Bermudagrass Management to Prevent Winter Injury

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VirginiaTech
Invent the Future

It certainly begins with the grass. Choose/use the wrong grass and all of your efforts can be for naught…

- What is your climate?
- What is your field use schedule for fall AND spring?
- What about your budget, equipment, labor, maintenance program, etc?
- What is your expectation?
- What is your clientele's expectation?

The winter of 2010-11 was tough on bermudagrasses all across VA

- Much more so than 2009-2010, even though temperature extremes and 'severity' of 2010-11 was much greater. Any guesses why?

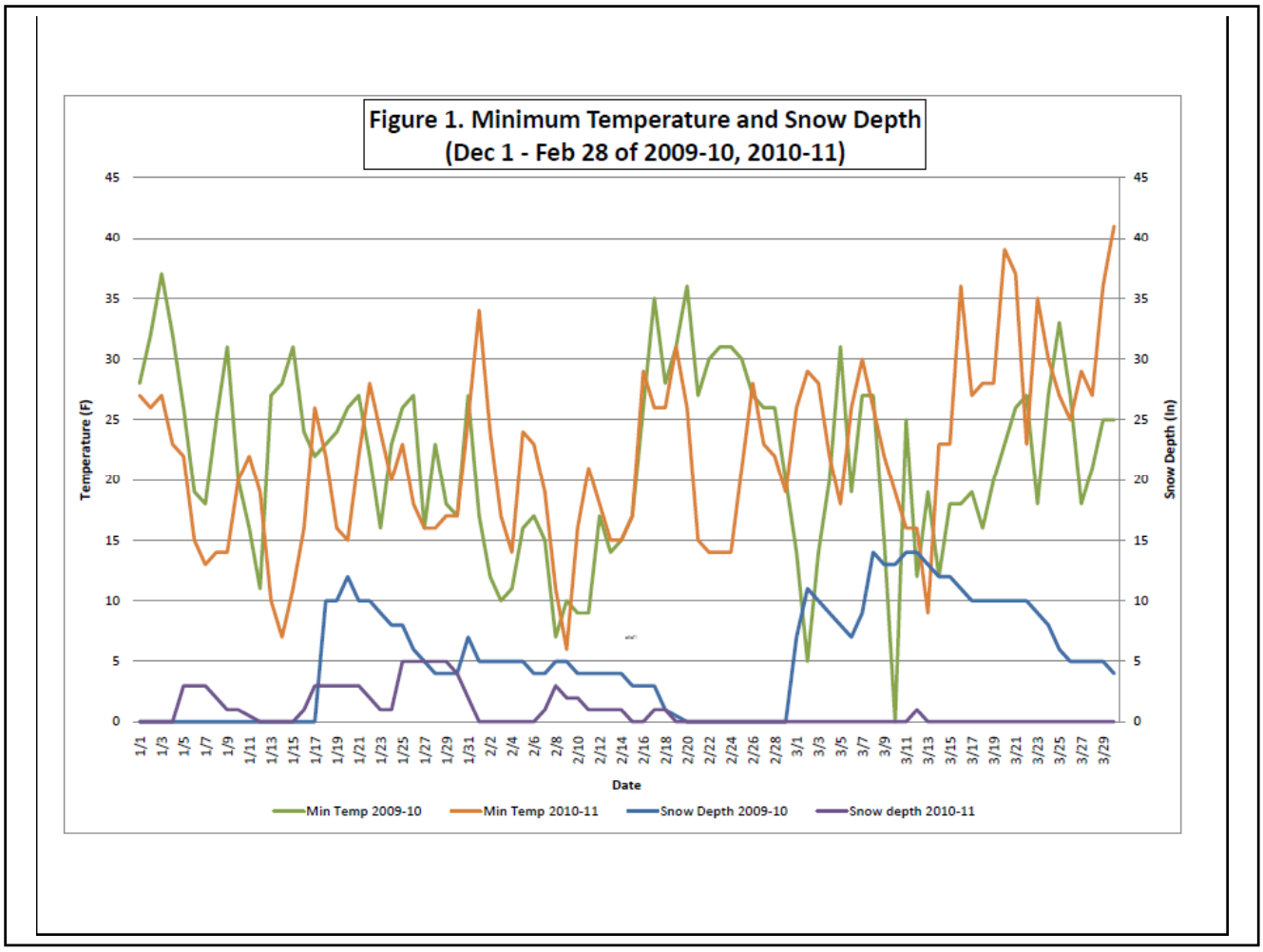
Figure 1. Minimum Temperature and Snow Depth
(Dec 1 - Feb 28 of 2009-10, 2010-11)
Temperature (F)
Snow Depth (In)
Date
Min Temp 2009-10
Min Temp 2010-11
Snow Depth 2009-10
Snow depth 2010-11

The winter of 2010-11 was tough on bermudagrasses all across VA

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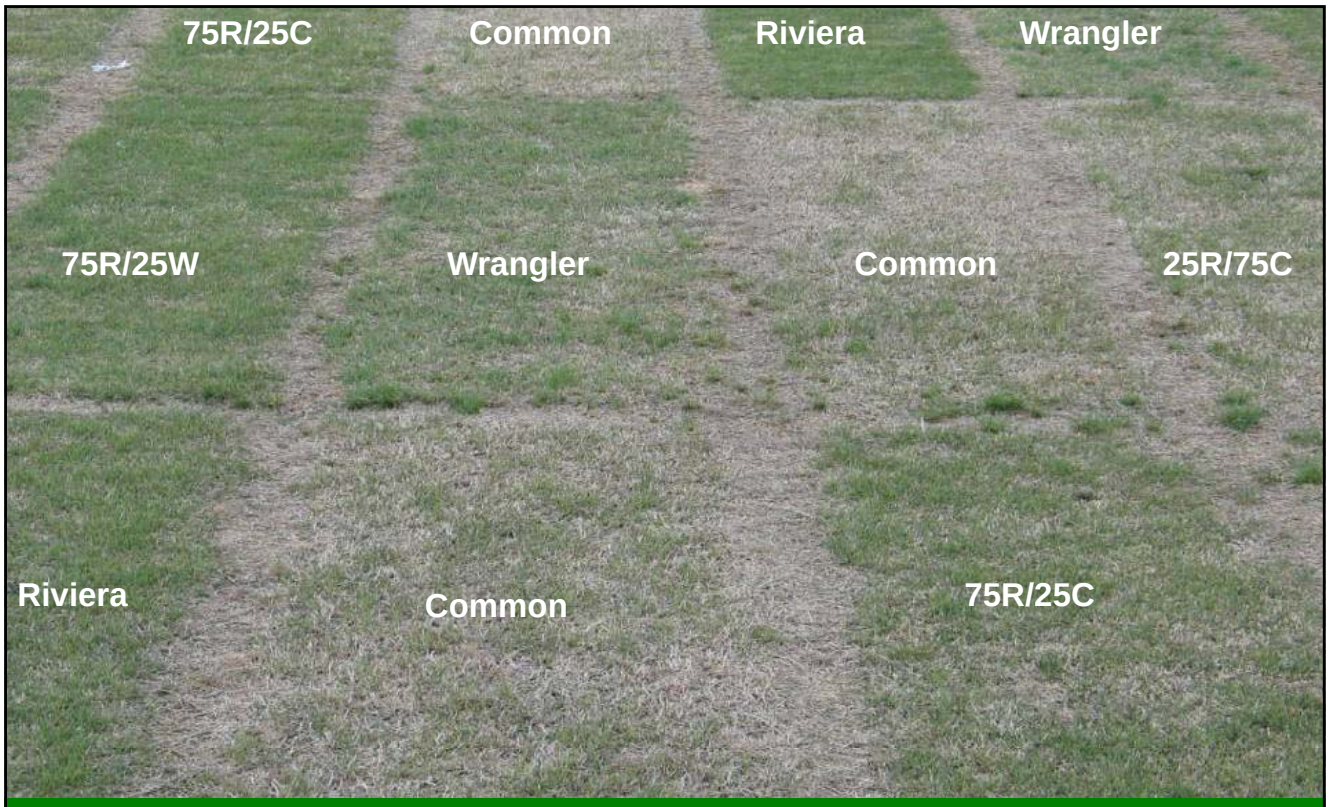
- Grasses selected for winter hardiness distinguished themselves, whether they were seeded or vegetatively established.

Vegetative Bermudagrass Varieties 5/20/2011

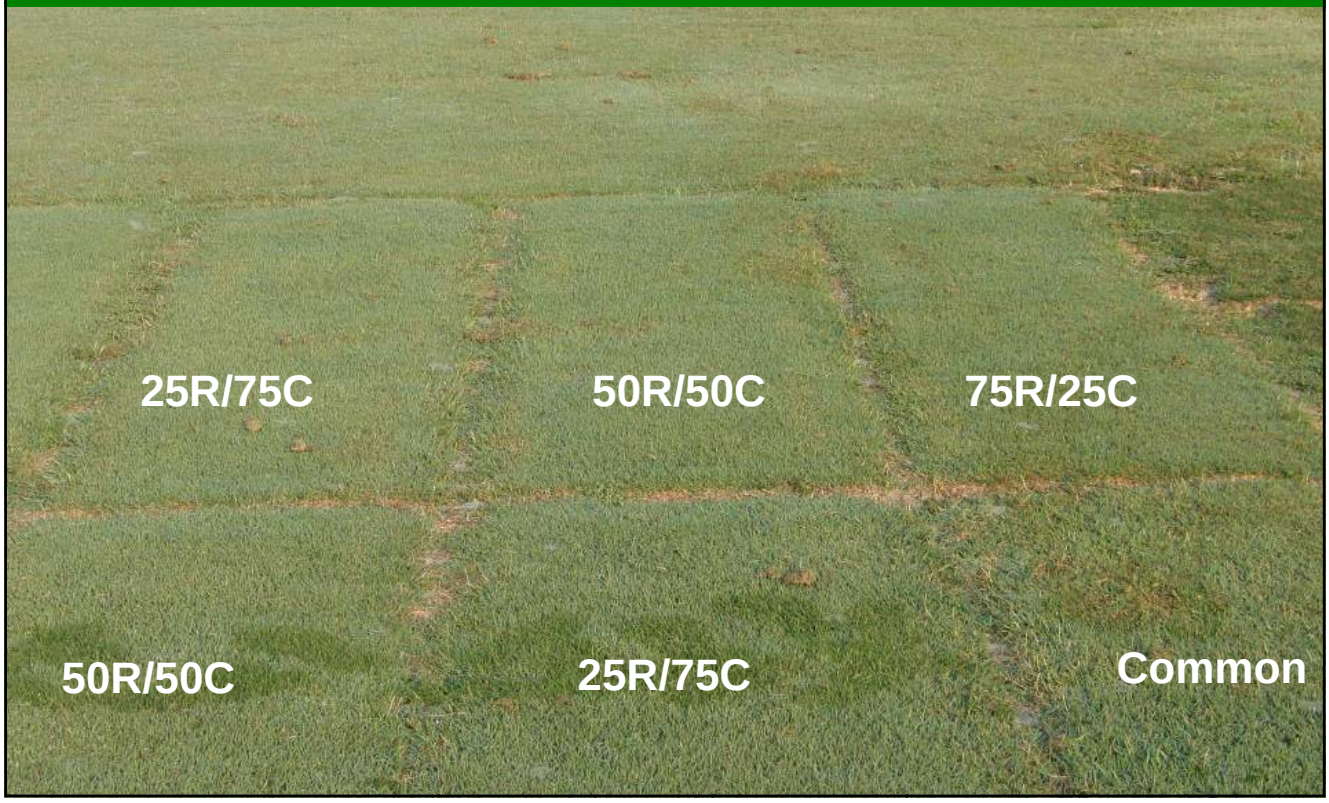
Seeded Bermudagrass Varieties 5/20/2011


Opportunities to put the Transition Zone to work for you… blending cold-tolerant bermudas with inferior cold-tolerant varieties.
Common
Riviera
Wrangler
2 Weeks after planting, July 2004.



Spring greening of Riviera (R), Common (C), Wrangler (W) and various % seeded bermudagrass blends on 26 April, 2005.

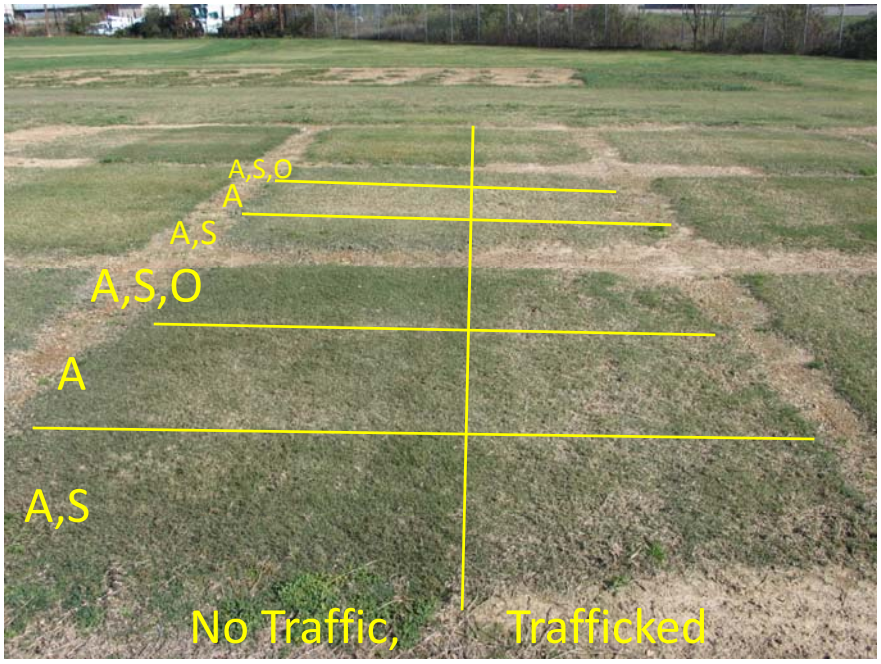
Visual turf quality of Common (C), and Riviera/Common (R/C) blends in August, 2 years after planting .



As a rule of thumb, I subscribe to this philosophy regarding bermudagrass athletic fields AFTER you have selected the best adapted variety:

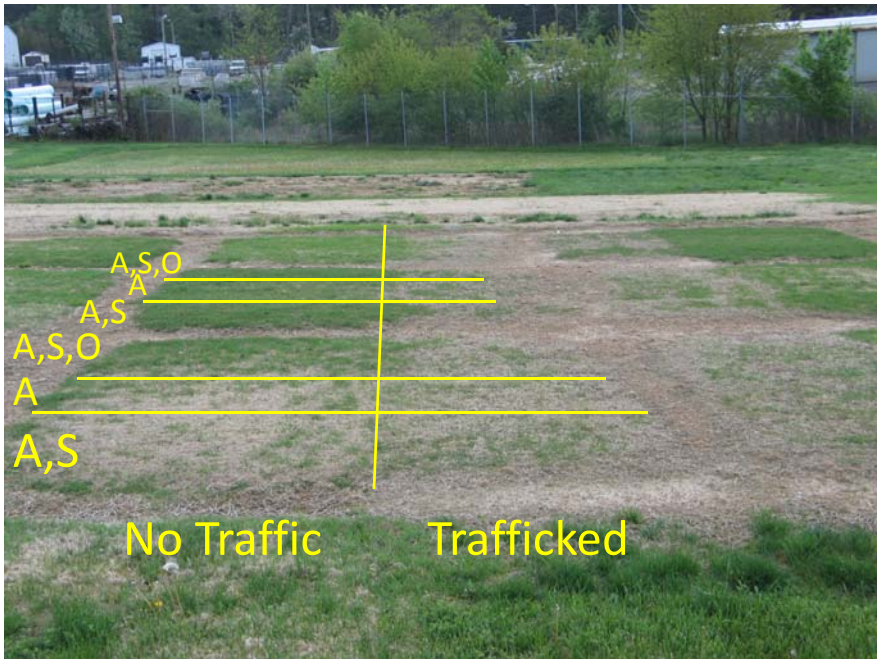
"The Longer You Can Keep It Active, the Better It Is for the Grass"

Late-season N fertilization
October 29, 2010



1 lb of N applied monthly (Aug, Aug+Sept., Aug+Sept+Oct) per 1000 sq ft.

April 27, 2011



Effects of late-season N on freeze tolerance of bermudagrass rhizomes (1999 data)

	% node recovery from rhizomes			
N fertilization	**28°F**	**25°F**	**21°F**	**18°F**
None after 1 Aug	53.6	49.7	42.2	0.0
1# N (15 Aug)	60.0	49.3	33.5	7.8
1# (15 Aug) + 1# (15 Sep)	53.4	44.4	38.5	0.0
LSD (0.05)	ns	ns	ns	ns

Richardson, Crop Sci., 2002

Summary of 'responsible' late-season N fertilization strategies

- Compare and contrast regional climate data, short and long-term weather forecasts for a particular season, AND your needs/desires of late-season N.
- WHY are you doing it?
  - The benefits come from extending photosynthetic activity of the grass in order to produce more food and biomass without increasing plant succulence.
  - "Visible" goals are:
    - Promoting recovery in heavy traffic/use areas
    - Extend color and growth
- <u>Ensure soil P, K, and pH levels are optimal long before any late-season N applications are made</u>

Summary of 'responsible' late-season N fertilization strategies

- WSN sources: a spoonfeeding approach (more frequent, low N levels) would be ideal
- WIN sources provide more flexibility in application timing and rate; reduced environmental concerns as well
- Foliar Fe applications, either alone or in combination with late-season N, have great potential to sustain late-season color without stimulating foliar growth. Another great fertilizer source for fall color without a surge of growth: SulPoMag… 5 lbs/1000 sq ft.

Take advantage of modifying plant tolerance to winter extremes by modifying cultural management

- Mowing
- Vertical mowing
- Core aeration

Don’t be ‘greedy’ with fall cutting heights. Raise the heights BEFORE frost… store some carbohydrates and grow some roots before the plant shuts down for winter dormancy.


Keep bermudagrass ‘juvenile’ by regular vertical mowing well BEFORE cold temperatures arrive.


Similarly, core aerate as often as feasible during the optimal growing period in order to optimize turf (and soil) health. 30, 40, 50% surface disruption possible?

Turf Blankets… not a miracle worker, but a great tool nonetheless.

In this situation, the sports turf manager indicated the value of the blanket in keeping people OFF the field was equal to its winter protection capabilities!

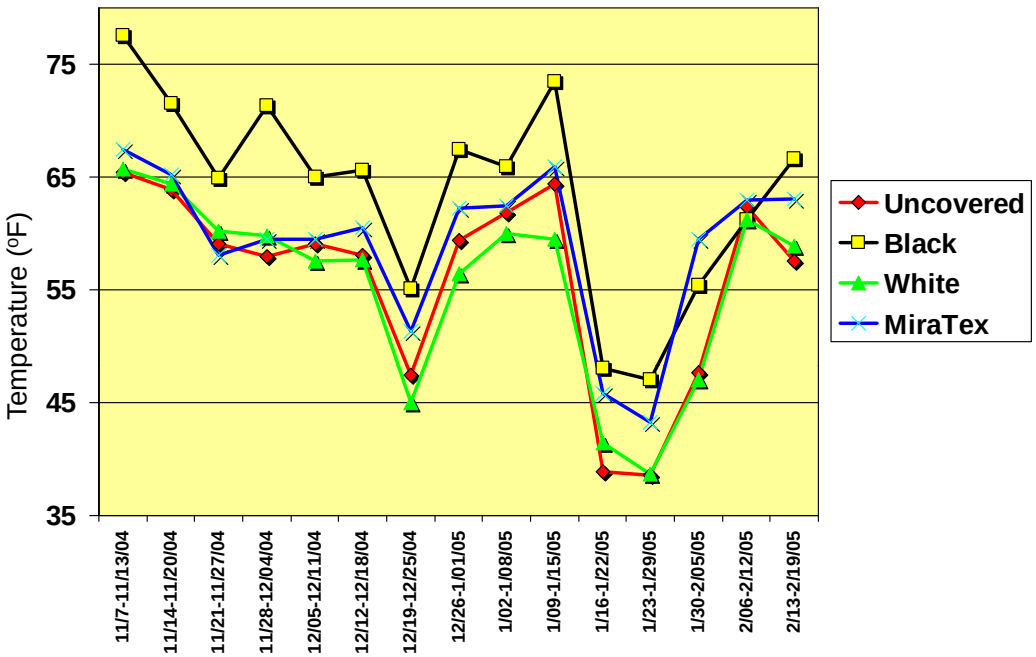


Figure 1. Weekly average high temperatures (ºF) of uncovered, black, white, and MiraTex covers at the surface of a 'Riviera' bermudagrass turf from 11/7/04 through 2/19/05.

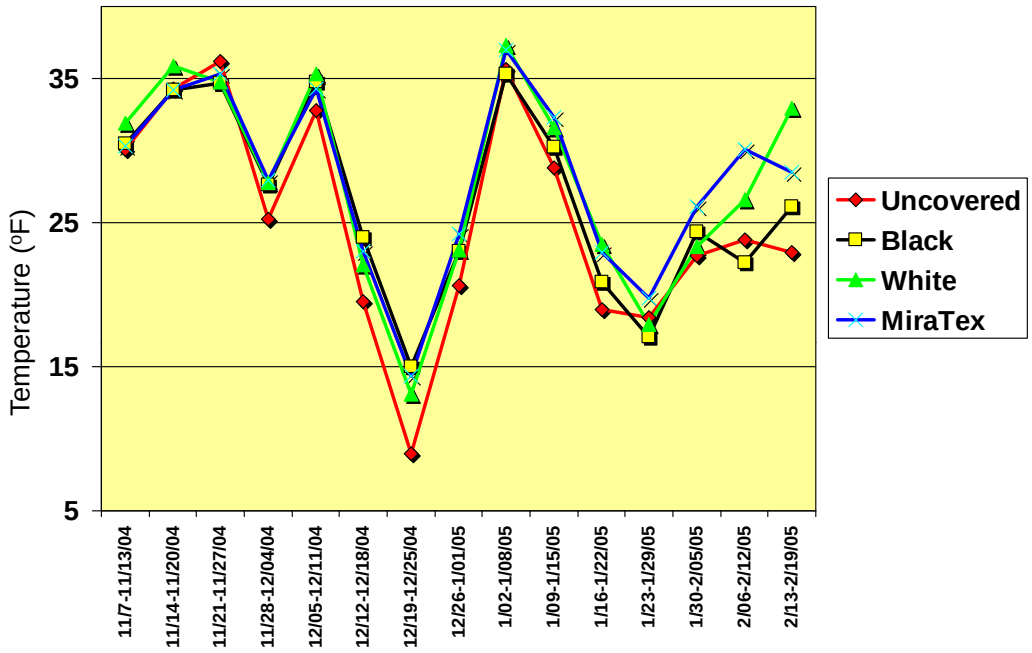


Figure 3. Weekly average low temperatures (°F) of uncovered, black, white, and MiraTex covers at the surface of a 'Riviera' bermudagrass turf from 11/7/04 through 2/19/05.

Covers: response varies depending on source and season

•Darker covers provide the best late-season color retention… the less light penetration, the more color retained under the blanket.

Spring Blanket Responses

- All covers provided winter protection.
- Light transmission is important for spring greening characteristics if covers remain in place.
- Gain 6-8 weeks of actively growing turf
- Turf should (must?) be protected from spring freezes when covers are removed.


Spring Dead Spot
Some of the most exciting research I have recently seen on SDS in the mid-Atlantic is from Dr. Tredway's program at NC State.

Research Objectives: Spring Dead Spot Management

Dr. Lane Tredway, NCSU

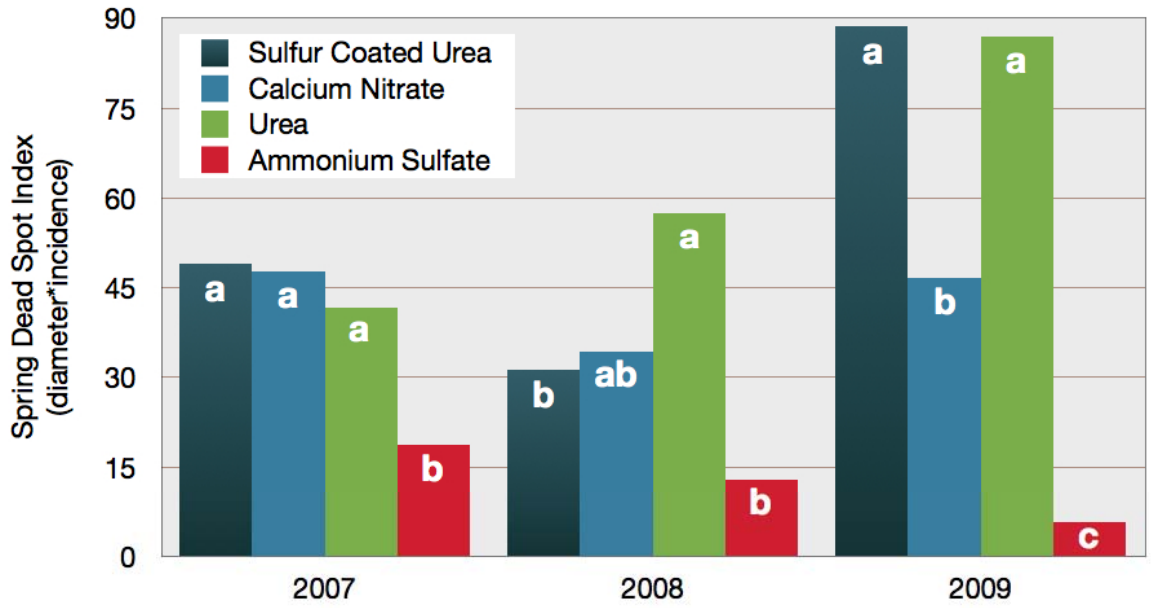
1. Determine the effects of nitrogen source and fall fertilization practices on spring dead spot development in bermudagrass fairways/athletic fields

2. Evaluate fungicides for preventive control of spring dead spot in inoculated plots

3. Compare and contrast the response of *O. korrae* and *O. herpotricha* to the above management practices

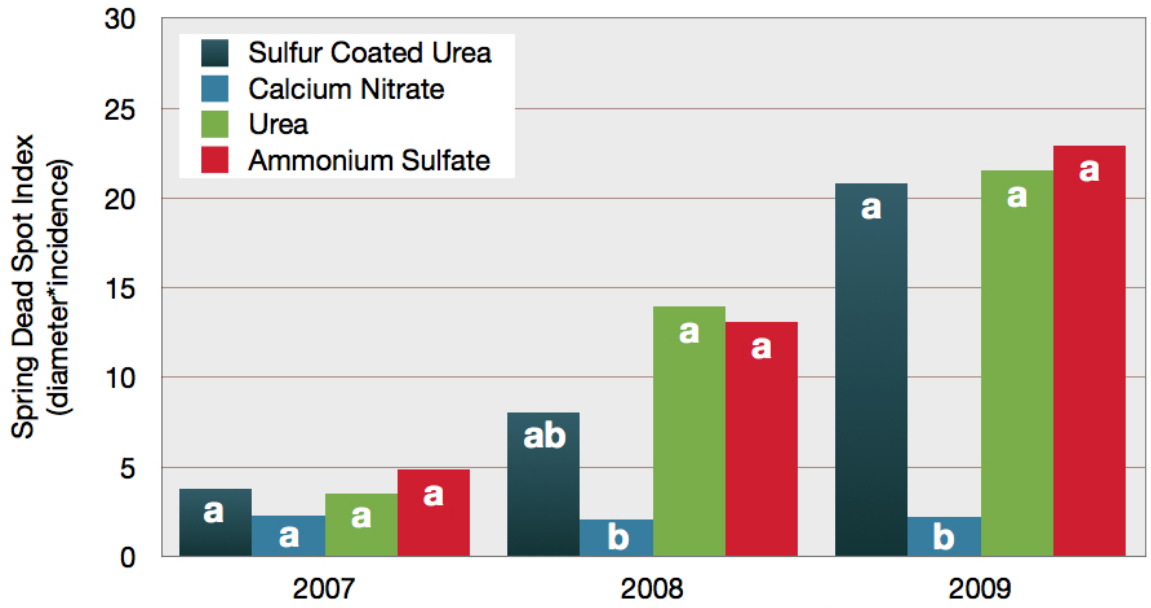
Dr. Lane Tredway, NCSU

Impact of Nitrogen Source on *O. herpotricha*



Dr. Lane Tredway, NCSU

Impact of Nitrogen Source on *O. korrae*



Waller-Duncan k-ratio t-test

Dr. Lane Tredway, NCSU

Calcium Nitrate

Ammonium Sulfate

Urea

May 2009

Dr. Lane Tredway, NCSU

Conclusions: Fertilization Programs and Preventive Fungicides for SDS Management

- Spring dead spot pathogens exhibited a differential response to nitrogen sources
    - *O. korrae* was effectively suppressed by calcium nitrate
    - *O. herpotricha* was suppressed most effectively by ammonium sulfate
- *O. korrae* was negatively correlated with soil pH and foliar Ca content, whereas *O. herpotricha* was positively correlated with these factors
- Fall applications of potassium, dolomitic lime, gypsum, and elemental sulfur had no effect on either spring dead spot pathogen
- Spring dead spot pathogens responded similarly to preventive fungicide applications

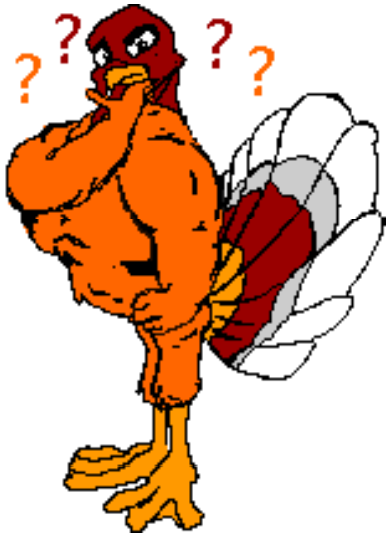
Current Va Tech Research

- Led by VT Turf Pathologist David McCall
- Goal: Apply NCSU results to pre-existing conditions of SDS on bermudagrass in VA
- Four trials across VA (established 2010)
  - Patriot, Riviera, 419, Princess 77
- Compare N sources
  - w/ and w/o fenarimol (Rubigan)
  - w/ and w/o verticutting
- Tracking SDS epidemics over multiple seasons

Preliminary Results

- Calcium Nitrate best option when applied with fungicide
  - improves performance of Rubigan
- Urea best option if no fungicides used
- Late season verticutting
  - slightly improved $CaNO_3$ performance
  - no effect on Urea performance
  - Reduced quality of Ammon Sulfate plots
- Ammon. Sulfate poorest performer in VA trials to date

Your questions, comments, and suggestions are always welcomed. Please let me know if I can help. I hope some of you can join us in Long Beach.



STMA Conference, January 10-14, 2012, Long Beach, CA

www.STMA.org/

SportsTurf MANAGERS ASSOCIATION

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