



14th Annual Conference

2023 Winter Conference

February 21, 2023

Agriteer

Rockingham, Virginia

Table of contents

Agenda	3
Speakers	4
Board Members	5
Corn Nitrogen Rate On-Farm Test Plots	6
Exhibitor Levels	10
Exhibitor Ads	11
Exhibitor Directory	15

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Agenda

February 21, 2023

14th Anniversary

Making Cover Crops Work

8:00 a.m. Registration and Trade Show

9:00 a.m. *Interseeding & Cover Crop Update from the Keystone State*

- Dr. Greg Roth—Penn State

10:00 a.m. Trade Show Break

10:30 a.m. *Challenges of Cover Crops & Species Diversification in a Grain Production Operation*

- Leslie Bowman—Chambersburg, PA

11:30 a.m. *No-Till Champion Recognition*

Noon Lunch and Trade Show Break

1:15 p.m. *New Cover Crop Tactics on the Horizon and a Tar Spot Update*

- Dr. Greg Roth—Penn State

2:15 p.m. *Farmers Talking to Farmers: Panel of advanced VA no-tillers share practical advice*

- Moderated by Lydia Fitzgerald—VT/
NRCS

3:15 p.m. Sessions Adjourn

2023 Speakers

Dr. Greg Roth is a Professor Emeritus of Agronomy in the Department of Plant Science at Penn State University. He has advanced degrees in agronomy from both Penn State and Virginia Tech. Dr. Roth served as an Extension Specialist in Grain Crop Management at Penn State for over 30 years prior to his retirement in 2018. His work has focused on managing grain and forage crops, variety testing, establishing cover crops and developing new alternative crops.

Leslie Bowman is the crop manager at Leshner's Poultry Farm, an integrated grain and egg producer near Chambersburg, PA. He oversees the crop production and manure management segments of the operation. He has over 25 years of experience with precision farming and no-till and more than 10 years' experience working with cover crops.

Farmers Talking to Farmers

Panel of advanced Virginia no-tillers share practical advice

Moderated by Lydia Fitzgerald, VT/NRCS Agronomist

Paul Davis, New Kent County, VA

Paul grows 550 acres of corn, soybeans, small grains, pumpkins, & cover crops. This includes 150 acres of high-intensity research plots for public- & private-sector clients. Paul earned ag degrees & played football at VA Tech, was Extension Agent in new Kent, and retired in 2009 to farm full-time.

Anthony Beery, Cumberland County, VA

Anthony raises 700 acres of corn, soybeans, orchardgrass hay, and small grains in Cumberland County. He farmed in the Shenandoah Valley where he helped lead the Virginia No-till Alliance (VANTAGE) & did pioneering on-farm work with manure injection & other innovative nutrient management and soil-building strategies. He relocated to Cumberland in 2018.

Doug Fifer, Augusta County, VA

Doug grows 220 acres of corn, soybeans, and hay and raises turkeys in Augusta County. Doug is passionate about building soil & optimizing nutrient use efficiency to maximize yield and save on inputs. Doug currently helps lead the Virginia No-Tillage Alliance (VANTAGE).

Lydia Fitzgerald, VT/NRCS Partnership Conservation Agronomist

Lydia started her agricultural career working alongside her family to produce wholesale pumpkins, grain crops, and apples in Nelson County, VA. She pursued her B.S. degree at Virginia Tech in Agronomy and M.S. degree the University of Kentucky. She started out working for NRCS before transitioning to her new role as the first VT/NRCS Partnership Conservation Agronomist. She leads the Soil Health + Integrated Conservation Agronomy Farmer Mentor & Demonstration Network. Lydia works to encourage partnership and collaboration on all aspects of integrated conservation agronomy between VA NRCS, Virginia Tech, Virginia Cooperative Extension, and other partners across the state.

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The **Virginia No Till Alliance** exists to maximize farm productivity and profitability by promoting successful implementation of continuous no-till systems through shared ideas, technology, conservation and education.

The VANTAGE Board of Directors is made up of farmers and agri-business representatives in the Shenandoah Valley region of Virginia.

Setting Up Corn Nitrogen (N) Rate On-Farm Test Plots: Basic Questions & Answers for Virginia Growers

Version 1.0 – January 09, 2023

Lydia Fitzgerald

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Chris Lawrence

NRCS State Cropland Agronomist
804-356-0610 / chris.lawrence@usda.gov

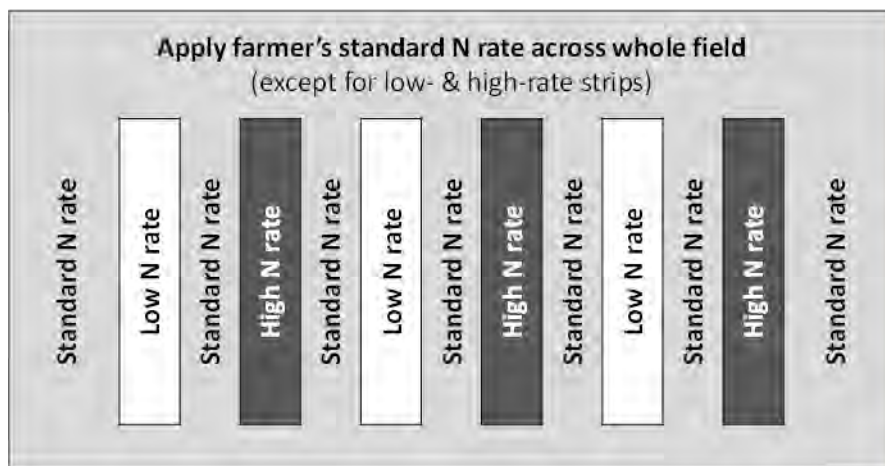
1. What's the basic recipe for a corn N rate test plot?

- Apply different nitrogen (N) fertilizer rates to strips in the corn field, creating a repeating pattern.
- Keep all other yield-influencing factors the same across the test plot area.
- At harvest, measure and record yields from each strip separately.



2. What's a typical N rate test plot layout?

Basic 3-rate, 3-rep N Rate Test Plot Layout



Keep all other yield-influencing factors constant across test plot area!

3. What N rates should I compare?

- You're not following a standardized protocol with predetermined rates set by someone else.
- You're choosing N rates ("treatments") that are most likely to answer your field- and farm-specific questions.
- This basic three-way comparison is often a good place to start:
 - a. Your standard or base rate. This is your chosen rate for the entire field – the rate you would apply if you were not doing a test plot. Most of the field will get this base rate. For example, 60 lb/ac sidedress N.
 - b. A low or zero rate. Your goal with this rate: To evaluate the soil's capacity to meet the crop's N need with little or no supplemental N fertilization. This rate should be low enough that you would expect to see least a little N deficiency in a typical year. For example, 0 lb/ac sidedress N.

c. A high or non-limiting rate. The goal with this rate: to ensure N will not be a limiting factor to yield, even under best-case growing conditions. For example, 120 lb/ac sidedress N.

- The above is just one option. For example, if you expect a lot of N release from recently applied organic amendments, your standard sidedress N rate for the whole field might be 0 lb/ac N. In this case, your other two rates might be incrementally higher, such as 35 lb/ac N and 70 lb/ac N.

4. How many reps should I include?

- More replication generally increases our confidence that any conclusions drawn from the plot are due to the effects of N rate and not some other random factor (like soil type differences, etc.)
- At least 3 or more reps of each treatment is ideal (see diagram above).
- 2 reps are better than no replication.
- A split field test (i.e., no replication) can be useful, but we don't consider that a test plot.

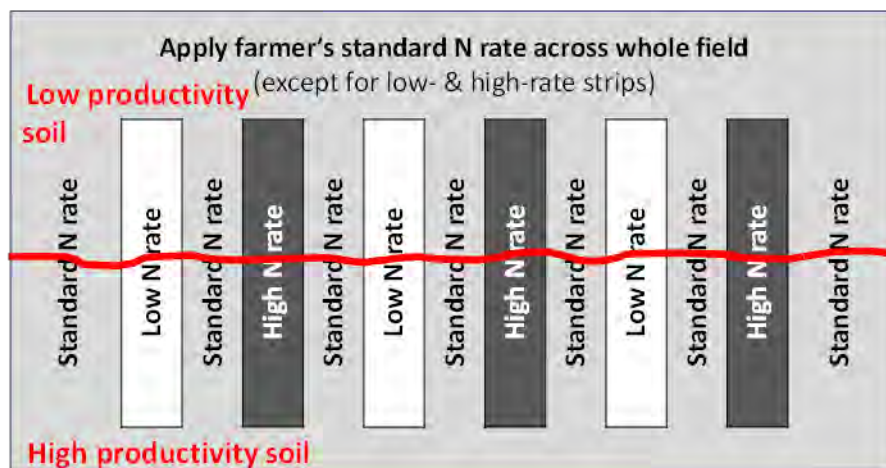
5. When and how should I apply my different N rate treatments?

- Priority #1 is to make the test plot fit with your N management system.
- Many growers currently apply a moderate amount of N at or ahead of planting. They hold a significant amount to apply at side-dress. For these growers, the simplest approach is to vary sidedress N rates – especially if when side-dressing with liquid fertilizer and drop nozzles.
- Other options are possible. For example, if your focus is determining the value of starter N, a test plot can be set up that varies N rates at planting.

6. How important is soil uniformity in the test plot field?

- Strive to keep every yield-influencing factor (other than N) the same across the test plot area.
- Therefore, it is best if soil productivity is uniform across the test plot area.
- However, what matters most is that any differences in soil properties be equally distributed across treatments. As the diagram below shows, it is possible to achieve a fair test in a field with a major soil type difference!

Basic 3-rate, 3-rep N Rate Test Plot Layout



Keep all other yield-influencing factors constant across test plot area!

7. How important is uniformity of other inputs in the test plot field?

- Again, strive to keep every yield-influencing factor (other than N rates) the same across the test plot area.
- If there are differences in corn hybrids, seeding rates, rates of other nutrients, etc. within the test plot area, this undermines our ability to draw meaningful conclusions about the impact of corn N rates.

8. What's typically the biggest challenge to doing a test plot right?

- Taking the time early in the season to plan the plot and put out the different rates.
- Taking the time at end of the season to properly measure and record yields in each strip.

9. What's the biggest opportunity to overcome that challenge?

Using precision technology to:

- a. Build the test plot into your variable-rate nitrogen fertilizer prescription for the field, feed that prescription into your sprayer, and let the machine automatically change rates to create the plot.
- b. Harvest the whole field without stopping, knowing that your yield monitoring system is reliably capturing all necessary information and that you'll be able to extract and analyze that information once the busy harvest season is over!

If the above isn't something you can set up on your own, ask your precision ag support person for help!



10. What are some key questions that this type of test plot can help me answer?

- Which N rate produced the highest yield?
- Which N rate produced the highest net return, considering yield as well as price of both corn and fertilizer?
- Which of the N rates was closest to the "right" rate for this particular field in this particular year?
- Looking back, which factors that I knew about ahead of time (or should have known about ahead of time) should I have assigned more (or less) weight to when planning my N rates on this field this year?
- What lessons can I take from this test plot experience and post-season analysis to improve my N rate planning for next year?

11. Wait – Why am I doing all this again?

- Corn N rate decision-making is important for productivity, profitability, and environmental sustainability. It can also involve, at least for some farmers and advisors, a lot of stress and effort.
- That effort can include early-season pre-side-dress nitrate testing (PSNT) for fields with manure histories. There is even talk of pre-season soil testing for biological activity to help predict soil N supplying-capacity.

- The hard truth is this: Regardless of how much testing & time you put into planning corn N rates, as long as you are **looking ahead** and predicting, your chosen rate for any particular field in any particular year will typically not be much better than an educated guess.
- The best way to objectively assess how good your N rate guess was for any given field is by **looking back** – by setting up a replicated rate trial, taking the plot to harvest, and analyzing the results after-the-fact.
- Many experts now agree that our best bet for improving farmer corn N rate decision-making is to focus **less** on seeking better predictive N rate tools and technologies, and **more** on empowering farms to do their own on-farm test plots using an “adaptive management” mindset.
- By objectively analyzing every year how well you predicted corn N needs in one or two case study fields, you can gradually improve your understanding of the many factors to consider when making N rate decisions.
- Annual N rate on-farm test plots will not only help you make better use of available nutrient management tools, tests, and planning systems, but will also help you understand over time how best to refine the resulting recommendations to account for farm-, field-, and season-specific considerations.

12. Who can I contact for help with this?

- Hopefully your local industry support, Extension Agent, DCR Nutrient Management Specialist, and/or local SWCD or NRCS staff will be willing and able to help. Let them know what you are doing.
- Reach out to us at the numbers and email addresses below!

<p style="text-align: center;">Lydia Fitzgerald VA Tech & NRCS Partnership Conservation Agronomist 540-414-4089 / lydia.fitzgerald@usda.gov</p>	<p style="text-align: center;">Chris Lawrence NRCS State Cropland Agronomist 804-356-0610 / chris.lawrence@usda.gov</p>
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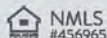
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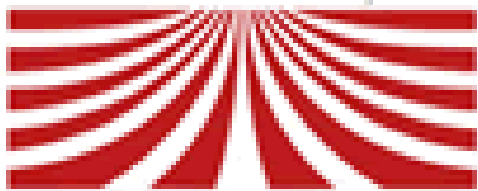
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