

7-13-2008

Yellow corn, Wet soils, and Nitrogen loss (Part 3)

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Recommended Citation

Sawyer, John E., "Yellow corn, Wet soils, and Nitrogen loss (Part 3)" (2008). *Integrated Crop Management News*. 813.
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Abstract

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Keywords

Agronomy

Disciplines

Agricultural Science | Agriculture | Agronomy and Crop Sciences

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Yellow corn, Wet soils, and Nitrogen loss (Part 3)

by John Sawyer, Department of Agronomy

Earlier I provided observations in two articles (June 19 and June 26, 2008) on corn growth and response to nitrogen (N) applied in an anhydrous ammonia study being conducted at the ISU research farm between Ames and Boone. Following are some final observations (July 7, 2008).

Response to Anhydrous Ammonia Timing – more observations

In this study, anhydrous ammonia was applied in late fall (October 31, 2007), spring preplant (April 30, 2008) and sidedressed (June 18, 2008) at different depths of injection and application rates with corn following soybean. Corn was planted May 15. The study is “low” on the landscape, and like many fields in Iowa this year part of the study area was wetter than the rest, with a part where the corn is dead due to standing water.

Plant growth has progressed well and corn is into its dark green phase. As of Monday, July 7 the corn on the “higher” ground continues to grow better (is waist high) than plants on the “lower” ground and where water had ponded (is at best knee high). Plants on the lower ground are responding to the fall and spring applied N with increased green coloration, but the growth differential between where N was applied and where no N was applied is not as large as where the plants were not as impacted by wet soils.

Looking at the plant coloration and growth, I still generally see a better response to the spring applied ammonia compared to the fall applied ammonia at the lower N rates. It is difficult to tell what amount of N may have been lost this spring, but it appears there might be some difference between the fall and spring applied ammonia. The corn is also showing response to the sidedress applied ammonia. Overall the corn coloration and height is showing a classic response to N rate (with more height differentiation between rates where corn is growing the best). In the control plots where no N was applied, you can see the impact of soil derived N – even in this very wet spring. Of course plant growth and color is less than where N was applied, but it is remarkable the soil resource for supplying crop available N.

At this time, where the corn is growing better (higher ground), a visible N response difference appears to be up to the 120 lb/acre rate. As the plants grow and take up N during this rapid growth phase, differentiation between N rates will become more clear. Growing conditions during the rest of the season, and of course grain yield, will be the final determinate of maximum N need.



The middle stake is in the border between two four row plots, spring applied ammonia. The plot on the left (stake is in the middle of the plot) had 120 lb N/acre and the plot on the right (stake is in the middle of the plot) had 80 lb N/acre. (J.E. Sawyer, July 7, 2008)



The middle stake is in the border between two four row plots, fall applied ammonia. The plot on the left had 160 lb N/acre and the plot on the right had no N applied. These plots are in the area more impacted by ponded water and with slower corn growth. (J.E. Sawyer, July 7, 2008)



The middle stake is in the border between two four row plots, sidedress applied ammonia. In the top photo, the plot on the left had 80 lb N/acre and the plot on the right had no ammonia applied. In the bottom photo, the plot on the left had 160 lb N/acre and the plot on the right had 80 lb N/acre. (J.E. Sawyer, July 7, 2008)

John Sawyer is a professor of agronomy with research and extension responsibilities in soil fertility and nutrient management.

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Last Updated 7/13/2008