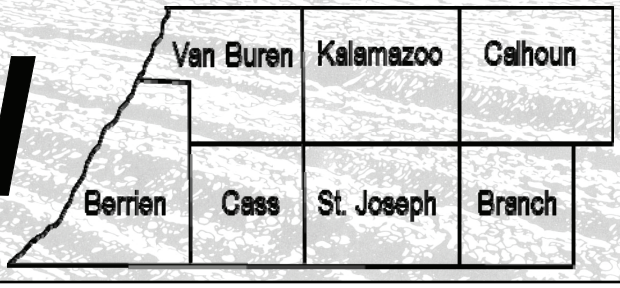
IN THE ROW



Vol. 1 Issue 2 May, 2013 A Newsletter Serving Corn & Soybean Producers in Southwest Michigan

Dear Agricultural Producer:

In The Row is a new newsletter serving corn and soybean producers in Southwest Michigan. This is a cooperative effort involving the Michigan Soybean Checkoff, the Corn Marketing Program of Michigan and MSU Extension. All printing, postage and handling costs associated with the newsletter are covered by the Michigan Soybean Checkoff and the Corn Marketing Program of Michigan. MSU Extension is responsible for providing timely and relevant crop and pest management information for each issue. Please call Melissa Franklin at (269) 657-8213 if you prefer to receive the newsletter via e-mail.

Sincerely,

Jon Zirkle Mike Staton Bruce MacKellar Lyndon Kelley Dale Mutch

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Corn Marketing Program of Michigan

Michigan Soybean Checkoff
Effective, Efficient, Farmer-Driven

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Michigan Corn, Soy, and Extension Team up for You

By Natalie Rector, Corn Marketing Program of Michigan

Your corn and soybean check off dollars are helping the SW Extension team reach you with in-season cropping information as we all have the same goals: seeing corn and soybean producers be profitable and efficient. Check off funds are invested in education, research, and promotion. We use all forms of media - meetings, paper, email, websites, Facebook, and Twitter - to reach our constituents. For cropping updates during the growing season, be sure to find the latest pest and cropping information from MSU Extension at www.news.msue.msu.edu and subscribe to an RSS feed to sort out and bring you only what your farm needs. Also find the Michigan Corn and Soybean organizations at www.micorn.org and www.michigansoybean.org. As the Corn Marketing Research Coordinator, I'm always interested in what you, the grower, would like to see us accomplish. I can be reached at nrector@micorn.org or 269-967-6608. Have a safe and productive planting season...you've waited long enough for it!

Pre-Sidedress Soil Nitrate Testing Can Save You Money

By Dale R. Mutch, PhD

The cost of nitrogen (N) has risen over the last few years. One way to reduce nitrogen for corn is to soil sample corn fields for a pre-sidedress nitrogen test (PSNT). The wet spring we had this year makes it even more important to evaluate the nitrogen residual in fields. A PSNT will tell corn growers how much nitrate nitrogen is available in their soil for the corn crop.

For most growing seasons, by June the ammonium form of N is converted to the nitrate form when soils warm up. You can test for nitrates by using a soil probe. Soil samples should be taken about three to four weeks after corn emergence. At this time the corn is usually at growth stage V-6 to V-8. PSNT samples should be taken before side dressing N to the corn. Do not forget that it will take approximately one day to sample the fields and the turnaround for most PSNT analysis is approximately 48 hours. So plan accordingly.

If a legume was grown or manure was applied to this field you will often get higher N readings for nitrate. It is important if you used these practices to take credit for the nitrogen added to the soil. Therefore, it is also important as previously mentioned that you sample these fields after soils have warmed.

To soil sample a field for PSNT, take 20 core soil samples at 12 inches deep representing 20 acres. The samples should be taken between corn rows so that you are not sampling the nitrogen placed in the row at planting. In a plastic pail place the 20 core samples and thoroughly mix the soil with a tool (wooden stick). Remove approximately 1 quart of soil from the pail and air-dry the sample. Do not put wet soil in a plastic bag or your test results could be altered. Place the dry soil in sample boxes and fill out the form which can be obtained from the MSU soil and plant nutrient laboratory in East Lansing www.psm.msu.edu/SPNL/. It is recommended that these boxes and forms be obtained prior to sampling your fields to assure a timely turnaround for your side dress nitrogen application.

PSNT results are measured as nitrate concentration in parts per million (ppm). The chart below provides the soil N credit for the ppm in the soil sample. As you can see in the chart, there are several ranges of ppm which would allow you to reduce nitrogen rates for your corn crop without reducing yield. If you have a ppm greater than 26 ppm, research shows you do not need to add any additional N for that corn field.

SOIL NITROGEN CREDIT FOR CORN IN MICHIGAN.
(*Use when N recommendation is based on MRTN*)

Soil Nitrate Test Value	Interpretation	Soil N Credit[1]
ppm		lbs N/acre
≤ 10	**Low** *Use Full Recommended N*	**0**
11 – 15	**Medium - Low** *Reduce N Rate Slightly*	**30**
16 – 20	**Medium** *Reduce N Rate*	**60**
21 – 25	**Medium - High** *Reduce N Rate*	**90**
≥ 26	**High +** *No Additional N Needed*	**

[1] These credits apply only for corn and MRTN nitrogen rates.
** Soil contains adequate available nitrogen for growing the corn crop. No additional nitrogen is needed.

(Reference chart was copied from: www.anr.msu.edu/news/michigans_soil_nitrate_test_for_corn by Dr. Darryl Warncke's article in 2009. These data are based on "maximum return to nitrogen (MRTN)" or "economic optimum N rates". MSU is using these recommended rates for Michigan corn production.

Michigan farmers who grow corn can save money by using the PSNT without reducing corn yield. The test is not difficult to do and can be done by anyone on the farm. It is important however, that you take your sample at the appropriate time to assure the nitrogen information is correct. Contact MSU's Jon Dahl (dahl@msu.edu) at the Soil and Plant Nutrient Lab (SPNL) to learn more.

Sidedress Time is a Critical Period to Evaluate Your Corn Crop—By Bruce MacKellar

If you are like me, just getting crops in the ground and off to a good start can be a battle. But evaluation of corn during the sidedress nitrogen application pass in the field can be critical to diagnosing and addressing problems that can set the stage for yield losses. At early side-dress time, the corn plant has switched from relying on its seed reserves for nutrients to relying on its root system. If your starter and/or pop-up fertilizer program has worked, you should continue to see rapid growth and good color in your fields during this period. But sometimes growers are horrified to discover reduced stand counts and uniformity. There can be several culprits:

1) Insect damage to the root system. White grubs, often from Asiatic Garden Beetles, can feed on the developing root system. Symptoms often show above ground as rapidly developing stand unevenness, occurring before the period when corn rootworm typically happens. Pull plants and examine root hairs for feeding. There are no effective rescue treatments. If you see excessive grubs during field prep, use soil insecticides.
2) Patches of missing plants occurring down the row. This situation is typical of Sandhill Crane feeding damage. Look for "gooney bird" tracks. Cranes pull out the developing seedling (often from the same fields each year), leaving the excavated plant on the soil surface. If replanting, consider applying Avipel as a planter box treatment in these areas. It causes discomfort for the cranes when they ingest the seed, deterring feeding.
3) Cutworm clipping. Might be too late by this point to diagnose. Look for plant carcasses and clipped stems.
4) Sidewall compaction of the seed channel: This wet spring may have led to more issues than we would like, especially on heavier soils. Corn seedlings sometimes cannot break through the compaction zone. Roots will often remain in the slot channel. This restricts water and nutrient uptake potential. Dig up the roots and examine root growth characteristics.
5) Herbicide Injury: Look for patterns - is there sign of overlap injury on headlands and regular patterns on edges of sprayer passes? Does the injury stop at the first tank, or does it peter out as the application went on?
6) How weed-free is the field? Look at species, escapes, and weed size. Is a post program necessary?
7) Are there signs of nutrient deficiencies? Different soil types and too little or too much water may be a factor. Make note of patterns and the portion of the plant showing discoloration. On lighter soils, yellow striping with the most severe plants showing pinkish or reddening leaves with white areas is often magnesium deficiency. Foliar-applied epsom salts may help while the roots develop. Dolomitic lime may help in the future.

Make sure you have adequate nitrogen to produce a realistic yield goal. The Maximum Return To Nitrogen (MRTN) system is designed to help maximize profitability by looking at expected returns to nitrogen application based on the price of corn and fertilizer N sources.

The trick is to be able to estimate how much nitrogen (N) the soil will provide given the environmental and cropping history each year. Dr. Robert Nielsen, Purdue's corn agronomist, says that it takes around 270 lbs. per acre of N to raise a full yield potential corn crop. Soil can mineralize a substantial portion of the N needed for the corn crop, but this is highly dependent on the soil temperature, moisture conditions, and the organic matter content of your soil.

MSU Soil Fertility Specialist, Dr. Kurt Steinke, has outlined the MSU nitrogen fertilizer application rates based on his research for maximum return to nitrogen application below:

Table 1. Suggested N rates for corn grain grown in Michigan at several nitrogen:corn price ratios, 2012.

Soil Productivity Potential[1]	Previous Crop	N:Corn Price Ratio			
		0.05	0.10	0.15	0.20
		Suggested N Rate (lbs. N/acre)			
High/Very High	Corn	**170** 155-185[2]	**150** 135-165	**135** 125-150	**120** 110-135
	Soybean[3] and small grains[4]	**145** 130-160	**120** 110-135	**105** 95-120	**95** 85-110
Medium/Low	Corn	**140** 130-155	**130** 120-145	**120** 110-135	**105** 95-120
	Soybean[3] and small grains[4]	**115** 100-130	**95** 85-110	**85** 75-100	**75** 65-90
Loamy Sands and Sands (CEC < 8.0)	Irrigated – all crops	**210** 195-225	**190** 175-205	**175** 160-190	**165** 150-180

[1] **Low**: average yield = < 135 bu/A; **Medium**: average yield = 136 to 165 bu/A; **High**: average yield = 166 to 195 bu/A; **Very High** = more than 196 bu/A; (average yield is the five-year running average disregarding unusual highs and lows).
[2] Range approximates ± $1 of the maximum return to N (MRTN) rate.
[3] When the previous crop is soybean, the nitrogen credit is built into the recommendation. Do not take any additional nitrogen credit. Nitrogen credits for previously applied manure need to be subtracted from the N recommendations.
[4] Refers to small grains interseeded with leguminous cover crop species. Small grains not interseeded with leguminous cover crop species should default to previous crop corn.

Delayed Planting and Soybean Yields

Planting Date	Wisconsin	Minnesota	Ontario
	%	%	%
May 20	100	97	95
June 1	89	91	90
June 10	75	82	84
June 20	68	70	71
July 1	61	57	57

Table values represent the expected relative soybean yield compared to the expected yield for soybeans planted before May 10th. —MSU Extension

Diagnosing and Responding to Soybean Emergence Problems—By Mike Staton

Early detection and diagnosis of soybean emergence problems is important to achieving high yields. Early detection and diagnosis enables you to minimize yield losses by taking prompt corrective action such as rotary hoeing or replanting if necessary. Soybean emergence ranges from 6 days under ideal conditions to 15 days under more challenging soil conditions. Conditions that can lead to delayed or uneven emergence include:

- cold soil temperatures
- excess soil moisture
- inadequate soil moisture
- soil crusting
- improper seeding depth or uniformity
- poor seed-to-soil contact
- insect feeding and disease infestations

If slow or uneven emergence occurs, dig up the plants and inspect them for signs of disease or insect damage to the root, hypocotyl, or cotyledons.

In most fields, the major insect pests affecting seedling emergence are seed corn maggots, white grubs and wireworms. Seed corn maggot adults lay their eggs in fields where manure cover crops or weeds have been incorporated into the soil within two weeks of planting. If seed corn maggots have reduced the stand to an unacceptable level, replanting should correct the problem. The decaying organic material that lured the adults to the field will not be attractive two weeks after incorporation. Seed treatments containing imidacloprid, clothianidin, permethrin and thiamethoxam will provide additional protection from seed corn maggots. If wireworms or white grubs are responsible for the stand reduction, the seed will need to be treated with thiamethoxam, permethrin, or clothianidin prior to replanting.

Phytophthora, Pythium, *Rhizoctonia* and *Fusarium* are the soil-borne pathogens most likely to damage germinating soybean seed. *Fusarium* species are present over a wide range of temperatures and may not kill seed outright, but may cause stunting and root rots later on. *Pythium* is prevalent in Michigan soils and damage is likely when soil temperatures are cool and a heavy rain occurs within 24 hours after planting. Affected plants will have swollen and bent hypocotyls. Replanting when the soil temperature exceeds 60° F should result in satisfactory emergence. Warmer temperatures (75-89° F) and drier conditions are conducive to *Rhizoctonia*. *Phytophthora* is favored by poorly drained soils and warmer temperatures (68-77 °F). If seedlings emerged from the soil but died quickly, *Phytophthora* is a likely suspect. Replant with varieties having specific race resistance or varieties having a high level of field tolerance *plus* a *Phytophthora* seed treatment.

If no insect feeding or disease symptoms/lesions are present, determine if the surface of the soil has developed a crust. If a crust exists, consider using a rotary hoe to break up the crust. To prevent damage to emerging seedlings, avoid rotary hoeing when the plants are in the "crook" stage and for three days after this brittle stage occurs. Large soybean seed is more likely to experience emergence problems in crusted soils than small soybean seed due to the larger cotyledons. Soybeans planted in 30 inch rows are more likely to emerge from crusted soils than beans planted in narrow rows as the closer seed spacing within the row enables the emerging seedlings to crack the crust. Seedlings that have lost only one cotyledon when emerging from crusted soils will produce normal yields. When both cotyledons are pulled off during emergence, yield losses will be significant.

If insects, diseases, and crusting are not the problem, determine if the planting depth is correct (1 to 1.5 inches deep) and uniform. Check to see that soil is firmed around the seeds. Some varieties may not emerge well when planted at depths greater than two inches. If serious planting problems are found and the stand is not adequate, the field may need to be replanted.

If no planting problems are detected, and the seeds/seedlings look healthy, insufficient soil moisture is the likely cause. Wait until a rain occurs and recheck the field.

When deciding if replanting is warranted, always compare the yield potential of the existing stand to that of the replanted stand and account for all replanting costs. Also consider the following information when making replant decisions:

- Yield losses of 0.4 of a bushel per acre per day have been shown to occur when planting is delayed after mid-May
- Uniform stands of 100,000 plants per acre in narrow rows and 80,000 plants per acre in 30 inch rows have the potential to produce good yields
- Seed for high-yielding varieties may not be available for replanting
- Over-seeding thin stands rarely improves yields

Jim Hilker Outlook: December 2013 Corn Futures (As of 4/30/2013)

There is a 10% chance that the price will be higher than $7.22 and a 10% chance that the price will be less than or equal to $4.10. This indicates that there is an 80% probability that the price will fall between these two prices. There is a 50% chance the price will be less than or equal to (or greater than) $5.43.

Efficient Irrigation Application Volumes Change Throughout The Growing Season

By Lyndon Kelley and Steve Miller

Maximum economic yield with minimum amount of irrigation is a goal for most irrigators. Efficient irrigation water use means providing enough water to avoid drought stress, but not so much that water is lost out of the rooting zone or to runoff. This includes leaving enough water holding capacity to capture the next normal rainfall thus not losing the value of rainfall.

Early in the season our irrigation goals are often focused on germinating seed, incorporated fertilizers, or soil-applied herbicides. In a "normal" year, May and early June often receive adequate rainfall to meet the developing crop's water needs, and plant roots will grow into moisture that is stored deeper in the profile. Chances of receiving additional rainfall are rather good then, so irrigation applications are kept to a minimum with the hope that nature will provide water soon. Rooting depth is not fully established at this point, increasing the potential of overfilling the soils water holding capacity in the rooting zone. Thus, small applications at this point are ideal.

Our irrigated sandy loam soils require about half an inch of irrigation to wet the soil profile down five to six inches. A single half inch application is often enough to germinate seed, assist in emergence (alleviate crusting), and incorporate fertilizers and soil-applied herbicides. Heavier loam soils may need 0.7 inch to 1.0 inch of water to wet the top 6 inches of soil to do so.

By mid-June the crop is near its full rooting depth, increasing the effective water holding capacity and lowering the potential of loss below the roots. At the same time, the potential for rainfall decreases and crop water use increases, allowing producers to increase their application volume to the 0.75 inch per application range. Typical crop water use would be 0.15 inches per day, making one 0.75 inch application last about five days. By late June, corn nears its stage of peak water use. Irrigators' goals switch to maximizing water to the root zone. Potential to lose water below the root zone lessens. Transpiration is more effective use of water than evaporation from soil or leaf surfaces, providing an opportunity for irrigators to maximize effective water use by minimizing the time they wet the plant leaf and soil surface.

Coming into this period, irrigators may want to concentrate on "closing in on the soil capacity" by nearly filling the rooting profile to capacity, leaving just enough room for predicted rainfall. This is especially true for producers close to or short on irrigation water capacity. 'Close to capacity' could be defined as not having the ability to meet daily water removal, 0.25 inches per day or five gpm pump capacity, for every irrigated acre served by the water supply.

Daily E.T. for many crops last summer exceeded 0.30 inches per day for several days in early July. Maintaining an adequate reserve of soil moisture is a good insurance policy to help plants manage plant stress. To build in a reserve for withstanding plant stress, irrigators should maintain high moisture levels during peak water use periods with enough room to capture one-inch of rainfall. If irrigation capacity is low, the grower should start irrigating prior to peak use or during rainy spells to build moisture level. In 2012, many irrigators started too late and could never regain good soil moisture level. If you have the capacity to provide one inch every three days, you can afford to gamble on receiving rainfall. Starting late can lead to poor irrigated yields.

At times of peak water use in the buildup phase, the application volume could be as large as 1.50 inches for four to five days of water use. The plant most effectively uses water for temperature control through transpiration. Water that is lost from evaporation at the soil surface or on the leaves is far less beneficial to the plant, providing only a temporarily cooler environment. Some crop producers will negate the benefit of watering by applying too small of an amount of water for it to reach the root zone. Compare making five, one-inch applications during the peak water use period compared to making 10 half-inch applications. Assuming 0.10 inches of evaporation loss from the soil surface and foliage, making five one-inch applications means 0.5 inches more water gets to the root zone.

Late season applications are reduced to 0.50 inches at a time as water use declines with increasing crop maturity. At dent stage, corn water use may be just 0.15 inches per day on a 75 degree day. Chances of receiving rainfall increases dramatically during this portion of the season. Applications of 0.75 inches at the beginning of this period may quickly decline to 0.50 inch as the crop nears black layer or maturity.

In some cases irrigation equipment may apply water faster than it can infiltrate the soil. Smaller application volumes reduce potential runoff or uneven application. Irrigators may say application greater than 0.30 - 0.40 inches seems to run off. Reducing application rates to prevent runoff is more efficient than potential evaporation losses, so more frequent but smaller applications could help. Sprinklers with larger wetted diameters will have less runoff issues. Matching sprinkler performance to field/soil conditions and leaving more residue on the surface can reduce potential runoff.

Crop water use (E.T.) estimates can assist producers in irrigation decision making. A good source of E.T. rate charts by Univ. of Minn. (FO-01322) can be found at http://www.extension.umn.edu/distribution/cropsystems/DC1322.html. Visit http://www.egr.msu.edu/bae/water/ or the St. Joseph Co. MSU Extension Irrigation webpage for more resources.

Correcting Manganese Deficiency in Soybean

By Mike Staton

Foliar applications of one pound of actual manganese (Mn) in 20-30 gallons of water per acre will alleviate deficiency symptoms in 4 to 6 inch tall soybeans. When deficiency symptoms are severe or if the plants are taller than six inches, apply 1.5 to 2 pounds of manganese per acre or make a second application 10 days to two weeks after the first. Manganese sulfate is the preferred choice (except when tank mixing with glyphosate) as it is one of the most effective and least expensive manganese sources. It is quite soluble and offers greater crop safety than the chelated forms of manganese when applied at comparable rates. Applying glyphosate and manganese separately is recommended. Apply manganese sulfate 7-10 days after glyphosate.

Some producers have experienced mixing and plugging problems when using products marketed as manganese sulfate (some of these are actually manganese oxysulfate which is much less soluble). The first step to preventing these problems is to check the solubility, analysis, and color of the material before purchasing. True manganese sulfate fertilizers are cream colored or light pink, contain less than 32% Mn, and are highly soluble (>99%). The powdered formulation of manganese sulfate is more soluble than prilled formulations.

Adding ammonium sulfate to the tank prior to adding manganese sulfate will improve solubility in hard water or water having a high pH. Some producers have premixed manganese sulfate into a suspension prior to adding it to the tank. Plugging problems can be significantly reduced or eliminated completely by maintaining good agitation until the tank is emptied and by flushing the sprayer tank, lines and nozzles with water immediately when finished spraying.

Tank mixing manganese and glyphosate is not recommended, as doing so can reduce the performance of components. Though not recommended, some producers may tank mix to eliminate a trip across the field. If you tank mix manganese and glyphosate, use the chelated manganese carrier (Mn-EDTA). Add ammonium sulfate (17 lbs. per 100 gallons) to the water followed by glyphosate and then Mn-EDTA. Mn-EDTA must be applied at lower rates (less than 1 lb. of manganese/acre) to avoid burning leaf tissue; more than one application may be required.

Jim Hilker Outlook: November 2013 Soybean Futures (As of 4/30/2013)

There is a 10% chance that the price will be higher than $14.61 and a 10% chance that the price will be less than or equal to $10.04. This indicates that there is an 80% probability that the price will fall between these two prices. There is a 50% chance the price will be less than or equal to (or greater than) $12.11.

Scouting Southwest Michigan Felds for Palmer amaranth in 2013 — By Christy Sprague, PhD

It has been almost three years (fall 2010) since Palmer amaranth resistant to glyphosate (Roundup) and ALS-inhibiting herbicides was first reported in Michigan. Initially, populations of this weed appeared to be localized to parts of St. Joseph and Kalamazoo counties. However, last summer more populations of Palmer amaranth were confirmed in nine Michigan counties: St. Joseph, Kalamazoo, Cass, Barry, Ionia, Clinton, Shiawassee, Gratiot, and Livingston. This weed is not native to Michigan and with resistance to glyphosate and other effective herbicides this weed is undoubtedly the toughest that Michigan growers have ever faced. In fact, in many Southern states where this weed is a problem, reports show the average increased cost to manage this weed ranges from $30 to $50 more per acre.

Some of the initial cases where glyphosate-resistant Palmer amaranth in Michigan was confirmed were in fields that had been spread with dairy manure. We have speculated that Palmer amaranth seed was brought in as a contaminant with cotton seed that was fed to dairy cattle. This may not be surprising when you consider the hundreds of thousands of cotton acres that are infested with glyphosate-resistant Palmer amaranth in the southern United States. While this may help establish the origins of some of these initial reports, once Palmer amaranth establishes itself, it is extremely difficult to control and seed can be moved from field to field with equipment and by other means.

It is essential for all growers to scout for Palmer amaranth in their fields. In areas where Palmer amaranth has not been confirmed, scouting efforts should be targeted in Roundup Ready fields that have been spread with manure in the past couple of years. If initial glyphosate applications are not controlling pigweed, it may be Palmer amaranth. It is important to get confirmation of this early to allow for potential management with herbicides or hand-weeding prior to seed production. *Remember* one female Palmer amaranth plant can produce an average of 400,000 seeds. In many cases if Palmer amaranth is identified early in its first year of establishment there may only be a few plants scattered throughout the field. Early identification and removal of this weed before it produces seed and spreads throughout the field is extremely important.

To help with the identification of glyphosate-resistant Palmer amaranth, we have developed two fact sheets *"Keys to distinguishing Palmer amaranth from other species"* and *"Palmer amaranth in Michigan: Keys to Identification"*. These fact sheets can be found on our website www.msuweeds.com. See the table on page 7 to help learn helpful ways to distinguish Palmer amaranth from other pigweeds and from waterhemp.

(continued from page 6)

	Palmer amaranth	Powell amaranth	Redroot/ smooth pigweed	Waterhemp
Seedling leaf hair	yes	no	no	no
Stem	smooth	hairy	hairy	smooth
Petiole length	long (>1X leaf length)	short	short	short
Spiny bracts	yes (female)	no	no	no
Seed head	unbranched	branched, 4-8"	branched, 1-2"	unbranched

This table is from MSU Extension bulletin ***MSUWS03-2013***

Seed Corn: Crop Management Explorations

By Jon Zirkle

Seed corn is a different animal, having many management intricacies that take time to master. That said, there are a number of research topics that could be examined to continue achieving yield goals and improving efficiency in raising seed corn. Here are a few crop research questions that we at MSU Extension could be exploring, possibly with your help in your fields:

A better understanding of unique water needs and how they differ for seed corn as compared to commercial corn. After detasseling and male row destruction, there is clearly a reduction in biomass out in the field. Can we measure these differences and tailor our water needs accordingly after these steps have been taken? On-farm research could help look at this question.

Examination of changes in root architecture. It could be insightful to do some in-field measurements of root mass dynamics of male and female plant components, assessing how the architecture of the system changes and uses water and fertilizer differently after detasseling and male row destruction. Some exploration could be done with a backhoe to take some samples this summer.

I'm sure there are other research questions out there. Contact MSU educators and check off groups listed in this newsletter if you would like to collaborate on such explorations. And I wish all the best in these future explorations: I have accepted another position beginning May 20th. It has been an honor working in southwest Michigan. Send me an email (zirklejo@anr.msu.edu) if you would like personal contact information so that we can stay in touch.

Improving Center Pivot Irrigation System Uniformity

By Lyndon Kelley

Irrigation system uniformity is the ability of an irrigation system to apply even amounts of water to all areas within an irrigated field. In simple terms, if the producer's goal is to apply one inch of irrigation water, the system will apply one inch of irrigation water in each area. Areas of the field that receive under or over the goal will receive under or over the goal for all applications, multiplying the error.

Sprinklers that over and under apply water by 40 percent will receive 0.6 inches (if under) or 1.4 inches (if over) of irrigation water each time the system attempts to apply one inch of water. By the end of the season, areas requiring eight inches of irrigation water will receive 4.8 inches (if under) or 11.2 inches (if over) of irrigation water. To compensate for the lack of uniformity, producers often apply enough water to prevent drought symptoms in the under-watered areas, leading to over application elsewhere. By improving system uniformity, producers can reduce overall water use. With the example above, if 100 lbs. per acres of nitrogen is applied via the irrigation system, some areas will receive 60 lbs. and others 140 lbs.

Irrigation system uniformity evaluation is conducted by sampling the output from a system and identifying areas of the sprinkler package that need improvement. Many machines operate at about 75 percent uniformity, making 10 -15 percent improvements in efficiencies achievable. Most common correction is made in the zone of interface between the end gun and the sprinkler package water supply. With proper adjustment of the end gun and a careful match between water supply volume/pressure and the sprinkler package requirements, almost all center pivot irrigations can achieve a 90 percent rate of uniformity of application or higher.

As an MSU Extension irrigation educator, I have worked with application uniformity for almost two decades and have found very little system uniformity performance differences between newer and older systems. In Michigan and Indiana, equipment wear is minimal. The issue of low performance more likely depends on whether the system was assembled correctly when installed and if the sprinkler package was designed for the water supply volume and pressure delivered to the system.

MSU Extension, working in cooperation with the Michigan Groundwater Stewardship Program, has been teaching technicians, producers, agency personnel and farm employees a procedure for evaluating irrigation system uniformity since 2004. Several Conservation District offices offer these evaluations as a service to irrigators. Learn more about the procedure, view example results from previous trainings, or download the irrigation system uniformity spreadsheet from the irrigation page found at www.msue.msu.edu/stjoseph/.

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IMPORTANT: Please Read
Questions? Call Mike Staton
at 269-673-0370 or e-mail
staton@anr.msu.edu

IN THE ROW
Corn & Soy Newsletter

Online MSU Extension and Agriculture Resources:

MSU Extension Home Page
http://msue.anr.msu.edu/
MSU Extension Field Crops Page
http://fieldcrop.msu.edu/
St. Joseph Co. MSUE Web Page
http://www.msue.msu.edu/stjoseph/
MSU Farm Management (FIRM)
http://firm.msue.msu.edu/
MSU Weeds and Herbicides
http://www.msuweeds.com
MSU Field Crop Pests
http://www.msuent.com
MSU Soil & Plant Nutrient Lab
http://www.css.msu.edu/SPNL/
MSU Diagnostic Services
http://www.pestid.msu.edu/
MSU Extension Bookstore (bulletins, etc.)
bookstore.msue.msu.edu
Midwest Cover Crop Council
http://www.mccc.msu.edu

List of Upcoming Events:

June 18, 2013
Pasture Walk – Location: Mike and Linda Klooster farm, 6573 E. North Avenue, Kalamazoo MI 49048. For more information contact MSU Extension Educator emeritus Maury Kaercher (269-569-9592) or MSU Extension grazing educator Jerry Lindquist in Osceola County (231-832-6139)

June 19, 2013
Branch/St. Joseph County MAEAP Farm Field Day – 5:30 - 9:00 p.m. at Mark Hacker Farms, 1275 Mendon/M-60, Athens, MI. For more information call 269-467-6336.

*Stay tuned for details about the **2013 MSU Weeds Tour**

July 16, 17 & 18, 2013
MSU Ag Expo, July 16 & 17: 9 am-5 pm; July 18: 9 am–3 pm. Questions? Please call 1-800-366-7055.

August 21, 2013
Center for Excellence 2013 Field Day. 8 a.m. to afternoon (includes lunch) - Bakerlads Farm, located on Cadmus Road, east of Morey Highway near Clayton, MI. Call 517-263-7400 for details.