Alternatives for turfgrass disease control without synthetic pesticides

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The University of Guelph
Guelph, Ontario, Canada
100 km west of Toronto
120 km from Niagara Falls

Major turfgrass diseases in Canada

- Cool Weather
  - Grey Snow Mould & Pink Snow Mould
  - Fusarium Patch / Microdochium Patch
  - Leaf Spots & Red Thread

- Warm Weather
  - Dollar Spot
  - Brown Patch & Anthracnose & Pythium Blight
  - Root diseases (Necrotic Ring Spot, Take-All Patch, Summer Patch)

Disease Management

Fusarium Patch on bent, spring or fall
Fusarium Patch - sporodochia
- pink spore-producing bodies

0.2 mm

M. nivale penetration into bent stomates

Fusarium Patch: Control
- 1) Leaf Wetness
  - reduce shade/less pm watering/drainage
- 2) Plant Health
  - less thatch / increase mowing heights+rolling / reduce compaction / less soft growth in early spring & late fall (careful with nitrogen)
- 3) Turf Covered
  - rake leaves / not heavy topdressing
- 4) Cultivars & Species
  - some cultivars more susceptible
- 5) Fungicides & Activators....

1. Leaf wetness & infection
Hyphae on epidermal cells under 100% humidity
2. Thatch & plant vigor
(restricts water flow (fertilizer & pesticides too)
■ non-productive tissues
■ harbors pathogens
(home and food)

3. Leaves provide cover for disease

4. Disease Resistance
■ see NTEP trials (no Bent or Poa fully resistant)

5a. Fungicides (out of 4)
■ iprodione (Rovral) 3.5
■ propiconazole (Banner/QP) 3
■ trifloxystrobin (Compass) 3
■ triticonazole (Premis/Triton) 3
■ azoxystrobin (Heritage) 2.5
■ chlorothalonil (Daconil) 2.5
■ mineral oil (Civitas) 1-3
■ myclobutanil (Eagle) 2
5b. Resistance Activators

Utilize a plant’s natural resistance responses
- against abiotic stresses
- against insects
- against diseases

Stimulating disease resistance response
- Two main forms:
  - Systemic acquired resistance (SAR, induction)
  - Induced systemic resistance (ISR, priming)

Biological inducer or Chemical inducer

Internal (systemic) messengers

Increased disease resistance

Resistance Activators

- **Phosphites**
  - Aliette, Appear, SwardPhite, Magallan, Alude...
- Benzothiadiazole/Acibenzolar
  - Actigard
  - Dac Action (Daconil + Actigard)
- Chelated metals?
  - Chelated iron (e.g. Fiesta)
- **Civitas** (mineral oil) + Harmonizer (chelated Cu)
- **silicon, butanediol, humic acid**...

Fusarium patch control (4=excellent)

<table>
<thead>
<tr>
<th>DMI’s</th>
<th>Strobies</th>
<th>Civitas</th>
<th>Phosphite</th>
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</thead>
<tbody>
<tr>
<td>Banner, Eagle, Premis, Triton, Tourney, etc</td>
<td>2.3</td>
<td>1-3</td>
<td>??</td>
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<tr>
<td>Heritage Insignia Compass</td>
<td>2.8</td>
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Fungicide efficacy from Vincelli (2015), PPA-1, summarizing hundreds of tests
**Anthracnose control (4=excellent)**

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Fungicide efficacy from Vincelli (2015), PPA-1, summarizing hundreds of tests

**Dollar spot control (4=excellent)**

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**Activating defenses - consequences**

- can reduce growth rates
- can slow plant development
- can lower crop yield
- stressed plants show even more negative effects
- can cause plant death (if too much)

Think of activators like steroids