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Cooperative Extension Service

Farm Update

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AGRICULTURE & NATURAL RESOURCES EDUCATION
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Estimating Nitrogen Loss

Tens of thousands of acres of nitrogen was applied to forages, wheat, and land to be planted to corn before the rain and flooding. For forages and wheat, the nitrogen was on weeks before the heavy rain, allowing it to get moved into the soil aggregates and taken up by the plants. The biggest concern for most is the nitrogen applied to land to be planted in corn this year.

The first problem is soil erosion, which occurred in the application zone of the anhydrous applicators. Some machines leave substantial surface disturbance. When water concentrates and erodes the application zone, the nitrogen attached to those soil particles is also relocated. There is no corrective action to take in these situations that replaces the nitrogen. However, be aware that the nitrogen remaining on these slopes may be half the intended rate in severely eroded areas.

In saturated soil conditions, most of the nitrogen will be lost to denitrification. Nitrogen that is still in the ammonium form is stable in any soil condition. Denitrification only occurs when nitrate nitrogen (NO3) is converted into dinitrogen (N2), nitrous oxide (N2O), or nitrous dioxide (NO3) and escapes into the atmosphere. This reaction happens when the soil lacks oxygen due to complete water saturation. Soil microbes require oxygen to survive. After two or

three days, any available soil oxygen is displaced by water, so to survive, microbes consume oxygen from nitrate, which converts it to nitrous gas. Up to 4% of nitrate nitrogen can be lost to the atmosphere each day saturated soil conditions continue. The process resets as soon as the soil profile drains out and oxygen returns

The percentage of fertilizer N in the nitrate-N form, three and six weeks after application will be: Anhydrous ammonia without N-Serve, 20 percent in three weeks, 65 percent in six weeks. AA with N-Serve, 10 percent in three weeks, 50 percent in six weeks. Urea without N-Serve will be 50 percent in three weeks and 75 percent in six weeks. Urea with N-Serve will be 30 percent in three weeks and 70 percent in six weeks.

Here is a real-world example. Anhydrous without N-Serve was applied at 175 actual units of N per acre on March 12. Assume complete saturation began April 2, just more than three weeks after application, and will remain continuously wet for 15 days. Approximately 20 percent of the 175, or 35 units, will be in the nitrate form at three weeks. Thirteen days minus the two required to initiate denitrification would result in a loss of 15.4 units of nitrogen (35 x 0.04) at 4 percent each day for 11 days. This calculation only provides an estimate of loss, but most results reveal that nitrogen loss from flooded soils is less than people expect.

A soil nitrate-N test can help verify the calculated estimate of nitrate-N remaining in the field. Each soil sample should consist of about 15 cores taken to a depth of 12 inches, hand crushed and well mixed before filling a soil sample bag with the appropriate amount of soil and shipping immediately to a soil test lab (several labs, including Waters Ag Labs in Owensboro, perform the test). Separate samples should be taken for upper and lower landscape positions, for well, moderately well, somewhat poorly and poorly drained soils, for fragipan and no-fragipan

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soils; and/or for undrained and tile drained field areas. Test results can be used to decide whether more N, and if yes, how much, is needed.

Pasture Fence Construction School

Wes and Jennifer Poole are hosting a University of Kentucky Fence School on their farm this Tuesday, April 22. The event will meet in the morning at St. Colombia Catholic Church in Lewisport and at their Maceo farm after lunch. Participants will learn how to drive posts, build H-Braces, install both fixed knot woven wire and smooth electrified high tensile fence, the laws pertaining to fencing, and the basics of successfully installing permanent electric fencing. The day will consist of classroom sessions in the morning and hands-on activities in the afternoon. There is still time to enroll. There is a $35 fee to provide lunch and materials. Sign up at https://2025fencingdaviess.eventbrite.com/ or call Caroline Roper, Master Grazer Coordinator, at 270-704-2254 or caroline.roper@uky.edu.