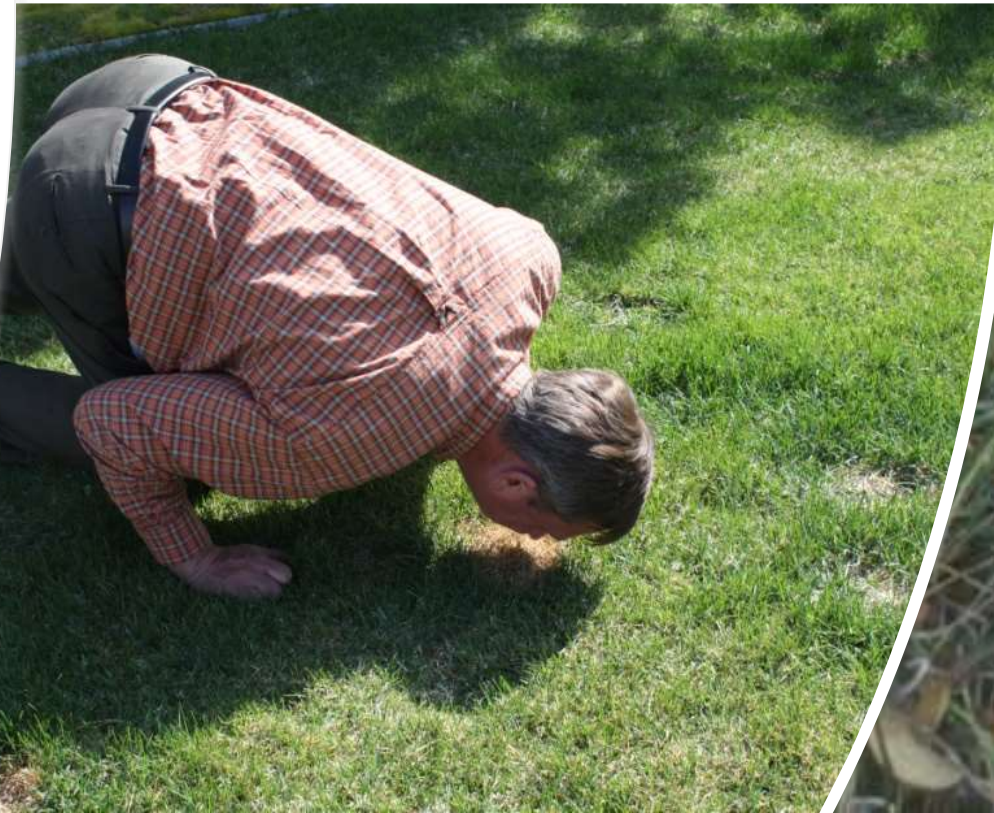


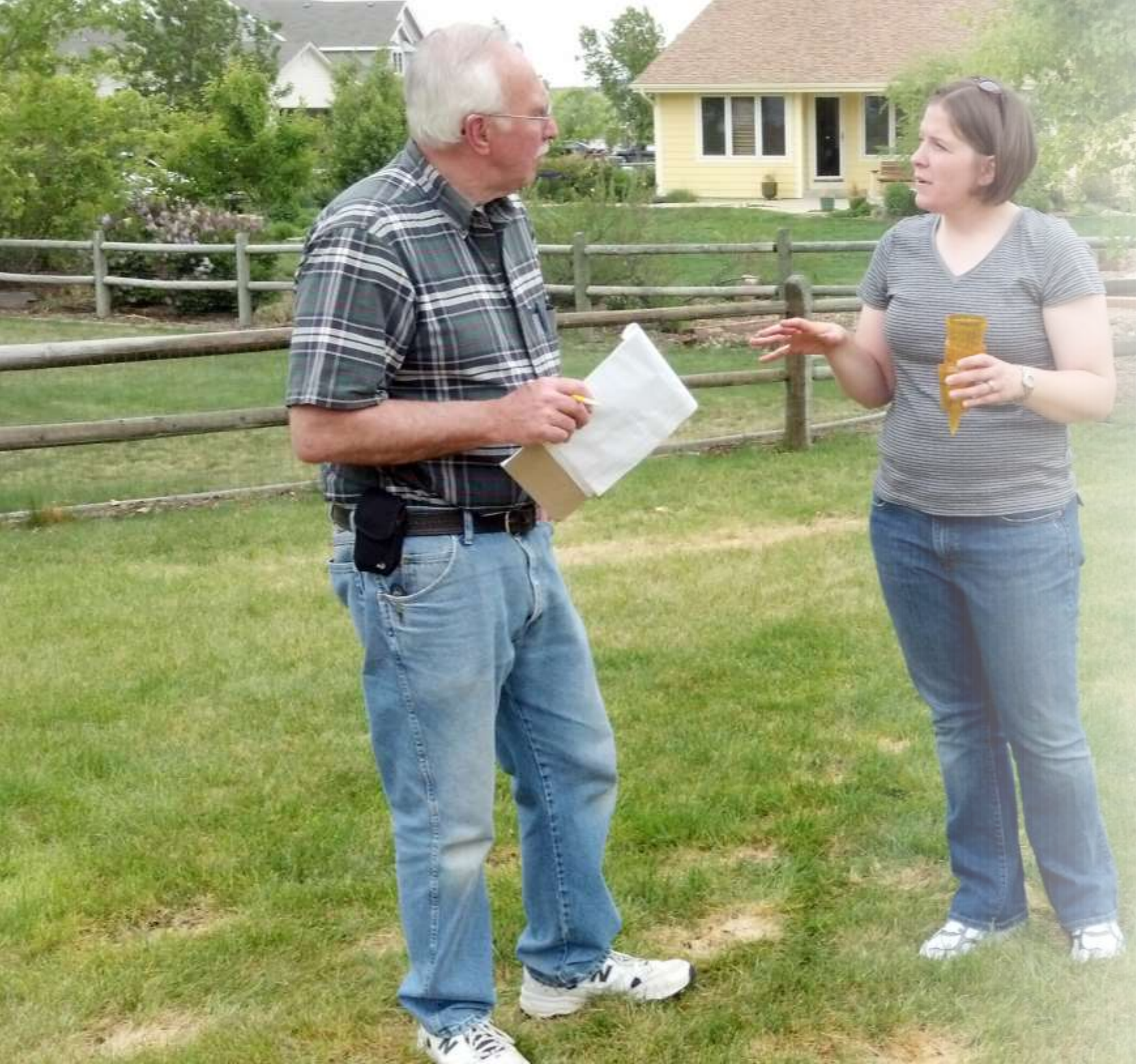




# Useful Diagnostic Tools

- Eyes, ears, nose
- Magnification (loupe, phone)
- A long, thin screwdriver or other probing tool
- Digital pics
- Shovel, spade, soil profiler
- Sharp knife
- Books, ID keys, guides, web sites
- Open, inquisitive mind
- EXPERIENCE!





# Important Diagnostic Information

Ask questions

- Age of property/lawn?
- When did the problem appear?
- Where in the landscape?
- Happening to neighboring lawns?
- Lawn care or DIY?
- What have you done to the lawn?
- What do you (client) think it is?

# Important Diagnostic Information

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## Good photos!

- Wide-angle of entire lawn
- Closer shots of patches from standing height
- Close-ups (1 foot) of patches, dead turf, weeds, grasses
- Highest possible resolution – allows you to magnify on your device/desktop screen





# Turf Diagnostics

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- Look for patterns – or lack of patterns
- Timing relative to:
  - Weather changes
  - Maintenance practices
  - Pesticide applications
  - Events on the turf
- Time of the year
- Repetitive? Same spot every year at this time...







What are some clues?  
Patterns?  
Timing?



Newly planted sod

The brown area is located on the same area of each piece of sod

Disease doesn't occur in patterns like this – nor does insect damage





Newly planted sod

New sod overheated while in transit from farm and/or while sitting on a pallet at the site, waiting to be planted

Center of the pallet for slabbed sod (or center of rolls AND center of pallet for rolled sod) can reach lethal temperatures within a day of harvesting the sod





New sod overheated while in transit from farm or while sitting on a pallet at the site

Note that the brown area is located on the same area of each piece of sod

Disease doesn't occur in patterns like this – nor does insect damage



# It's ALWAYS (almost...) Water!

















0.1 inch

0.2 inch

1/10 of an inch difference...not a big deal? Yes, it is!  
The healthy turf is getting 2X the water that the brown area is receiving. Over the course of a growing season, that is a huge difference in water = unhealthy turf (disease, weeds, ugly)



Use any type of straight-sided container to measure output (use a ruler to measure water depth) or to check for coverage issues



# Diagnosing Brown Spots in the Lawn with an Irrigation Audit

*A.J. Koski, PhD, Extension Turfgrass Specialist*  
*A.S. O'Connor, PhD, Extension Horticulture Agent*

Brown Spots in lawns can have many potential causes, but the most common issue is poor/non-uniform irrigation coverage. When an irrigation system is operating, it always looks like water is being applied evenly, but that's rarely the case. Conducting a quick irrigation audit (measuring the amount and uniformity of water being applied) can be a very beneficial tool.

Many Colorado water providers provide irrigation audit services to customers - for little or no cost. However, you can do your own informal audit to help solve lawn brown spot woes.



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## The Informal Lawn Irrigation Audit Process

1

Gather 5-10 identical containers for collecting water. These can be tuna or cat food cans, plastic cups, rain gauges, etc. It's important they are the same type to collect water evenly and sit level in the lawn.



2



Working in one irrigation zone, randomly place the cups in the lawn. Put some on green areas and some on brown areas. Make sure the containers are level. Avoid placing containers next to sprinkler heads - keeping them a few feet away.

3

Let the irrigation system run through a normal cycle. Or run the system for 15-20 minutes while watching the sprinklers run. Look for crooked, low, plugged, or blocked heads.



4

Measure the depth of the water in each container with a ruler. Write down each number, along with a note if the lawn is healthy or brown. Measure to 1/10" if possible.



5

Do some simple math to get the average depth of water applied in the green turf areas and the brown areas. While it may seem insignificant, keep in mind that a green area that received 0.2" of water versus a brown area with 0.1" is getting TWICE as much water every time you irrigate!



Uniformity in your irrigation system is the key to efficiency!

# Common Brown Spot Causes

A. Heads are too low in the ground, which results in green "donuts" in the turf and brown areas beyond.

B. Heads aren't coming up perfectly vertically. Crooked heads will never distribute water uniformly!

C. Heads not turning the way they should - they may be "stuck".

D. The spray pattern may be blocked by plants or landscape materials.

E. Water pressure may decline as additional homes are built in your neighborhood. Find windows of time when water pressure is best (i.e. the middle of the night).

F. Nozzles can get plugged or worn.

G. Heads can get broken, bumped, or moved by mowers or aerification equipment.

H. Tree roots can impinge on irrigation lines, decreasing or stopping water flow to heads.

I. The valves for a station may not be opening fully.

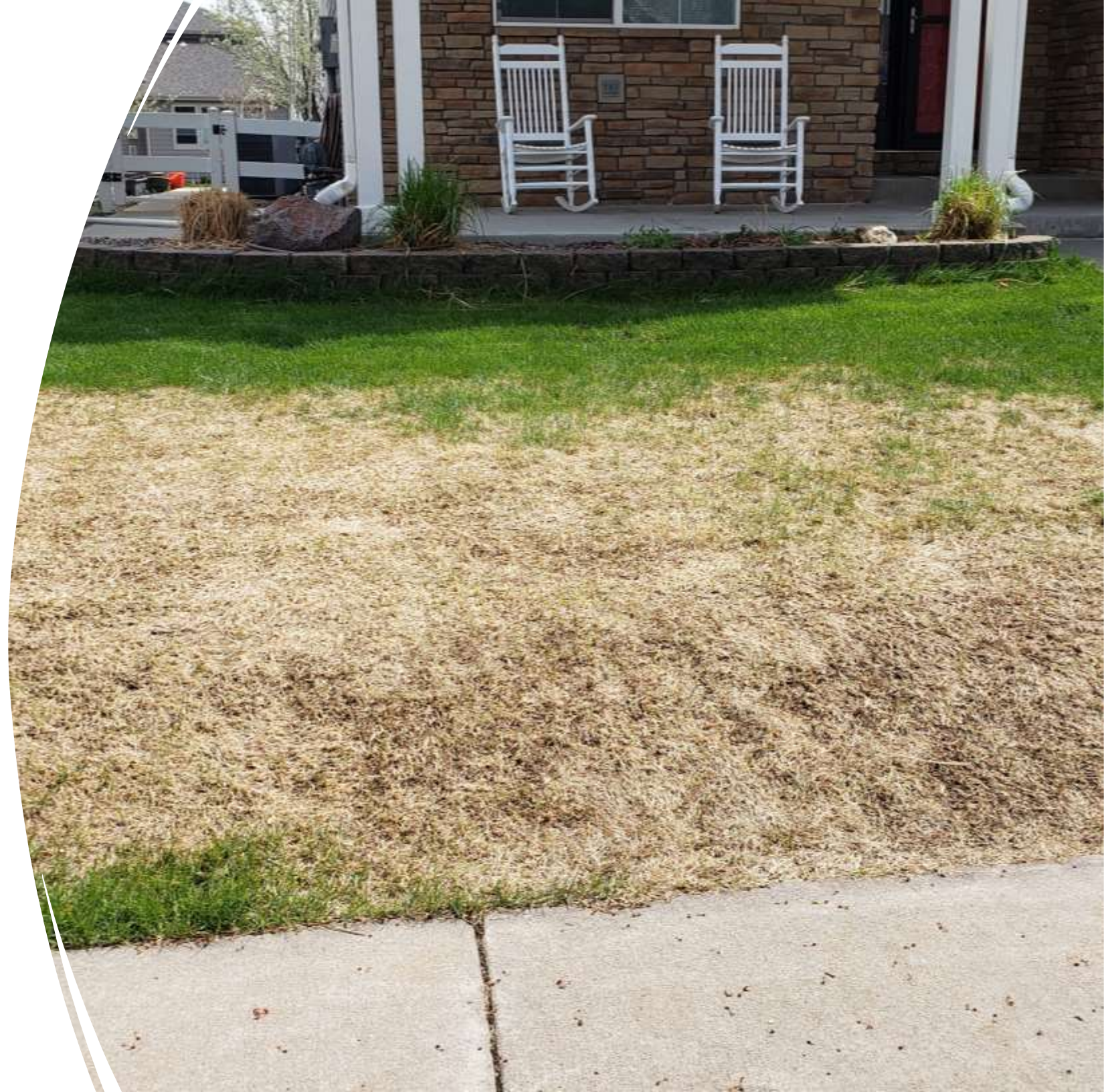
J. The irrigation design is poor - heads may be spaced too far apart or there are too many heads on a station.



# Late Winter/Spring Turf Problems and Brown Spots

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- Freeze drying/drought
- Snow mold
- Ice cover
- Salts
- Mites (clover and grass mites)
- Cranberry girdler (began previous fall)
- Animal urine spotting (dog, elk)
- Patches of dormant warm-season grasses (buffalo, zoysia, bermuda)
- Night



# Late Spring/Early Summer Turf Problems and Brown Spots

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- Animal urine spotting (dog, elk)
- Rabbit feeding and urine injury
- “Leftover” mite and cranberry girdler injury
- Sod webworm
- Leftover necrotic ring spot (NRS) injury from previous year
- Ascochyta leaf blight (see irrigation issues ↓ )
- Irrigation issues
- Weed control mistakes
- Fertilizer misapplication/burn





# Mid-Late Summer Turf Problems

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- Animal urine spots
- Fertilizer and pesticide misapplication
- Irrigation issues (#1!!!)
- Mower tracking on heat/drought-stressed turf
- Beginning of grub feeding
- Heat-induced dormancy of rough bluegrass patches



# Late Summer-Fall Turf Problems

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- Animal urine spots
- Fertilizer and pesticide misapplication
- Irrigation issues (#1!!!)
- Grub feeding
- Necrotic ring spot
- Cranberry girdler



# The Two Most Common Turf Diseases on Colorado Lawns

- Ascochyta leaf blight (spring/early summer)
- Necrotic ring spot (late summer/fall)



Ascochyta leaf blight on Kentucky bluegrass



Necrotic ring spot on Kentucky bluegrass

# Ascochyta Leaf Blight

- Seen on all turf species
- Stress-incited disease
  - drought
  - heat
- Most common when spring turns to summer
- Shows up where irrigation coverage is deficient
- Not lethal, but looks like it is



Fungus attacks the leaf blade at the tip and works its way down to the base of the leaf – but does NOT kill the plant!

Turf appears dead, but look for signs of new shoot growth  
Recovery takes 1-4 weeks, depending upon severity



# “Fixing” Ascochyta leaf blight

- Adjust sprinklers (or turn them on)
- Keep the soil evenly moist – but avoid constant saturation
- Turf should recover in 2-4 weeks, depending on species and weather
- We NEVER recommend a fungicide application of any type for this disease – because it is easily “fixed” by addressing the irrigation problem that caused its occurrence in the first place



# Ascochyta Leaf Blight

June 9 in Windsor

There is a broken irrigation head in the very green section, which caused water application problems for the entire station. The resulting drought stress caused an outbreak of Ascochyta leaf blight



# Ascochyta Leaf Blight

June 23 in Windsor

Just 2 weeks later, following repair of the irrigation system, the turf has recovered quite well. No fungicides were applied.





# Ascochyta Leaf Blight

June 29 in Windsor

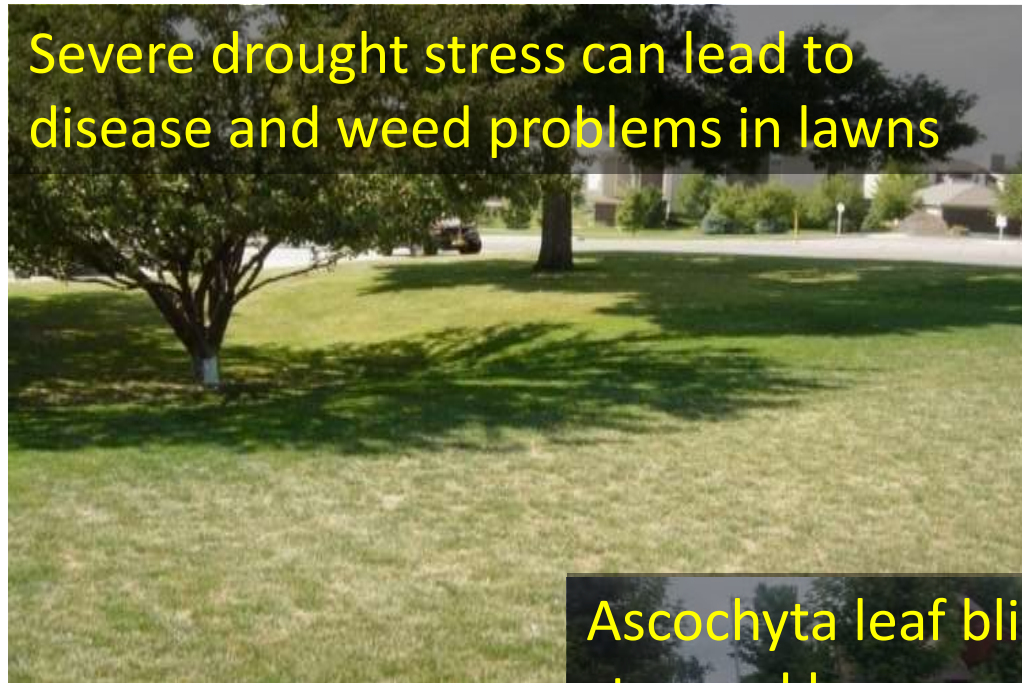
Three weeks after the disease outbreak it is hard to tell that there was any disease on this lawn.



# Not Enough Water...

- Lawn not as green, less dense
- More weeds that tolerate drought (crabgrass, bindweed, dandelions,
- Poor wear tolerance
- Stress-tracking on drought-stressed turf
- Certain diseases more common (Ascochyta leaf blight, dollar spot)
- Some insects are favored by drought/dryness and damage is more severe (chinchbugs, winter mites)

Severe drought stress can lead to disease and weed problems in lawns



Ascochyta leaf blight on drought-stressed lawn



Clover mite injury in spring

# Too Much Water...

- Squishy turf
- Shallow roots
- Poor drought resistance
- More soil compaction
- Needs more fertilization
- More rapid thatch formation
- Some insects are favored (grubs)
- More weeds
- Higher water bills
- Necrotic Ring Spot disease



# Necrotic Ring Spot

- Caused by the fungus *Ophiosphaerella korrae*
- Sometimes (incorrectly!) called:
  - Neurotic ring spot
  - Narcotic ring spot





Necrotic ring spot may occur as only a few random patches in a lawn – or may totally infest a lawn when conditions are perfect for the fungus to grow.





# Necrotic Ring Spot

*Ophiosphaerella korrae*



Overly moist root zone  
– especially in the  
spring and early  
summer

Too much quickly  
available nitrogen early  
in the growing season

Shorter mowing heights  
( $< 2$  inches)

Soil compaction, thatch

# Necrotic Ring Spot

## *Ophiosphaerella korrae*

### Fixing NRS?

- Keep turf drier – but not stressed; avoid daily irrigation that keeps turf overly wet between irrigation events
- More late-season N; less **quick** N in spring
- Raise mowing height > 3 inches
- Core cultivation to reduce compaction, for thatch reduction
- Overseed with perennial rye

Fungicides only effective when applied along with the above management “fixes”





# The Most Common Lawn Insect Problems

- Turfgrass mites (clover, Bank's grass mites)
- White grubs (chafers, Japanese beetle)
- Caterpillars (sod webworm, cranberry girdler)
- Billbugs



# Grass Mites

clover mites, Bank's grass mites

Dry, warm late winter/spring

South- and west-facing parts of the landscape  
(warmer and drier)

Lack of snow cover

Thatchy turf; drought-stressed turf

Shallow-rooted turf more is more susceptible to  
winter drought stress

Tall fescue can be more resistant because deeper  
rooting can mean less drought stress – but mites  
will still feed on drought-stressed tall fescue

Clover mites often occur near trees, walls,  
buildings – while grass mites can be found  
anywhere in a lawn



# Turf Mite Damage – The Fix

Mites often kill the grass – so if it doesn't green up by late March, it's likely dead

Dead areas can be re-sodded or overseeded (aerate followed by seeding)

Prevent problem in the future with winter watering November through March if there is no snow cover and soil is extremely dry

Insecticides and most miticides aren't very effective



# Cranberry Girdler (Subterranean Webworm)

Adult moths emerge in spring

Lay eggs in summer

Larvae feed on roots late summer/early fall –  
this is when the damage occurs (Sept-Oct)

Larvae spin silken cocoons in soil and  
overwinter

Some feeding may occur in the spring before  
pupation





Cranberry girdler larvae become large enough to begin causing damage in September/October

Their occurrence is sporadic, both year-to-year and which lawns in a neighborhood are affected

Pulling on dry-appearing turf will easily reveal the presence of the larvae

Not all turf in the affected areas will be killed, but heavy infestations can kill grass – requiring seeding or sodding



# Japanese Beetle

*Popillia japonica*



# Masked chafer and May/June beetle



Adult masked chafer



May/June beetle adult (left) and larva or white grub (right). (Adult photo courtesy of Steve Katovich, USDA Forest Service, Bugwood.org).



Signs of Grub Activity in  
Lawns

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## Animal Pest Problems of Lawns



# Dog Urine Injury

- The concentrated salts in the urine of some dogs can kill grass
- There are NO miracle products that fix or eliminate the salts – aside from copious amounts of water
- The BEST solution is to train the dog to use a mulch or gravel area
- Can happen with both female and male dogs
- Tall fescue and perennial ryegrass are more tolerant of the salts – so are an option for reseeding affected areas



# Why do Earthworms like Lawns?

- Moist
- Shady
- Clay
- High organic matter
- Grass clippings? Tree leaves?
- High pH
- Low salinity
- Pesticides? Most are not a problem for earthworms





While nightcrawlers consume thatch and other organic matter in lawn and are effective at aerating the soil, presence in large numbers can cause lawns to thin out and become very bumpy and uneven.

The bumpiness occurs because they clean their burrows out constantly, leaving castings around the entrance to the burrow – causing the lawn’s surface to become uneven.





# Rabbit Damage to Lawns

- Constant defoliation and urination in same spots can damage or kill grass
- Rabbit urine is very concentrated
- Lack of predation in urban areas has resulted in very high populations
- Feeding is often done at night
- Exclusion with wire mesh (hardware cloth) fencing is best solution
- Motion detection sprinklers can discourage feeding; repellents can be effective, but are expensive
- Use of Milorganite (sewage sludge) fertilizer can discourage feeding





Rabbit injury can be more severe where turf is drought stressed, and may be confused with necrotic ring spot disease “craters”

Both of these are photos of rabbit injury on Kentucky bluegrass lawns.

Close examination MAY reveal the presence of droppings/pellets, but family dogs often will feed on them – so there often are few





Rabbit urine is often very concentrated (salty!) because it is difficult for rabbits to find drinking water sources in urban landscapes – the grass is killed by a combination of repeated, close clipping/feeding and salt injury.

The presence of dropping/pellets, dead turf, and closely-cropped grass can indicate a rabbit problem.

Pellets may not always be present, as rabbits will consume their own pellets – and dogs will often find and eat them as well.













Rabbits are often more active at night – so people may not ever see them feeding on their lawns

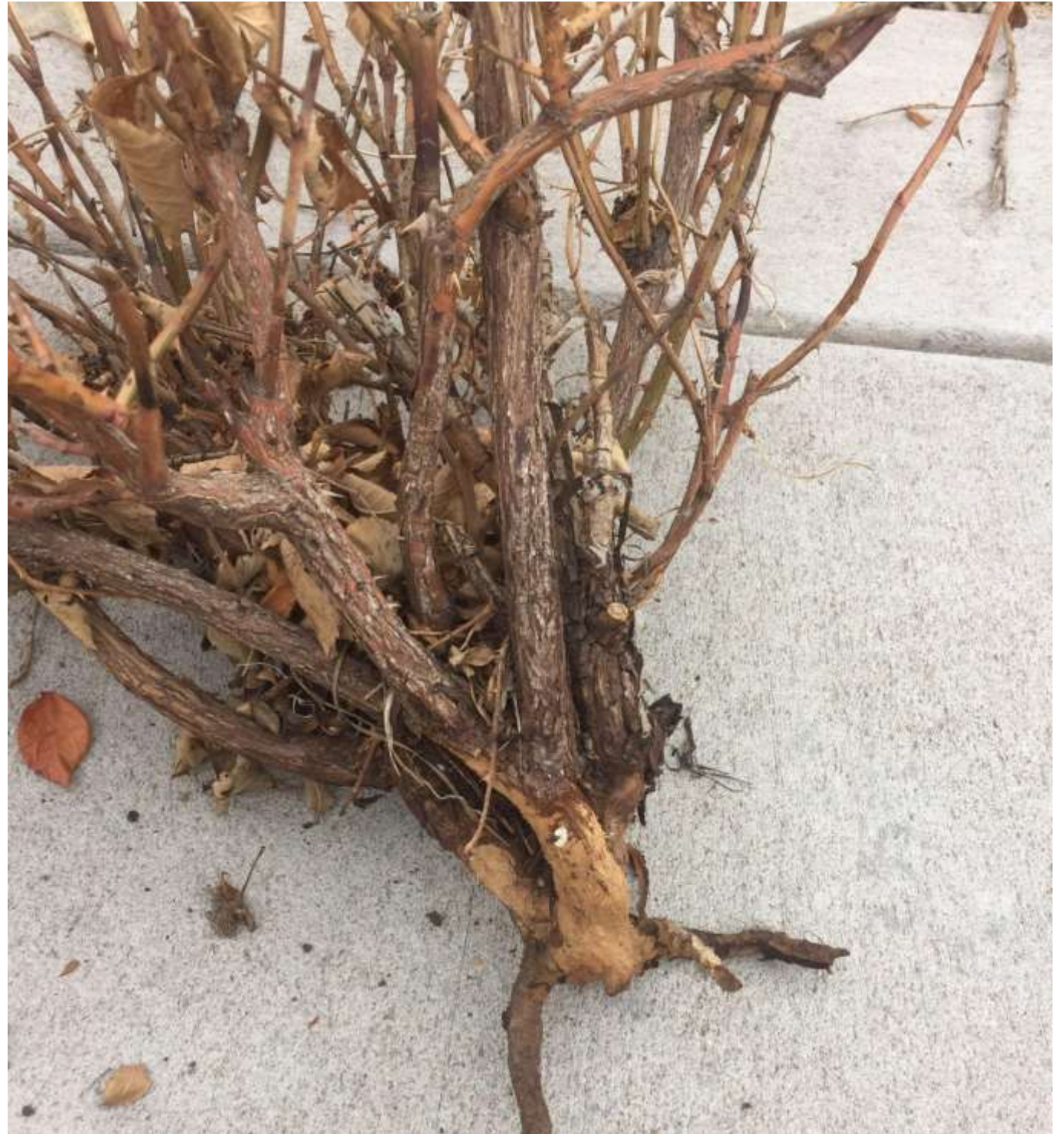


# Vole Damage to Lawns

- Voles (meadow mice) populations are very cyclical in nature
- Damage often occurs under snow cover, and usually in lawn areas near some type of cover (junipers, mulch beds, tall/"native" grass areas)
- Shrub and flowerbeds with "weed barrier" can encourage voles (they live under the weed barrier)
- Voles can be trapped using unbaited mousetraps placed on their trails
- Use of poison baits is discouraged because of danger to children, pets, and non-target wildlife
- Avoid use of weed cloth/barrier to reduce attractiveness of beds to voles
- Good evidence that application of Milorganite fertilizer (biosolids) to lawn and other areas of the landscape can discourage vole activity













**Voles can be active during the summer too. They can be trapped using un-baited mousetraps placed on their trails and where they enter/exit areas of cover.**