

Missouri Ag News

A Publication of University of Missouri Extension - Southeast Region

Volume 4, Issue 2

April 1, 2014

The Leaky Nitrogen Cycle

Inside this issue:

The Leaky Nitrogen Cycle	1
A Summary of the New Farm Bill	3
Soil Borne Viruses	4
USDA Storage Facility Loan Program	4
Evaluating Wheat Stands	6
Spotted Winged Drosophila	6

Look for the color code to find articles related to the following.

Crops	Horticulture
Engineering	Livestock
Forestry	Other



The long-term goal of every agronomist is to improve nitrogen use efficiency within a cropping system. All agronomists will agree that applied N that is fully utilized by a growing crop to provide food, feed and fiber does not cause unwanted environmental pollution in the current season. Considering that we are now living in a time when the environmental impacts of fertilizer use in agriculture are being constantly questioned. More than ever, the need to improve N use efficiency and economic return is so important. The primary reason for N fertilization is to obtain near maximum yields, maximize N use efficiency and to minimize N loss and carryover at the end of the growing season. However, doing so is extremely challenging which is the exact reason N use efficiency research has remained a major area for research by agronomist. It is my opinion, that irrespective of what new technology may emerge, N fertilizers and fertility management will continue to play a decisive role in crop production. So, why is this problem so hard to tackle? To answer this question we need to take a closer look at the Nitrogen Cycle. The N cycle has so many holes for loss of N it might as well be called the “leaking N cycle.” Nine major processes make up the N

cycle, plant uptake, exchange, nitrification, denitrification, volatilization, mineralization, immobilization, N₂ fixation and leaching. Of these nine processes, exchange, denitrification, volatilization, immobilization and leaching can result in a loss in the amount of N available for plant uptake.

With so many opportunities for loss, clearly there will always be some amount N loss from the cropping system to the atmosphere, surface and ground water. Major loss of N occur: to the atmosphere by volatilization of ammonia, volatilization of nitrous oxide and nitric oxide from nitrate in poorly aerated soils, and volatilization of nitrogen from plants containing N in excess of what the plant can use in seed production, just after flowering; to surface water by runoff during heavy rain; and to ground water by leaching of nitrate out of the root zone in permeable soils receiving heavy rain or irrigation. Nitrogen losses by these processes are at least partially responsible for the reason that only 50-70% of the applied N fertilizer is actually found in the crop.

Years of research have yielded us

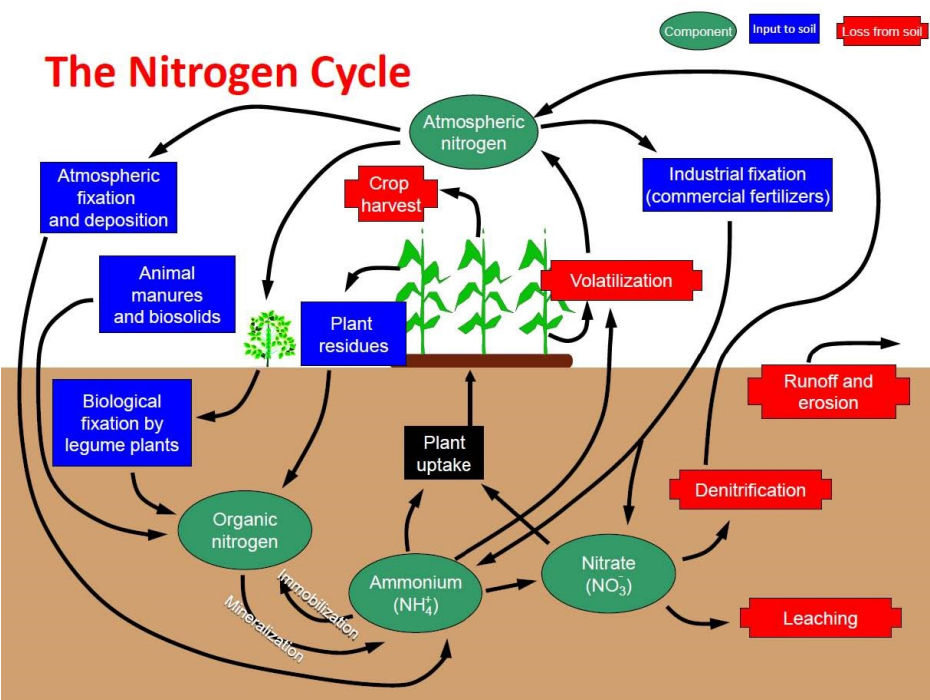
continued.....The Leaky Nitrogen Cycle...

with numerous management approaches to reduce N loss and maximize the utilization of applied N by the growing crop. Some of these management practices, such as tillage, irrigation, residue management, time of application, and fertilizer type selection are well known practices. However, it is important to keep in mind that loss of N cannot always be altered by management practices, as soil factors such as temperature and soil characteristic also play a major role. In the coming season it is important to consider the condition for N loss in your cropping system and to take the necessary step to reduce your N loss and improve your N use efficiency. Below is a summary of management practices for reducing N loss in three common situations.

Surface applied urea has high potential for loss by volatilization if there is no rain immediately following application; Practices: Incorporate urea into soil, apply before rainfall, irrigate immediately after application, and make use of urease inhibitors (i.e. Agrotain®) to slow urea conversion to NH_3 .

Well drained soils have high potential for loss by leaching; Practice: Time application to avoid high percolation conditions and avoid applying excess N (split application); an alternative to time application is the use of nitrification inhibitors (i.e. Instinct®) - shown mixed results in research studies.

Poorly drained soils have high potential for loss by denitrification – Time application to avoid N exposure to saturated soil conditions and avoid applying excess N (split application); an alternative to time application is the use of nitrification inhibitors (i.e. Instinct®) - shown mixed results in research studies.



There are also products that are both urease and nitrification inhibitors. Some examples would include NutriSphere-N® and Agrotain Plus®. Finally, the effectiveness of any of these products are determined by many factors such as soil temperature; soil characteristics, including organic matter, biological activity, microbial populations; precipitation and soil moisture; and the interaction of these factors.

Source: Wade, 2012 (<http://www.virginiacrops.com/wp-content/uploads/2012/03/nitrogen-cycle-03172012.jpg>)

A.J. Foster, Agronomy Specialist, University of Missouri, Bloomfield, MO.

A Summary of the New Farm Bill

The passage of the 2014 Farm Bill brings about significant changes in agricultural policies. The new features include a greater emphasis on insurance products and enrollment choices based on changes related to the farm.

The farm bill is for five years, 2014-2018. The sign up period is unknown at this time. Comments by the Secretary of Agriculture at the Commodity Classic in February indicated the sign up may not begin until late summer or early fall and the signup may extend into 2015. The reason for the delay is the complexity of the program and the time needed to write the computer software for enrollment.

At my web site I have a list of web links and pdfs on the 2014 Farm Bill. It will updated as more information becomes available. This will include spreadsheet decision tools and web based programs. I will also include information meetings in the region. <http://extension.missouri.edu/scott/Farm-bill.aspx>

The following summarizes the key changes that were made, the new programs that are being made available to landowners and producers, and the decisions that these individuals or firms will need to make.

The new farm bill eliminates Direct Payments, the Counter-Cyclical program (CCP), the Average Crop Revenue Election program (ACRE), and the supplemental revenue assistance program. Marketing loans are retained and unchanged.

Corn, soybeans, grain sorghum, and rice farmers will have the choice to enroll in either the Price Loss Coverage (PLC) or Agricultural Risk Coverage (ARC). Producers will have a one-time opportunity to elect PLC or ARC on a farm by farm, and crop by crop basis. If choosing ARC, producers must then also choose between County Coverage or Individual farm Coverage. If the PLC option is chosen,

farmers will also have the opportunity to enroll in the new insurance policy Supplemental Coverage Option (SCO).

Farmers and landowners will have the opportunity to reallocate the current base acre allotment. This attempts to bring current base allotment more in-line with recent plantings. The reallocation of covered commodities will be in proportion to the 4-year average of the planted acres (actual planted and prevented plantings) from 2009 to 2012 crop years. Also, yields can be updated to reflect 90% of the 5-year average from 2008 to 2012.

Cotton will have a new "safety net" program called STAX (Stacked Income Protection Plan) beginning with the 2015 crop year. Current cotton base can be converted to "generic" base. In any year that generic base is planted to a covered commodity, that base will fall in-line with the program choice for that commodity. For example, if soybeans are allocated to generic base in 2015 then the generic base will follow the soybean program chosen (ARC or PLC). Then if corn were planted to the generic base in 2016, the generic base would follow the corn program chosen (ARC or PLC).

Because STAX will not be available until 2015, cotton will receive a "transition assistance" payment for 2014. This equates to 5.4 cents/pound on all 2013 base acres and direct payment yields. The Marketing Loan program including loan deficiency payment's (LDP) and marketing loan gain's (MLG) continues to operate as it has under the 2008 farm bill. The Loan Rate on cotton is changed, however. The Loan Rate will be the average Adjusted World Price (AWP) for the previous 2 crop years but not more than 52 cents/lb. and not less than 45 cents/lb.

David Reinbott, Agronomy Specialist, University of Missouri, Benton, MO.

Soil Borne Viruses

As wheat continues to develop this year continue to scout for wheat spindle streak mosaic and wheat soilborne mosaic virus which are vectored by a soil fungus. Other viruses that occur in wheat and can occur in the same field are barley yellow dwarf which is vectored by aphids and wheat streak mosaic which is vectored by the wheat curl mite. Fungicides do not control viruses in plants. Typically, symptoms become pronounced as wheat begins greening up. Symptoms include yellow to light green mosaic patterns with no distinct edges. Fungal disease typically causes lesions with distinct edges which eventually merge or raised pustules as you would find with stripe rust or leaf rust.

Virus symptoms may persist as long as cool conditions continue and as air temperatures increase symptoms tend to fade. Management for soilborne viruses include crop rotation, variety selection, and maintaining soil fertility levels. Again, fungicides do not control viruses in plants. For more information and photos of virus symptoms refer to IPM guide 1022: "Management of Soft Red Winter Wheat" at the following link: <http://extension.missouri.edu/publications/DisplayPub.aspx?P=IPM1022>

Anthony Ohmes, Agronomy Specialist,
University of Missouri, Cape Girardeau, MO.

USDA Storage Facility Loan Program

The U.S. Department of Agriculture (USDA) today announced the expansion of the Farm Storage and Facility Loan program, which provides low-interest financing to producers. The enhanced program includes 22 new categories of eligible equipment for fruit and vegetable producers.

Producers with small and mid-sized operations, and specialty crop fruit and vegetable growers, now have access to needed capital for a variety of supplies including sorting bins, wash stations and other food safety-related equipment. A new more flexible alternative is also provided for determining storage needs for fruit and vegetable producers. Waivers are available on a case-by-case basis for disaster assistance or insurance coverage if available products are not relevant or feasible for a particular producer.

Additionally, Farm Storage and Facility Loans security requirements have been eased for loans between \$50,000 and \$100,000. Previously, all loans in excess of \$50,000 required a promissory

note and additional security, such as a lien on real estate. Now loans up to \$100,000 can be secured by only a promissory note.

The low-interest funds can be used to build or upgrade permanent facilities to store commodities. Eligible commodities include grains, oilseeds, peanuts, pulse crops, hay, honey, renewable biomass commodities, fruits and vegetables. Qualified facilities include grain bins, hay barns and cold storage facilities for fruits and vegetables.

Contact your local FSA office or visit www.fsa.usda.gov for more about FSA programs and loans, including the Farm Storage Facility Loan Program.

Anthony Ohmes, Agronomy Specialist, University of Missouri, Cape Girardeau, MO.

Missouri Century Farms Program

If your farm has been in your family since December 31, 1914, you can apply to have it recognized as a Missouri Century Farm. To qualify farms must meet the following guidelines:

1. The same family must have owned the farm for 100 consecutive years or more as of Dec. 31, 2014.
2. The line of ownership from the original settler or buyer may be through children, grandchildren, siblings and nephews or nieces, including through marriage or adoption.
3. The present farm shall consist of no less than 40 acres of the original land and shall make a financial contribution to the overall farm income.

For applications received by May 1, a \$65 fee covers the cost of a certificate, farm sign, and booklet for approved applicants. If the application is received between May 1 and May 15, the cost is \$75. Applications must be postmarked by May 15, 2014 to be considered.

For application forms and more information you can visit any local extension center home page or go the Missouri Century Farms Web site. You can also contact the MU Extension Publications department at 1-800-292-0969.

<http://extension.missouri.edu/>

<http://extension.missouri.edu/centuryfarm/>

Free Climate Data

Farmers have a new set of free tools to help them make crop decisions. The websites are important because access to historical climate data helps farm operations that depend on favorable temperatures and precipitation patterns, Massey says. He and Guinan recently presented the information at MU's Crop Management Conference in Columbia. To explore several weather data links go to <http://extension.missouri.edu/news/DisplayStory.aspx?N=2084>.

Evaluating Wheat Stands

Wheat development in late planted fields has been minimal due to cold weather and many fields may have limited number of tillered wheat plants.

Tiller development (Feekes 2 -3) starts in the fall of the year and can go through early spring. Spring tillers that contribute to yield are limited to a short period of growth right after wheat breaks winter dormancy.

At Feekes 3 stage of growth tillering ends. Wheat moves into green-up (Feekes 4-5) phase where energy is going to developing heads. Tillers formed after this period of time may not contribute to yield. Feekes 5 is when final nitrogen decisions need to be made since Feekes 6 is jointing and the beginning of wheat's greatest demand for nitrogen.

A good guide for following wheat development is Purdue University's guide: "Managing Wheat by Growth Stage" at <https://www.extension.purdue.edu/extmedia/ID/ID-422.pdf>.

Any evaluation of stand is an estimate of potential yield and not all tillers may produce a viable head.

With this in mind, one way to estimate yield is to count plants with at least 2 unfurled leaves in a foot of row. Take the formula: (count * 12)/row spacing in inches = plants per square foot. On average, each stem per square foot has the potential to produce a bushel per acre. There are always others factors as the season progresses that influences this potential. There are numerous ways to estimate a wheat stand, just keep in mind they are only estimates.

The following guides from Oklahoma State and Kentucky may help: <http://wheat.okstate.edu/wheat-management/grazing/pss2149estimatingwheatgrainyield.pdf> and http://www.uky.edu/Ag/GrainCrops/ID125Wheat_Management_Kentucky.html.

Anthony Ohmes, Agronomy Specialist, University of Missouri, Cape Girardeau, MO.

Spotted Winged Drosophila

Missouri saw the introduction of a significant new pest of small fruit in 2013. This tiny vinegar fly, *Drosophila suzukii*, uses a serrated ovipositor to lay eggs inside intact fruit. This pest is significant as it moves from host to host as the season progresses. The list of potential fruit it prefers develops in progression as the season moves on. Fruit affected in Missouri last year included blueberry, blackberry, cherry, and high tunnel tomato. The Spotted Winged Drosophila also uses peaches, nectarines, elderberry, raspberry and wild hosts such as autumn olive, crabapple, Amur honeysuckle and wild grape for larvae production.

Control begins by trapping to detect insects using a 1 quart



container filled with active dry yeast (1/2 tablespoon), sugar (2 tablespoons) and 6 oz. water. Change this mixture weekly. Place 3/16 inch holes toward the top and around the container.

The male is easily identified by locating the single, black or dark spot on each wing. Once detected, a

spray program should be implemented for control.

For more information regarding this pest contact your local extension center.

Sarah Denkler, Horticulture Specialist, University of Missouri, Poplar Bluff, MO.

Image of trap by Hannah Burrack, North Carolina State University. Image of SWD from ipm.uconn.edu.



Nutrient Management Planning Course

Thursday, May 8, 2014

9:00 a.m. - 3:30 p.m.

Delta Fisher Research Center

Portageville, MO

The primary goals of this course include:

- ◆ Train people on the **use of WebSNMP** for delineating fields and setback features and making farm maps;
- ◆ A refresher on using Purdue's Manure Management Planner for developing a nutrient management plan;
- ◆ Instructions on using the **Missouri web-based Document Generators** to create your nutrient management plan.

We will have laptop computers available for all participants. You can bring your own laptop if you prefer. Lunch will be provided.

We will apply for 5.0 Nutrient Management and 1.0 Soil and Water Continuing Education Credits for Certified Crop Advisors. The cost is \$75. For questions about registering for the course contact Hannah McClure (McClureH@missouri.edu; 573-884-6311).

This course is sponsored by University of Missouri and Missouri NRCS.

For Sale: Carla Springer of Five Oaks Farms has market tables for sell that would be of great use to any produce vendors. They are on wheels and independent of each other or can be used together. They also have adjustable tops. They are asking \$100 each. If you are looking at making a SPLASH this market season, these tables would do it!



Missouri Ag News is a publication of the University of Missouri Extension, compiled by Agriculture Specialists in the Southeast Region of Missouri. Contributions to this publication are made by:

Donna Aufdenberg - Horticulture
aufdenbergd@missouri.edu 573-238-2420

Sam Atwell - Agronomy (Rice)
atwells@missouri.edu 573-748-5531

Sarah Denkler - Horticulture
denklers@missouri.edu 573-686-8064

A.J. Foster - Agronomy
fosteraj@missouri.edu 573-568-3344

Mike Milam - Agronomy (Cotton)
milammr@missouri.edu 573-888-4722

Anthony Ohmes - Agronomy (Corn)
ohmesa@missouri.edu 573-243-3581

David Reinbott - Ag Business
reinbottd@missouri.edu 573-545-3516

Frank Wideman - Ag Engineering
widemanf@missouri.edu 573-547-4504

If you are interested in receiving this publication via e-mail or being removed from the email list please send a request to denklers@missouri.edu.

Future Meetings & Events -

Nutrient Management Planning Course May 8, 2014. Delta Fisher Research Center, Portageville, MO. Contact Hannah McClure at 573-884-6311 for more information.

Commodities and markets - <http://extension.missouri.edu/scott/crop-budgets.aspx>

2014 Farm Bill - <http://extension.missouri.edu/scott/Farm-bill.aspx>