Cooperative Extension Celebrates 100th Anniversary

In 1914 President Woodrow Wilson signed into law the Smith-Lever Act, the enabling legislation that created the Cooperative Extension Service. The word “cooperative” is important because it meant funding for the program would be a joint effort between the counties, states and Federal governments to bring the research of the Land Grant colleges to the people. Today, we are the NDSU Extension Service but the mission has not changed. The NDSU Extension service is still the conduit on non-biased, research-based information generated by the land grant colleges and experiment stations.

In 1973, NDSU Extension began the Water Spouts newsletter for irrigators, thus supplying researched based information on irrigation for 42 of the 100-year existence of Extension. Throughout the year you may notice events or field days that note this important milestone and if you have time, please plan to attend.

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Summer Water Tours – North Dakota Water Education Foundation

This summer the North Dakota Water Education Foundation will offer 5 water tours. The first tour will start on June 18 and the last will be on August 20. These tours provide a firsthand look at North Dakota’s critical water issues. Registration is $20 per person and includes tour transportation, meals, refreshments, informational materials and a one-year subscription to North Dakota Water magazine. Tours offered are:

- Devils Lake Solutions in Action – June 18
- Red River of the North – July 10
- Central North Dakota Irrigation – July 17

The abundant irrigation in central North Dakota is a significant asset to the agricultural industry in the area where many industries are thriving as a result of irrigation. Tour stops will include the Van Bedaf dairy, the Carrington Research Extension Center, the Garrison Diversion Conservancy District and an irrigated farm near Carrington. Discussions during the tour will include new developments in irrigation technology as well as the state’s newest irrigation project – the Mile Marker 7.5
irrigation project. The tour, which begins and ends in Carrington, will include drive-by and discussion of other enterprises in the area including the Dakota Growers Pasta Plant, the Crossroads golf course, and other facilities.

- Northwest Oil Impact – August 6
- Missouri River Expedition – August 20

To register for one or more of these tours, go to [www.ndwater.com/programs](http://www.ndwater.com/programs) and click on “Summer Water Tours” on the left hand menu or send a check to NDWEF, PO Box 2254, Bismarck, ND 58502. Please indicate which tour or tours you want to attend and include the number of people. For more information give us a call or send an email.

North Dakota Water Education Foundation
(701) 223-8332, Fax (701) 223-4645
ndwaterusers@btinet.net

North Dakota Corn Nitrogen Calculator

After five years of field nitrogen (N) rate trials, with funding from the North Dakota Corn Council, International Plant Nutrition Institute and Pioneer Hi-Bred International, the N recommendations for corn in North Dakota have been revised. Also, I’ve posted the North Dakota Corn Nitrogen Calculator on my website at [www.ndsu.edu/pubweb/soils/corn/](http://www.ndsu.edu/pubweb/soils/corn/).

The new recommendations are region-specific, with the regions designated as west-river and eastern North Dakota. In eastern North Dakota, the next designation is long-term no-till (six years or more continuous no-till/one-pass seeding) or conventional till.

If producers select conventional till, the next division is high-clay soils (Bearden, Fargo, Viking, anything with about 28 percent or more clay) and “medium-textured” soils, which are anything not high clay.

Once the grower identifies the textural class, the decision is whether the field has been capable of achieving greater than 160 bushels per acre. If so, choosing this category would be the next step. If not, then choosing less than 160 bushels per acre would be the option.

The recommendation values from the categories are based on the yield response to total available N, including previous crop credit and soil test nitrate-N to 2 feet in depth, and also any credit from organic matter 6 percent or greater. But the recommendation value also depends on corn price and N cost.

The value is the result of an “economic production function” similar to that used in the North Dakota Spring Wheat and Durum Calculator and the formulas used in Illinois, Minnesota, Iowa, Wisconsin and other Corn Belt states relating yield response and economics.

If, within the high-clay and medium-textured soils, producers choose the lower productivity category, the selected results state that the value is only a preplant suggestion, but an additional side-dress application is very strongly recommended to help the grower achieve the greatest yield. No preplant rate practice is available that would move the grower on these soils into a higher yield category in a wet spring.

Later this summer, a corn fertility publication will be published. It will explain the different categories in detail. Also, algorithms on the direct side-dress rate using active optical ground-based sensors also will be published.

The new N recommendations are the end product of yield and N rate analysis from 77 North Dakota sites, nine sites in southern Manitoba, 21 sites in northwestern Minnesota and six sites in northern South Dakota.

The North Dakota sites were established and taken to yield west of the Missouri River by Roger Ashley, now-retired southwest region Extension agronomist. The eastern North Dakota sites were administered by me, with assistance from Greg Endres and Jasper Teboh at Carrington, and my graduate students Lakesh Sharma and Honggang Bu. We also received help from undergraduate students Brad Schmidt and Eric Schultz. Matt Franzen, a computer science senior at NDSU, developed the programming for the calculator. The calculator was posted with assistance from Nate Derby, a technician in the NDSU Soil Science Department.

John Lamb, of the University of Minnesota, St. Paul, provided data from Minnesota. John Heard, of Manitoba Ag, provided data from Manitoba, and Ron Gelderman provided data from South Dakota. Data for the irrigated corn came from work at Oakes, N.D., by Ray Knighton and Derby, his technician at the time, and data from Walt Albus, research agronomist at NDSU’s Oakes Irrigation Research Site.

I appreciate all of the assistance with funding, data collection and data provided, and the help with programming and posting.

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Rain between October and May Determines the Moisture Status of Fields

You probably noticed we did not have an April issue of Water Spouts. The prolonged cool weather and very slow snowmelt resulted in very low concerns about flooding, but the slow warm-up has certainly set the planting season back about 2 weeks from normal. According to the North Dakota Agricultural Weather Network (NDAWN), the soil temperature of bare soil has just passed 50 degrees F at many of the weather stations around the state.

As we enter the growing season, the soil moisture status in many fields across the state is quite variable. The cumulative rain amount received at each NDAWN station for September 15, 2013 to May 12, 2014 is shown below. Rain receive the previous fall will often infiltrate and stay in the subsoil after a killing frost. Some may be lost to evaporation but is less than 5% of the total. Snow amounts are not included in the total. Note the large variability where some locations received almost 12 inches and others less than 5 inches. This variability can have
a great affect on the amount of stored soil moisture, especially the subsoil below the 18-inch depth.

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It Pays to Check Soil-Water Compatibility of Your Irrigation System

The NDSU Soil and Water Environmental Laboratory have been making soil-water compatibility recommendations since the early 1960s. These recommendations are based on the electrical conductivity (EC) and sodium adsorption ratio (SAR) determined on the irrigation water and the soil series present on the land to be irrigated.

The soil series in your field can be found online using the Websoil Survey (http://websoilsurvey.nrcs.usda.gov/app/) developed by the Natural Resources Conservation Service (NRCS). This application contains the digitized soil series for each state in the US. Printed county soil survey maps are also available through local NRCS offices but they will not be as complete as the online version.

Every soil series in North Dakota has been classified as either unsuitable for irrigation, conditional, or irrigable. Once you know the soil series in the field, the irrigation classification can be quickly found in the NDSU Extension bulletin AE-1637 Compatibility of North Dakota Soils for Irrigation, available online at www.ag.ndsu.edu/publications/crops/irrigation-and-drainage or in your county Extension office.

Compatibility classifications are based on slope, sodicity, salinity, permeability, restrictive subsoil layering or depth to bedrock. The compatibility classifications are based on the limits of the soil’s ability to tolerate added salts or sodium.

Electrical conductivity tolerance limits range from 1000 to 3000 µmhos/cm and SAR tolerance limits range from 6 to 12.

Soil water compatibility recommendations are made based on how high the irrigation water salinity and sodicity are relative to the tolerance limits of the soils to be irrigated. For example, we may have irrigation water with an EC of 1585 and an SAR of 5.9. We could use this water on a soil such as a Hecla, which has tolerance limits of 3000 µmhos/cm for EC and 12 for SAR. On the other hand, this water would not be compatible with a Bearden soil, which has tolerance limits of 1500 µmhos/cm for EC and a SAR of 6.

Soil-water compatibility determinations should be done before irrigation systems are established. Failure to obtain compatibility recommendations can result in soil hardening, becoming impenetrable and losing productivity. Even where soil-water compatibility recommendations have been obtained, and soils and water have been found to be compatible, soils should be sampled to a minimum depth of 6 feet in 1-foot increments and analyzed for pH, EC and sodium. This should be done before irrigation commences in a field and again every three to five years. This allows the irrigator to monitor any detrimental changes that may be occurring due to irrigation and become problems before they cause major soil degradation.

Use AE1360 Irrigation Water Analysis, available online at: www.ag.ndsu.edu/publications/crops/irrigation-and-drainage for submitting an irrigation water sample. An irrigation water analysis will cost $35 and if you want a soil-water compatibility recommendation the total will be $50 from the Soil and Water Environmental Laboratory at North Dakota State University with the submittal of a water sample and legal description of the field to be irrigated.

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Starting the Irrigation System: A Checklist

- Open and check electric control panels for rodents or damage before starting the irrigation system.
- Check all motor openings to see if they are properly screened, again to keep out rodents.
- Measure and record the static water level in all wells.
- Visually inspect the piping system, especially above ground pipe.
- Check all air-release valves to make sure they are working.
- **Fill pipelines slowly; make sure all the air is out of the system.**
- Replace any broken or old pressure gages.
- Check the sprinkler system for damage.
- Make sure all portable aluminum or PVC pipe sections have gaskets installed.
- Check gearboxes on center pivot towers for water accumulation. Drain water and replace with oil.
- Check the tire pressure on center pivots.
- With the center pivot running, visually check each sprinkler head to make sure it is working properly.

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