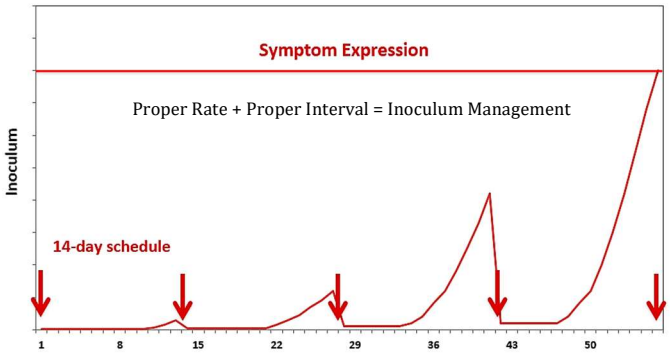
Disease Inoculum Management

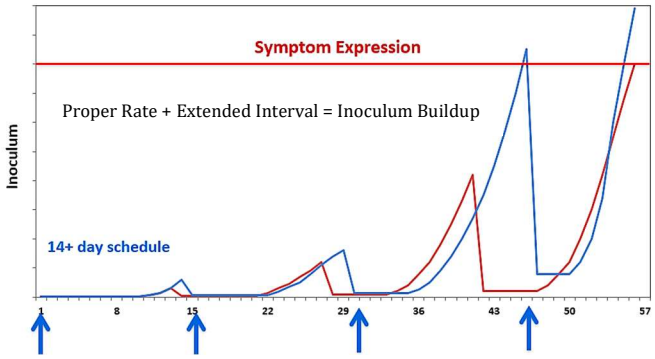
Overview

To achieve satisfactory disease control, superintendents try to anticipate disease outbreaks and apply fungicides prior to disease development. Preventive fungicide applications are thought of as working before disease symptoms are present while curative fungicide applications are thought of as working after disease symptoms are present. However, the key to effective disease management is to understand the difference between the amount of inoculum and the amount of symptom expression.

Inoculum Buildup

- 90% of applied fungicide active ingredient is depleted within 3-7 days of application (Daniels and Latin, GCM Magazine, Dec 2013).
- Inoculum starts building exponentially the last 7-10 days of a 14-day application interval, in spite of no symptoms.
- Delaying application by a day or two allows buildup of inoculum, increasing long-term disease pressure and ultimately results in more fungicide applications (see illustrations below).



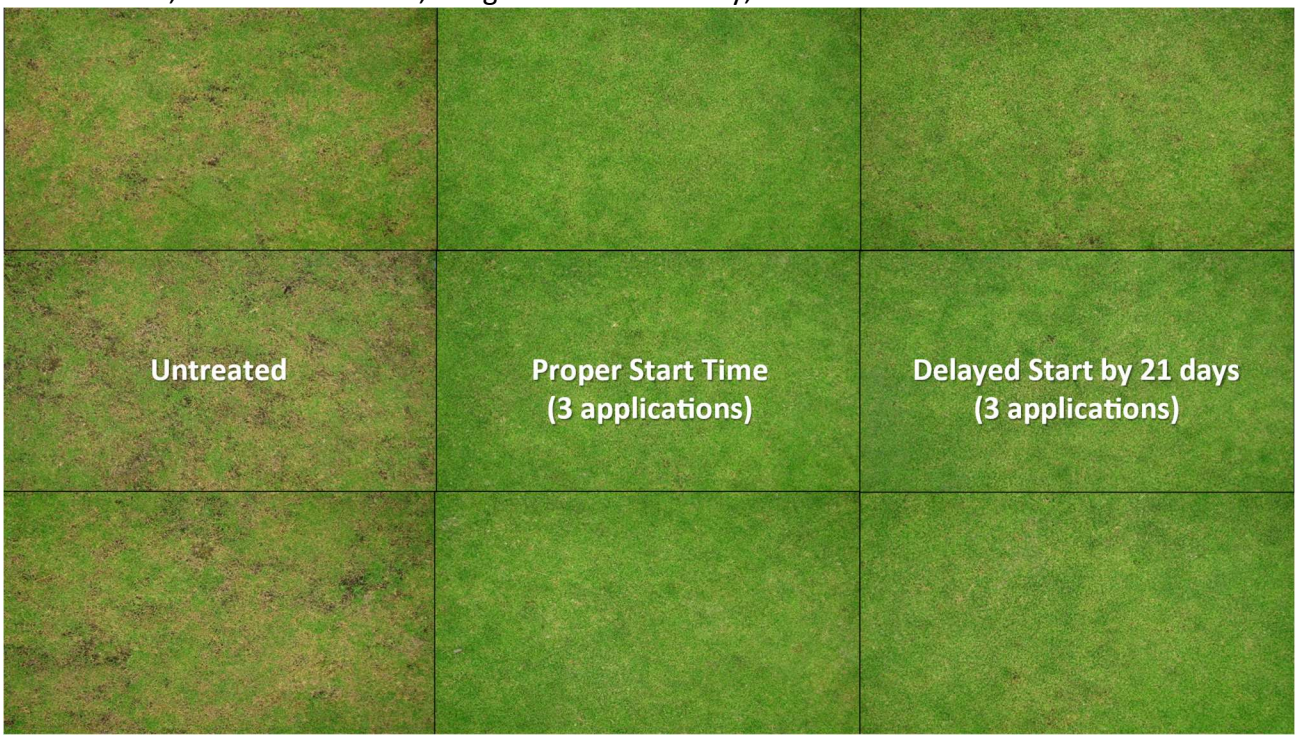


- Key is to avoid stretching preventive applications on long intervals or making curative applications as these approaches allow tremendous buildup of inoculum.

Research Examples

- Dollar Spot, Boehm et al, The Ohio State University, 2001

- Anthracnose, Cook & McDonald, Oregon State University, 2007



Preventive Fungicide Timing

Spring

- Take-All Patch (55-60°F soil temp) 🔵
- Fairy Ring (55-60°F soil temp) 🔵🔴
- Pythium Root Rot (60°F soil temp) 🔵🔴
- Anthracnose (65-68°F soil temp) 🔵
- Summer Patch (65-70°F soil temp) 🔵
- Dollar Spot (60°F air temp) 🔵🔴

Summer

- Mini Ring (>85°F high air temp) 🔴
- Brown Patch (>68°F night air temp) 🔵
- Pythium Blight (>68°F night air temp) 🔵🔴
- Summer Decline (>68°F low air temp) 🔵🔴
- Gray Leaf Spot (82-90°F air temp) 🔵🔴
- Take-All Root Rot (77-86°F soil temp) 🔴

Fall

- Large Patch (72-75°F soil temp) 🔴
- Spring Dead Spot (<75°F soil temp) 🔴
- Microdochium Patch (45-68°F max air temp) 🔵🔴
- Snow Mold (50-65°F air temp sclerotia germinate; 32-40°F with snow cover) 🔵
- Pythium Root Rot (60°F soil temp) 🔵🔴

🔵 Cool-Season Disease
🔴 Warm-Season Disease

Summary

- Apply fungicides at appropriate time, rate, and application interval to keep inoculum levels low.
- Increase frequency of application and/or rates during environmental conditions favoring high disease pressure.