

# Influence of Phosphonates, Wetting Agents and Fertilizer on Algae

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# Blue-Green Algae

- Prokaryotic Organisms (Cyanobacteria)
- Contain Chlorophyll-a
  - Release Oxygen and Photosynthesize
- Associated With *Phormidium* and *Oscillatoria* (Tredway et al., 2006)
- Various Species Likely Found

# The Problem With Algae

- Surface Slime Mats/Crusts
- Production of Mucilage Substance
  - Protection
  - Conservation of Water
- When Dry, Crust Is Impermeable to Water Which Limits Turf Growth



# The Problem With Algae

- Mats and Fibrous Growth Clog Soil Pores
- Create Anaerobic Conditions
  - Susceptible to Black Layer (Tredway et al., 2006)







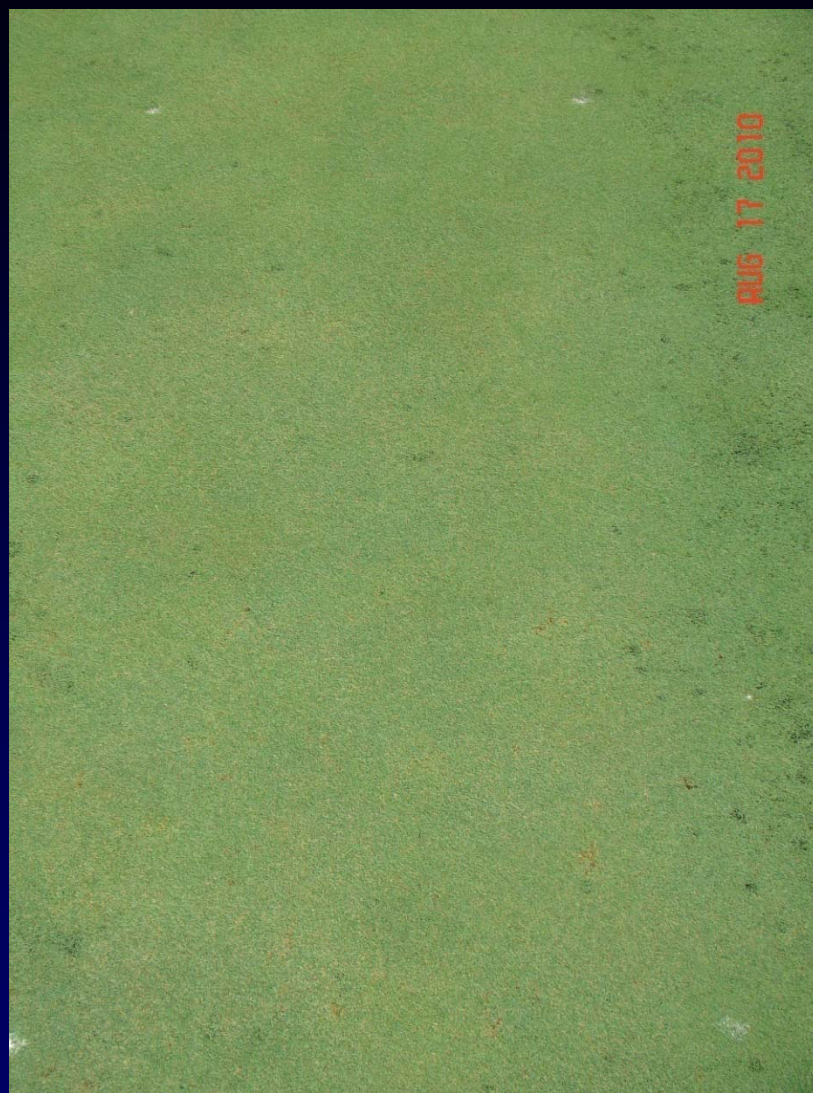
# Promoting Conditions

- WATER, WATER, WATER
- Poor Soils/Construction Mixes
- Poor Drainage
- Shade
- Thinned Turf
  - Mechanical Stress
  - Disease
  - Poor Establishment

# Cultural Control Methods

- Installation of Drainage
- Improve Air Circulation
  - Removal of Trees/Underbrush
  - Installation of Fans
- Aerification or Spiking
  - Break Crust
- Topdressing
  - Coats Algae Layer
  - Promote Drying

Rep. 1



- Treatment 5
- Alude
- 14 Day Application
- 10.511 fl oz / 1000 ft<sup>2</sup>

Rep. 1



- Treatment 24
- H<sub>3</sub>PO<sub>4</sub> / KOH
- 14 Day Application
- 59.484 fl oz / 1000 ft<sup>2</sup>

# Titration Summary

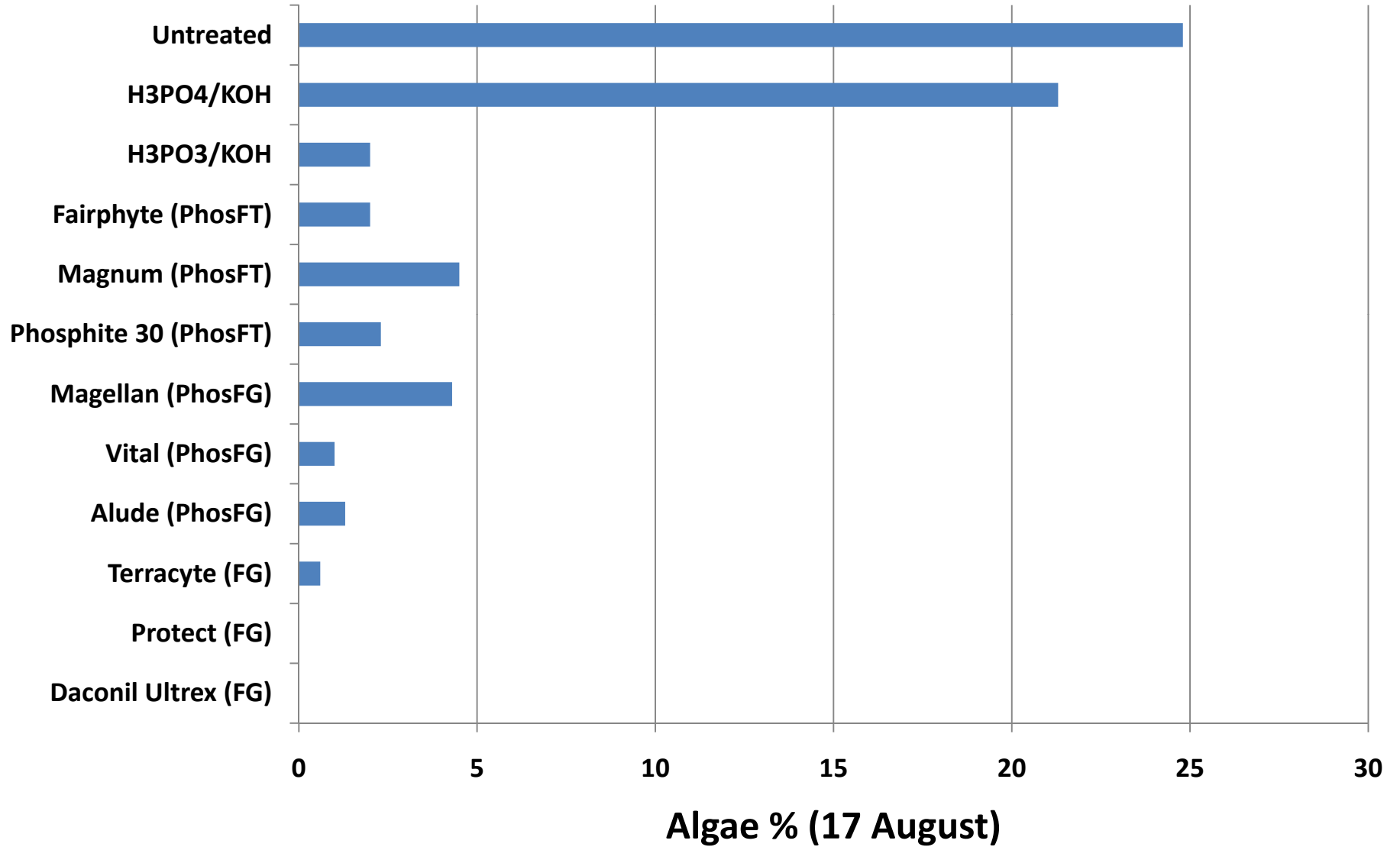
- Algae Suppressed with all Phosphites
- Increased Suppression with Increased Phosphite Rates
- No Suppression with Phosphate
- Rates  $>10.9$  Caused Minor Phytotoxicity with Repeated Applications

# Product Comparison

- Fungicides (FG)
- Phosphites (Phos)
  - Fungicides (FG)
  - Fertilizers (FG)
  - Analytical



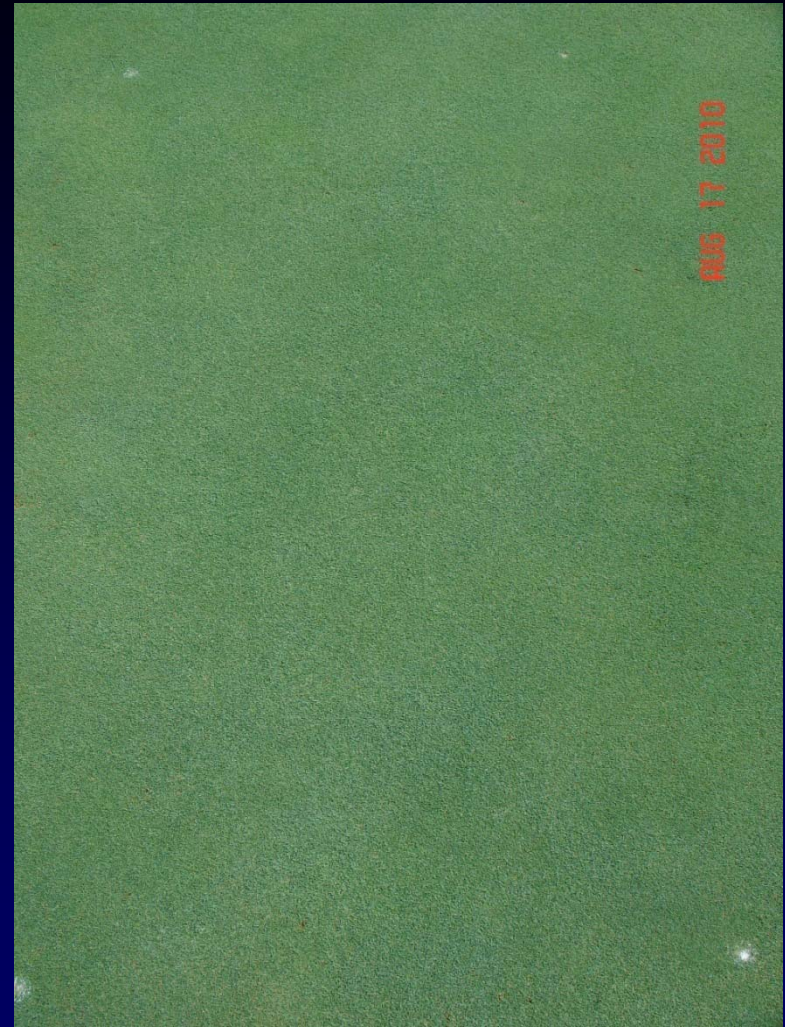
# Preventive Algae Suppression



## Rep. 1



- Treatment 12
- Untreated Check

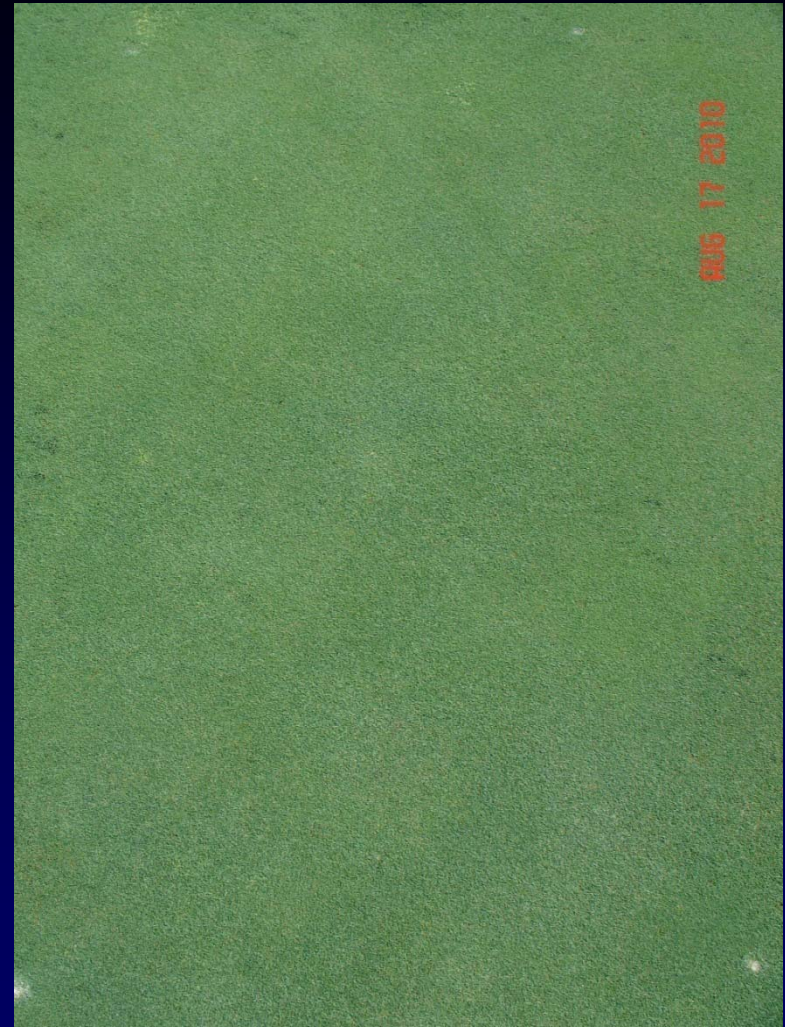


- Treatment 1
- Daconil Ultrex
- 14 Day Application
- 3.4 oz / 1000 ft<sup>2</sup>

## Rep. 1



- Treatment 12
- Untreated Check

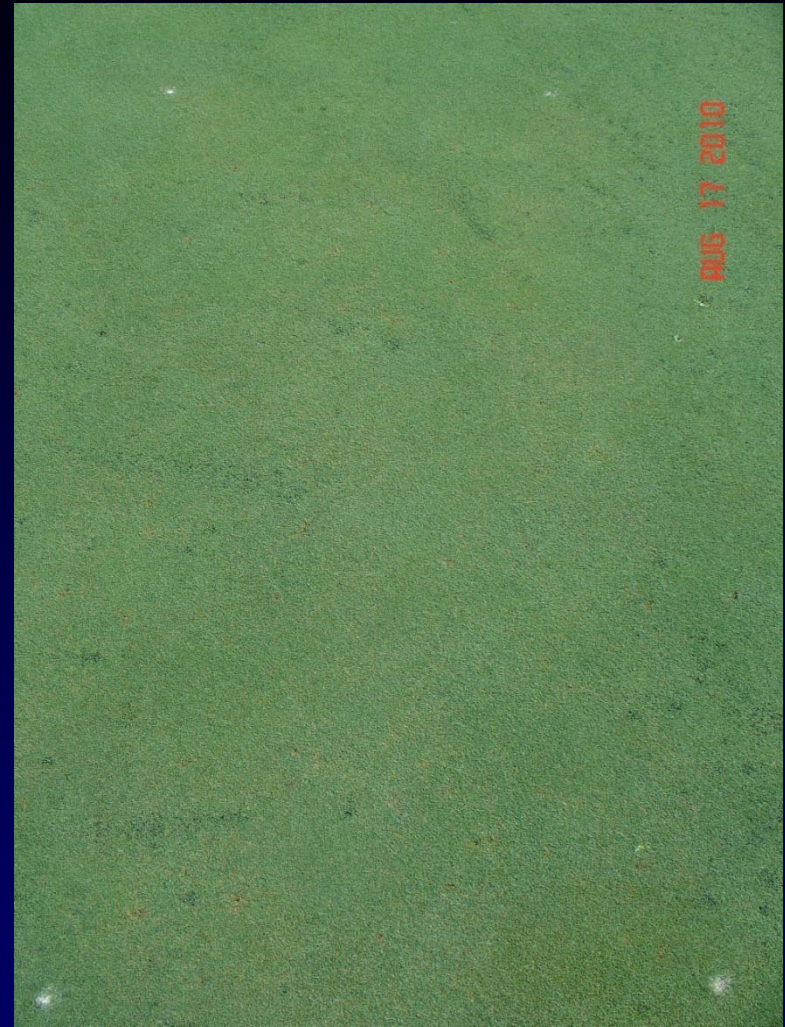


- Treatment 2
- Protect
- 14 Day Application
- 6.0 oz / 1000 ft<sup>2</sup>

## Rep. 1



- Treatment 12
- Untreated Check



- Treatment 4
- Alude
- 14 Day Application
- 7.4 fl oz / 1000 ft<sup>2</sup>

## Rep. 1

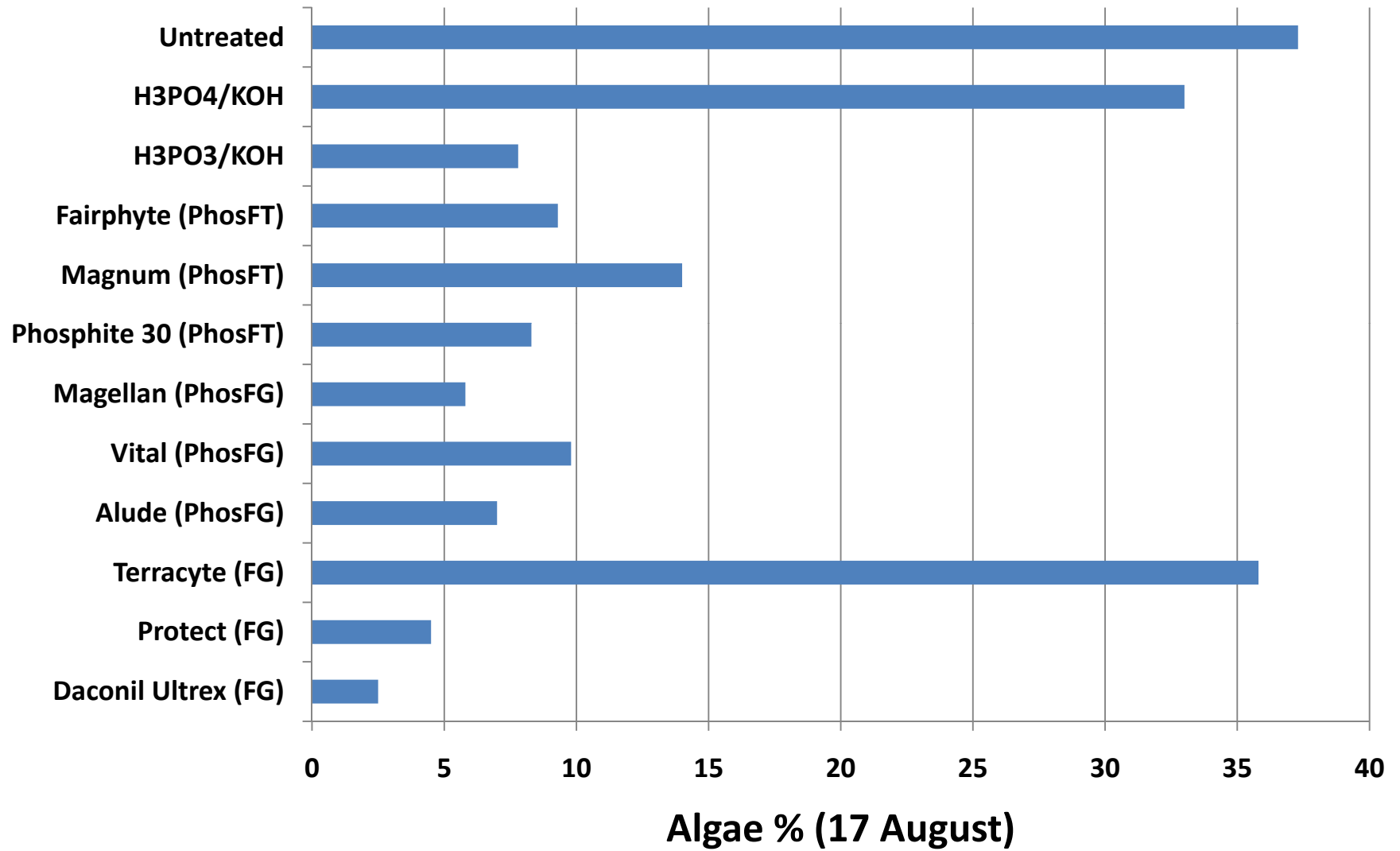


- Treatment 12
- Untreated Check



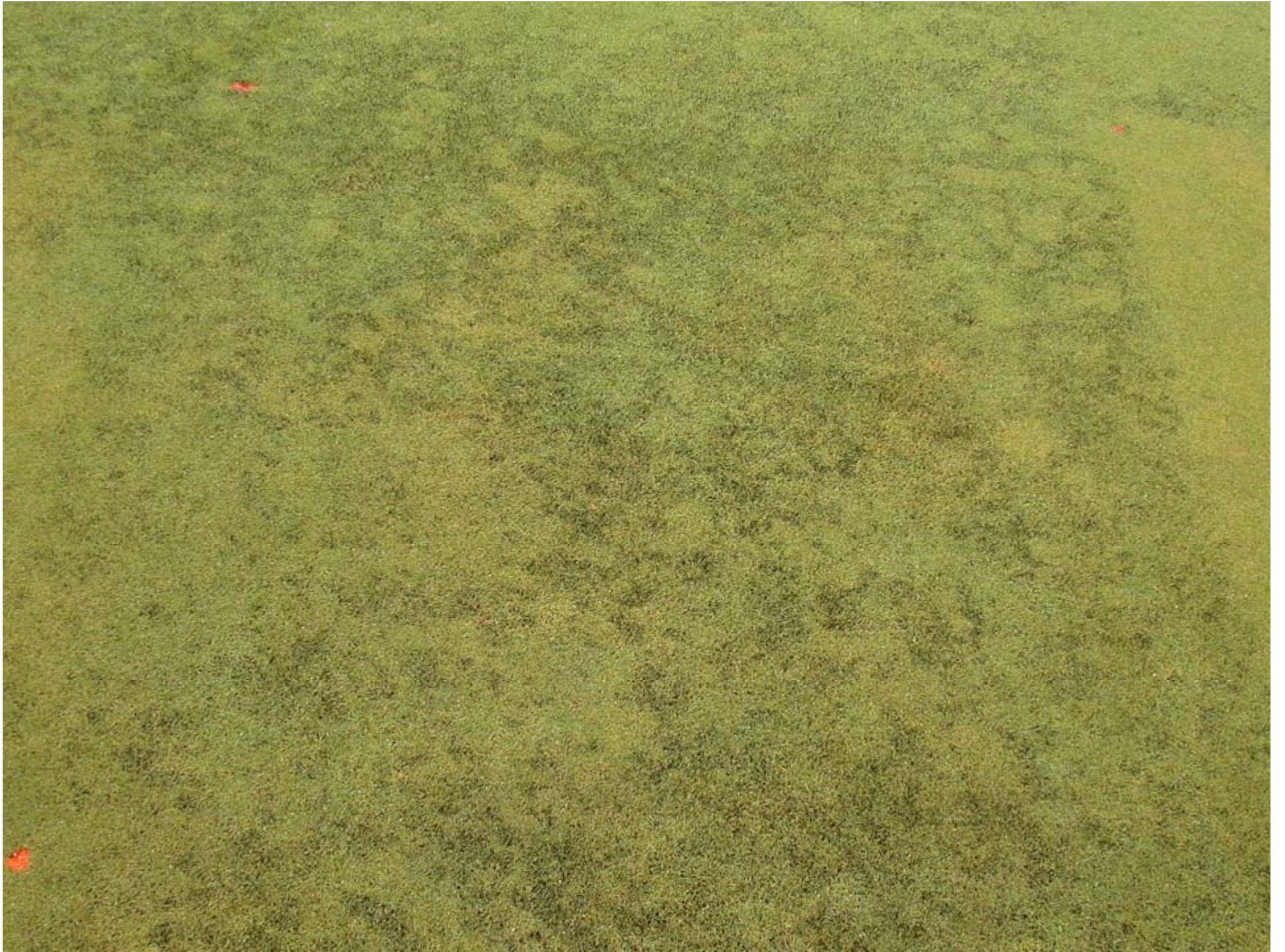
- Treatment 11
- H<sub>3</sub>PO<sub>4</sub> / KOH
- 14 Day Application
- 29.74 fl oz / 1000 ft<sup>2</sup>

# Curative Algae Suppression



# N-Source Studies

- Nitrogen Treatments
  - 20-20-20 (Combination)
  - 46-0-0 (Urea)
  - 21-0-0 (Ammonium Sulfate)
  - 15.5-0-0 (Calcium Nitrate)
  - 13-0-46 (Potassium Nitrate)
  - 34-0-0 (Ammonium Nitrate)
- Fertilizer Applied at 0.1 lb N/1000 sq ft per Week





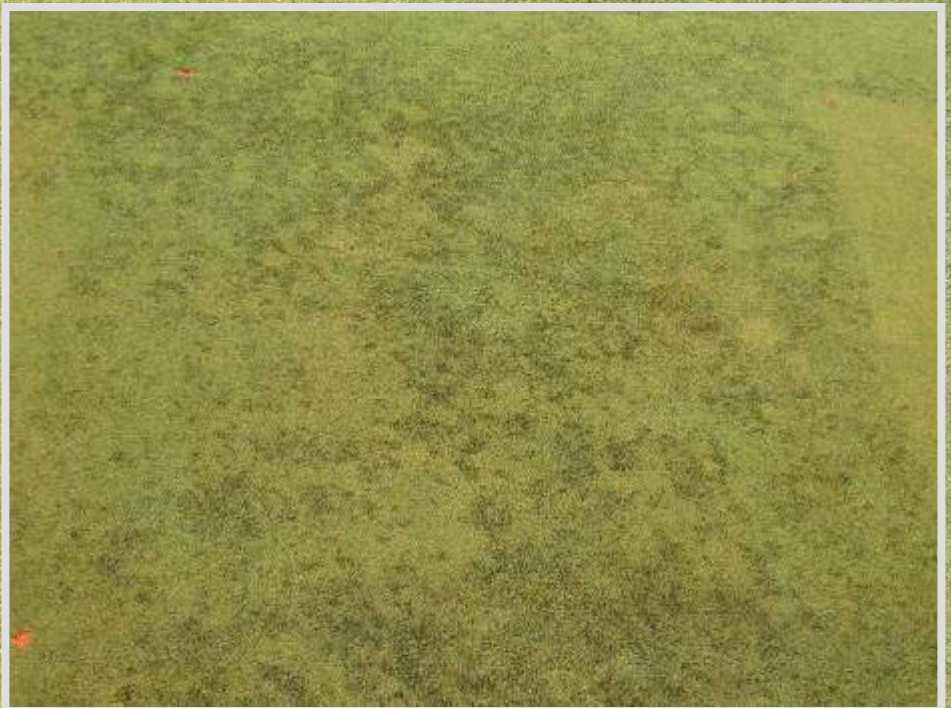


# Impact of N-Source

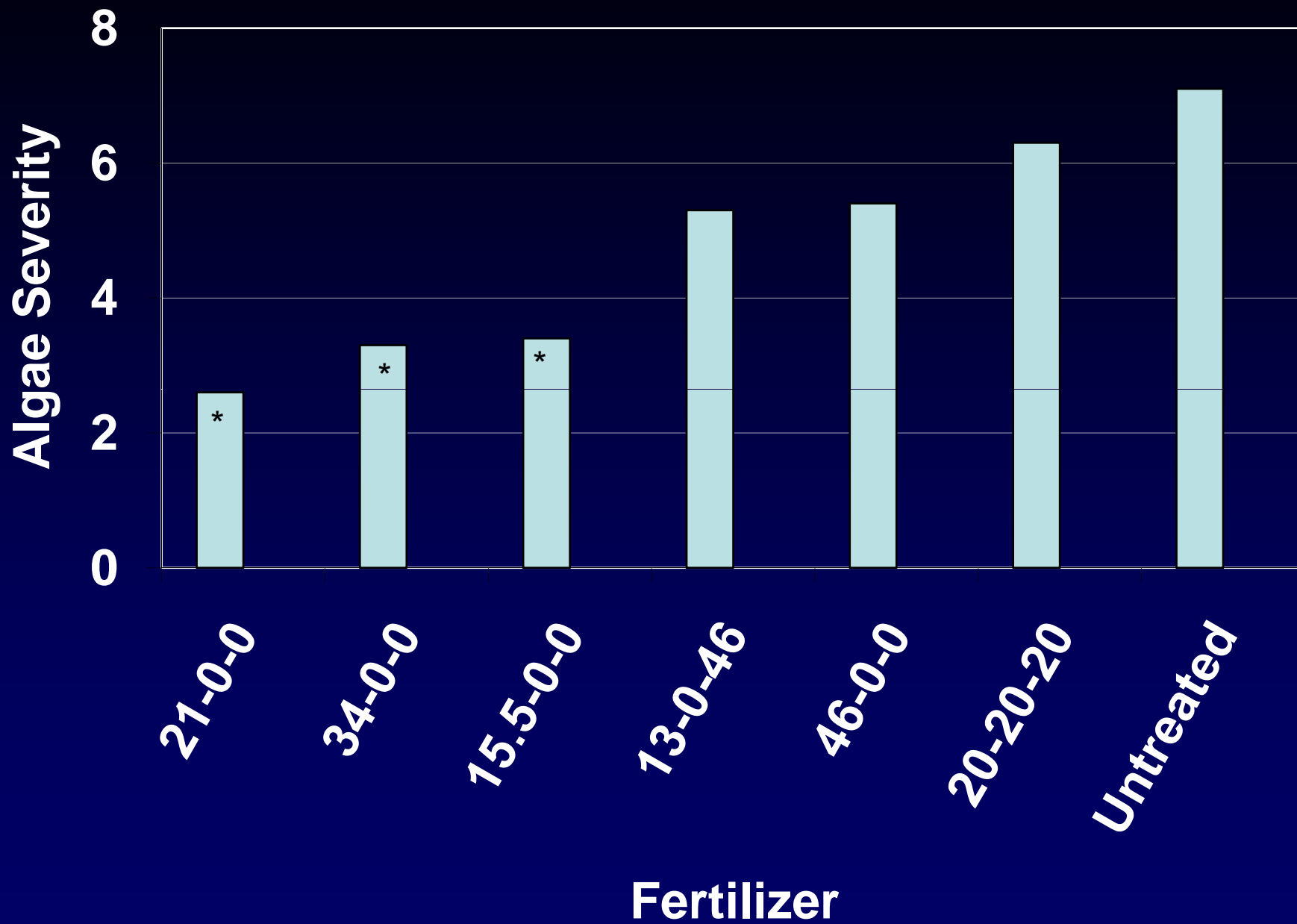
Ammonium Sulfate



20-20-20

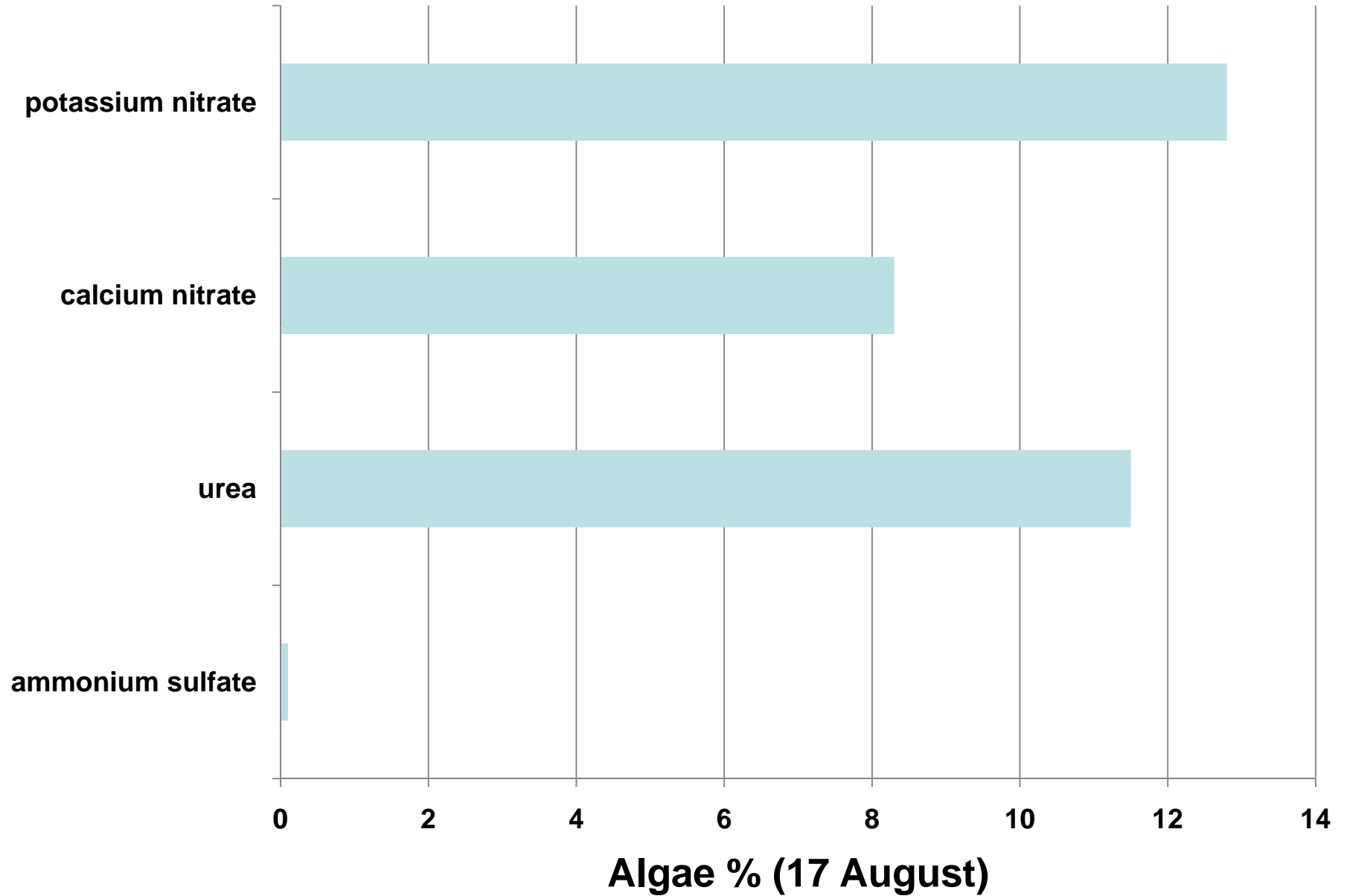






\* Indicates Significantly Less Algae Than in Untreated Control

# Fertilizer Influence on Algae



# Summary To Date

- Preventive Suppression Possible With Phosphites ( $\leq 10.9$  kg  $\text{H}_3\text{PO}_3$ /HA)
  - Moderate Curative Suppression
  - Excellent Control with Chlorothalonil/Mancozeb
- Improve Turf Density With Adequate N-Fertility
  - Impact of Phosphorous Conflicting
  - Acidifying Fertilizers May Directly Reduce Algae
- Wetting Agent Data Conflicting

# Questions!

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Tri-State Turfgrass Association

MetGCSA

CAGCS

NEGCSA

NHGCSA

USGA

Aquatrols

Cleary

