October 26, 2015

IOWA INSTRUCTION 190-394 – 360 SOIL SCAN UNIT AND ASSOCIATED INTERNET PROTOCOL ADAPTER (IPAD)

IA394.0 PURPOSE

This Iowa Instruction provides guidance on the use of the 25 - 360 Soil Scan units and the IPADs associated with the Soil Scan units.

IA394.1 SCOPE

NRCS recently purchased 25 - 360 Soil Scan units from the 360 Yield Center for the testing of nitrate nitrogen levels in both soil and tile water. To operate these 360 Soil Scan units 25 IPADs were also purchased. This instruction will clarify how the 360 Soil Scan units with the paired IPADs will be used in the field.

IA394.2 FILING INSTRUCTIONS

This Iowa Instruction will be posted on the Iowa NRCS Employee Website, which can be accessed under the Topics/People/NRCS Employees/Iowa NRCS eDirective, or at this link Iowa NRCS eDirectives website.

IA394.3 EXHIBITS

See attachment.

/s/Larry Beeler, Acting
Kurt Simon
State Conservationist

Attachment

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IOWA INSTRUCTION 190-394 – 360 SOIL SCAN UNIT AND ASSOCIATED INTERNET PROTOCOL ADAPTER (IPAD)

1. PURPOSE:

This Iowa Instruction provides guidance on the use of the 25 - 360 Soil Scan units and the IPADs associated with the Soil Scan units.

2. BACKGROUND:

Natural Resources Conservation Service (NRCS) recently purchased 25 - 360 Soil Scan units from the 360 Yield Center for the testing of nitrate nitrogen levels in both soil and tile water. To operate these 360 Soil Scan units 25 IPADs were also purchased. This instruction will clarify how the 360 Soil Scan units with the paired IPADs will be used in the field.

3. PROCESS:

The 25 IPads were purchased and assigned to 360 Soil Scan units. The 25 IPads have been assigned to individual users, but have been set-up to allow for a "shared" environment. The assigned individual is ultimately responsible for the IPAD device. The IPADs that are to be used with the 360 Soil Scan units will have the following capability:

- App Store – Soil Scan Updates
- SCAWLAN Wi-Fi Access – App Updates
- Bluetooth Connectivity
- Camera

Since the IPADs and 360 Soil Scan units are the responsibility of the assigned individual a log will be maintained that includes a "Check Out of iPad and Soil Scan 360 Equipment" sheet with date and time that the IPAD and 360 Soil Scan unit is used. A signature of the individual using the equipment when it is picked up and the individual who the equipment is assigned to will sign when the equipment is returned. An example is attached. It is the responsibility of the individual that is assigned to the equipment to ensure whoever is planning on using the IPAD and 360 Soil Scan unit is trained in its proper use and returns the equipment cleaned, free of damage, and in long term storage.

The 360 Soil Scan unit is a tool for measuring nitrate nitrogen in both soil and tile water samples. It is the intent that the units be used as a demonstration tool to allow for producers to get information on fields for their use in making nutrient management decisions. For example as NRCS and partners are working with an individual and have encouraged them to use a reduced rate of nitrogen according to Iowa State University (ISU) recommendations following our 590 standard we may run a soil nitrate test in the spring to determine if site still has enough nitrogen to carry the crop to maturity or if a side dress application should be needed. The information is the

producers and NRCS will not be storing the date in the office or on the IPAD. The information may be recorded in writing by the producer on the attached document "360 Soil Scan Nitrate Test Results." The information should then be taken to ISU Extension Service or their Crop Consultant for nutrient recommendations. NRCS will not be making field specific recommendations to the producer.

The 360 Soil Scan units may also be used to demonstrate the benefits of Water Quality and Nutrient Management practices by showing before and after results of installation of these practices.

Instructional Fact Sheets have been developed to provide information to producers on the proper collection and storage of the soil and tile water sample before it is tested. Copies of these fact sheets are attached.

Additional training is available to areas or individually upon request. A limited amount of supplies such as sensor tips and calibration solution is available at the State Office. Contact Barbara Stewart, State Agronomist barb.stewart@ia.usda.gov if you have any questions.

Approved By: /s/Larry Beeler, Acting Date: October 27, 2015

Kurt Simon
State Conservationist
Natural Resources Conservation Service
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Attachments

Exhibit A – Check Out of iPad and Soil Scan 360 Equipment
Exhibit B – 360 Soil Scan Nitrate Test Results
Exhibit C – Taking a Good Nitrate Soil Sample
Exhibit D – Taking a Good Tile Water Nitrate Sample

EXHIBIT A

Serial Number of 360 SoilScan Unit: _____

Check Out of iPad and Soil Scan 360 Equipment				
Print Name	Signature	Time and Date of Check out	Time and Date of Check In	Recived Back by (Signature)

EXHIBIT B

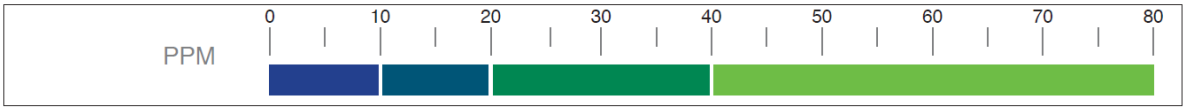
USDA
United States Department of Agriculture

Natural Resources Conservation Service

360 Soil Scan Nitrate Test Results

SOIL ANALYSIS

Nitrate (NO3-N)



Producer	Sample Number	Sample Depth	Sample Core Length
Farm	Date Sample Taken	Time Sample Taken	Date Sample Tested
Field	Notes		

Analyzing Results: *The 360 Soil Scan Nitrate Test will analyze the amount of nitrate ions present in your soil that are available for plant uptake. Depending upon crop stage and rainfall, a producer will be able to determine whether they have enough nitrogen for the crop to optimize yields for the remainder of the crop year. Consult ISU recommendations PM-1714 "Nitrogen Fertilizer Recommendations for Corn in Iowa" and your crop advisor to interpret the results.*

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Taking a Good Nitrate Soil Sample

To ensure accurate results of your nitrate soil sample the most important step is collecting the soil sample. This can be the largest source of errors in the soil testing process. The information is critical for obtaining information on which to base recommendations and decisions concerning nitrogen fertilizer.

Basic Sampling Guidelines

Time of Soil Sampling: The first soil samples should be collected when corn plants are 6-12 inches tall. Continued sampling is recommended throughout the growing to ensure your nitrogen to yield potential ratio is in line – to better understand if nitrogen is a limiting factor based on yield potential.

Selecting Test Area: Soil samples should be collected within several test areas that are around 10-20 acres and uniform with respect to soil characteristics and management. It is important to have a strategy on the location of the field you plan to sample prior to going to the field. Base your location on different characteristics. For example:

1. Pull a representative sample from high OM – CEC and high yield,
2. Pull a representative sample from low OM – CEC and lower yield area,
3. Pull a representation sample on an area that represents the average OM – CEC and yield of the field. Avoid, or sample separately, odd or dissimilarly treated areas not representative of the uniform soil or management zone area.

Depth of Soil Sampling: Take soil cores at a 0-12 inch depth and a 12-24 inch depth once corn reaches the V6 stage.

Number of Cores per sample: When taking the soil sample, pull several (8-12) cores per soil sample. Cores should be pulled across the row from one row to the other every 3-4 inches apart. This will ensure that soil samples are collected in a manner that is not biased by presence of corn rows or bands of fertilizer. Placing a template constructed from a 1" X 6" X 30" board with holes, drill every 3 inches to ensure you are getting a good pattern sampled. Repeat the process until you achieved the desired number of cores per sample.

The soil from all cores should be crushed and thoroughly mixed before a subsample is removed for analysis.

Handling Samples
before testing: Temperature can have a big effect on the results of nitrate in the soil. Moist soil samples should be protected from temperatures above 75° F and should be refrigerated if they cannot be analyzed quickly.

DO NOT leave samples in a hot vehicle, for example, or place them on the dash of a pickup, even if the outside temperature is below 75°.

DO NOT wait more than 24 hours before analyzing the samples. The soil is a living environment and microbes can have an effect on the nitrate results if the temperature is different than the soil environment. Soils that are extremely wet or muddy should not be sampled.

Analyzing Results: The 360 Soil Scan Nitrate Test will analyze the amount of nitrate ions present in your soil that are available for plant uptake. Depending upon crop stage and rainfall, a producer will be able to determine whether they have enough nitrogen for the crop to optimize yields for the remainder of the crop year. Consult ISU recommendations PM-1714 "Nitrogen Fertilizer Recommendations for Corn in Iowa" and your crop advisor to interpret the results.

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Taking a Good Tile Water Nitrate Sample

The 360 Soil Scan tool can be used to test for nitrate in tile water. The following information is a guide for people interested in testing their own tile water for educational purposes. It is only a guide, and should not be considered the only way to perform a sampling operation.

Choosing When to Take Samples

To best ensure that drainage water tests provide accurate results, a regular sampling schedule should be undertaken, such as bi-weekly or monthly, depending on the commitment level of the sampler and when tile drains are running.

If such frequent sampling is not feasible, collect samples at least once or twice annually. It is also important to check the quality of tile effluent soon after a nutrient application or heavy rainfalls. This will ensure that any significant changes in the tile water stemming from the application of nutrients will be noticed, and appropriate protective measures can still be taken.

Samples for Chemical Properties

- For any nutrient samples, use plastic or glass containers with a screw lid. One example is a mason jar with a water tight lid.
- If the sample bottle is not new, wash it with detergent that is free of phosphate and ammonia, then rinse it under tap water until suds are no longer present.
- The sample bottle should be large enough to hold 8 ozs. of sample water.

Collecting and Storing Chemical Samples

- Collect the sample directly into the sample container.
- The sample container should be rinsed once or twice with water from the site being sampled.
- Fill the container to within 1 cm of the top.

Handling Before Test for NO_3-N

Once the sample has been properly collected, take it in for testing. Generally, the sooner the testing takes place, the more accurate the results. If you are not able to deliver the sample right away, store it at 34-36° F. The sample may be stored up to 48 hours at this temperature before it is tested.

Analyzing Results: *The 360 Soil Scan Nitrate Test will analyze the amount of nitrate ions present in your tile water. The amount of NO_3-N in tile water may depend on the time of year, crops that are growing, amount of rainfall, and tile flow. For information about interpreting the results, see Purdue Extension Agronomy Guide AY-318-W "Interpreting Nitrate Concentration in Tile Drainage Water" or your local Extension Office.*

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