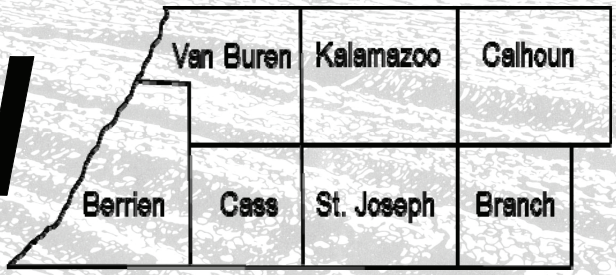
IN THE ROW



Volume 1 Issue 3 June, 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 Linda Towles at (269) 467-5511 if you prefer to receive the newsletter via e-mail.

Sincerely,

Mike Staton Bruce MacKellar Lyndon Kelley Dale Mutch

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Corn Marketing Program of Michigan

Michigan Soybean Checkoff
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Double Crop Soybean Recommendations

Mike Staton

Planting double crop soybeans is not recommended in Michigan due to the high risk associated with this practice. Soil moisture is the most critical factor to consider as most double crop failures are caused by a lack of moisture "If June is dry, do not try" is a good quote to remember.

The following management practices will increase your probability of success with double crop soybeans:

- Understand the rotation restrictions for all herbicides applied to the wheat crop.
- Harvest the wheat as soon as possible. Wheat can be harvested at 18 to 20% moisture without damaging the kernels and safely dried using natural air or low temperature drying systems.
- Chop or bale the straw. Chopped straw must be spread uniformly.
- Leave 8 to 10 inches of wheat stubble. This forces soybean plants to set pods higher.
- Select varieties that are one half to one full maturity group earlier than the recommended full-season varieties for your area.
- Choose tall, small-seeded varieties if possible.
- Plant as early as possible and always before July 10th. At this time of the year, soybeans lose one bushel per acre of yield potential for each day planting is delayed.
- Plant with a no-till drill or planter into untilled wheat stubble to conserve soil moisture and save time.
- Plant in narrow rows (15 inches or less) and use higher seeding rates (225,000 seeds per acre with a drill and 180,000 seeds per acre with a planter) to facilitate faster canopy closure and increase the height of the lowest pods.
- Select fields having few stones or consider rolling the fields after planting to reduce the potential for cutter bar damage when harvesting shorter plants.
- Select wheat fields that have received herbicide applications or have very little weed pressure.
- Never plant double crop soybeans in fields infested with soybean cyst nematodes.
- Control existing weeds at planting and have a strategy for controlling weeds in the crop.

By planting double crop soybeans you are adding another soybean crop to your rotation. This can decrease future soybean yields due to higher levels of soil-borne diseases and soybean cyst nematodes.

Late-Season Nitrogen Effects on Soybeans

Mike Staton

Researchers at Kansas State University compared three nitrogen fertilizers (UAN, urea and ammonium nitrate) at three application rates (0, 20, and 40 lbs. N/ac) in 1994 and 1995. All fertilizer treatments were applied between R3 and R4 and all eight locations were irrigated. Nitrogen fertilizer significantly increased soybean yields at six of the eight sites. Adequate nodulation was confirmed at all sites.

Table 1. Effect of late-season N rate and source on irrigated soybean yields (Wesley et al.)

N Rate	N Source	Average Yield (bu/ac)
0	—-	55
20	UAN	62
40	UAN	58
20	AN	61
40	AN	61
20	Urea	63
40	Urea	64
20	Urea + NBPT	64
40	Urea + NBPT	65
LSD 0.1		6

Because of this information, the SMaRT program conducted two trials in 2011 and one trial in 2012 to determine if late-season nitrogen applications could be profitable in Southwest Michigan. The cooperating farmers applied 21 lbs./ac of actual N at all sites. In 2011, ammonium sulfate was applied at one site and UAN was applied at the other. In 2012, ammonium sulfate was applied. Nitrogen fertilizer did not significantly increase soybean yields in these trials (table two). Our application timing may have been too early (R3 in 2011 and R2 in 2012) as root nodules are active midway through R5.

Table 2. Effect of late-season nitrogen application on irrigated soybean yields in St. Joseph County .

N Rate	Average Yield (bu/ac)
0	70.6
21	71.4

Further research is needed to see if late-season nitrogen fertilizer applications are profitable in our irrigated soybean production systems in Southwest Michigan. Please contact Mike Staton at (269) 673-0370 ext 27 if you would like to conduct a late-season nitrogen fertilizer trial in 2013.

Management of White Mold in Soybean

Martin Chilvers, Field Crop Pathologist, Michigan State University

The disease white mold or Sclerotinia stem rot, caused by the fungus *Sclerotinia sclerotiorum* is a significant problem across the North Central production region. The incidence and severity of this disease can vary greatly depending on environmental conditions. Will this be a white mold year? We'll have to wait and see. Unfortunately there are no silver bullets for white mold control, there are no varieties that are completely resistant and fungicides do not provide 100% control. However, developing a management plan based on knowledge of field history and best disease management practices can help reduce losses.

Factors that favor white mold development include: a history of white mold disease in the field, a high yield potential crop with a dense canopy, use of a susceptible variety, narrow rows, high plant populations, and cool moist conditions during flowering. Three factors must come together for white mold disease, presence of the pathogen, presence of a susceptible host and suitable environmental conditions.

Early signs of the fungus that causes white mold can sometimes be found in fields, but the common birds nest fungus is easily and often confused with the white mold mushroom. Spores produced by the white mold mushrooms are carried on air currents and land on flower petals, which is where disease initiates. Identification of disease late in the season is relatively simple. As the name suggests white cottony mycelia (fungal threads) can be found on infected plants, lesions will appear water soaked at first and stems will appear shredded as they dry out. Sclerotia which are the resting body of the fungus and are the approximate size and shape of mouse droppings will be readily produced on and in infected stems and pods. Studies have shown that for every 10% of plants infected in a field yield is reduced by 2-5 Bu/A. White mold infection can also reduce seed quality, price discounts may occur due to the presence of foreign material (sclerotia) and the oil and protein concentrations can also be negatively affected.

Once disease symptoms are present in a crop it is too late to save infected plants. If fungicides are to be used they should be applied in July at the beginning of flowering (R1) with a possible follow up application a week or two later. Research shows that fungicide applications at beginning of flowering provide a higher level of control than those made at beginning of pod development. As the disease cycle is dependent on infection through flower petals it is essential to get fungicide on to protect flowers, this include correct timing as well as good penetration of fungicide product deep into the foliage.

If soybeans are being produced under irrigation consider minimizing favorable conditions for disease development during flowering. Infrequent heavier watering is better than frequent, light watering. Apply only enough water for adequate growth during flowering and increase water application as necessary after flowering.

Minimum and no-till operations tend to keep the white mold sclerotia near the soil surface where they rapidly degrade. Tillage can bury sclerotia enhancing their survival. Sclerotia are capable of surviving in soil for up to 10 years. There has been interest in the use of biological control agents such as Contans, these products can fit into a white mold management strategy by reducing the number of sclerotia that survive in the soil.

In managing white mold consider the following core management recommendations:

- Maintain field records to know where losses are occurring and identify problematic fields, that may require special management
- Select varieties with the highest level of resistance
- Consider adjusting cultural practices, such as row with and populations to enhance air flow and minimizing that cool moist microclimate that often develops beneath the soybean canopy
- Rotate with non-host crops such as corn and wheat
- Fungicides may form part of a management practice, but they will not completely control disease, keep replicated checks (non-sprayed areas) in the field to monitor disease control
- Biological control can be used as part of a management strategy to reduce sclerotia load in the soil
- If irrigating, reduce irrigation frequency during flowering

For more information an article discussing white mold management produced by the North Central Soybean Research Program can be found at: http://www.planthealth.info/pdf_docs/WhiteMold_NCSRP.pdf

Evaluating Soybean Nodulation

Mike Staton

Because biological fixation supplies most of the nitrogen for soybeans (50 to 70%), producers should evaluate their soybean stands to determine if nodules are present in sufficient numbers and active. This is easy to do and the information gained can be used to correct an in-season nitrogen deficiency or develop strategies for improving nodulation the next time soybeans are grown in the field.

You can begin checking roots for nodules any time after the V3 growth stage. However, the best time to sample is about 6 to 7 weeks after planting. The nodules will be large and active by this time and supplemental nitrogen fertilizer can still be applied if needed. Always use a shovel to carefully remove as much of the root system as possible from the soil. Dig up at least 10 plants from representative areas in each field and immerse the roots in water to remove the soil.

There should be at least eight to 20 large and active nodules per plant at R1. Nodules that are actively fixing atmospheric nitrogen will be pink to red when cut open. If the nodules are white, they are immature and have not begun fixing nitrogen. Green, brown or mushy nodules are no longer fixing nitrogen. If you find mushy nodules and the field has not been flooded, look for small white maggots (larvae of the soybean nodule fly) in the nodules. The soybean nodule fly is a minor pest but was found in Ingham County in 2011.

Poor nodulation and nitrogen fixation are most likely to occur in the following situations:

- New soybean fields, due to low bacteria populations
- Fields containing high levels of residual soil nitrogen from a previous forage legume or manure application
- Coarse-textured soils due to high temperatures and inadequate moisture levels to sustain bacteria
- Flooded or saturated conditions lasting seven days due to oxygen deprivation
- Soil pH below 5.8 or above 8.0
- Compacted soils due to a lack of oxygen

Fields showing nitrogen deficiency symptoms (light green and stunted plants) due to low nodule numbers or activity will respond to supplemental nitrogen. Applying 60 to 70 lbs. of actual nitrogen per acre will provide an economic return (8 to 10 bushel per acre). Apply the supplemental nitrogen between the R1 and R3 growth stages. Liquid fertilizers will damage the foliage at this application rate so dry materials are recommended. Consider adding a urease inhibitor to reduce volatilization losses when applying urea.

Come and Join Us at the IPM BREAKFAST in Centreville, Michigan Every Tuesday!!

Dale Mutch

Last year corn and soybean prices were the highest I've witnessed in my career. These field crops are very important to landscape in southwest Michigan. As crop commodity prices increase, it becomes even more important to know what conditions are in your fields. Knowing the pest situations and their thresholds can maximize your profits.

Integrated pest management (IPM) is an important practice for corn and soybean farmers in southwest Michigan. Scouting your fields for pests will enhance your ability to determine if the level of the pests justifies a treatment to control them. Scouting and communicating with other individuals/experts can assure that you are aware of potential problems in your fields. Fortunately, in southwest Michigan there are several agribusinesses and private consultants that offer Scouting. Farmers can also learn to scout their own fields.

Several years ago Michigan State University Extension (MSUE) in St. Joseph County conducted an IPM breakfast to help farmers, consultants, agencies and agribusinesses to become more informed about pest outbreaks in southwest Michigan. At these IPM breakfasts' participants discussed pests, their economic thresholds and other potential problems to look for down the road. Knowing your pests and their economic thresholds can help you to target your pest control methods.

I'm excited and happy to say that the MSUE, St. Joseph County office has re-initiated the IPM breakfast for the growing season of 2013. In collaboration with Kent Feldman of Co-Alliance, the IPM breakfast will be held every Tuesday at **The Amish Table at 7:00 AM Centreville, MI 49032**. I know this is early in the morning but what's better than having good conversation about corn and soybeans with experts across the region, eating breakfast and sipping on your coffee. We are trying to bring in specialists in the IPM disciplines to attend each breakfast meeting so individuals can get their questions answered.

The IPM breakfast will enhance MSUE to develop programming needs for Southwest Michigan in the future. I hope you can attend one or all of these IPM breakfasts' this season. I also look forward to seeing you and I can guarantee you won't go away mad or hungry. For more information please contact the St. Joseph County MSUE Office at (269) 467-5511.

Keep a Lookout for Western Corn Rootworm Resistance to Bt on your Farm

Article modified from Managing Western Corn Rootworm Resistance to Bt Corn on the Fringe, written by Field Crop Entomologist Dr. Chris DiFonzo

Resistance and rootworms is not a new topic. In fact, rootworms are one of the few pests that have developed a behavior change that made them resistant to crop rotation, one of the oldest pest management strategies in use today. Then in 2003, Bt-rootworm corn was introduced, and for a while managing for the pest without using soil insecticides became easy. However, as with many things in agriculture, nature has a nasty habit of finding a way to circumvent our best strategies. Performance problems with the Cry3Bb1 rootworm event began in Southern Minnesota and Eastern Iowa in 2009. (The Cry3Bb1 event is used in YieldGard Plus, VT Triple, Genuity VT Triplepro, and is one of two events used as a part of the multi-trait pyramid in Smart-Stax). The number of fields reporting significant damage increased in 2010 and 2011 and has been reported in isolated areas in Colorado, Illinois, Kansas, Missouri, Nebraska, South Dakota and Wisconsin. These high pressure hotspots share a few common characteristics in their cropping history: planting multiple years of continuous corn and using same rootworm resistance trait (Cry3Bb1) year after year. There is little crop diversity in these areas of the central corn belt, with corn and soybean production dominating the landscape in the areas and the population of corn rootworm beetles are high.

In Michigan, there is more crop diversity (wheat, alfalfa, vegetables, etc.) and lower overall rootworm pressure. It is thought this is the reason why there have not been reports if Cry3Bb1 rootworm resistance in the eastern corn belt to date. University extension field crops entomologists have devised a strategy to help you to keep rootworm resistance from developing on your farm.

The main components of the plan include: scouting, rotating your crops and removing volunteer corn in soybean fields. **Scouting:** The most typical sign of severe corn rootworm feeding is goose-necked corn or lodging. But before these symptoms occur, we have had high populations of corn rootworms in that field the season before. The trick is to be able to observe the warning signs of high rootworm activity during the last season to catch populations on the increase. **Begin looking early.** It is important to scout your fields starting about 1-2 weeks prior to tassel emergence through silking. **Be on the lookout for goose-necked corn.** Goose-necked corn occurs when rootworms feed on the corn root mass, removing enough that the plant falls over. As the plant recovers, the stalk bends up to orient the plant in an upright position. Dig up a few plants, and wash the root masses off with a high pressure hose or pressure washer. Rootworm damaged roots will show signs of feeding by removal of clusters of roots. Visually inspect the field, checking for elevated numbers of corn rootworm beetles. There will usually be a few. In fields that are developing resistance, you will not have trouble finding them. **Window pane leaf feeding symptoms:** Beetles that emerge before silking will also often feed on leaf cuticle tissue. Keep an eye out for streaks of feeding on leaves that show "window pane" feeding symptoms. These look like areas where the green tissue has been removed, leaving only a thin strip of the waxy cuticle. **Silk Clipping:** When there are high numbers of corn rootworms, silks are often clipped down to the ear tip. This may or may not impact pollination. If clipping occurs shortly after pollination has occurred, kernel development may proceed normally. Japanese beetles are also aggressive silk clippers, so scout to confirm that WCR beetles caused the damage.

If you find elevated numbers of beetles in your Bt corn field, you can contact your seed company representative or Dr. Chris DiFonzo for help in making sure that the plants are expressing the Bt Toxin. A sample of ground up leaf tissue placed in a vial with a test strip can check for the presence of the toxin.

Recommendations for control: The recommendation for managing Bt resistant rootworms is to **rotate the crop being produced**. This will eliminate the resistant WCR population by denying it a food source. Rootworm larvae need corn roots to survive. Rotating to a soybean field free from volunteer corn will starve the rootworm larvae. Consider rotating adjacent fields as well to reduce the potential for resistant female beetles from moving into these fields to lay eggs. Under this system, you should not need to use soil applied insecticides in corn for control.

Volunteer Corn Control in Rotated Soybeans: For this system to work, your rotated field needs to be completely free of volunteer corn. This means using a non-roundup post emergence grass weed control program to ensure that volunteer corn is controlled.

Southwest Michigan: Growers should also monitor their soybeans fields in August for Western Corn Rootworm activity in soybeans. It is possible that the rotation-resistant WCR beetles may remain active in our area. Populations of the variant in S.W Michigan were limited to the southern two tiers of counties in the western portion of the MI. If your see more than incidental numbers of WCR beetles in you soybean fields you intend to rotate to corn, a soil insecticide may be warranted next spring.

For more information on managing your fields to prevent western corn rootworm Bt resistance on your farm, visit MSU Field Crops Entomologist website at http://www.msuent.com

Corn Leaf Disease Control in Seed Corn Production

Bruce MacKellar

Corn leaf diseases can sometimes cause yield loss in commercial corn hybrids. While most hybrids have been selected for some degree of tolerance for the most common corn leaf diseases, we occasionally see challenges because the environmental conditions are exceptionally conducive to disease development, especially if the hybrid is somewhat susceptible to the disease. However, in seed corn production, the inbred parent lines often do not have the same degree of resistance/tolerance, and significant loss of leaf tissue from disease can reduce yield potential. Factors such as previous crop, temperature, relative humidity and extended periods of leaf wetness all play contributing roles in leaf disease incidence and severity.

Scouting for leaf diseases often begins in earnest when corn is entering the rapid elongation phase, around V8-V9. The goal of early scouting is to look for the presence of disease pustules in fields. As corn approaches tassel emergence, the focus switches to evaluating the leaves around the ear leaf for disease. Most fungicide programs are protective rather than curative, so it is important to scout early enough to apply fungicides before tissue damage occurs in the area of the ear leaf.

The most common leaf diseases found in seed corn production in southwest Michigan that warrant fungicide application include common rust, northern corn leaf blight, and gray leaf spot. Because so much of the leaf tissue is removed in the de-tasseling process, fields are generally scouted regularly for these diseases, and fungicides are applied at a much lower incidence and severity level than for commercial corn. Environmental conditions conducive to development of diseases are listed below:

Common Rust:

- Pustules are small, round to oval in shape, reddish brown in color
- Overwinters in Texas and Mexico, blows north each June/July
- Generally a silking time disease
- Cool temperatures (60F-75F), heavy dews, high relative humidity's
- 6 hours of moisture needed for spore infection
- Spray protectants early before disease spreads on leaves

Northern Corn Leaf Blight:

- Lesions are long oval, cigar shaped, may be "fuzzy" underneath
- Overwinters on corn leaf debris, more of an issue on continuous corn
- Occurs after silking, significant yield damage occurs when infection is early
- Most prevalent following warm, wet periods
- Moderate temperatures (66F-80F), prolonged leaf wetness from dews

Gray Leaf Spot:

Starts as water soaked or light brown spot with yellowed halo lesion, progresses to necrotic lesions bound by leaf veins, giving a "checked" appearance.

Overwinters on corn debris, more of a problem on continuous corn or where minimum tillage is used.

Infection tends to "move up the plant", starting on the lower leaves

The most damaging infection periods occur 2-weeks prior to 2 weeks after pollination. Subsequent infections usually cause much less yield reduction.

Later planted fields are more at risk for infection

Most prevalent in hot conditions (75F-95F), prolonged wetness, in low air flow areas in fields in inbred lines or susceptible hybrids.

Fungicides: Strobilurin and Strobilurin/Triazole premix fungicides applied at R1 are among the most effective fungicide programs for controlling Gray Leaf Spot and Northern Corn Leaf Blight in the presence of disease. Keep in mind that fungal pathogens have quickly developed resistance to these classes of fungicides in other crops following repeated use, so these important crop protection chemicals should **only** be used when they are needed to protect the crop. Environmental conditions play a key role in the development of leaf diseases. Combine scouting observations with weather forecasts to see if the disease you see in the fields is likely to continue to spread.

Sources: Dr. Kiersten Wise: "Diseases of Corn: Northern Corn Leaf Blight", Purdue University Extension Publication BP-84-W. Purdue Department of Botany and Plant Pathology

Crop Water Use

Lyndon Kelley and Steve Miller

Estimating daily crop water use is an essential skill to irrigation management. Most irrigators strive to maintain adequate soil moisture levels by replacing the water used by plants in transpiration and evaporation from soil surface. Together these are referred to as evapotranspiration or E.T. Estimates of E.T. are deducted from the available water in most checkbook irrigation scheduling programs.

Most E.T. estimates are obtained using water removed by a reference crop and multiplied by a crop specific factor often referred to as Kc. Typical in Michigan and Indiana irrigation scheduling programs is the use of a 6" grass as a reference crop. Western states will often use a 12" alfalfa stand as their reference. The crop factor makes up for the difference between the irrigated crop in your field and the reference crop. Since sun light interception is a major factor in water use, annual crops' Kc will start the season low, often in the 10% range. By peak water use months, most crops achieving full canopy will have Kc values from 100 -120% of the reference crop.

Irrigation scheduling programs use estimates of daily crop water use (ET) to keep track of soil available water using a checkbook type register. Three different checkbook irrigation scheduling tools are available through Purdue or MSU Extension that will adapt to irrigation in the Michiana area.

Irrigation Scheduler is a simple computerized irrigation scheduling checkbook model from the Agronomy Department of Purdue University. This method can be used throughout Michigan and Indiana. Crop specific E.T. values are estimated from the daily high and low temperatures provided by the producer. **Irrigation Scheduler** is available from: www.agry.purdue.edu/irrigation/

Enviroweather computes daily estimate of potential E.T. and projects E.T. demands for 7 days at each of the 58 strategically located weather stations in Michigan calculating crop E.T. using wind, relative humidity, and net solar radiation in addition to temperature to estimate crop E.T. demands. Estimates are available from: from www.enviroweather.msu.edu.

Pick the station nearest to you, and then click on one of the categories listed near the top of the screen (eg. Field crops, Fruit), then click on Potential Evapo-transpiration. Estimate can be used in a simple form of irrigation scheduling. This system works well after crop canopy and full root zone are establish, before that potential E.T. must be adjusted. It will not take into account water lost out of the root zone if the soil water holding capacity is exceeded.

Irrigation Scheduling Checkbook Method – University of Minnesota is an Extension bulletin that explains basic concepts of irrigation scheduling and incorporates them into a paper system that provides support and recordkeeping. This method can be used in all of Michigan and Indiana. Crop specific E.T. values are taken from a table incorporating daily high temperature and stage of plant growth based on the number if weeks after emergence. The bulletin is available through the University of Minnesota or from the web link listed below select "Irrigation" on the left hand side: http://www.msue.msu.edu/stjoseph

MSU Excel Version of Scheduler was developed as a spreadsheet alternative to the web based Irrigation Scheduler V 4.0. It allows greater flexibility and adaptability to the computer savvy irrigator. This method will provide results for all of Michigan and the upper tier counties in Indiana. Reference crop E.T. can be taken from each of the Enviro-weather stations where the program will use crop specific coefficient to adjust for your crop stage of growth. The MSU Excel version of Scheduler is available from**:** http://www.agweather.geo.msu.edu/mawn/irrigation/

Irrigation scheduling is required to be in compliance with Generally Accepted Agricultural Management Practices: http://www.michigan.gov/mdard/0,1607,7-125-1567_1599_1605---,00.html

All of the above mentioned irrigation scheduling tools, plus other irrigation management information is available from: http://www.msue.msu.edu/stjoseph Click the "irrigation" button on the left hand side.

MSU EXTENSION

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DATED MATERIAL

IN THE ROW
Newsletter-

List of Upcoming Events:

June 26, 2013 MSU Weed Control Field Day: Located at the MSU Crops Barn at the corner of Mt. Hope and Beaumont Roads, East Lansing MI Registration fee $25 by June 20, $35 at the door (includes lunch). Field Crops Session 9:00am – 1:00 pm. Afternoon session covers weed control in Horticulture crops. For more information and on-line registration, visit: http://www.msuweeds.com/msu-weeds-com-events/2013-msu-weed-tour/

July 16, 17 and 18, 2013 MSU Ag Expo: Located at the corner of Mt Hope and Farm Lane, Michigan State University Campus, East Lansing MI. The expo grounds are open 9:00 am – 5:00 pm on the 16th and 17th, 9:00 am – 3:00 pm on the 18th. Admission to the event is free. For more information about the 2013 Ag Expo program, visit: http://agexpo.msu.edu/

**Stay tuned for more information on :

Soybean Disease Control Field Day, Late July or Early August- Decatur, MI
Soybean Harvest Equipment Field Day, Last week of September – Martin, MI
MSU Soybean Variety Trial Tour, First Week of September-Hamilton, MI