

RUTGERS

New Jersey Agricultural
Experiment Station

Cultural Control Strategies for Anthracnose

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NE-1025 Multi-State Research Project

- Reported initial findings of cultural management affects on disease in GCM (Murphy et al., 2008)
- Update our conclusions on nitrogen fertility, topdressing, and irrigation
- Summarize our understanding of all best management practices (BMPs) for anthracnose

Nitrogen (N) Fertility

- Crucial to the health and vigor of the turf, which, in turn, affects playability
- 0.1 lb per 1000-ft² per week (late spring through summer) reduces anthracnose compared to every month
- 0.2 lb per 1000-ft² per week is better

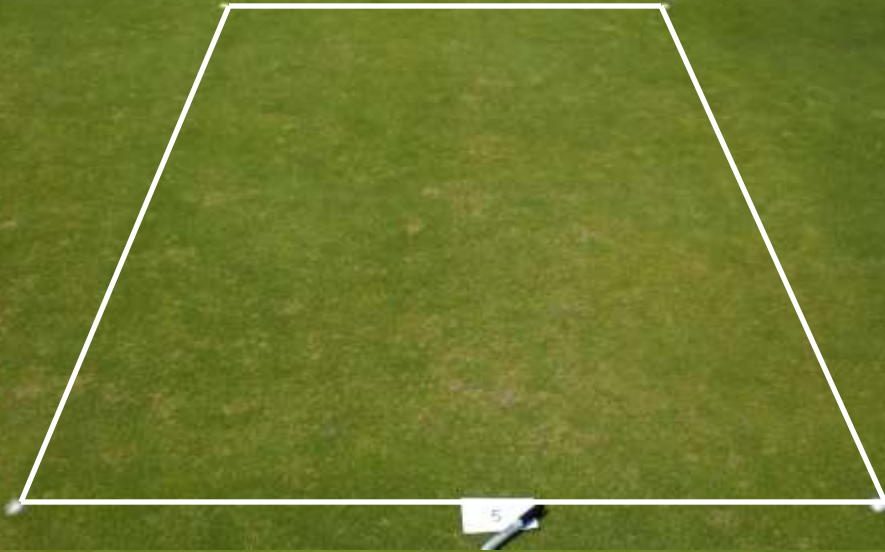


Summer N Rate

20 July 2009

0.094 lb N per 1000 ft² per app

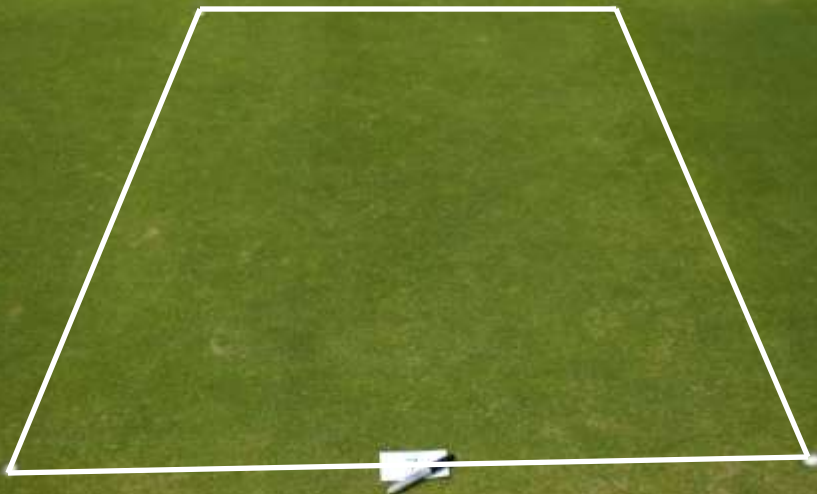
0 lbs



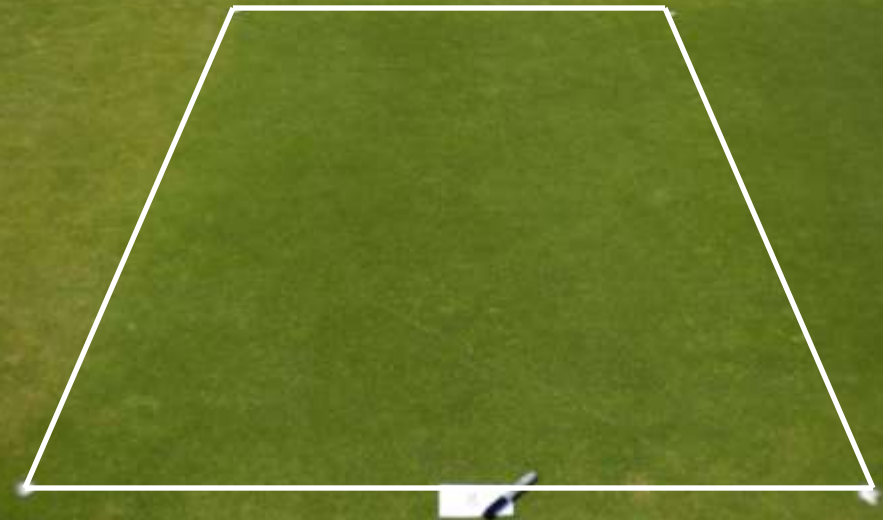
0.375 lbs



0.75 lbs



1.5 lbs



Nitrogen (N) Fertility

- N at 0.4 to 0.5 lb per 1000-ft² per week very effective at reducing anthracnose
- However, these rates continued into the summer dramatically increase disease



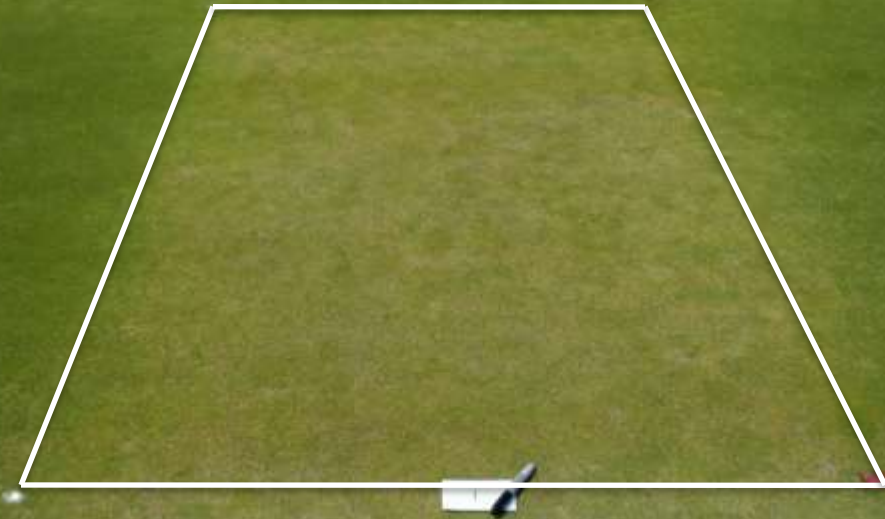
Nitrogen (N) Fertility

Granular-N (slow release)

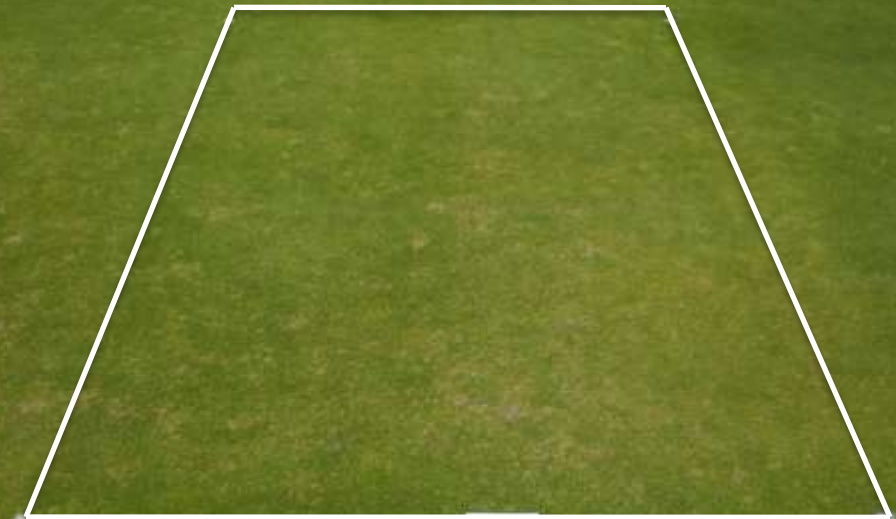
- Higher rates of N applied before the disease becomes severe (spring) reduces anthracnose severity

Granular Rate

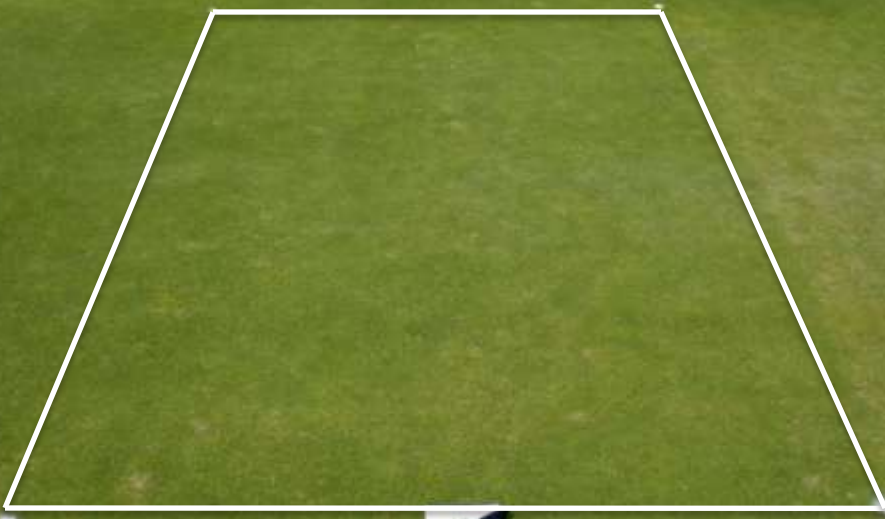
0 lbs



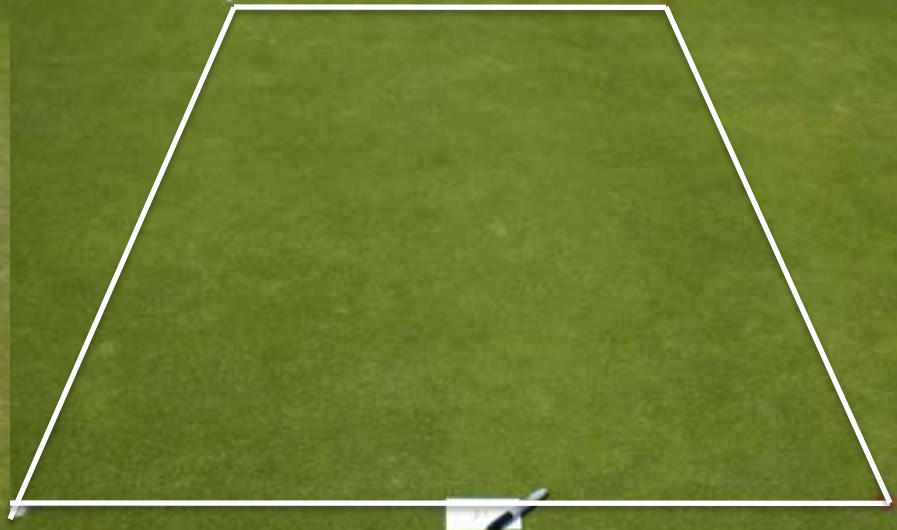
1.5 lbs



3.0 lbs



4.5 lbs



Spring Granular

0 lbs 1000 ft² Summer

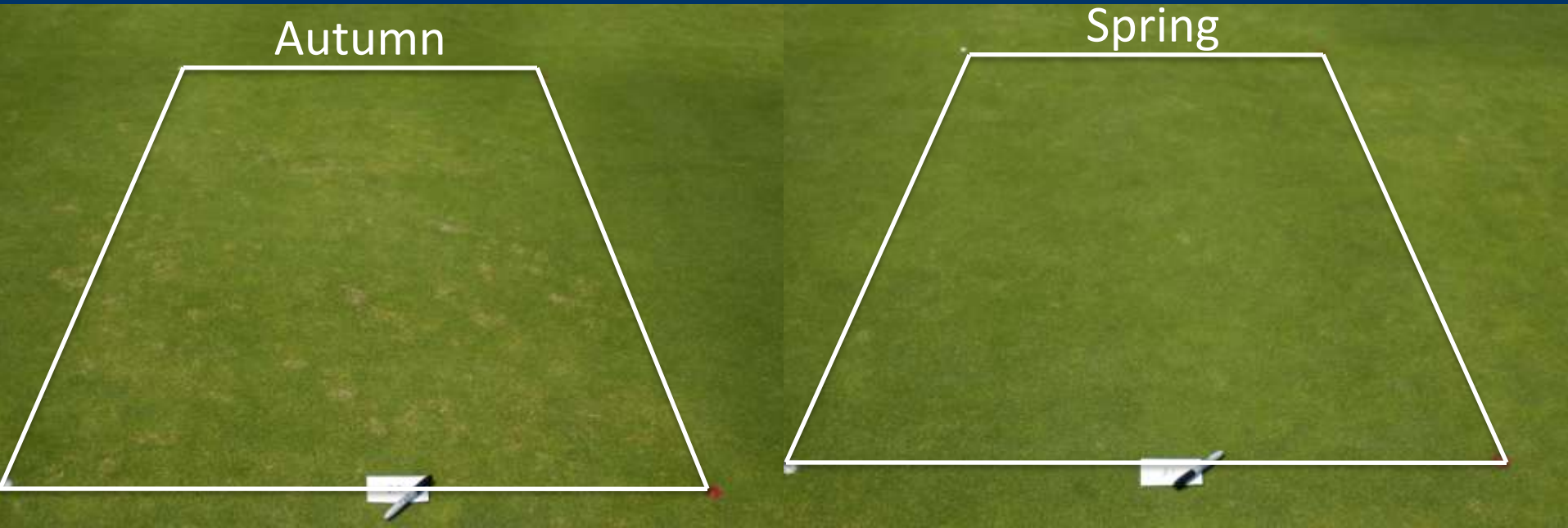
20 July 2009

Nitrogen (N) Fertility

- Granular-N applied in the fall affects disease severity but requires more N compared to spring apps
(at least 1.5 lb or more per 1,000 ft² annually)

Season of Granular N

Granular N at 4.5 lb per 1,000-ft²



20 July 2009

No Summer N (0 lbs per 1000ft²)

Nitrogen (N) Fertility

Putting greens with a history of anthracnose

- Re-evaluate the distribution of N fertilization
- Late-season N is not an efficient timing to manage anthracnose disease
 - Summer timing much more effective
 - Spring compliments the summer program

Nitrogen (N) Fertility

- Recent studies indicate that N source affects anthracnose severity
- **Potassium nitrate** reduced disease severity; whereas, **ammonium sulfate** increased anthracnose compared to urea, ammonium nitrate, and calcium nitrate
- Currently assessing whether it is a N source, soil pH, and/or K effect

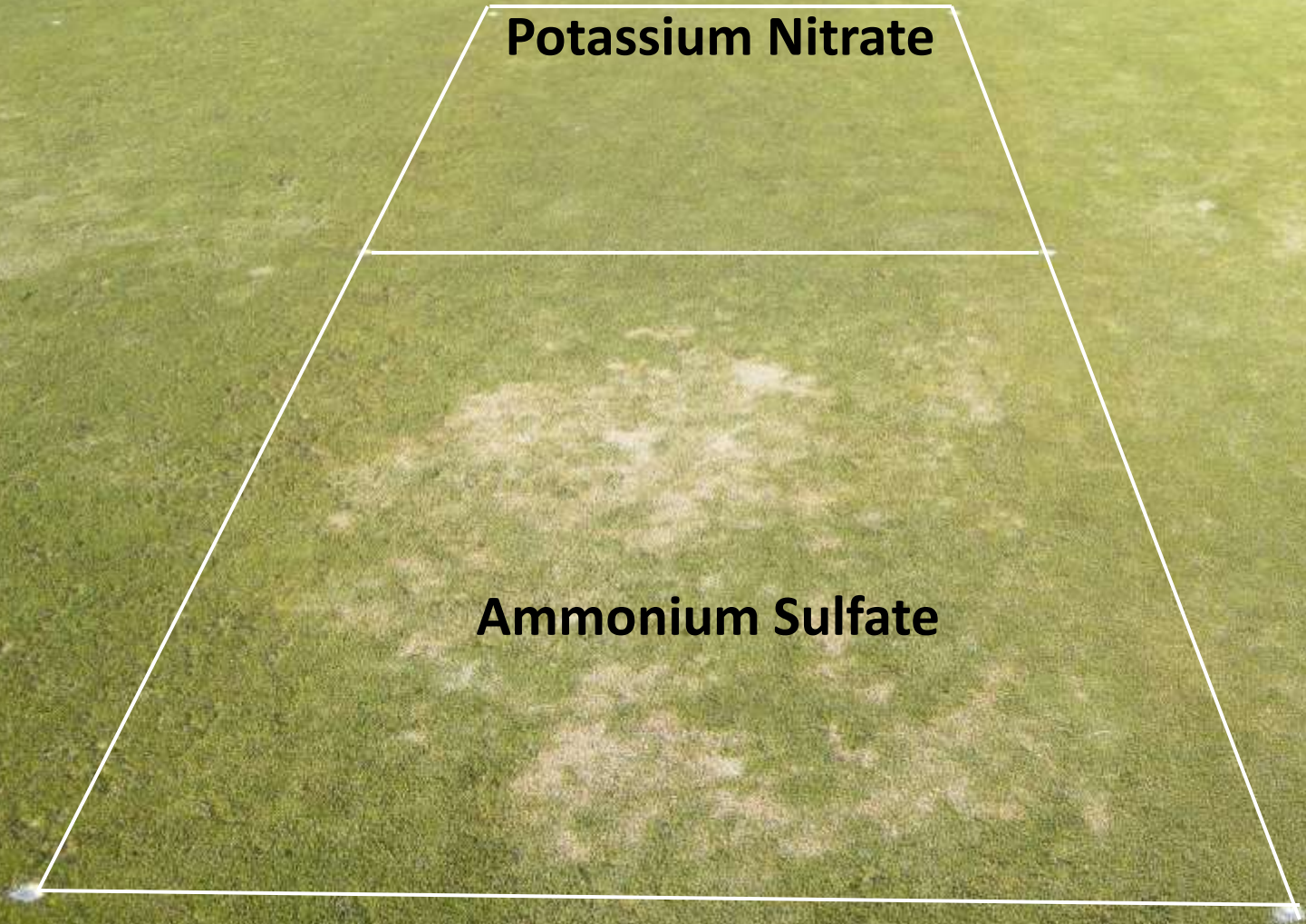


Snow Melt / Ice Damage 2011

Snow Melt / Ice Damage

Potassium Nitrate

Ammonium Sulfate



N Source and Winter Injury

Calcium Nitrate



Potassium Nitrate

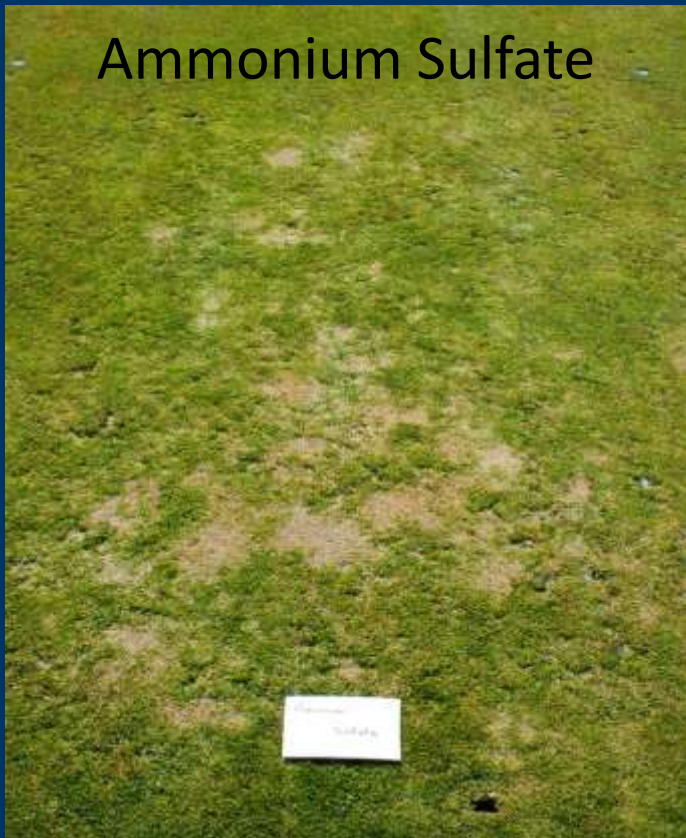


Summer - weekly apps of 0.1 lb 1000-ft² of respective N source
Fall - three 1 lb 1000-ft² apps (25 Sept., 15 Oct. and 11 Nov.)

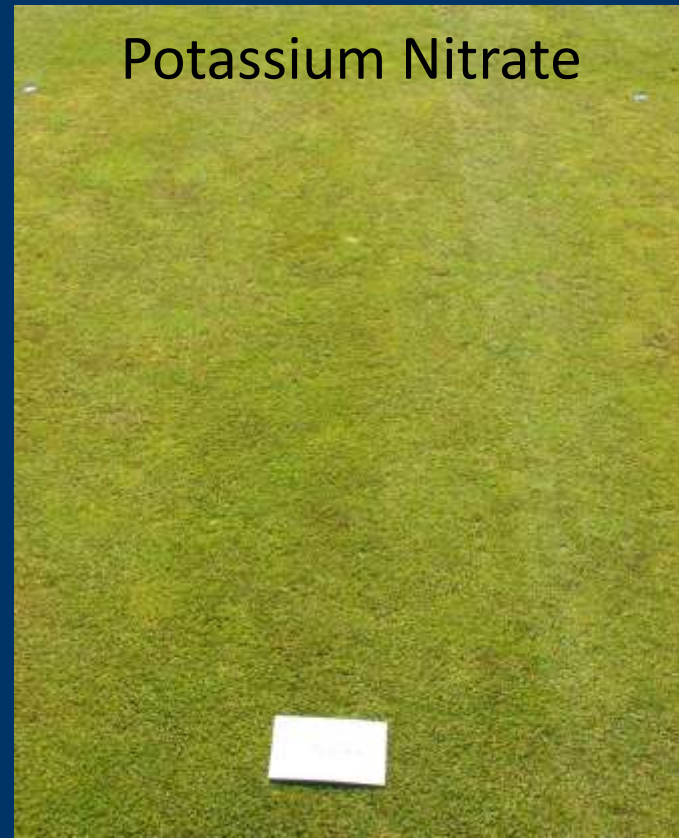
Nitrogen (N) Fertility

- More research to confirm but soil pH and/or K deficiency may be important

Ammonium Sulfate



Potassium Nitrate



Sand Topdressing

Modify thatch/soil

Smooth the surface



Crown protection

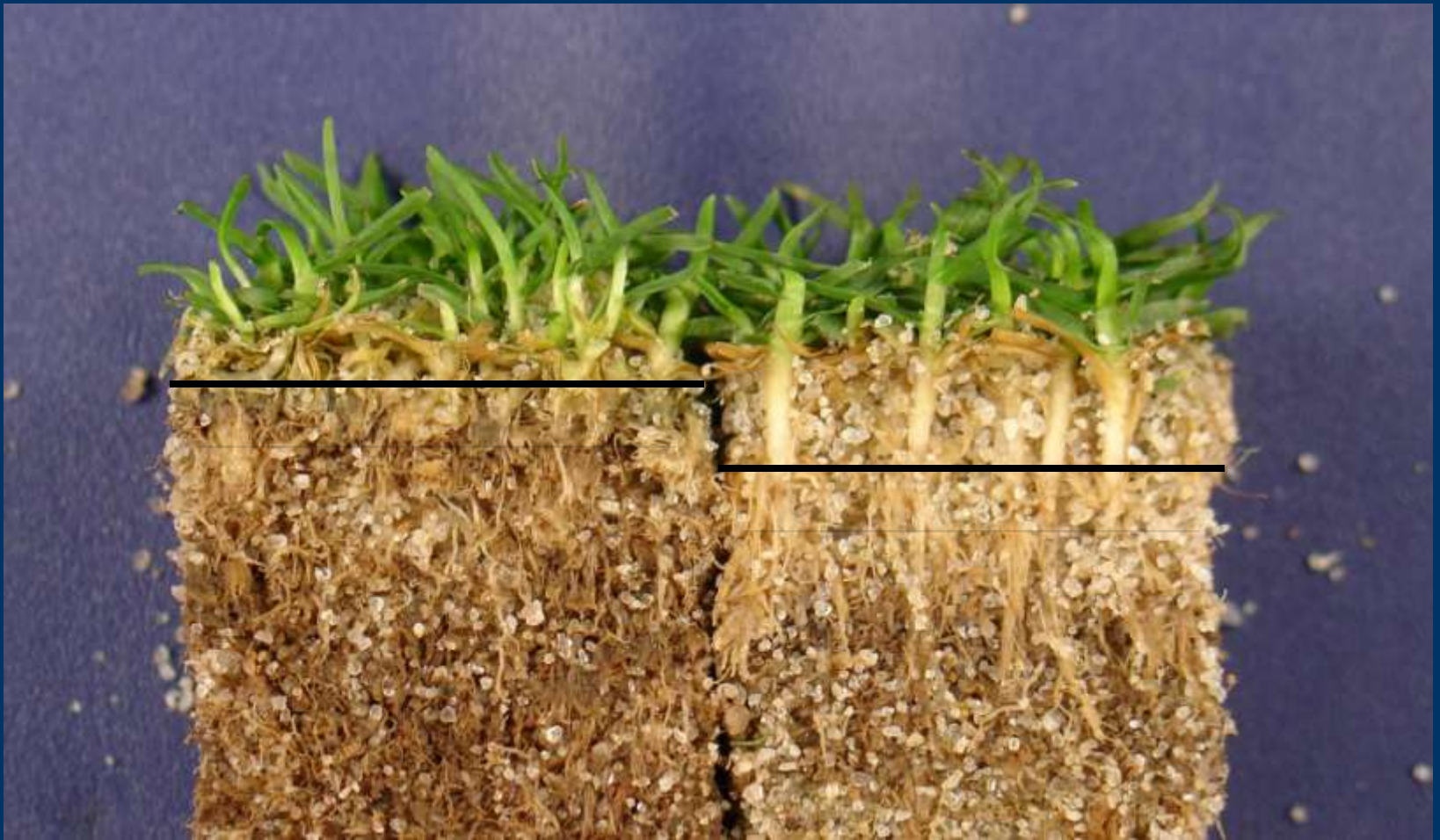
Winter protection

Topdressing Practices

- Frequent, topdressing (1 or 2 ft³ per 1,000-ft² every 7 or 14 days) reduces anthracnose
- Benefit also true under conditions of intense foot traffic

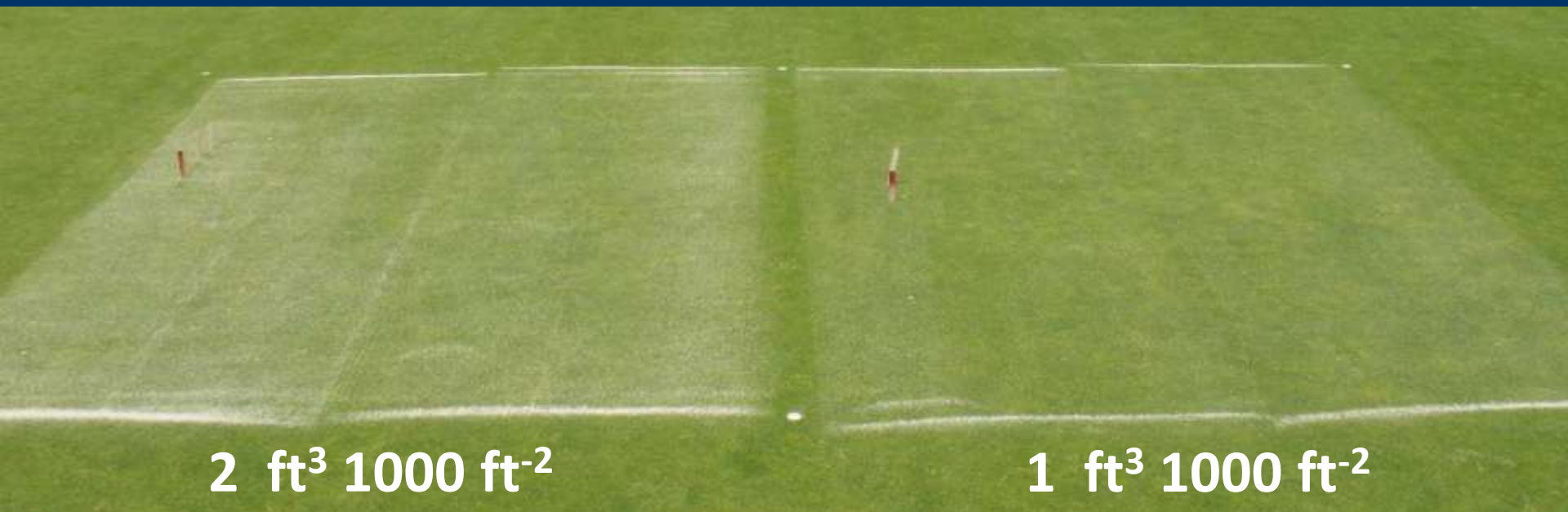


Benefit of Sand Topdressing



Topdressing Practices

- Summer topdressing, while successful, has challenges that limit implementation



Topdressing Practices

- Research indicates that both fall and spring applications reduce anthracnose severity
- Spring topdressing is the most beneficial timing



Irrigation Management

- Turf growing in saturated soil due to poor surface and slow internal drainage is more susceptible to anthracnose (Sprague and Evaul, 1930; Vargas and Turgeon, 2004).



Irrigation Management

- Field research has confirmed that drought stress also increases anthracnose severity on annual bluegrass
- Specifically, deficit irrigation that subjects turf to frequent wilt stress during warm dry weather (e.g., 40 and 60% ET_0) will increase anthracnose disease

Verticutting

- Used to improve surface playability and reduce other problems associated with thatch
- Reputed to enhance anthracnose due to wounding of tissue



Verti-cutting

- Recent detailed studies of mechanical injury indicates that neither wounding of leaves, crowns, nor stolons dramatically affects anthracnose severity



Best Management Practices

Nitrogen Fertility – maintain turf vigor

- Spring N at 1 to 2 lb per 1000-ft² (rather than autumn)
- Up to 3 lb per 1,000-ft² in spring if disease pressure is severe
- At higher rates, include slow release nitrogen

Best Management Practices

Nitrogen Fertility – maintain turf vigor

- Begin light-frequent N early in the year
- 1.5 to 3 lb of N per 1000 ft² over summer
- At higher summer rates, likely to need less N the spring;
- ...however, higher spring N recommended if anthracnose is severe by mid spring

Best Management Practices

Topdressing

- Spring topdressing very beneficial (e.g., 4 to 8 ft³ per 1,000-ft²) if summer topdressing is minimal
- Spring topdressing more effective than fall
- Weekly or bi-weekly sand topdressing at 1 or 2 ft³ per 1,000 ft² during summer

Best Management Practices

Topdressing

- Incorporate sand to minimize wear on mowing equipment – incorporation doesn't affect disease
- Foot traffic over topdressed turf does not increase disease severity; in fact, it reduces the severity!

Best Management Practices

Irrigation

- Wilt stress or excessively wet conditions will increase anthracnose
- Irrigate at 60 – 80% of ET_0 and hand water to avoid wilt stress
- Correct surface drainage restrictions

Best Management Practices

Verti-cutting and other cultivation

- CANNOT confirm that wounding from these practices increases disease
- Do not avoid the use of verti-cutting or other cultivation practices if needed

Best Management Practices

Mowing and Rolling

- Avoid mowing below 0.125 inch (“fixed” head)
- To achieve ball roll of ~10 ft at higher mowing heights, light-weight roll and/or increase mowing frequency
- Rolling every other day may slightly reduce anthracnose

Best Management Practices

Plant Growth Regulators

- Trinexapac-ethyl (Primo MAXX)
Mefluidide (Embark)
Ethephon (Proxy) have minimal effects
- Benefits of improved tolerance to low mowing, enhanced plant health, and seedhead suppression outweigh any potential negative effects



Bayonne, NJ