



Turf Diseases & Innovations at the Turfgrass Diagnostic Lab

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Department of Plant Pathology



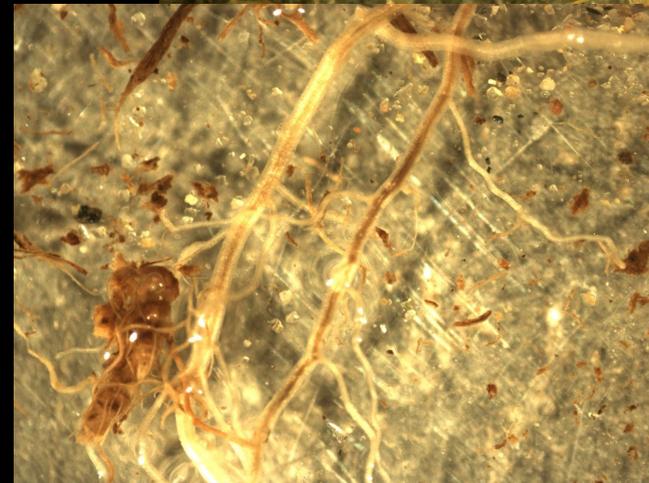
What is the TDL?

- Turfgrass diagnostics for golf courses, athletic fields, sod farms, home lawns, etc.
- Also conduct various research projects
 - Main focus is turf diseases
- No financial support from UW or the state
- Dr. Paul Koch and myself



What does the TDL do?

- Turf disease diagnostics
- Written reports with recommendations
- Turfgrass identification
- Lawn weed identification
- Answer turf related questions
- Fungicide and disease trials



Turfgrass Disease Samples

- Need a large enough sample
 - 6" diameter, 2-3" depth so I can look at soil and roots
- Transition between healthy and affected turf
 - Diseases and insects will be most active in the transition
- Pictures, pictures, pictures!
 - Everyone has a cell phone now
- Fill out the submission form
- Give me the whole story
 - Can speed up response time



Getting the whole story

- Homeowner calls and states they cannot get grass to grow in one area of their yard no matter what they do
- They've "tried everything"!
- Consider not trying to grow a lawn there
 - Mulch, stones, flower beds



Written reports with recommendations

- Sample cost is \$20 for homeowner samples
- Includes a written report with my diagnosis and recommendations



Turfgrass Diagnostic Lab
O. J. Noer Turfgrass Research & Education Facility
2502 Highway M, Verona, WI 53593-9537
www.tdl.wisc.edu

E-mail: hockemeyer@wisc.edu Phone: 608-845-2555 Fax: 608-845-8162

Client Information:
[Redacted] Winona, MN 55987

Sample #: 2022-094 and 095
Date Received: 7/19/22
Invoice Date: 7/20/22
Mail Submission
Diagnosed by: Kurt Hockemeyer

Diagnosis: *Bipolaris* leaf spot caused by the fungus *Bipolaris sorokiniana*.



Figure 1. Many dark, cigar shaped spores were observed in the sample after incubation in a moisture chamber. These spores were identified as *Bipolaris sorokiniana*.

Recommendation: *Bipolaris* leaf spot is a common disease of Kentucky bluegrass and other lawn species during the summer. The genus *Bipolaris*, along with the fungal genus *Qoehlsiera*, used to be classified together as *Helminthosporium*. This fungus infects plants during the heat of the summer and requires high humidity and high moisture levels for infection. Initial symptoms begin as a general thinning of the stand and can quickly spread to surrounding leaf blades and cause irregular dark leaf spots. If left unchecked and the environment remains favorable to the pathogen, symptoms can progress to a "melting out" where the basal portions of the plants can be killed. Symptoms appear as a reddish-brown rotting of the sheaths, crowns, and rhizomes. This can lead to wilting, yellowing, or death of the foliage or whole plant. Symptoms typically appear in irregular patterns, and certain areas may be more affected than others.

Leaf spot is most severe on lawns that are growing slowly due to adverse environmental conditions. Shaded areas with poor air movement can result in weakened turf with extended periods of leaf wetness that favor the pathogen. Heavily fertilized lawns during

summer are more susceptible to *Bipolaris* infection. Excessive thatch, long periods of leaf wetness, drought stress, and low mowing heights favor the pathogen.

Most newer cultivars of Kentucky bluegrass have been bred with genetic resistance to this disease. Refer to the website ntep.org or contact the seed company for info on specific cultivars. Planting resistant cultivars is the easiest and cheapest way to control this disease. You could also plant seed blends or mixtures that contain other turf species (perennial ryegrass, fine fescue, tall fescue). Keep mowing heights high (2.5 to 3 inches) to allow the turf to compete with the fungus more effectively. Keep mower blades sharp to keep cuts as clean as possible. Apply most of the nitrogen in the fall to help contribute to a healthier lawn. During summer, fertilize to meet the needs of the plant but avoid over fertilization during the peak of summer stress. Avoid early evening irrigation during July and August, rather irrigate early in the morning to allow the leaf blades time to dry only if needed. If lawn is irrigated regularly, irrigate for longer periods only once or twice per week when natural rainfall does not reach 1 inch per week. Prune trees or move other obstructions that may impede air movement or block sunlight. Remove excessive thatch where the pathogen may overwinter, and core aerate to allow for healthier plants that can fight off the pathogen naturally.

Leaf spot can be controlled either preventatively, or curatively, but any fungicide application will be more effective when applied in the early stages of the disease. Fungicide applications won't cure completely infected plants but will help to reduce further spread of the fungus. Susceptible lawns should be monitored for disease activity during periods of high heat and humidity. For a list of effective fungicides, please refer to our website, turfpests.wisc.edu.

Severely infected areas may not be recovering at this point and may need to be raked and reseeded. You could reseed with more conventional turf species such as Kentucky bluegrass or perennial ryegrass. Or you could go with a lower maintenance turf species like tall fescue. Tall fescue is more drought tolerant and does not require as much fertilization as Kentucky bluegrass.

INVOICE
July 20, 2022

Homeowner Diagnosis for Sample 2022-094 and 095 PAID

Thanks for your payment!

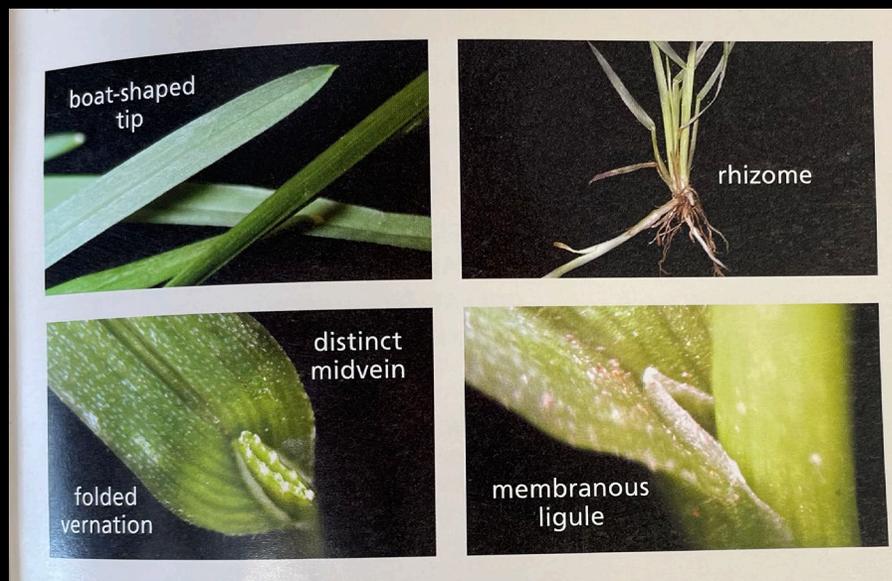
Thank you for your support of the Turfgrass Diagnostic Lab. Please call with any additional questions or comments you may have.

Kurt Hockemeyer-Turfgrass Diagnostic Lab Manager



Turfgrass and Weed Identification, Turf Related Questions

- We also offer turfgrass identification, and weed identification
- Can answer turf related questions
 - Fertilizer
 - Seed
 - Herbicides
 - Aeration
 - Etc.



Services NOT offered

- Soil nutrient testing (P, K, pH, OM, etc.) (UW Soil and Forage Lab)
- Ornamentals disease diagnostics (PDDC)
- Non-turf related insect identification (Insect Lab)
- I'm also not a magician or mind reader
 - I can't usually help with turf that died 2 years ago



When to contact the TDL

- When diseases are active or shortly after
 - Dead circles appear during/right after snowmelt
 - Small brown spots appear during a cool, wet spell in spring
 - Diffuse discoloration of the turf during the hottest, driest parts of summer
 - Dead arcs, rings, or patches of turf on recently sodded lawn in fall



How to submit a sample

- Properly collect sample
 - Right size, right location, right time
- Properly pack sample
 - Wrap in foil, secure in the box, NO Shake N Bake
- Send promptly
 - Overnight shipping, ship early in the week
- Do not send JUST dead grass
 - Saprophytes can mask real issues
- Take good pictures
 - Some wide view shots to give perspective, some close up shots



Contact us!
Or ship a sample! (Or drop off)

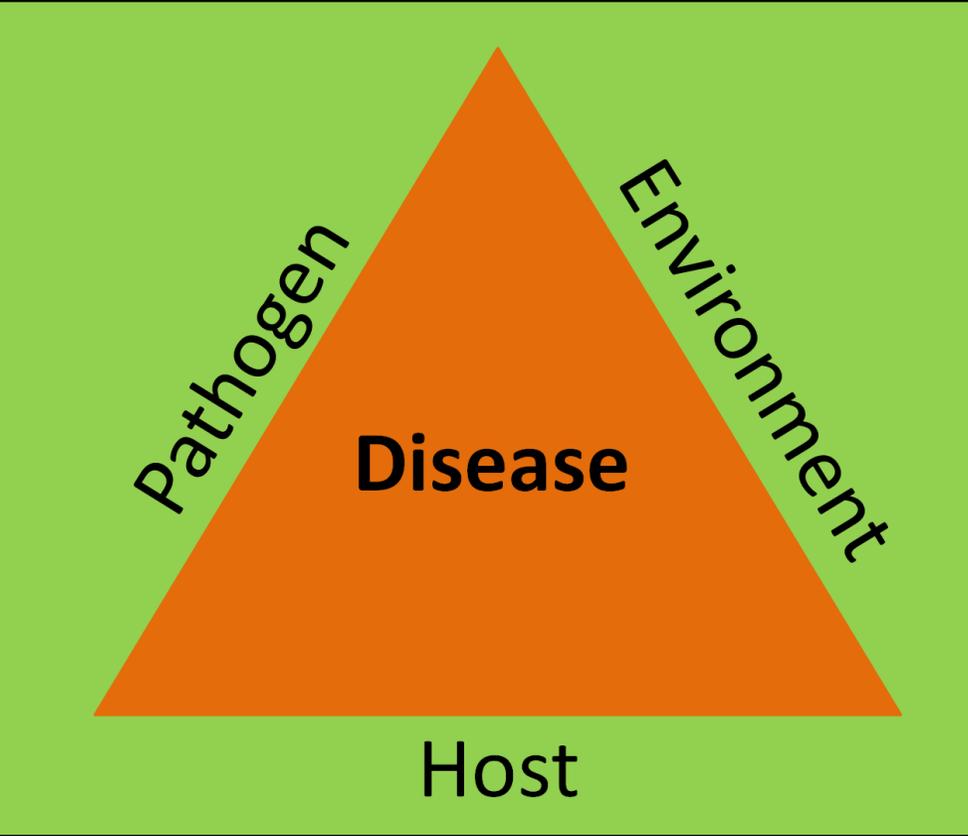
- Kurt Hockemeyer
- Website: tdl.wisc.edu
- Email: hockemeyer@wisc.edu

- Address: OJ Noer Turfgrass Facility
- Attn: TDL
- 2502 S Pleasant View Rd
- Verona, WI 53593

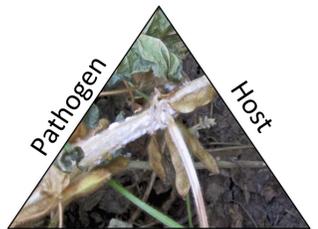
- Phone: 608-845-2535 (leave a message)



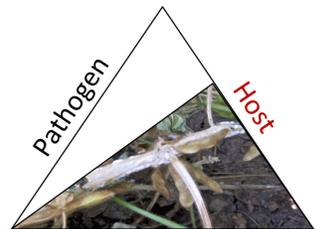
Disease Triangle



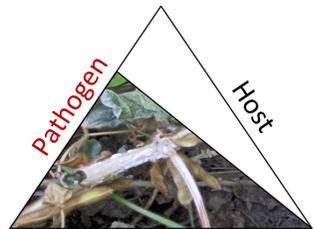
PLANT DISEASE TRIANGLE



Environment

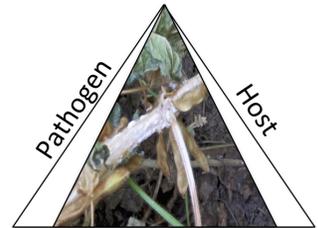


Environment

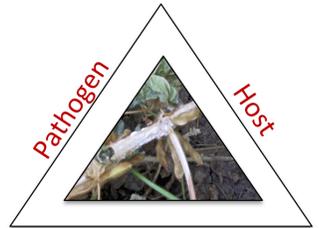


Environment

- Disease only occurs if three things exist all at the same time
 - Pathogen
 - Host
 - Environment
- Manipulating a component or combinations of triangle components influences the incidence and severity of disease



Environment



Environment

Common Lawn Diseases

What is my most common diagnosis?

40-50%

- Abiotic = not caused by a living organism

- Drought damage
- Heat damage
- Mechanical injury
- Phytotoxicity
- Applicator error
- Mechanical breakdowns

- No disease found
 - When I don't have a good idea what caused decline



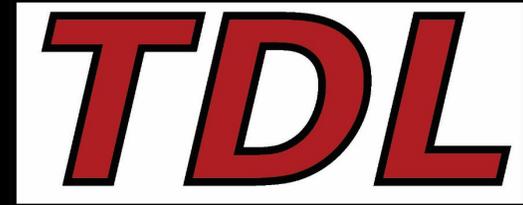
Abiotic vs Biotic

- Pathogens typically cause damage in circles
 - Medium to large circular patches
 - Small spots
 - Tiny leaf lesions
- Some pathogens spread by spores
 - Irregular or diffuse patterns
- Disease tends to be random
 - If entire lawn is dead, unlikely to be a disease
- Linear vs nonlinear damage
- Diseases progress over time
 - Increase in size and severity
- Diseases usually only attack one species
- Weeds are resistant to most diseases

Common Lawn Diseases

- Snow molds
- Leaf spots
- Necrotic ring spot
- Summer patch
- Rust
- Dollar spot





TURFGRASS DIAGNOSTIC LAB

Snow molds

Causal agents: Gray snow mold (*Typhula incarnata*); pink snow mold (*Microdochium nivale*)

Optimum Conditions: Gray snow mold needs cold conditions and approximately 60 consecutive days of snow cover, pink snow mold needs extended periods of cool, wet weather **but not necessarily snow**

Signs: Fuzzy white mycelium right after snow melt, sclerotia left behind in leaf tissue (only gray snow mold)

Symptoms: Circular patches of matted turfgrass with a white to tan bleached color. Pink snow mold may have more of a reddish hue. In the absence of snow cover, patches of pink snow mold are often smaller and less distinct.

Control: Limit nitrogen fertility going into fall (do not confuse with dormant application). Mow grass until dormancy, but do not cut abnormally short. Remove leaves and other debris from the lawn surface.



Leaf Spots

- Drechslera and Bipolaris leaf spot
- Ascochyta leaf spot
- Septoria leaf spot
- Curvularia leaf spot
- Nigrospora leaf spot



Drechslera leaf spot

- Causal agent: *Drechslera* spp.
- Turfgrass hosts: All lawn turfgrass species
- Optimum conditions: Extended periods of high moisture and high humidity
- Signs: Microscopic cigar-shaped spores
- Symptoms: Start out as purple/yellow/reddish colored lesions with dark-colored border that can spread to impact the entire plant. If infection is severe can thin and turn a reddish or purpling color (melting out).



Necrotic ring spot

Causal agent: *Ophiosphaerella korrae*

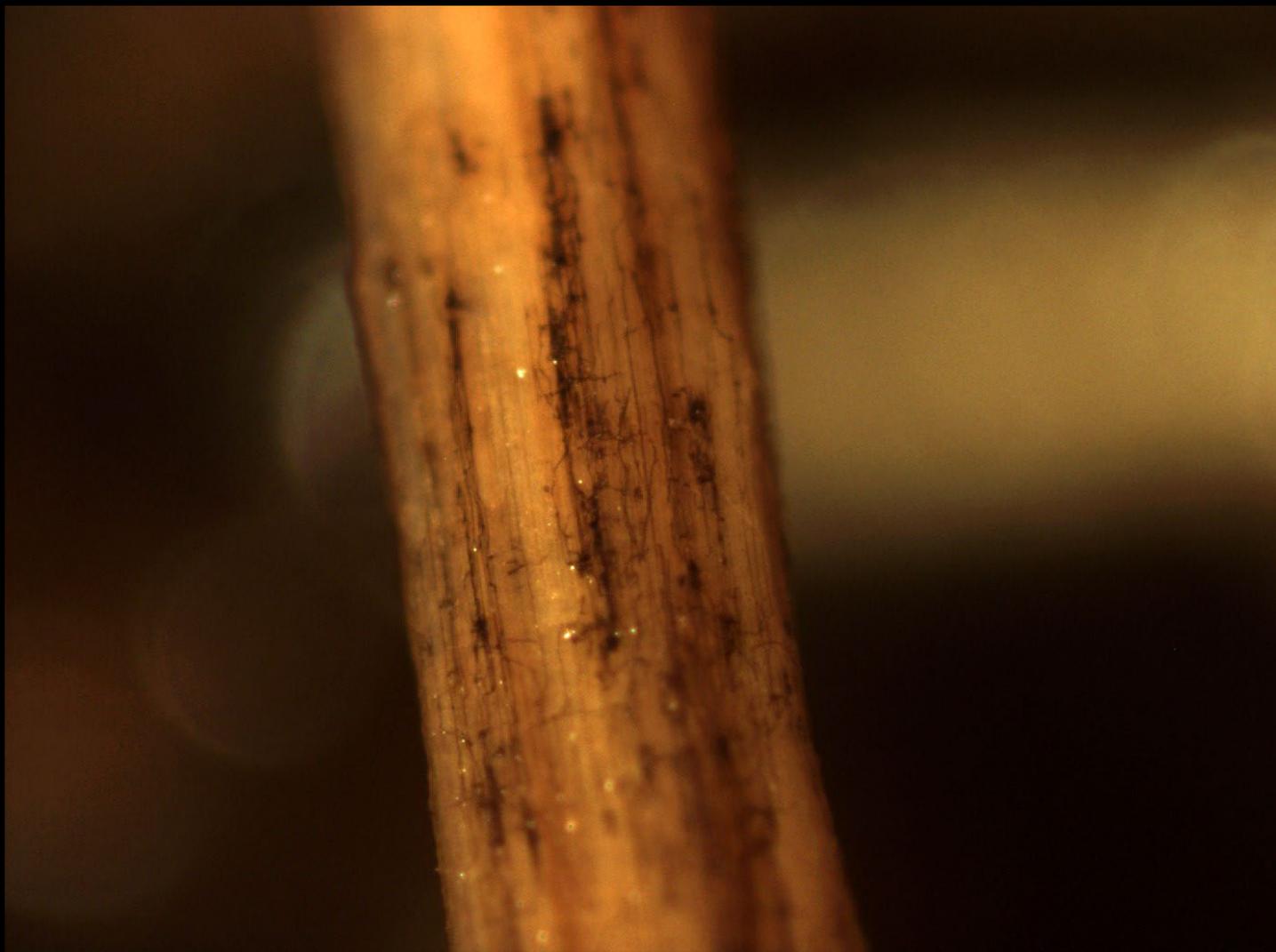
Turfgrass hosts: Kentucky bluegrass, fine fescues

Optimum conditions: Cool, wet weather in spring followed by warm, dry weather in summer.

Signs: Dark runner hyphae growing on the outside of root tissue

Symptoms: **Is a root-rotting disease.** Circular or arc-like patches of yellow to tan turf several inches to several feet in diameter form in late spring or early summer. Resistant weeds and grasses may fill in the center of the patch giving it a “frog-eye” appearance. Most severe on sodded lawns within 2-10 years of establishment. Disease severity drops off 8-10 years after establishment.

Fungus actually attacks the turfgrass roots in spring and fall with soil temperatures between 50-65°, but disease is not observed until summer. Why?????



Rings, arcs, patches



Necrotic ring spot

Control: Frustrating!!!

Once symptoms are observed the root system has already been damaged and the turf has to be nursed along with light, frequent irrigation until the fall.

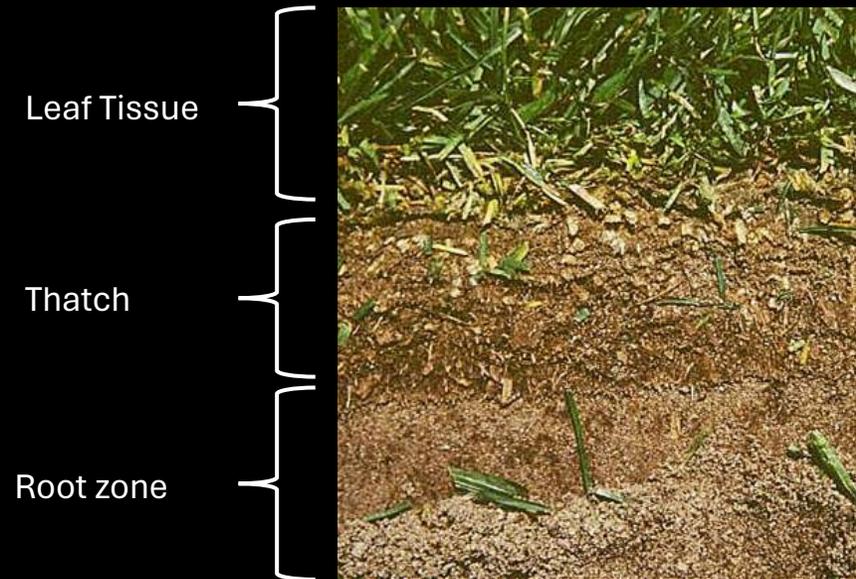
NRS is also difficult to prevent on newly sodded lawns. Plant resistant cultivars of Kentucky bluegrass. Limit nitrogen fertilizer application to no more than 4 lbs/1000 sq. ft. per year. Do not fertilize much before May 1. Keep thatch under 0.5 inches.

Deep, infrequent irrigation.



Necrotic ring spot

- Chemical control is available, but not usually recommended



Summer patch

Causal agent: *Magnaporthe poae*

Turfgrass hosts: Kentucky bluegrass and fine fescues

Optimum conditions: Sustained temperatures greater than 85°F and wet soils.

Signs: Dark runner hyphae growing on the outside of root tissue

Symptoms: **Is a root-rotting disease.** Circular or arc-like patches of yellow to tan turf several inches to several feet in diameter form in mid to late summer. Resistant weeds and grasses may fill in the center of the patch giving it a “frog-eye” appearance. Most severe on lawns established on compacted soils, wet soils, soils with high pH, or soils over-fertilized with quick-release nitrogen.

Fungus becomes active at SOIL temperatures of approximately 60°F, and causes the most damage at SOIL temperatures greater than 85°F.



Summer patch

Control:

Similar to NRS, once symptoms are observed very little can be done to affect the fungus and the turf has to be nursed along with light, frequent irrigation until conditions cool.

Preventatively, general healthy rooting practices can be employed:

- Deep, infrequent irrigation
- Proper mowing height
- Well-drained soil
- Aerify in fall if needed (reduce compaction, reduce thatch layer)
- Proper nutrition balance (do not fertilize in hot conditions)
- If necessary, lower soil pH using acidifying fertilizers

Rust

Causal agent: *Puccinia* spp.

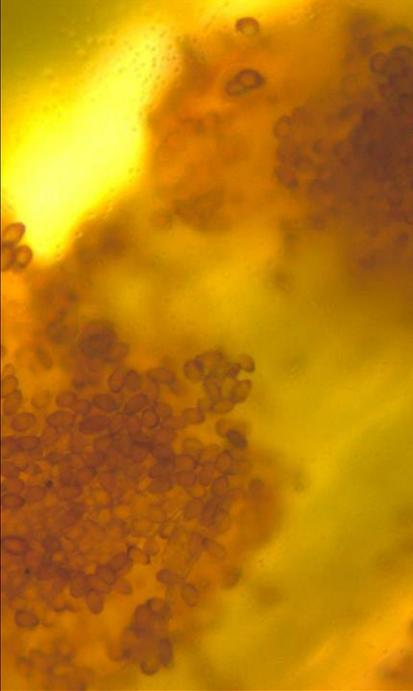
Turfgrass hosts: Most cool-season turfgrasses, esp. perennial ryegrass

Optimum conditions: Warm (68-84°F) and humid conditions on slowly growing turf

Signs: Rust colored spores. Begin as small yellow flecks on affected leaf blades. As the disease progresses the flecks multiply and turn orange, and can give the entire stand of turf an orange cast.

Symptoms: Most infections occur on turf growing slowly due to drought stress, nutrient deficiency, or heat stress. Under severe conditions thinning of the turf stand may occur. Usually only aesthetic, does not kill turf.

Control: Increase growth rate of plant through fertilization and irrigation. If serious problem persists, plant a more resistant grass species or cultivar.



Dollar spot

Causal agent: *Clariireedia jacksonii*

Turfgrass hosts: All cool-season turfgrasses

Optimum conditions: Warm (59-86°F) and humid conditions, low N fertility

Signs: Fuzzy, white mycelium growing from lesions in the early morning dew

Symptoms: Small circular spots rarely exceed 2” in diameter, bleached white lesions, hourglass shape with brown border

Control: Proper fertility, proper irrigation, dew removal, fungicides usually not needed in home lawns



New Research

- Leaf Mulching Study
 - How different leaf management practices and leaf depths affect:
 - Snow mold severity
 - Long term soil health



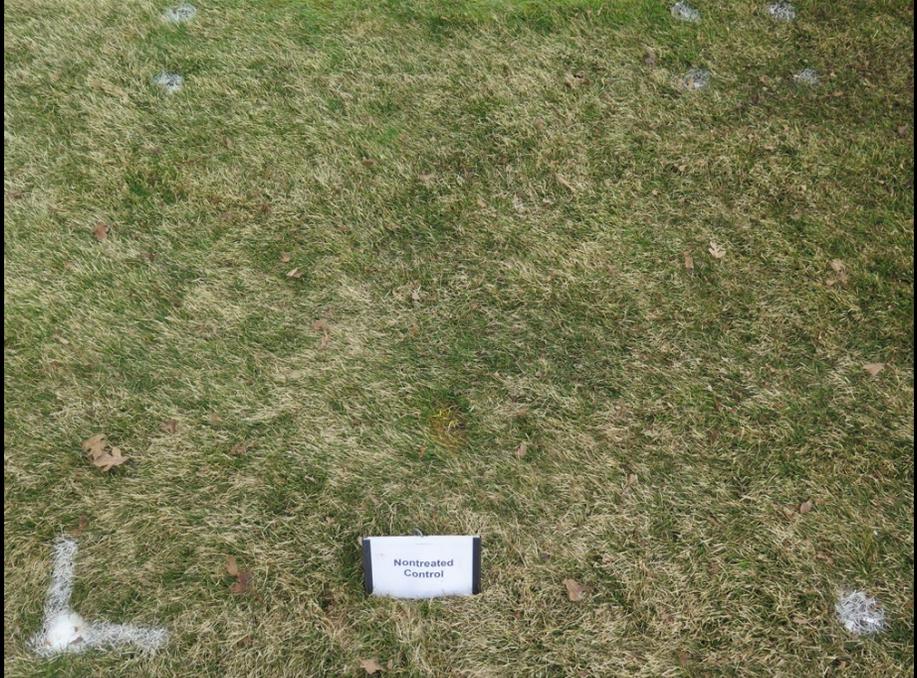
Treatments

- Treatment 1: No leaves (nontreated control)
- Treatment 2: Mulched leaves @ 5 cm depth
- Treatment 3: Mulched leaves @ 10 cm depth
- Treatment 4: Unmulched leaves @ 5 cm depth
- Treatment 5: Unmulched leaves @ 10 cm depth

Results after Year 1



Results after Year 1



Results after Year 1



Results after Year 1



Initial Takeaways

- 5 cm of mulched leaves consistently performed the best
- Both 10 cm treatments were smothered
 - Resulted in weed encroachment over the summer
- Getting close to another spring rating
- Will conduct soil health tests at study conclusion

Turfpests.wisc.edu



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Turf Insects

Turf Weeds

Additional Information

How to use the site

Acknowledgments and Additional Resources

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Product efficacy ratings included on this site are for the benefit of the turfgrass manager and are not endorsements of any particular product or company.

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Turf Management Mobile

Turf Weeds

Select one or more pests below (up to 3) to see the most effective products for control:

SUBMIT »

- Annual Bluegrass
- Annual Sedge
- Barnyardgrass
- Bermudagrass
- Bittercress
- Canada thistle
- Chickweed, Common
- Chickweed, Mouse-Ear
- Corn Speedwell
- Crabgrass
- Creeping Bentgrass
- Dallisgrass
- Dandelion
- Field Madder
- Field Paspalum
- Fountain Grass
- Goosegrass
- Ground Ivy
- Henbit
- Indian Mock Strawberry
- Kyllinga spp.
- Lespedeza
- Mallow



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turfpests.wisc.edu/grid.aspx?crop=8&type=weeds&ids=110,115

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Turf Management Mobile

Turf Weeds

Ground Ivy
 Dandelion

Labeled Products: [Refresh Grid](#)

| Name | Rating | MOA Code | Application Rate | Application Interval |
|-----------------------|--------|-----------------|--|----------------------|
| T-zone 7 | | | | |
| Dandelion | 4 | 1.2-1.5 fl oz/M | 30 days. Apply 0.75-0.83 fl oz/M for Bermudagrass and Zoysiagrass. | |
| Ground Ivy | 3 | 1.2-1.5 fl oz/M | 30 days. Apply 0.75-0.83 fl oz/M for Bermudagrass and Zoysiagrass. | |
| Negate 7 | | | | |
| Dandelion | 4 | 1.5 oz/A | 4-6 weeks | |
| Ground Ivy | 3 | 1.5 oz/A | 4-6 weeks | |
| Momentum FX2 7 | | | | |
| Dandelion | 4 | 1.1-1.5 fl oz/M | 4 weeks | |
| Ground Ivy | 3 | 1.1-1.5 fl oz/M | 3-4 weeks | |
| Manor 7 | | | | |
| Dandelion | 4 | 0.25-0.33 oz/A | 4-6 weeks | |
| Ground Ivy | 3 | 0.33-0.5 oz/A | 4-6 weeks | |
| Escalade 7 | | | | |



TURFGRASS DIAGNOSTIC LAB

turfpests.wisc.edu/product.aspx?product_id=331&pest_ids=110,115&crop_id=8

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Turf Management Mobile

Negate - Turf Weeds

| Product Information | |
|-----------------------|---------------------------|
| Active ingredient(s): | metsulfuron, rimsulfuron |
| Formulation: | 20%, 16.67% |
| Manufacturer: | Quall-Pro |
| WSSA Code: | 2 |
| Group Name: | ALS Inhibitors |
| Safe to Use On: | Bermudagrass, Zoysiagrass |
| POST: | Yes |

| Usage in Turf | |
|-----------------------|---|
| Remarks: | Approved additives may be used to improve performance |
| Application Range: | 1.5 oz/A |
| Application Interval: | 4-6 weeks |

| Turf and Dandelion | |
|--------------------|-----------|
| RATING: | 4 |
| RATE: | 1.5 oz/A |
| COMMENTS: | 4-6 weeks |
| Product Type: | Herbicide |

| Turf and Ground Ivy | |
|---------------------|-----------|
| RATING: | 3 |
| RATE: | 1.5 oz/A |
| COMMENTS: | 4-6 weeks |
| Product Type: | Herbicide |

You still need to do your research!

- Make sure the herbicide is legally allowed to be applied to residential lawns
- Make sure it is safe to apply to the species present in your lawn
- **READ THE LABEL!**



Specimen Label

| | | | |
|------------|-------|---|-----------|
| CLOPYRALID | GROUP | 4 | HERBICIDE |
|------------|-------|---|-----------|

 **CORTEVA**
agriscience

Lontrel[®]
Turf and Ornamental

HERBICIDE

™/® Trademarks of Corteva Agriscience and its affiliated companies

For selective postemergence control of broadleaf weeds in

- **non-residential turfgrass**, including turfgrass grown for seed or sod farms,
- noncrop areas including roadsides, parks, recreation areas and unimproved rough turf areas;
- landscapes, ornamental plantings, field grown nurseries such as with conifers, non-leguminous woody species, and ornamental grasses;
- Christmas tree plantations.

Active Ingredient:
clopypalid: 3,6-dichloro-2-pyridinecarboxylic acid, monoethanolamine salt 40.9%

Other Ingredients 59.1%

Total 100.0%

Acid Equivalent: clopypalid: 3,6-dichloro-2-pyridinecarboxylic acid - 31% - 3 lb/gal

Uh oh!



- Applied simazine, a warm season only herbicide just before Memorial Day
- Did not fully read label

Any questions?

