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Wheat Update

TEXAS A&M UNIVERSITY COMMERCE

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Feeks 2.0, Beginning of tillering

Nitrogen Topdressing Management

Last fall, area wheat growers began asking us about applying nitrogen to their wheat crop this year. Our general recommendation at that time was that we did not see a need for a fall application if the wheat was planted following a failed corn or grain sorghum crop. We deduced that the short corn and grain sorghum crops likely had enough nitrogen left in the soil to supply the needs of the fall planted wheat crop. Observations over the fall and early winter have generally confirmed our theory to be correct. We got by this year, but we cannot expect to be successful with this approach most years. Wheat planted behind a productive corn or grain sorghum crop will usually benefit from fall or early winter nitrogen application to "rot the stalks". Microbial breakdown of the residue will often tie up soil nitrogen, making it unavailable to the wheat crop for a prolonged period.

When is the best time to topdress winter wheat in this region? We have been working with timing studies since the mid 1980's, and we reviewed our research trials to try to make some sense out of the numbers.

Strip of wheat that was not fertilized

We have data on 24 studies from 1987 to 2006. Over that period, we have compared an early application (early to mid February) to a late application (early to mid March) to measure the optimum timing for grain yield. After summarizing the data, we found in some years, timing did not make very much difference – the early February applications made almost as much as the early March applications. In one study in 2005, the early application produced almost 15 more bushels of grain per acre than the late one. Rainfall records in 2005 showed a dry period from mid March to mid April. Evidently, there wasn't enough rain to move the nitrogen into the soil profile in time for the wheat plants to use it for growth and development. Other years, the late application made 8 or 9 bushels more than the early ones. We assembled rainfall data over the same period (courtesy of Maynard Cheek), and found a common

denominator. Years with very wet conditions in March and April favored the March applications. Later applications during those years produced 8 or 9 bushels more than the early February applications. On the other hand, in years where March and April rainfall was less than normal, there was very little difference in grain yield between the early and late applications.

We believe this can be explained by nitrogen loss through denitrification and surface runoff. Denitrification is simply the loss of nitrogen in a gaseous form to the atmosphere. It is the most common form of loss in heavy soils with a low water infiltration rate. Most of our blackland and transitional greyland soils have water infiltration rates of less than .2 inch per hour. The top few inches of soil quickly become saturated during a heavy rain. Warm, saturated soils create ideal conditions for a number of facultative anaerobes, which can use the oxygen off of the nitrate ion and release the nitrogen back into the atmosphere. This is called "denitrification", and can at times reach 10 pounds of nitrogen per acre per day. Heavy water runoff during this time can also carry soluble nitrogen away from the fields and into the waterways. We do not see these types of nitrogen losses in the drier years. This probably explains why there is little difference between the early and late nitrogen applications over a period of years, but there may be real differences in wheat yields, year to year.

As a producer, how do I use this information to maximize my profits? None of us have the benefit of a "crystal ball" so we cannot determine the wet years ahead of time. Over the past 20 years, we have been well served by targeting mid February to begin topdressing our wheat and hope to be finished by the first week in March. In research plots, we have often produced as much wheat by topdressing in mid March (past jointing) as we have in early March.

As far as nitrogen rates are concerned, 100 pounds of actual nitrogen per acre has been our most cost effective rate topdressing rate. We have often seen small yield increases with rates in excess of 100 pounds of nitrogen per acre, but the yield increases have seldom offset the cost of the additional nitrogen. We have also not shown any differences in nitrogen sources – dribbled nitrogen solutions (32%), ammonium nitrate, and urea have all performed similarly.

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