



Extension Ag Update

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A New Nitrogen Test That Works

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For years soil scientists have been saying that there is no good soil test for nitrogen to use as a basis for nitrogen fertilizer recommendations. That may be changing with the promise of a new test being developed at the University of Illinois that can estimate mineralization.

The rule of thumb for nitrogen application has been 1.2 pounds for every expected bushel of corn yield. From there farmers would subtract out the credits for legume nitrogen, manure, etc. in order to come up with the final rate of nitrogen to apply to their field. The 1.2 pound rate is based on field studies where increasing amounts of nitrogen fertilizer is incorporated and is compared to the yield. The most economical rate of nitrogen was recommended.

At best, this rate method is a “best estimate” guess for a particular field in Illinois since it is not based on local soils or conditions. Applying too little nitrogen can result in significant yield loss. In other environments, this method might lead to applying too much nitrogen and result in environmental pollution.

Using a standard Mason jar University of Illinois researchers are testing a new simple chemical test that can help farmers fine tune nitrogen applications. It is based on measuring a material in the cell wall of soil microbes called amino sugar nitrogen. This sugar is just one source of soil organic nitrogen.

It is a simple test that is now being refined to make it easy for soil labs to conduct. A soil sample is taken similarly to present soil sampling methods. In the lab, the soil is placed in a Mason jar with sodium hydroxide. By the lid is a container with boric acid indicator solution. The jar is then heated for five hours at 120 F. During this time the amino sugar nitrogen is converted to ammonia gas

that is then trapped in the boric acid. Upon completion of the five hours, the indicator solution is titrated and the amount of nitrogen can be calculated.

According to Dr. Rich Mulvaney, University of Illinois Crop Science Dept., more field research is needed. Questions still being studied are: should we sample every year, how many samples are needed per acre, what is the right sampling depth, how should sample be handled prior to arriving at the lab, what affect does weather have on amino acids in soils and many more. It is believed that this test will be able to detect fields where no nitrogen is needed if normal climate conditions occur. A recent study looking at 25 Illinois soils (0–12 inch samples) correctly identified fields as being responsive (< 225 mg kg⁻¹) or nonresponsive (> 235 mg kg⁻¹) to N fertilization for corn production. Another study currently underway indicates that manure applied years ago can still be providing substantial nitrogen to a crop.

It will be a couple of years before this test is available to soil test labs. In the mean time, current research is indicating that this test could reduce the amount of fertilizer applied to fields and hopefully improve the environment by minimizing excess nitrogen being applied.

Farm Machinery Costs

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Machinery costs comprise a significant portion of total costs on Illinois grain farms, averaging 16 percent of total economic costs, according to data compiled by the University of Illinois and the Farm Business Farm Management (FBFM) Association. A U of I Extension study provides benchmarks so farmers can see how their machinery costs stack up in comparison to others.

“There is considerable variability in machinery costs across farms, with more profitable farms tending to have lower per acre machinery costs,” explained Gary Schnitkey, U of I Extension farm management specialist and author of “Benchmark Machinery Values on Grain Farms.” Schnitkey said the study allows a farmer to compare his or her machinery values to the benchmarks to determine whether machinery values are high or low. “Having high or low machinery values does not necessarily indicate that a farm has a problem with machinery costs,” he said. “However, having either high or low machinery values suggests that a farmer should evaluate his or her machinery practices.”

Data for the benchmarks comes from farms enrolled in FBFM. To be included, a farm had to receive a majority of revenue from grain operations and had to have balance sheet data that included a fair market valuation for machinery. In addition, the farm had to receive less than \$20 per operator acre from custom work. “This criterion eliminated farms that perform a large amount of custom work,” he said. “A total of 1,682 farms meet the above criteria and were summarized in the study.” Machinery includes all tractors, combines, planters, drills, and tillage equipment. It also includes grain hauling equipment such as grain carts and trucks. Machinery also includes pickups and other light duty trucks that are used in the farm.

The study includes tables showing the distribution of per acre machinery fair market values and distribution of per acre machinery cost values. The complete study can be found on the Farm.doc site at: <http://www.farmdoc.uiuc.edu/manage/newsletters/111201.html>.

Research

C-FAR Project: Processed and Unprocessed Manures Effect on Crop Yield, Soil and Ground

<http://www.cast.ilstu.edu/ksmick/Compost/agcover.htm>

Paul M. Walker, Department/College Agriculture Institution, Illinois State University and Walton Kelly, Ground-Water Geochemist; Illinois State Water Survey

Regulations regarding field application of liquid swine manure are becoming more stringent. EPA proposed total maximum daily loads (TMDL) in surface water (rivers, etc.) could limit the application of swine manure. Procedures which decrease manures nutrient (element) content must be identified and evaluated. The effect of applying manure and inorganic fertilizer on subsurface water must be qualified and quantified. This multi-year project is designed to compare the use of raw, unprocessed liquid swine manure, effluent collected from a solid-liquid separator and traditional inorganic fertilizer as soil amendments for corn and soybean production, and to evaluate their effects on subsurface water quality. The objectives are to: 1) compare plant growth and grain production, 2) evaluate potential for pathogen transfer from manure to grain, and 3) monitor subsurface chemical and bacterial water quality beneath treated plot replicates.

Outcomes and Impact

The agronomic results are based on data collected from three growing seasons. Compared to ground water, the unprocessed swine slurry and separated effluent had elevated levels of many constituents, especially NH₄-N, phosphate, BOD, Al and Zn. The concentrations of potentially harmful constituents were clearly lower in the effluent than in the slurry. In addition, the concentrations of key fractionates were substantially reduced in the effluent for year four compared to years 1, 2 and 3.

The effluent applied during year four was separated using a continuous gravity belt thickener in combination with a polyacrylamide polymer derived flocculant compared to a static gravity screen-rolled press separator without polymer in years 1, 2 and 3. Mean concentrations of coliform were higher in slurry than in separated-aerated effluent. Microbial concentrations of total and fecal coliforms, and E. coli were not detected in soybean and corn grain samples. Nitrate concentrations were significantly elevated in the soil water beneath the inorganic fertilizer plot and slightly elevated beneath the effluent and slurry plots. It also appears that C1- concentrations were elevated in groundwater beneath the effluent and manure plots. Other constituents that were elevated in the slurry and effluent (NH₄-N, HCO₃⁻, PO₄³⁻, B, F-, K, Na, Al, Cr, Cu, Fe, Zn, NVOC, BOD) were not found in anomalous concentrations in the subsurface water beneath these plots.

Previous manure applications on the control plot made comparisons difficult. It appears that the soil water and groundwater were impacted by these applications, with very high concentrations of NO₃-N and C1-, although not the other constituents listed above. During this four-year project when no treatment was performed on this plot, the concentrations of NO₃-N and C1- tended to decrease with time. Although groundwater quality was not significantly impacted by the slurry

and effluent amendments in this study, the fact that NO₃-N and C1- concentrations were elevated in the wells impacted by previous long-term manure applications indicates the potential for groundwater quality degradation. However, NO₃-N and C1- were the only two contaminants found in the groundwater; the metals and other elevated constituents found in the slurry (and effluent) did not appreciably migrate through the soil and were thus not good indicators of manure contamination of groundwater at this site.

For soybean, seed yield was similar for the four treatments. Since soybean can acquire nitrogen from the atmosphere, this result was expected. For corn, grain yield of plants supplied with effluent, inorganic nitrogen fertilizer, or unprocessed slurry tended to be greater than the control. For corn plants that received an application of nitrogen (effluent, inorganic nitrogen fertilizer, or unprocessed slurry), no significant differences in grain yield were observed. Data needs to be collected over a number of years to assess seasonal variation and long-term effects of application to agricultural soils. Data collected thus far suggest that effluent and slurry can serve as satisfactory nitrogen replacements for inorganic nitrogen fertilizer.

C-FAR Project: Corn Hybrid & Drying Temperature Effects on End Use Quality

http://web.aces.uiuc.edu/c-far/cfarreporting/display.cfm?project_id=215

Kevin Baker, Department/College Agriculture Institution, Illinois State University, S.R. Eckhoff and M.R. Paulsen; Agricultural Engineering Dept.; University of Illinois at Urbana-Champaign Purpose and Goals

The objectives of this project were: to use a laboratory-scale dryer to dry corn samples at four drying temperatures and evaluate hybrids by drying temperature differences in wet milling yield; and to improve estimates of added value for processing of specialty corn hybrids, including waxy, high-starch, and hard endosperm hybrids.

Outcomes and Impact

Fifteen commercial hybrids including three waxy varieties were used in this study. They were grown on the Agricultural Engineering Farm at the University of Illinois. They were harvested at three harvest moistures of about 30, 25, and 14% wet basis. The two higher moisture samples were dried at temperatures of 50, 70, 85 and 100° C, using a convection drier at ISU Bloomington to a target moisture of about 14% wet basis.

Samples harvested at 14% were not dried further. Stress cracks in the samples were measured as an index of the effect of drying severity. The dried samples were scanned with an Infratec 1229, that uses near infrared transmittance. Extractable starch yields were predicted using an equation with an R² of 0.81, and SECV of 1.33. The starch was studied for the effects of high drying temperature on elatinization using a differential scanning calorimeter (DSC 2920), an electron microscope, and with water activity measurements.

The results indicated that the two harvest moistures were significantly different, with the 25% harvest moisture having higher starch yields, than the 30% corn. Corn dried at temperatures of 50 and 70 ° C had significantly higher starch yields than those dried at 85 and 100 ° C.

Sprays, Trap Promise to Slash Insecticide Use in America's Corn Belt

<http://www.ars.usda.gov/is/AR/archive/nov01/fungi1101.htm>

Don Comis, (301) 504-1625, comis@ars.usda.gov, Source: ARS News Service, USDA,

While Agricultural Research Service scientists are not about to satisfy a plant pest's craving for pumpkin by serving pie, they are only too happy to serve a family recipe to die for. The ingredients of that recipe, including cucurbitacins and other chemicals from the pumpkin and gourd or cucurbit family, attract corn rootworm beetles. One of these ingredients is in three new, low-insecticide bait sprays and a monitoring trap for the beetles.

These commercial products have emerged from a 6-year joint ARS-university research and demonstration program in the Corn Belt. The bait sprays are CideTrak, made by Trece, Inc. of Salinas, Calif.; Invite, made by FFP Agriscience, Inc., of Eustis, Fla.; and SLAM, made by MicroFlo, of Memphis, Tenn. The trap is the Pherocon Corn Rootworm Trap, made by Trece.

The trap lures beetles with volatile plant chemicals. It enables farmers or consultants to make sample counts of the beetles to decide when the numbers are high enough to warrant spraying with CideTrak, Invite, or SLAM. The baits are sprayed aerially on corn leaves where the beetles eat. The sprays form drops containing cucurbitacins and insecticide. The cucurbitacins cause the beetles to feed almost exclusively on the drops, so they ingest a lethal dose of insecticide. CideTrak and SLAM get their cucurbitacins from wild buffalo gourd root powder, while Invite relies on a Hawkesbury watermelon juice ingredient.

The actual active insecticidal ingredient in the three sprays is an ounce or less per acre, which is 95 to 98 percent less than in conventional sprays. The bitter cucurbitacin doesn't appeal to other insects, so it is safe for bees and other beneficial insects. The musky smell released when a cantaloupe is sliced comes primarily from cucurbitacin.

▶ Resources to Consider

▶ 2001-2002 Agronomy Handbook

<http://www.aces.uiuc.edu/iah>

This handbook outlines the best management practices based on unbiased research done by the University of Illinois. It covers corn, soybeans, small grains and forages. In addition, chapters discuss soil fertility, soil testing and tillage. The Interactive Agronomy Handbook is available on the web and has numerous calculators to help you make management decisions. Get your copy at your county Extension office or order it at 1-800-345-6087.

▶ 2002 Illinois Agricultural Pest Management Handbook

<http://www.ipm.uiuc.edu/agriculture/index.html>

Sections on Insect Pest Management, Pesticide Application Equipment, Environmental Hazards of Pesticides, Herbicides, Insecticides, Plant Disease Management, Weed Control and Worker Protection Standard make this an essential desk reference for anyone producing grain or forage crops in Illinois. Call Information Services at 1-800-345-6087 or call your Extension office

▶ Profitable Pork: Alternative Strategies for Hog Producers

<http://www.sare.org/bulletin/hogs>

A new 16 page bulletin from USDA's Sustainable Agriculture Network (SAN), showcases farmer profiles and research examples of alternate ways to raise pork profitably. In designing hog systems that work on their farms — in deep-straw bedding, in hoop structures and on pasture — producers have been able to save on fixed costs, find greater flexibility, identify unique marketing channels and enjoy a better quality of life. To order a free copy, call 301/504-6422.

Relay Intercropping Of Soybeans And Wheat

<http://www.ag.ohio-state.edu/~corn/archive/2001/sep/01-30.html>

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Ohio and Indiana farmers who practice relay intercropping of soybeans and wheat can choose from an array of wheat varieties that perform well in wider-row spacing, saving on equipment and seed costs. Wheat row spacing normally is 7.5 inches wide, said Jim Beuerlein, Ohio State University agronomist. But in studies conducted by Beuerlein and Purdue University agronomist Tony Vyn, certain wheat varieties performed just as well when row spacing was widened to 15 inches.

About two dozen wheat varieties were analyzed for their performance in Ohio and Indiana. The purpose of making the rows wider than normal is for the machinery to get through, so you can get more light coming down into the canopy to help the soybeans grow,” Beuerlein said. Beuerlein and Vyn grew wheat varieties in both 7.5- and 15-inch row spacings, and compared yield, test weight and a variety of agronomic characteristics such as height and heading date. Beuerlein found that varieties that perform well in wide rows tend to be either tall by nature or grow tall because of favorable weather; and exhibit a nonerect growth habit that compensates for skips in the row or low population.

The research showed that wheat normally grown in 15-inch rows produces 5 percent to 15 percent less yield than wheat grown in 7.5-inch rows, but the lower yield from wide rows is partially offset by reduced seed costs, Beuerlein said. “When growing wheat in 15-inch rows, a farmer only has to use half as much seed per acre,” Beuerlein said. “So, for example, if a 7.5-inch row has a two-bushel seeding rate, the farmer has saved one bushel at \$12 a bushel for seed. He may lose four bushels of grain in yield, but at a grain cost of \$3 per bushel he can still make the same profit. One bushel of seed has the same value as four bushels of grain.” Seeding rates are significantly lower in 15-inch rows, Vyn said. He added that plants in the wider rows appear to be somewhat shorter than wheat in narrower rows.

“We observed that it is important to keep seeding rates at 850,000 seeds per acre in 15-inch rows,” Vyn said. “That’s much less than the traditional seeding rate in 7.5-inch rows of 1.3 million to 1.5

▶ More Resources to
▶ Consider

▶ Purchasing and Leasing Farm

Equipment, NCR-615

Raymond Massey, University of Missouri; and William Edwards, Iowa State University.

This publication explains the variety of choices farmers face when determining how to obtain farm machinery services. It explains the typical plans that financial institutions and equipment manufacturers offer for financing the purchase of farm equipment. It also discusses rental and lease agreements, including explanations of lease terms, lease contracts, and the leasing process. Tax and financial considerations are also covered. A detailed example is given comparing a lease contract and a loan/purchase agreement. To order, call 800-562-3618; e-mail mwps@iastate.edu, or visit the catalog section of the MMWPS website at www.mwpsdq.org.

Ag Drainage: Planning an Ag Subsurface Drainage System (BU- 07685-GO)

<http://www.extension.umn.edu/distribution/cropsystems/DC7685.html>

Gary R. Sands, and Jerry Wright, Minnesota Extension Engineers, University of Minnesota

Topics include economics, system capacity and drainage coefficient, topography and system layout, drain depth and spacing, drain sizing, use of drain envelopes, environmental impacts, surface inlets and installation quality. To order call the University of Minnesota Distribution Center at (800) 876-8636 or visit online at <http://www.extension.umn.edu/units/dc/>

million seeds an acre. “We also found that wide-row wheat is less likely to lodge even with high nitrogen fertilizer rates.” Wider-row spacing saves on equipment costs, because fewer seed meter units are necessary on the drill, Beuerlein said. “Farmers are looking for anything that will reduce production costs,” Beuerlein said.

The relay intercropping process usually involves planting wheat in October, then interplanting soybeans the following year in late May or early June. Even earlier soybean planting dates are possible with polymer-coated seeds that delay soybean emergence. The OSU-Purdue data indicates both crops in an intercropping system perform well. “In many ways we are not sacrificing wheat yields in order to gain the potential of 30-bushel-an-acre relay soybean yields in areas that are traditionally not suited for double-crop beans,” Vyn said.

Source: Candace Pollock, Associate Editor, OARDC Research Services, Ohio Agricultural Research, and Development Center, The Ohio State University, 1680 Madison Ave., Wooster, OH 44691, (330) 202-3550, pollock.58@osu.edu

EDUCATIONAL OPPORTUNITIES

University of Illinois Agriculture Events Calendar

<http://www.crops.uiuc.edu/events/sept.html>

Check out our web-based Events Calendar. New programs are being confirmed every day. Keep in touch with your Extension Office for programs addressing the topics that interest you and are offered in your County. To find your counties website go to: <http://web.aces.uiuc.edu/ve/>

Rural Route 2 is Available at 1-800-468-1834



<http://www.extension.uiuc.edu/ruralroute/>

The Rural Route 2 service is designed to help farm families get through tough times. This **confidential service** provides referrals for farm business and family financial advice; helps manage economic as well as personal situations; helps locate local support; and identifies assistance through the Illinois Farm Development Authority.

► Agricultural Drainage: Soil Water Concepts (BU-07644-GO)

<http://www.extension.umn.edu/distribution/cropsystems/DC7644.html>

Gary Sands, Minnesota Extension Engineer, University of Minnesota
This is an 8-page, heavily illustrated publication presenting concepts that are fundamental to understanding how subsurface drainage affects soil water and the water balance. It explains—with practical examples—the components of the water balance in the crop/soil system and their relationship to drainage. To order call the University of Minnesota Distribution Center at (800) 876-8636 or visit at <http://www.extension.umn.edu/units/dc/>

► Acquiring and Managing Resources for the Farm

Business (NCR610D)

Ken Thomas, Extension Specialist -Farm Management (retired), University of Minnesota

This publication details one of the most challenging aspects of today's farm manager's job: acquiring and managing resources. The chapters discuss the acquisition of farm real estate, renting farmland and facilities, selecting the type of lease arrangement, and keeping appropriate records. Also covered are: analysis of possible purchases, financing, managing the machinery, farm personnel management, determining staffing needs and managing a work force. To order, call the University of Missouri 1-800-292-0969.

► New agrarianism' reflects renewed interest in land stewardship

Eric T. Freyfogle, Prof. of Law, Dept. of Nat. Res. and Environ. Sci., U of Ill 217-333-8713, ericft@uiuc.edu

his book is a collection of essays discussing the new agrarianism trend where consumers are adopting a new land-sensitive philosophy to making purchases from their food to where they live. He gives evidence that this new trend is taking a different path than today's market-driven economy. To order call: 1-800-828-1302 or see on line at <http://www.islandpress.com>.

Internet Resources

The Premium Calculator

<http://www.farmdoc.uiuc.edu//cropins/insurance/index.cfm>

This calculator allows users to input their location, and generate a table of crop insurance premiums across five types of insurance and across available coverage election levels.

The Crop Insurance Evaluator

<http://www.farmdoc.uiuc.edu//cropins/evaluator/index.cfm>

This calculator evaluates the impacts of different insurance choices on the cost, frequency of payment, gross revenue impacts, and the degree of risk reduction provided by different insurance choices, again by location and crop chosen by the user. Taken together, they provide useful guidance as farmers evaluate their crop insurance choices for this growing season.

Perspectives on Farmland Leasing

<http://www.farmdoc.uiuc.edu/manage/newsletters/newsletter.html>

This newsletter summarizes Illinois information for: (i) Tenure relationships, (ii) Cash rents, and (iii) Equivalent cash rents. Time series data for different regions of the state are provided.

Attracting Consumers with Locally Grown Products

http://www.foodmap.unl.edu/report_files/Locally_Grown_Consumer_Survey_Report.pdf

This report summarizes the initial findings of a telephone survey of 500 households in the states of Nebraska, Iowa, Missouri and Wisconsin. The primary grocery shopper in the household was surveyed for their attitudes and opinions on locally grown and produced food, organic and all-natural food and meat purchasing behaviors.

North Central Initiative for Small Farm Profitability

<http://www.farmprofitability.org>

A four-state, multi-institutional, farm-to-fork effort designed to improve the profitability and competitiveness of small and mid-size farms in the Midwest.

The StarLink™ Saga - A Case Study of Ag Biotechnology Regulation

<http://www.farmdoc.uiuc.edu/legal/index.html>

Don Uchtmann's, Prof. of Ag Law, University of Illinois, 217-333-1829, uchtmann@uiuc.edu

This article tracks the pre-StarLink evolution of U.S. biotechnology regulatory policy and suggests ten lessons regarding the U.S. system for biotechnology regulation.

Maintenance, Cleaning and Storage of Ground Sprayers (#8917)

<http://www.montana.edu/wwwpb/pubs/mt8917.html>

Proper storage and cleaning techniques can add years to the life of spraying equipment. This fact sheet offers tips for preparing your pesticide spraying equipment to be stored for the winter, including a list of which cleaning agents are most effective for various pesticides used.

Agricultural and Alternative Energy

<http://www.bae.umn.edu/extens/energy/>

The University of Minnesota Biosystems and Agricultural Engineering Department has a new page focusing on alternative energy sources and especially agriculturally based energy sources.

Food Marketing and Processing Clearinghouse

<http://www.foodmap.unl.edu>

A comprehensive clearinghouse of marketing and processing information for farmers and producers interested in identifying potential new markets, learning about alternative agriculture opportunities, locating processing equipment, conducting market research or finding information on a large variety of other topics.

About the Ag Update Newsletter

The Ag Update Newsletter is a bi-monthly newsletter providing education and research support to the agricultural industry. Current and past issues may be found at the following website <http://www.urbanext.uiuc.edu/agupdate/index.html>

Contact your county Extension office and request to be put on their agricultural mailing list to receive the local agricultural newsletter and notices about upcoming agricultural events near you. To find your counties location, phone and website go to: <http://web.aces.uiuc.edu/ve/>

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