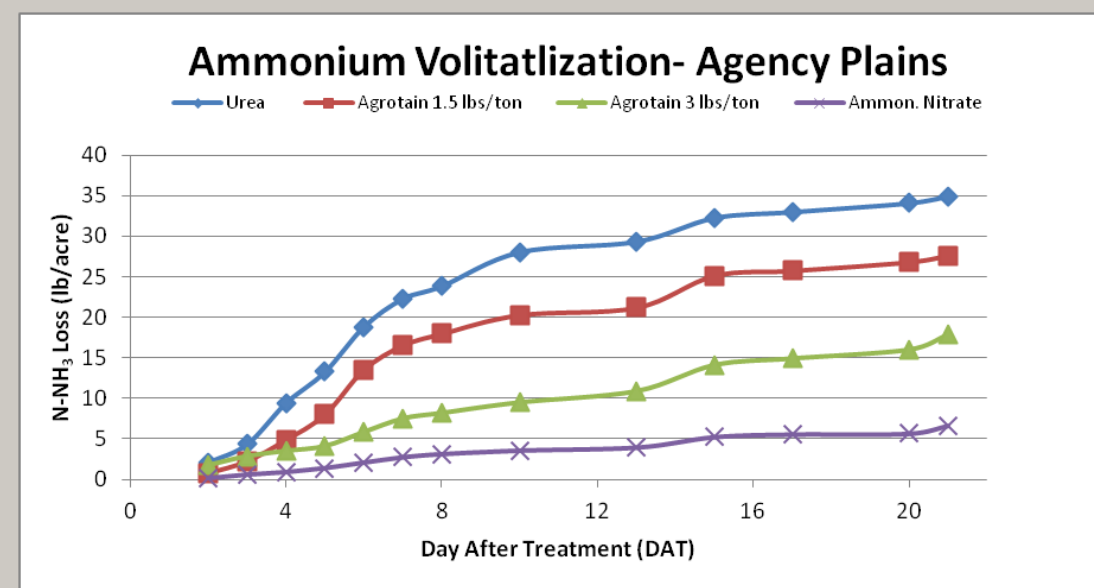
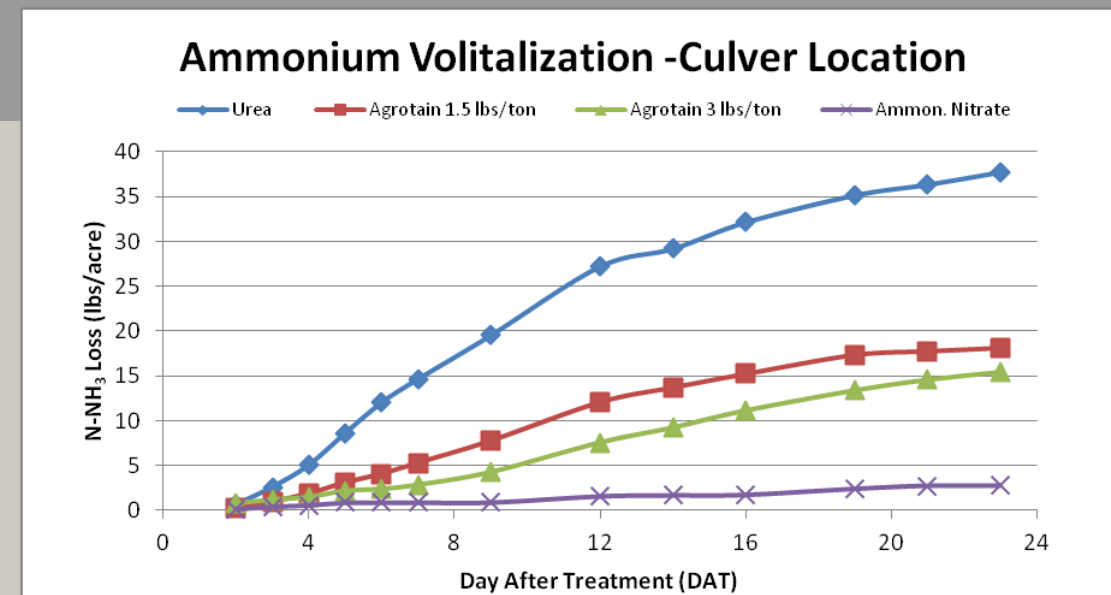




Quantifying Ammonia Volatilization from Surface Applied Fertilizers in Kentucky Bluegrass

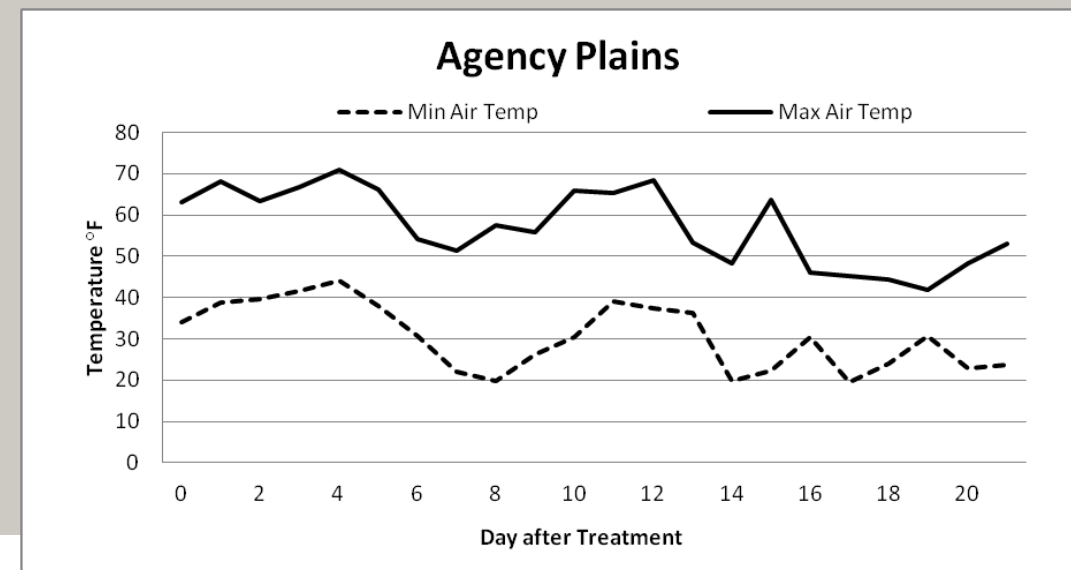
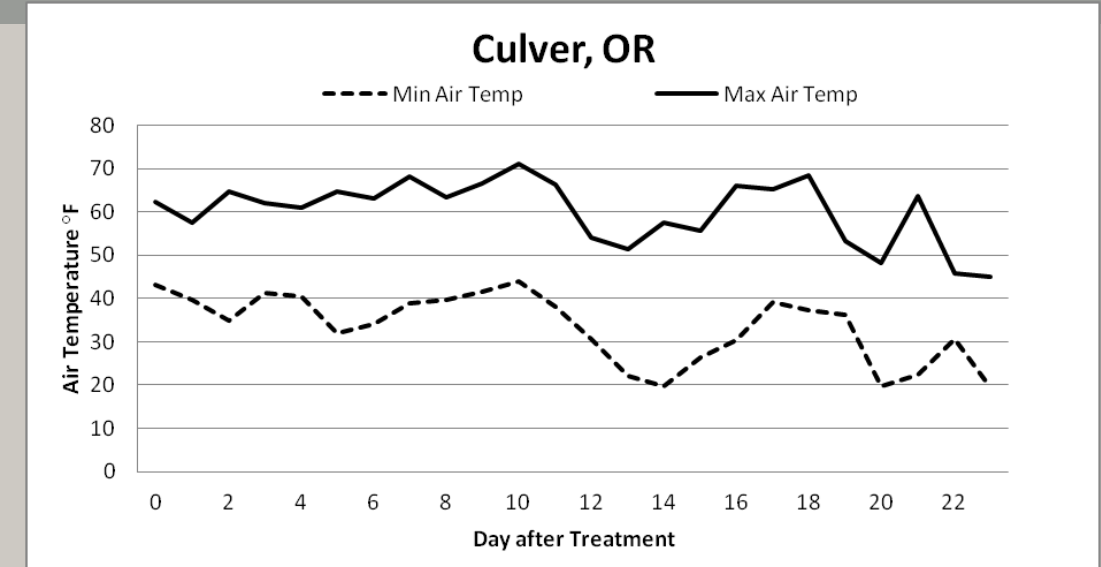
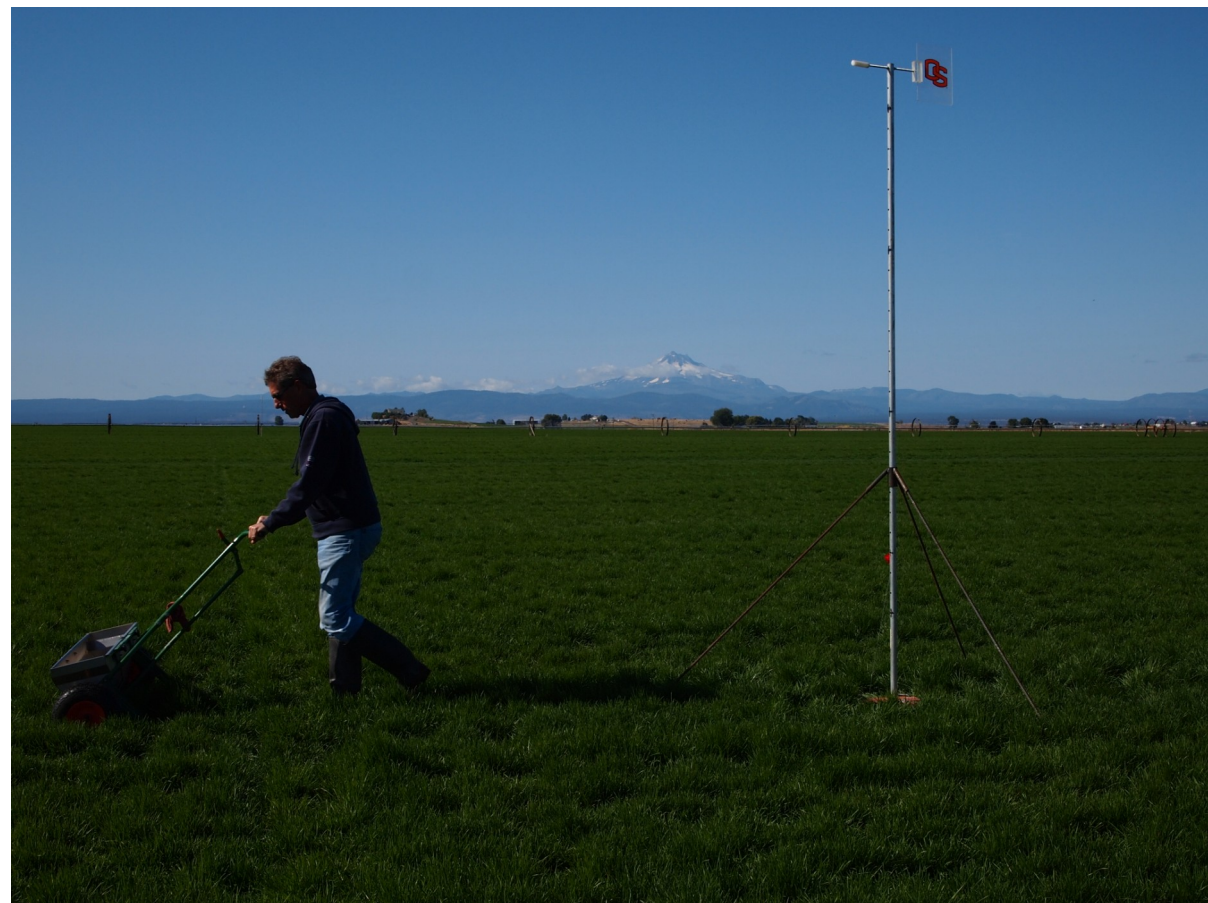
Kentucky bluegrass seed fields in central use surface-applied nitrogen. Volatile nitrogen loss as ammonia is an economic and environmental concern. The objective of this second-year study was to quantify as pounds per acre ammonia volatilization from urea, Agrotain-coated urea at 1.5 lbs/ton, Agrotain-coated urea at 3 lbs/ton, and ammonium nitrate applied to the soil surface in the fall under commercial field conditions in central Oregon. Ammonia volatilization losses were measured with a modified passive flux method (Wood et al. 2000), which consists of a rotating 10-ft-tall mast placed at the center of each 100-ft-diameter circular plot. Nitrogen loss due to ammonium volatilization across both locations was highest with urea followed by Agrotain-coated urea at 1.5 lbs/ton and Agrotain-coated urea at 3 lbs/ton. Ammonium nitrate provided the least amount of volatilization.

Following application of 150 lb N/acre, nitrogen loss due to ammonia volatilization across both locations was highest with urea, followed by Agrotain-coated urea at 1.5 lb/ton, Agrotain-coated urea at 3 lb/ton, and ammonium nitrate with the least volatilization. Ammonia volatilization across both locations averaged 36 lb N/acre for urea. Informally it appears the amount of Agrotain applied to the urea is correlated to the amount of ammonia volatilization, with 22 lb N/acre for Agrotain-coated urea at 1.5 lb/ton, 16 lb N/acre for Agrotain-coated urea at 3 lb/ton, and data from the fall of 2010 indicated a loss of 9 lb N/acre for Agrotain-coated urea at 5 lb/ton. Losses with ammonium nitrate were 4 lb N/acre during the fall of 2011 and averaged 6 lb N/acre across the two years of the project.



Weather Conditions

During the initiation of the project at the Culver site, day time high temperatures were in the 60's, with night-time lows near 40°F. At 14 days after treatment (DAT) high temperatures had dropped from 70°F to 50°F, followed by a rise to near 70°F at 18 DAT. There is a corresponding drop in ammonia volatilization on 14 DAT (most notably on urea) that matches the drop in the daytime high temperature. The Agency Plains location was initiated 6 days after Culver. There is the corresponding flattening of the curve in ammonia volatilization for urea on the eighth day and again on the 13th day. At 13 DAT temperature again dropped from near 70°F to 50°F, followed by a rebound to the low 60's before dropping back down into the 40's. Informally there appears to be a correlation between day time temperatures and level of volatilization at both locations. Any correlation with relative humidity and wind speed is more difficult to discern.



Summary of Two-Year Project:

Heavy dew and higher temperatures appear to increase the amount of ammonia volatilization under central Oregon conditions. Unlike companion projects in the Columbia Basin where the volatilization curve is reported to flatten to near horizontal in two weeks, our curves often continue on an upward trajectory throughout the third week of monitoring this season. Perhaps overnight dew or frost, followed by warm days that create a daily freezing and thawing cycle promotes continued ammonia volatilization. The effect of relative humidity and wind speed on volatilization is less clear.

To compare the 2010 results with those from the 2011 trial, please visit our website at www.oregonstate.edu/dept/coarc