

Turf Insect and Disease Trends

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2-5-2025



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O.J. Noer Turfgrass Research and Education Facility
Verona, WI



- Home of Wisconsin turfgrass research since 1992
 - Turf diseases
 - Soil health
 - Cultivar development
 - Fungicide and herbicide trials
 - And so much more!



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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
- tdl.wisc.edu



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What do you think of when I say "turf"?

- Probably artificial turf
- The artificial turf industry has appropriated the word
- Turf: grass and the surface layer of earth held together by its roots
- Persists under routine traffic and/or defoliation
- Turfgrass: turf forming grass
- Over 7,500 species of grass – less than 30 are turfgrasses

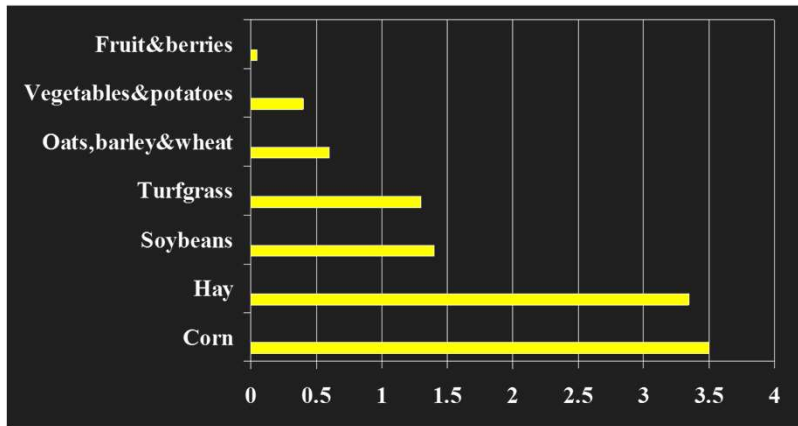


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Major land uses, Wisconsin, 1999

• Source: WI Ag Statistics Service

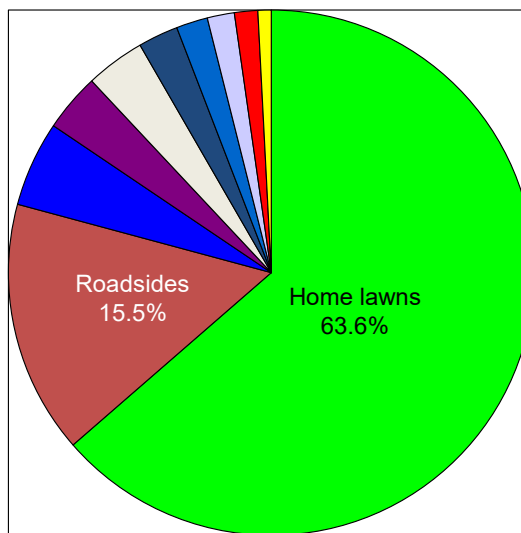


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Wisconsin Turf Acreage (1999)

- Sod farms 0.8%
- Airports 1.4%
- Churches/cemeteries 1.7%
- Cities/towns 2.0%
- Schools/colleges 2.5%
- Parks/Rec areas 3.6%
- Golf Courses 3.6%
- Commercial property 5.3%



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Value of Wisconsin Turf, 1999

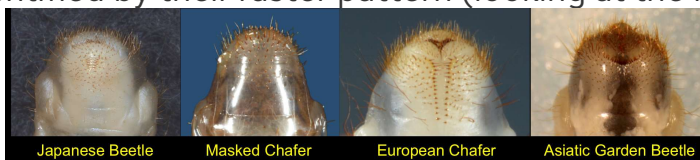
- \$938 million on turf establishment/maintenance
- \$2.7 billion spent on turf equipment
- 454 Golf courses: \$20 million in taxes paid
- 92% of homeowners rated lawns as important to them



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White Grubs

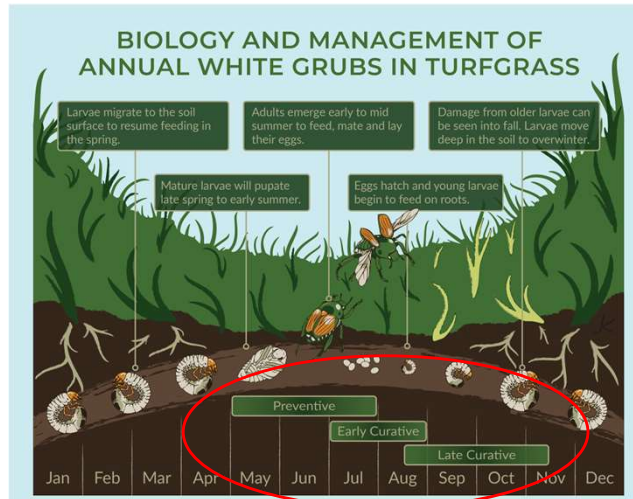
- Several species
 - Japanese beetles
 - Masked chafer (2 species)
 - European chafer
 - Asiatic garden beetle
 - Oriental beetle
 - Green June beetle
 - May/June beetle (several species)
- Species is important and will help to inform control timing
- Can be identified by their raster pattern (looking at the butt)



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White Grubs

- Most common in Wisconsin are the annual white grubs (1 reproductive cycle per year)



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When to control white grubs

- SCOUT!
- Populations exceeding 6-10 grubs per sq ft



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Vertebrate damage

- Looking for white grubs
- Not always an indication of white grub infestations



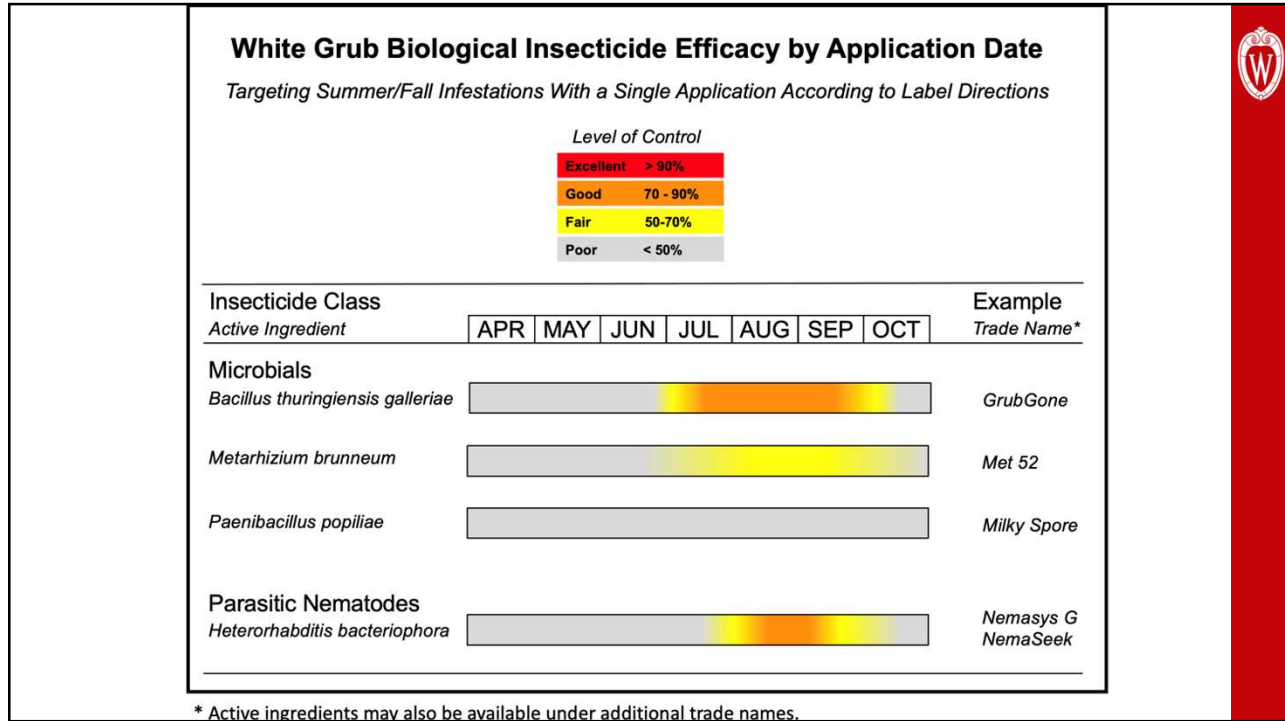
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White grub management

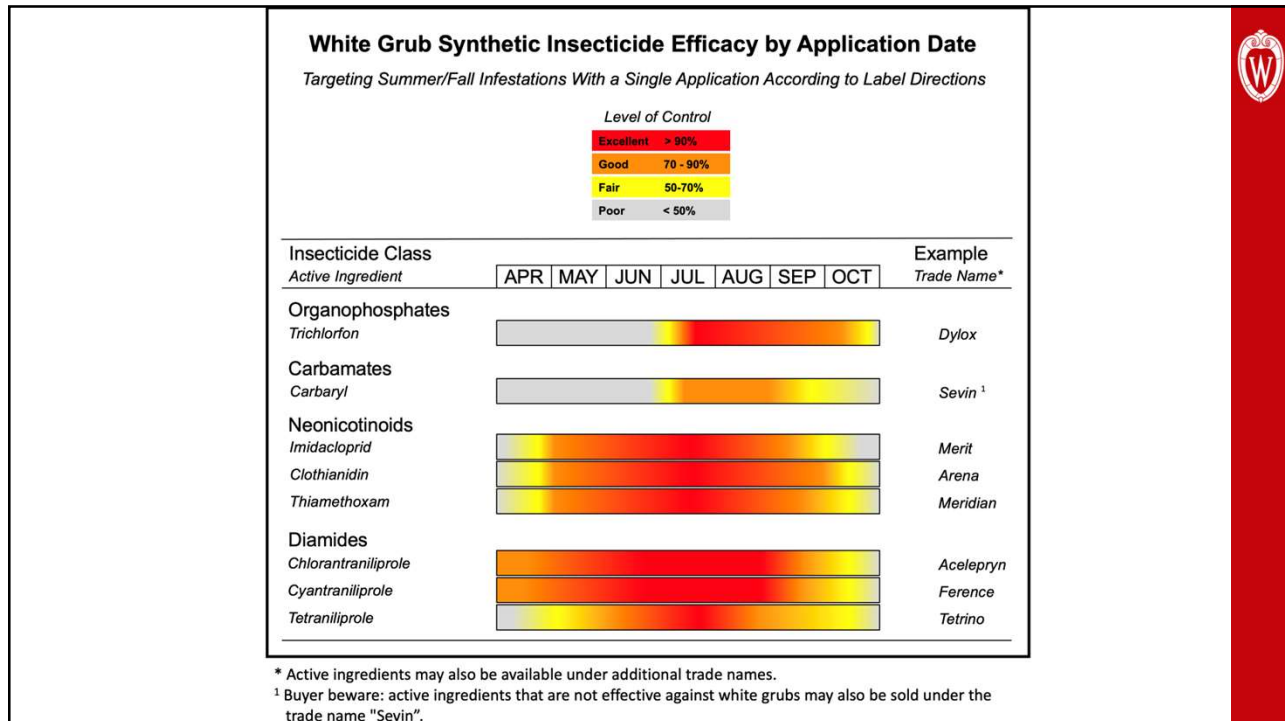
- Cultural controls
 - Proper mowing, fertilization, irrigation, thatch management
 - Promote healthy and vigorous turf
- Biological insecticides
 - Effective products are limited
- Synthetic insecticides
 - Preventive
 - Early Curative
 - Late Curative
- Infestations go in cycles



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Chinch bugs



- Damage often associated with open, sunny areas
- Can often go unnoticed due to the small size of insects (1/6")
- Looks like droughty turf

Chinch bug

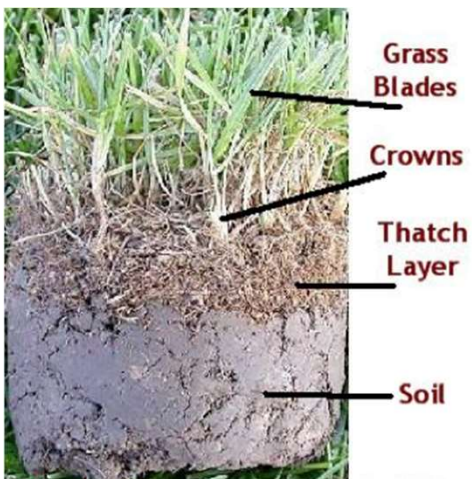


Big eyed bug



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Chinch bug damage



- Damage is often worse in lawns with excessive thatch (≥ 1 inch)
- Occurs from July-August
 - When adults are actively feeding
- Adults and nymphs pierce plant parts
 - Remove plant fluids
 - Inject a toxin that causes yellowing, necrosis

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Scouting for chinch bugs



- Look at the edges of affected areas
- Flood a coffee can dug into the ground
- 20-30 insects

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Controlling chinch bugs

- Cultural control methods
 - Promote a healthy and vigorous lawn
 - Proper mowing, fertilization, irrigation, thatch management, etc
 - Endophyte enhanced turfgrasses
- Biological control methods
 - Big eyed bug →
- Chemical control methods
 - Conventional insecticides



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Snow molds



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

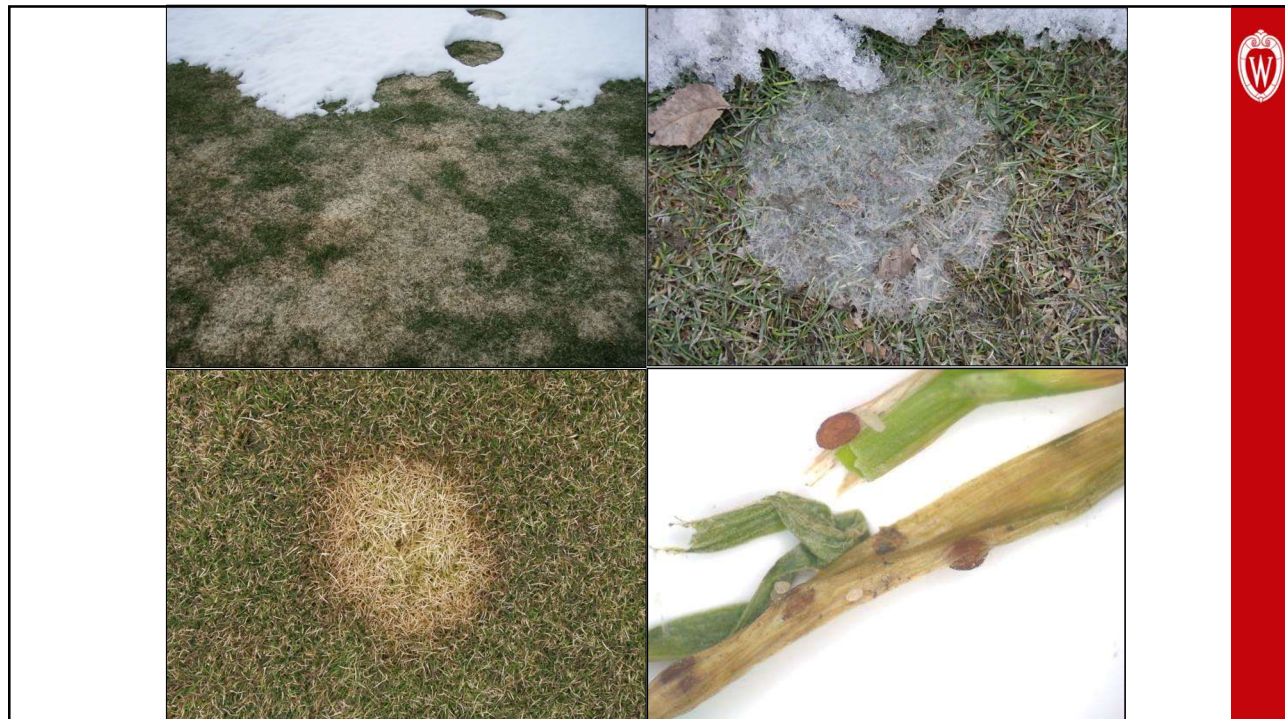
Optimum Conditions: Gray snow mold needs cold conditions and approximately 60 consecutive days of snow cover, pink snow mold needs extended periods of cool, wet weather **but not necessarily snow**

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.

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Leaf Spots

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

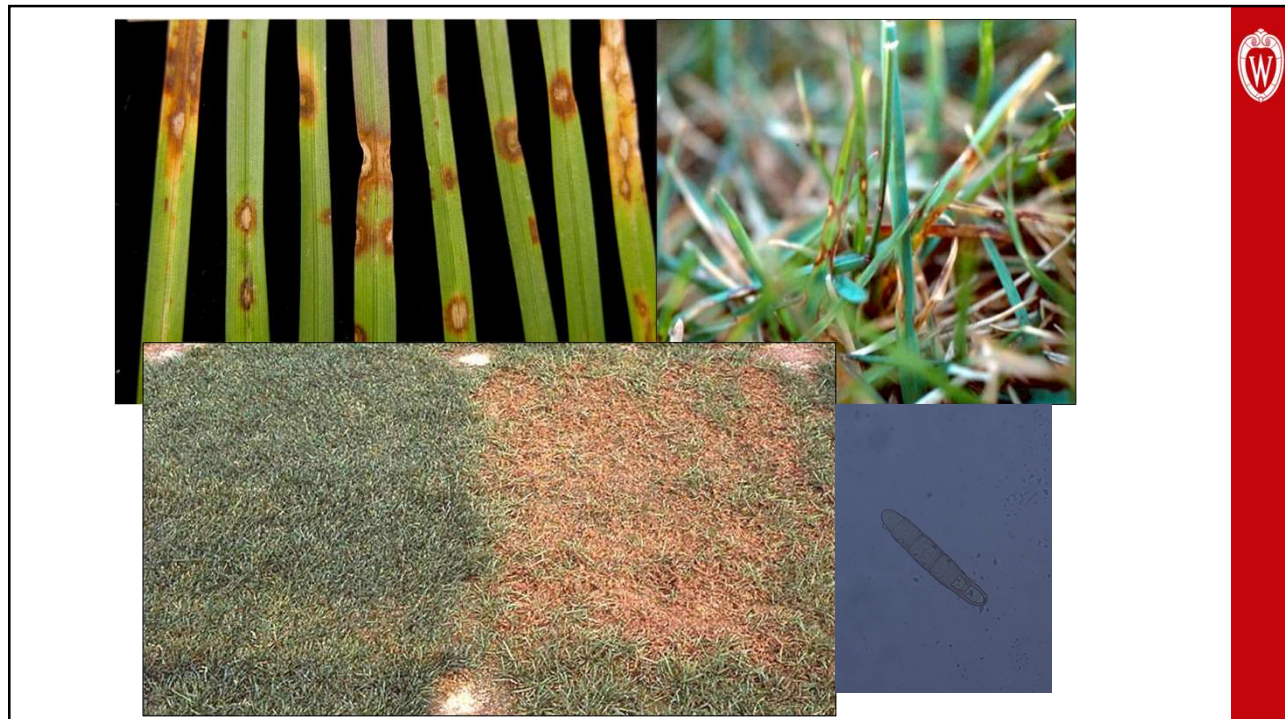


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Drechslera leaf spot

- 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).

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Necrotic ring spot

Causal agent: *Ophiosphaerella korrae*

Turfgrass hosts: Kentucky bluegrass, fine fescues

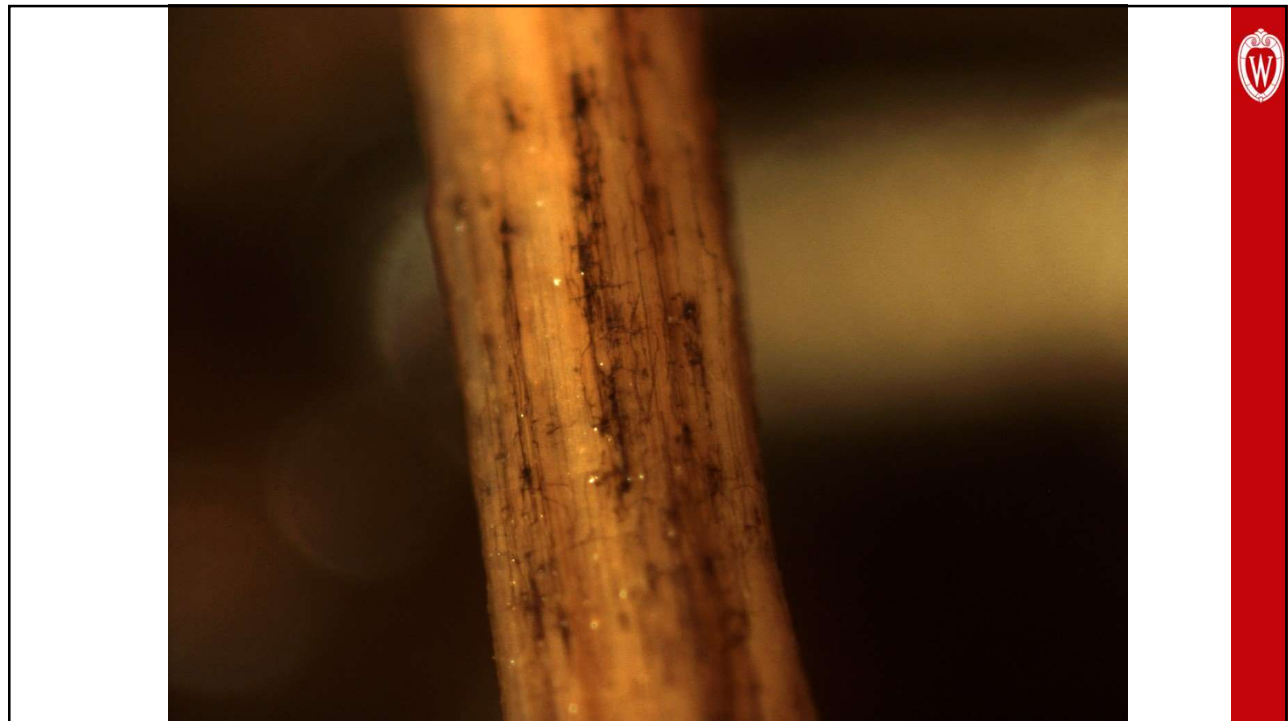
Optimum conditions: Cool, wet weather in spring followed by warm, dry weather in summer.

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?????

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Rings, arcs, patches

Two side-by-side photographs of a lawn. The left image shows a lawn with several circular patches of dead grass. The right image shows a lawn with several irregular patches of dead grass, some forming arcs. The images are framed by a white border on the left and a red vertical bar on the right containing a white crest with a 'W'.

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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. Fungicides in the spring and/or 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.

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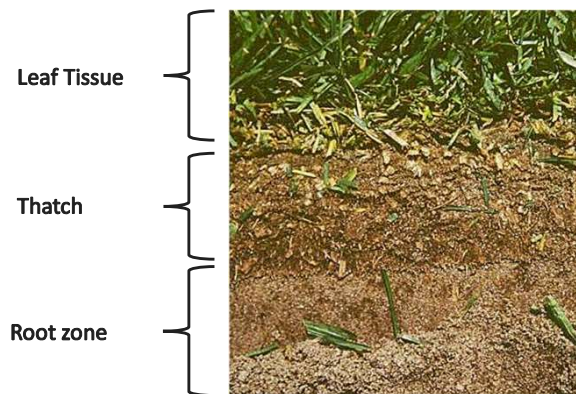


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Necrotic ring spot



- Chemical control is available, but not usually recommended



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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.

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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. Fungicides in summer.

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

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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.

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Dollar spot



Causal agent: *Clarireedia 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

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IPM (Integrated Pest Management)

- Scout for disease and insects
 - Use the diagnostic lab if you can't scout
- Promote a healthy and vigorous lawn
 - Most diseases can be controlled by properly maintaining a lawn
- Don't overwater
 - We rarely need extra irrigation in Wisconsin
- Address other issues before relying on fungicides/insecticides



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Environmental Trends

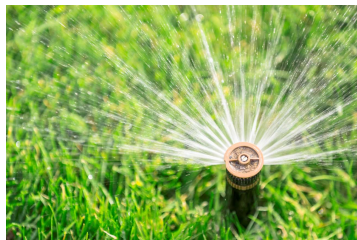


- Climate change
 - Getting warmer on average
 - Feels like major swings between very wet and very dry
- Soil conditions
 - Poor soil conditions are often found in new construction
- Irrigation factors
 - Underwatering or overwatering

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Best irrigation practices

- Figure out how much water you are actually applying
 - Watering for 30 mins doesn't actually mean anything
 - Translate watering "time" to "depth"
- Place rain gauge(s) in random locations in your lawn
 - Water for a set time and record the depth in the gauge
 - Average multiple locations
 - Ex. 30 mins of irrigation translates to 1/4 inch water, therefore 2 hrs will get you to approximately 1 inch of water



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Best irrigation practices

- Most of the time, natural rainfall is enough
- Rule of thumb = 1 inch of water per week
- Wait until the leaf blades do not bounce back up after stepping on them (drought stress)
- Then try to apply about 1 inch of water in 1 or 2 watering events
- Wait until you observe drought stress again
- The specifics will depend on your tolerance for drought stress, soil type, slopes, etc



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Future Trends

• Emerging Threats

- Diseases and insects will probably be more unpredictable with changing weather patterns
- Possibly new diseases/insects could be introduced to Wisconsin
- Future restrictions on pesticides in lawns
- Restrictions on watering lawns

• Innovative Solutions

- Continued research will help understand disease and insect outbreaks
- Vigilance/cooperation with other turfgrass researchers
- Development of alternative methods of disease/insect control
- Breeding efforts to introduce new cultivars (disease and drought resistance)



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Conclusion

- The only constant is change
- We have to adapt with the changes
- We are constantly trying to predict where the turfgrass industry will be going
- That informs what research we do

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Questions?

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