Common Diseases of Turfgrass in Utah

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Types of Turf

- **Cool-season grasses**
  - Optimal growth 60-75°F
  - Not adapted to high temperature and drought
  - Bentgrasses *(Agrostis)*, fescues *(Festuca)*, ryegrass *(Lolium)*, bluegrasses *(Poa)*

- **Warm-season grasses**
  - Optimal growth 75-95°F
  - Not adapted for prolonged or severe cold
  - Grama *(Bouteloua)*, buffalograss *(Buchloe)*, bermudagrasses *(Cynodon)*, zoysiagrasses *(Zoysia)*

- Numerous diseases affect turf
Common Turf Diseases

- Snow mold
  - Pink snow mold
  - Gray snow mold
- Take-all patch
- Necrotic ring spot
Snow Molds

- Psychrophilic, cold-loving
- Attack plants under a layer of snow
- Two common snow molds
  - Pink snow mold (*Microdochium nivale*)
  - Gray snow mold (*Typhula incarnata* and *T. ishikariensis*)
- Almost all grass species are susceptible to both types
Pink Snow Mold Symptoms

- Circular patches after cool, wet weather
- Orange-brown to dark reddish-brown to light gray or tan
  - More commonly patches are dull white color
- White or light pink mycelium at edges
- “frog-eye” symptom possible
Pink Snow Mold Symptoms

- Patches will have bleached color and can be confused with symptoms of gray snow mold
- Small clusters of pink spores on leaf surface
Pink Snow Mold Disease Cycle

- Pathogen survives in infected plants and debris
- Mycelia will begin growing
  - Grows slowly allowing infected turf to be undetected
- Once weather becomes wet, overcast with cooler temperatures, pathogen spreads very rapidly
Pink Snow Mold Disease Cycle

- Sunny, dry conditions will dry out the turf and pathogen will be inactive
- Snow cover not a requirement for pink snow mold
- Spreads slowly when humidity is low or little moisture is present on surface
- Spreads rapidly in turf growing slowly and has thick layer of thatch
- Also favored by poor drainage and long, matted leaves
Pink Snow Mold Resistance

- All grass species are susceptible, but some less susceptible than others
- Annual bluegrass most susceptible
- Bentgrasses very susceptible
  - Colonial bentgrass more susceptible than creeping bentgrass or velvet bentgrass
- Kentucky bluegrass, perennial ryegrass, red fescue more resistant than other varieties
Pink Snow Mold Management

- Avoid applying nitrogen fertilizers late
- Do not leave grass uncut at end of season
  - Last cut can be much closer
- Avoid extreme thatch buildup
- Prevent large snowdrifts from forming
- Rapid drying and warming will lessen disease severity
- Remove snow to promote better drainage
- Remove mycelial crust by raking
- Maintain low soil pH and balanced soil fertility
Pink Snow Mold Control

- Fungicide not recommended for homeowner use
- Apply approximately two weeks before first snowfall
- Fungicides with ingredients such as quintozene, fludioxanil, iprodione, strobilurins
Gray Snow Mold Symptoms

- Light yellow, straw-colored turf
- Leaves matted down with white to gray mycelium growth
- Mycelia dry as grass dries turning leaves gray or silver
- May be ring of gray or white mycelia around edges
- Only leaves are killed, crown not affected
Gray Snow Mold Symptoms

- Production of sclerotia characteristic
  - Formed on leaves
  - Can be pink, white, amber when young
  - Darken to reddish-brown, dark brown, or black
Gray Snow Mold Disease Cycle

- Survives as sclerotia during summer
- Germinates in fall
- Sclerotia fall into thatch layer as leaves decompose in the spring
  - Appears in same areas year after year
- Severe disease occurs with persistent snow cover
- Most severe on unfrozen turf under snow or heavy mulch
Gray Snow Mold Disease Cycle

- Deep snow particularly favorable for disease
  - Unfrozen soil, humidity levels, matted leaves
  - Allows more time for pathogen to be active
Gray Snow Mold Management

- Avoid applying nitrogen fertilizers late
- Do not leave grass uncut at end of season
  - Last cut can be much closer
- Avoid extreme thatch buildup
- Prevent large snowdrifts from forming
- Rapid drying and warming will lessen disease severity
- Remove snow to promote better drainage
- Remove mycelial crust by raking
Gray Snow Mold Control

- Fungicides not recommended for homeowner use
- More effective when applied in fall
- Apply fungicide that is absorbed and translocated by plant in fall before leaf growth stops
- Combine contact fungicide with penetrant fungicide (iprodione, fludioxanil, etc.)
- Fungicides must be chosen carefully
  - Two different fungal species
  - Fungicide effectiveness will be different
Gray Snow Mold Resistance

- All species are susceptible, some less than others
- Bentgrasses and annual bluegrass most susceptible
- Kentucky bluegrass less susceptible, but differs with cultivar
  - Cultivars with some resistance: Adelphi, Baron, Glade, Monopoly
  - Cultivars very susceptible: Fylking, Merion, Nugget, Pennstar
- Fescues (red fescues) and perennial ryegrasses more resistant than Kentucky bluegrass and bentgrasses
Take-All Patch

- Fungal disease caused by *Gaeumannomyces graminis*
- Primarily affects roots
- Major disease of cool-season turf
  - Affects bentgrasses, fescues and bluegrass species
- One of many fungi that cause patch diseases
- Seems to be most severe in areas recently disturbed areas
  - Decrease in diversity of soil microorganisms
Take-All Symptoms

- Root infection occurs in spring and fall; aboveground symptoms visible in summer
- Begin as small, circular patches
  - Light brown or reddish brown
- Symptoms look very similar to Microdochium patch (*Microdochium nivale*)
- Patches reddish brown or bronze when actively developing
Take-All Symptoms

- “Frog-eye” symptom possible
- Symptoms noticeable in hot, dry weather
- Dark mycelial strands colonize root — Parallel to root axis
- Roots develop dark brown streaks internally
- Stolons, rhizomes, roots, shoot bases turn dark brown to black
Take-All Symptoms

- Brittle roots in warm, dry weather allow plants to be easily pulled from soil
- Perithecia develop in late fall on culms
Take-All Disease Cycle

- Survives as perithecia and mycelium
- Ascospores inside perithecia penetrate root hairs and epidermal cells
- Runner hyphae colonize root surface and produce simple hyphopodia and infection cushions
- Penetration of root cells achieved by hyphopodia
- Dark brown streaks in vascular tissue as fungal hyphae builds up
Take-All Disease Cycle

- Spread by direct contact between plants
  - Spread underground growing along root surfaces and rhizomes
- Long distance spread
  - Moving infested soil or plant material
  - Contaminated equipment
Take-All Management

- Recovery is slow
- Plant a mixture of grasses
- Soil pH around 5.5 to 6.0 may reduce disease severity
  - Utah soils are alkaline (high pH)
  - Requires ongoing applications of management practices (acidifying fertilizers)
- Maintain balanced fertilization program
  - Manganese, potassium, phosphorus deficiencies
Take-All Management

• Supplement any nutrients in fall or spring
• Restricting root growth increases disease severity
  – Avoid excessive irrigation and nitrogen applications
  – Provide adequate drainage
  – Aerate turf when symptoms are absent
Take-All Prevention

- Effectively clean equipment before working with healthy plants
- Fungicides are available, but are only effective as a preventative measure
  - Applications in fall and early spring most effective
  - Triazoles (Eagle, Banner Maxx), azoxystrobin (Heritage), fluoxastrobin (Disarm)
Take-All Resistance

- All species of Agrostis (bentgrasses) are susceptible, but some cultivars have moderate resistance
- Kentucky bluegrass and creeping red fescue are highly resistant
Necrotic Ring Spot

- Fungal disease (*Ophiostoma korrae*)
- Primarily affects roots
- Many cool-season turf species affected
  - Kentucky and annual bluegrass, tall fescue
- Symptoms easily confused with other diseases
- Causes a patch disease
Necrotic Ring Spot Symptoms

- Patches develop in cool, wet weather
  - Small light green areas
- Leaves turn reddish-brown to bronze to light straw color
- “frog-eye” symptom
  - Sunken depressions occur when turf dies
- No leaf lesions
- Roots, crowns, lower stems turn black or brown due to fungal hyphae
Necrotic Ring Spot Symptoms

- Infected roots become rotted
- Pseudothecia present in crowns or roots
- More severe in sod and areas with compacted soil
  - Symptoms appear 2-3 years after establishment of turf
Necrotic Ring Spot Disease Cycle

- Survives in plant debris
- Moves by growing on roots and rhizomes
- Hyphae colonize roots
- Injection hyphae enter root and infect inside
  - Decrease in water and nutrient uptake predisposing plant to other injuries
Necrotic Ring Spot Disease Cycle

- Roots, rhizomes, leaf sheaths, crowns infected in spring or fall
- Patches may fade with higher temperatures
- Patches may reappear under drought or heat stress
- Recovery from this disease is slow
Necrotic Ring Spot Management

• Use management practices that reduce stress
• Water deeply and infrequently
  — In presence of NRS, water more frequently
  — Light applications applied daily in hot weather
Necrotic Ring Spot Management

- Prevent over-watering
- Core-aeration to minimize soil compaction
- Avoid nutrient deficiencies
- Maintain balanced fertilization program
  - Nitrogen, Phosphorus, Potassium
- Slow-release fertilizers reduce severity
  - More uniform release of nutrients
Necrotic Ring Spot Resistance

• No varieties of Kentucky bluegrass that offer complete resistance
  — More tolerant: Adelphi, Eclipse, Midnight, Majestic
  — Somewhat resistant: Monte Carlo, Baron, Unique, Voyager, Beyond

• Plant mixtures of grass species or cultivars
• Perennial rye grass reported to be immune
Necrotic Ring Spot Prevention

• Severely infected plants pulled easily from soil
• Clean equipment before working with healthy turf
• Preventive fungicide application may suppress development
  — Timing is essential
• Apply in the spring before pathogen begins colonization
Necrotic Ring Spot Prevention

- Chemicals labeled for NRS
  - Thiophanate methyl,
    iprodione, propiconazole,
    azoxystrobin
- Research has shown control of NRS with fungicides has been erratic
General Disease Management

• Practice good cultural techniques
  – Avoid excessive thatch buildup
  – Promote good drainage
  – Balanced soil fertility
  – Don’t apply fertilizer late in season
  – Low soil pH
  – Core-aeration