



Timely Information for Agriculture

FALL 2022

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NORTHERN NOTES

From the 2021 drought to the 2022 monsoon, you could not expect a more wild change in annual weather patterns. The cool, wet spring brought a delayed planting season that extended well into June, but most fields were eventually planted with some encouragement from good crop prices. Following the wet spring weather, concerns about potential soil nitrogen losses prompted greater interest in in-season soil



JOHN BREKER SOIL SCIENTIST, CCA, 4R NMS

sampling to check on soil nitrogen status and the Pre-sidedress Soil Nitrate Test (PSNT) for corn. In some cases, the soil nitrogen status was sufficient to finish the crop, but others required additional nitrogen to ensure good crop yield and quality. An adaptive approach to in-

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Fall Special: Hydraulic Soil Sampling Kit (24 inch)

AGVISE Laboratories is offering a fall special on the first 50 Hydraulic Soil Sampling Kits (24 inch) sold this fall. You will receive \$200 credit on soil analysis for each kit purchased. The Hydraulic Soil Sampling Kit (24 inch) is priced at \$3,400.00 USD. The kit includes a 12VDC electric-hydraulic pump, 30-inch hydraulic cylinder and mounting channel, two stainless steel soil probes (solid and slotted), two heavy-duty (HD) soil probes (solid and slotted), and a complete set of 5/8-inch, 3/4-inch, and wet-style tips for each soil probe type. The HD soil probe is ideal on hard, compacted, or frozen soils. You can view details of the Hydraulic Soil Sampling Kit (24 inch) on our website: https://www.agvise.com/product/hydraulic-soil-sampling-kit/. You can also take a look at videos of the soil sampling systems in operation: https://www.agvise.com/installed-soil-sampling-kit-examples/.

If you need to collect deep soil samples for deep-rooted crops like sugar beet and sunflower, we also have a 42-inch telescoping hydraulic cylinder system, which can be outfitted with an 8-HP Honda gaspowered hydraulic pump or large-capacity 12VDC electric-hydraulic pump. Please call for details on the 42-inch soil sampling systems.

AGVISE Soil Fertility Seminars: January 3-5, 2023

The AGVISE Soil Fertility Seminars are back on the schedule for January 3-5, 2023. You will not want to miss the great program lineup, so mark your calendar now! More details and registration will be mailed in November. *Please note the seminar date order for the Watertown and Willmar seminars are swapped.*

January 3: Watertown, SD January 4: Willmar, MN January 5: Grand Forks, ND

Northern Notes Cont...

season nitrogen management is something I expect we will see more often, especially when nitrogen fertilizer prices and availability is uncertain.

A current soil test is the best start to making fertilizer plans for 2023. With high fertilizer and crop prices continuing, the economics of soil testing only makes dollars and sense. Last fall, high fertilizer prices caused some people to reduce fertilizer rates or even skip a year of applying phosphorus and potassium fertilizer to reduce input costs. It can work for one year, but it is not a sustainable strategy for good crop yields and long-term profitability. It is more important than ever to have current soil test data to make profitable fertilizer decisions for 2023.

Every day in the field is important for fall soil sampling, and the right soil sampling equipment will help you get that done. AGVISE has a full inventory of soil sampling equipment and supplies to help you obtain high-quality soil samples and collect them quickly. If you need to upgrade your equipment or add another soil sampling system before fall, we are ready to help. We have extended our Fall Special on hydraulic soil sampling systems (see article for details).

As the small grain harvest gets underway, please remember that soil testing right behind the combine is a recommended practice. Some advantages include more consistent topsoil cores (0-6 inch) for the best quality soil test data, and it also guarantees that fields will get soil tested and not missed because of weather problems later in the fall. We are prepared to provide you with great service again this year. If you need any soil sampling equipment or supplies, we can get it to you ASAP. I hope you have a safe harvest and fall soil sampling season ahead.

Prevented Planting Acres? What to do for 2023

Good crop prices encouraged late planting beyond crop insurance deadlines, but additional June rainfall kept some producers from planting all their acres, leaving some unplanted fields or unplanted parts of fields. There are many questions about soil testing on these unplanted fields: When should you start soil sampling? What kind of residual soil nitrate-nitrogen amounts can you expect? The extremely wet soil conditions may have caused considerable soil nitrogen losses to leaching or denitrification. Through summer, warmer and drier weather added nitrogen through mineralization of soil organic matter. In addition, cover crops and any weedy growth will acquire nitrogen from soil. The amount of soil nitrate-nitrogen remaining for next year will depend on soil type, environment, and management factors, which vary from field to field and zone to zone.

Management Factors

- What was the crop grown in the previous year?
- What was the nitrogen fertilizer rate and application timing? Was it applied last fall?
- Did you do any summer tillage? More tillage promotes nitrogen mineralization.
- How was your weed control? Did the weeds get large and acquire substantial nitrogen?
- Did you plant a cover crop? Did the cover crop get incorporated later?

Environmental Factors

- Did excessive rainfall cause nitrate leaching on well drained soils?
- Did excessive rainfall cause denitrification on poorly drained soils?
- Were summer temperatures warm? Warm temperatures promote N mineralization.

Soil testing on these unplanted fields can begin as soon as good quality soil samples can be collected after mid-August. There is no reliable way to guess how much residual soil nitrate may be present in these unplanted fields or unplanted parts of fields. Soil testing is the only accurate way to learn how much residual soil nitrate remains in the soil profile.

To obtain the best information for nitrogen management, we recommend splitting fields into management zones for soil testing. The unplanted field areas can vary considerably from the rest of the field, which will skew the field-average soil test result and resulting nitrogen fertilizer rate.

Sampling Depth: Be consistent!

Soil test results are only as reliable as the soil samples collected in the field. A crucial part of soil sample quality is consistent sampling depth. This is important because all the soil test calibration research and fertilizer guidelines for non-mobile nutrients (e.g., phosphorus, potassium, zinc) are based on a soil core depth of 0-6 inches, thanks to the historical tillage depth. If soil cores are taken too shallow or too deep, you can skew soil test values and the resulting fertilizer guidelines. Getting the most accurate and useful fertilizer guidelines, starts with a good quality soil sample. To help illustrate this point, we did a simple demonstration project, showing how soil sampling depth consistency affects soil test results in a long-term no-till and conventional-till field.

Table 1. Long-term No-till (since 2011); Grailsilty clay loam near Golden Valley, ND

Depth	STP	STK	OM (%)	CCE (%)
0-2"	14	192	4.6	0.3
0-4"	10	139	4.2	0.2
0-6"	7	122	3.9	0.1
0-8"	6	111	3.6	0.1

STP: soil-test phosphorus STK: soil-test potassium OM: organic matter

Table 2. Conventional Tillage (roto-tilled yearly, 6 inch depth); Bearden silty clay loam near Northwood, ND

Depth	STP	STK	OM (%)	CCE (%)
0-2"	29	264	4.6	4.2
0-4"	26	261	4.6	4.3
0-6"	21	240	4.3	4.8
0-8"	18	222	4.1	5.3

Soil nutrient concentrations can vary greatly throughout a soil profile, even more so in long-term no-till where soil nutrients are not regularly mixed. This leads to stratification of nutrients near the soil surface, meaning a soil core that is too shallow or too deep can greatly affect soil test results. You can clearly see the effect of no-till stratification in soiltest potassium (STK) levels in Table 1. Between the 0-2 and 0-4 inch soil cores, there is a 53 ppm difference in STK.

Although nutrients in conventional tillage systems do not concentrate at the surface to the extent



they do in no-till, a concentration gradient still exists. This is most obvious near the tillage depth, where soil mixing below that depth stops. In Table 2, the 0-2 and 0-4 inch soil test results are similar, but the differences become apparent at the 0-6 inch depth. Soil sample depth is just as critical in conventional tillage as it is in no-till. In addition, it is important to collect soil samples before any fall tillage occurs to collect good quality soil cores with consistent depth. Tillage creates uneven clods and a "fluffy" soil surface, making it hard to determine what actually represents the 0-6 inch soil depth.

Tips to increase soil sample depth consistency

• Collect soil samples before any tillage occurs. If tillage does happen before you can take a soil sample, try to make a firm surface with your foot or sample in a tire track.

• If you are using a hand probe, mark the target soil core depth on the soil probe clearly. A metal file works great to cut a notch in the soil probe at 6 inches. The file mark does not wear away like a piece of tape or permanent marker can.

• If you are using a hydraulic probe and use your hand to measure the soil core length, calibrate often to ensure you are measuring a true 0-6 inch soil core.

• If you train new soil samplers, reiterate the importance of soil sampling depth consistency. Provide clear instructions on measuring the proper soil sampling depth in the field.

• Be sure the soil sample submission information sent to the laboratory (online or paper) matches the actual soil sample depth obtained in the field. The correct soil sample depth can be noted on the paper forms or edited on the AGVISOR online submission before it reaches the laboratory.

Take Soil Samples Now for Soybean Cyst Nematode (SCN)

Soybean cyst nematode (SCN) is the number-one soybean pest in the United States, causing over \$1 billion in lost soybean production annually, and the pest has now reached Manitoba. The SCN problem is worsening as SCN resistance traits are failing, and we are seeing increasing SCN egg counts in regions where SCN populations were previously well controlled. Unlike herbicide resistance in weeds, you cannot visually see failed SCN control and increasing SCN populations. Instead, you will collect SCN soil samples to see if the SCN egg count is increasing or decreasing and learn if SCN resistance traits, crop rotation, and other control measures are working.

If you have never tested for SCN before, you will want to sample fields intended for soybean or dry bean and gather a baseline SCN egg count. The best time to collect the soil sample is at the end of the growing season, right before harvest or just after (before any tillage). Sampling in the fall coincides with the highest egg counts in the soil. Collect 10-20 soil cores (6 to 8 inch soil depth) right alongside the soybean row from areas of the field that are likely to have SCN. Do not collect SCN samples in severely problematic or dead areas because SCN will not be actively growing and reproducing if they do not have a good food source. Since SCN is a soil-borne pathogen, it moves wherever contaminated soil can enter the field. Therefore, the areas you will want to collect samples from are field entry points where soil can be transferred on equipment and tires, places where windblown soil accumulates (e.g., fence lines), ditches and flooded areas, and locations in fields with consistently low soybean yields. Mix the soil cores together and take a subsample to fill a soil sample bag.

The SCN soil sample must be a separate soil sample because it cannot be dried and ground like soil fertility samples. We have special yellow submission forms for SCN samples. Please let us know if you need some SCN forms.

Postcards and Poster Promote Soil Testing

Each year, AGVISE provides our customers with free postcard mailers to promote soil testing for the producers they serve. The postcards help direct their producers' attention to soil testing right after harvest begins, which gets the soil testing season started on time. Customers who use the postcards tell us the postcards help them start soil testing earlier and ultimately get more soil testing done.

We can customize your postcard message so you can tell producers exactly what you want! Here is an example of what one customer had us print on her postcards last year.

"Call our agronomy staff today to sign up for soil testing (555-123-4567). Soil testing is the first step towards a profitable crop in 2023!"

Once you receive your customized postcards, all you have to do is put the producer's name and address on the postcard, add a stamp, and put them in the mail. These postcards also fit into most statement envelopes, so you can include them with statements. If you want some personalized postcards to send to your producers at no charge, please call our Northwood office (701-587-6010) and ask for Mary. She will ask what you want printed on the postcard and how many postcards you want.

Don't forget, we also have a colorful poster that promotes soil testing with 4R Nutrient Stewardship. Of course, we all know that good nutrient stewardship begins with soil testing! After you have done the proper soil testing, you can follow the 4Rs: Right Rate, Right Source, Right Place, Right Time. If you want us to send you a new poster to promote soil testing, please contact our office.



SOUTHERN TRENDS

Corn Growth and Development–Are we behind? The spring and early summer were very interesting to say the least. Spring rains continued well into late May and delayed planting for sugar beet, corn, and soybean throughout the southern region. By mid-May, many producers changed long-day corn maturities to earlier corn maturities. In the Benson, MN neighborhood, corn planting finally got underway around May 20 (60% planted) and was near completion on June 5 (93% planted). Around the coffee shop, many people have commented, "How far behind is the corn crop in 2022?" So, let's put some numbers to this question.



The High Plains Regional Climate Center has a nice growing degree day (GDD) calculator for simulations of corn growth and development (https://hprcc.unl.edu/agroclimate/gdd.php). I made a few GDD simulations for previous years, comparing 2022 with 2019 (a below average GDD year) and 2021(an incredible GDD year). As of mid-July, the 2022 growing season was 3 days ahead of 2019 (63 more GDD) and 9 days behind 2021 (182 fewer GDD). A corn plant takes about three days to make a new leaf when the corn plant is V12 and younger, so you can guesstimate that we were about 3 leaf stages behind 2021.

With the late spring planting window, many corn producers around Benson, MN opted for corn maturities about 6 to 8 days earlier than normal. If you compare an earlier 92-day corn maturity with a more typical 100-day corn maturity, the required GDD to blacklayer is 2207 and 2401 GDD, respectively. We generally accumulate 20-30 GDD per day in midsummer. If either corn maturity was planted on May 20, the estimated silking (R1 stage) date is July 21 for the 92-day maturity and July 25 for the 100-day maturity, a difference of four days. Similarly, the estimated blacklayer (R6 stage) date is September 18 for the 92-day maturity and October 12 for the 100-



Nielsen, R.L. The Planting Date Conundrum. Corny News Network, Apr. 2022. Purdue Univ., West Lafayette, IN. https://www.agry.purdue.edu/ext/corn/news/time-less/PltDateCornYld.html

day maturity, a difference of 24 days. Toward the end of the growing season when fewer GDD are accumulated per day, the difference in maturity groups really starts to show. Warmer than average temperatures will shorten that difference, but only time will tell if the right decision was to plant earlier corn maturities.

To help drive home the point about planting date and final corn grain yield, I really like the graph from Dr. Bob Nielsen at Purdue University (graph above). Early planting does not always result in very high corn yield, and late planting does not always result in very low corn yield. In 2022, late planting will limit top-end crop yield potential, but the final crop yield could still be good as long as GDD accumulation remains above average. As always, Mother Nature will be the final determinant in setting the final crop yield.

Choosing the Right Soil Probe Tip for Wet or Dry Soil

To help you collect the best quality soil samples, AGVISE Laboratories provides different soil probe and tips options for our 24- and 42-inch hydraulic soil sampling systems. The stainless steel and heavy-duty (HD) chromoly steel soil probes each have wet and dry soil probe tips for adverse soil sampling conditions. The wet tip is ideal for very wet soils, high clay soils, and even frozen soils. It has a recessed lip just inside the opening, which allows the wet soil to flow into the soil probe without smearing and plugging inside the probe body. The dry tip features a cutting edge and larger opening for easier soil sampling in hard, dry soils. If you have not tried the wet or dry tips, you really must give them a try.



HD Dry HD Wet Tip Tip



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CINDY EVENSON PRESIDENT AGRONOMIST, CCA

PRESIDENT'S CORNER

This year marks the 45th anniversary that AGVISE has provided laboratory soil testing services. After the first year in business, AGVISE added the laboratory division to complement the crop consulting and contract research farm that started in 1976. A lot has changed in the past 45 years.

In the early years, all the work was done manually, everything from running the laboratory instruments to typing the reports. Through the years, computers and automation have played an integral role in advancing the laboratory to reach present production and quality control standards. In the early 1990s when I started work at AGVISE, there were computers and some automation, but the data was captured with

a foot switch connected to the electrode or instrument detector. Data was stored on floppy disks, which were physically carried into the office and inserted into a disk reader to store the data in the database to generate reports. Further automation, electronic data transfers, and online databases (like AGVISOR) have now made the process from data entry to reporting 100% integrated and streamlined.

Agricultural, scientific, and technological advancements over the past 45 years, which have bolstered our production of food, fiber, feed, and fuel, have also been matched with similar advancements in the laboratory. I am excited to see what the next 45 years might bring to the soil testing industry.

The AGVISE team is excited for the 2022 fall soil testing season, and both of our laboratories are geared up for the busy fall ahead. We are ready to provide you with great service and support for you and your clients. I hope everyone has a safe and productive fall harvest season.