

Field-scale measurement of ammonia volatilization as affected by N source.

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Measurement of Ammonia Volatilization

- Small plot experimental methods - chambers
- Laboratory procedures
- Field scale methods



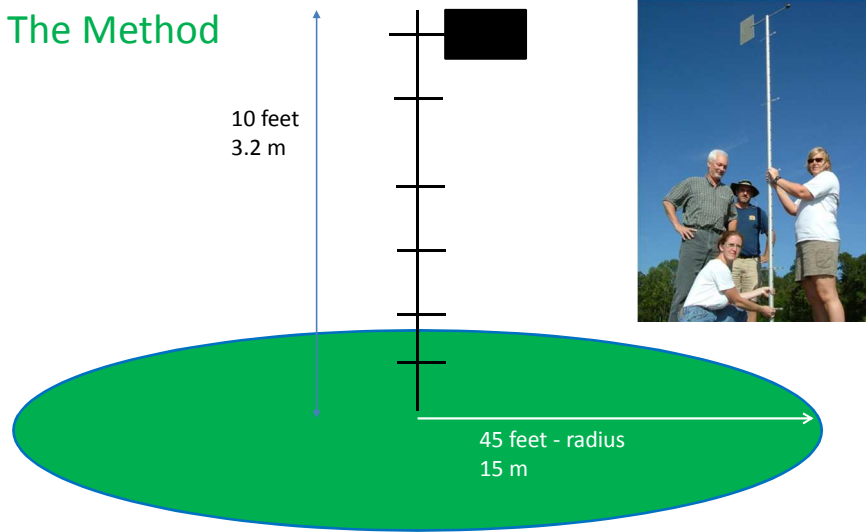
Objective

The objective of this work was to quantify ammonia loss from fertilized grass swards, in the field, as affected by N source.

Experiments

- Two years of field studies on sod, 10 day long studies.
- Two years of field studies on a bermudagrass/bahiagrass field, 10 week long studies.
- Both conducted in the Auburn, AL area.
- Both large, field scale studies.

The Method



Total research area:
20 hectares

Minimum of 100 meters between plots

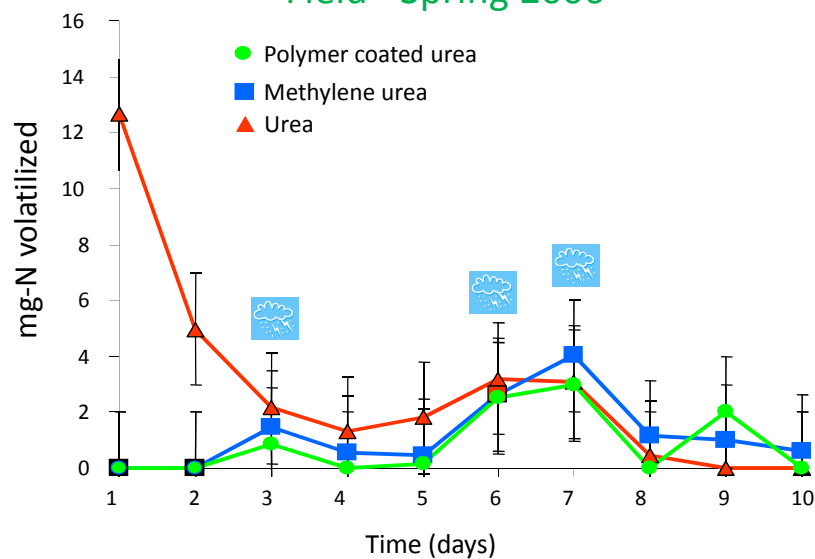
General Methods

- Fertilizers applied via walk spreaders.
- Masts erected.
- Tubes removed every day for 10 days or weekly for 10 weeks.
- Each tube washed with 20 mL water, rinseate analyzed for ammonia concentration.
- Total ammonia loss totaled for each week.

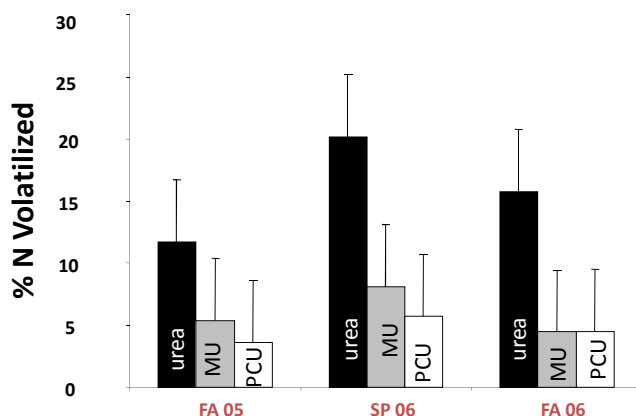
10 day field studies

- Hybrid bermudagrass sod crop.
- N applied at 3 lb N/1,000 ft² (14.6 g m⁻²; 146 kg ha⁻¹; 130 lb A⁻¹)
- No water applied after application.
- N sources were methylene urea, polymer-coated urea and urea.
- Data collected every day for 10 days.

Ammonia Volatilization Over 10 Days Field - Spring 206



Total Ammonia Loss as a % of total N Applied – Field Study – 10 day studies; 3 events



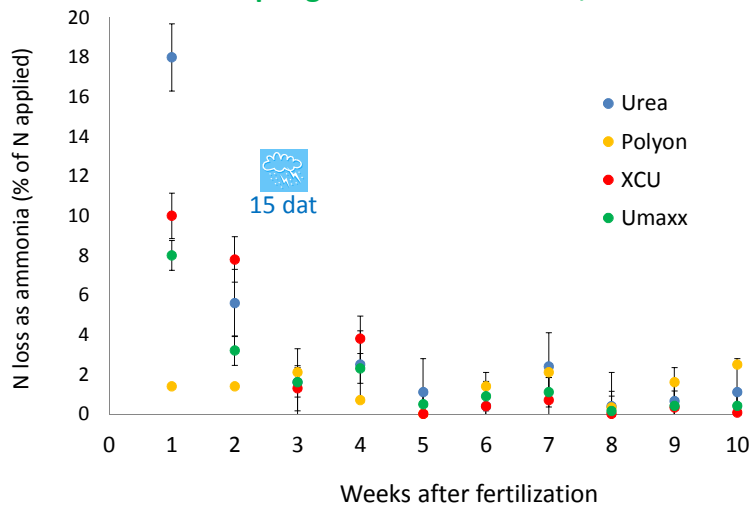
But - some of these products have 10 to 12 week release patterns

- Bermudagrass/bahiagrass pasture mowed to a 'rough fairway' height via weekly mowing.
- Four fertilizer treatments, each replicated three times. An unfertilized background control plot was also included.
- Treatments: urea (46-0-0), polymer coated urea (Polyon[®]; 42-0-0), 'stabilized' urea (UMaxx[®]; 47-0-0), and polymer-sulfur-coated urea (XCU[®]; 43-0-0).
- Fertilizers applied at 7.3 g N m⁻² (1.5 lb N/M; 73 kg ha⁻¹; 65 lb A⁻¹) on July 20th 2009 and July 26th 2010. Treatments were applied using a walk-behind drop-spreader.
- No irrigation was applied until natural rainfall occurred.



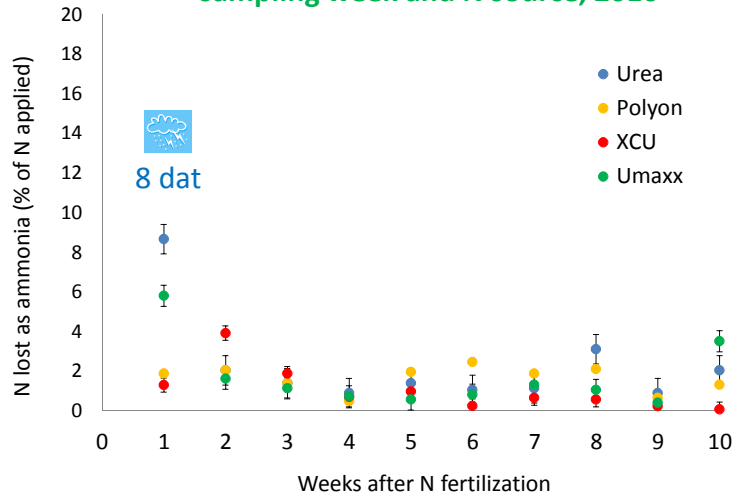
Figure 1. Aerial map of the research area in Loachapoka, AL, with individual mast locations marked with a ★.

Ammonia volatilization as affected by sampling week and N source, 2009



Use of trade names is not an endorsement and are used to provide clarity as to the treatments.

Ammonia volatilization as affected by sampling week and N source, 2010



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Significant differences in ammonia loss typically only observed in the first few weeks.

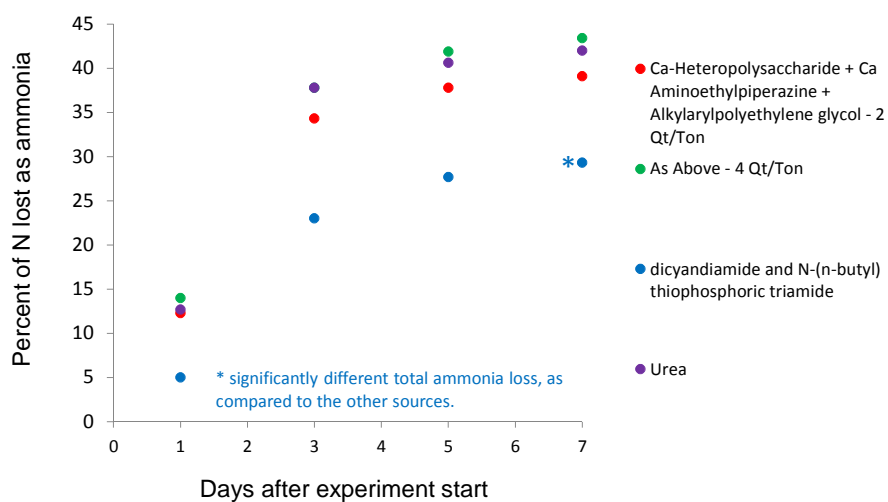
Fertilizer Source	Ammonia loss as a percent of N applied	
	2009	
	Week 1	Week 2
Urea	18 a	5.6 ab
Polyon	1.4 b	2.1 b
UMaxx	8 ab	3.2 ab
XCU	10 ab	7.8 a
	2010	
	Week 1	Week 2
	Urea	8.7 a
Polyon	1.8 c	2.0 ab
UMaxx	5.8 b	1.6 b
XCU	1.3 c	3.9 a

Means separation at alpha = 0.05.

Results – 10 week field study

- Over 10 weeks in 2009, a total of 33, 14, 24 and 19% of applied N volatilized from the urea, Polyon, XCU and UMaxx fertilized plots, respectively.
- Over 10 weeks in 2010, a total of 23, 17, 11 and 17% of applied N volatilized from the urea, Polyon, XCU and UMaxx fertilized plots, respectively.
- TOTAL ammonia loss (over 10 weeks) was often not affected by N source, but slow or stabilized N sources did often reduce ammonia loss (as compared to urea) in the first two weeks.
- Significant N loss due to ammonia volatilization occurred in the first two weeks after fertilization, especially in the urea treatment.
- This large-scale field test is a worst case scenario, with N applied to the turf/soil surface with no subsequent irrigation.

Preliminary Studies - Laboratory Ammonia Loss as Affected by N Source and Amendments



THANK YOU!

