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Sulfur Fertilization for Soybeans (and Other Grain Legumes)

Dana Rushovich and Ray Weil
Graduate Student and Professor
Department of Environmental Science and Technology

Sulfur is one of the six macronutrients that plants need for growth in addition to nitrogen (N), potassium (K), phosphorus (P), sulfur (S), calcium (Ca), and magnesium (Mg). Sulfur is taken up in similar quantities to P, but has widely been ignored as a part of farmer’s routine nutrient management for several reasons. Historically, S was applied routinely as part of organic amendments such as manure and compost and as an “impurity” in common fertilizers. Until the implementation of the amendments to the Clean Air Act in 1990, S was supplied in sufficient quantities through atmospheric deposition and mineralization of organic S in soils. However, with today’s higher yield agriculture, decreased atmospheric deposition and purified synthetic fertilizers, soils in the mid-Atlantic are becoming widely deficient in S.

Sulfur works closely with nitrogen in grain legume (soybean, bean, pea, peanuts) production. It is essential for nitrogen fixation and protein and oil synthesis. Sulfur is a key component of sulfur containing amino acids (SCAA) cysteine and methionine which are necessary for all non-ruminant animals (people included) to utilize proteins. These amino acids often limit the feed and food value of grain legumes. Grain legumes are second only to grains as the most widely grown crop worldwide and serve as a main protein source for many of the world’s populations as well as non-ruminant animals. Humans (and chickens) cannot synthesize methionine and cysteine and therefore must get it from dietary sources.

Responses in both yield and protein quality (amino acid composition) are most likely in sandy textured soils. However, finer textured soils will also likely become deficient in the coming decades. Sandy soils tend to be low in S because they have little anion exchange capacity (sulfate is held by iron coatings on soils), low organic matter (S is part of soil organic matter and is released during decay much like nitrogen is) and rate of leaching (S leaches away as sulfate anions).

A preliminary survey of MD soybeans by the Weil lab in the Department of Environmental Science and Technology found a wide range of S content and N/S ratios in the seed suggesting that many soils, especially the sandy soils on the eastern shore would be responsive to improved S management. A ratio of nitrogen to sulfur in the seeds greater than about 20 to 1 is often the best indication of sulfur deficiency. The range of seed...
compositions suggests that not all soybeans are alike in their feed or food value, even if their total protein content (or total N content) is similar.

2017 Soybean S Fertilization Trials

In 2017, soybean field trials were conducted at the Central Maryland Research and Education Center at Beltsville. A randomized split plot design with four treatments and 3 replicates per site was used. The four treatments were (1) Gypsum broadcast at time of planting at 500 lbs/acre (2) Epsom applied as a foliar spray at first flowering at a rate of 77 lbs Epsom salts in 30 gallons of water. (3) Combined Epsom and Gypsum (4) Control. Soybean yield measurements were taken with combine and seed samples were analyzed for total S by Inductively coupled Plasma Atomic Emission Spectroscopy (ICP-AES) and for amino acid content.

The results of the 2017 soybean trials showed that on the most responsive sites, S fertilization can lead to about a 15% yield increase and an almost doubling in the essential sulfur-containing amino acid content (Figures 2 and 3).

This year we are repeating the same soybean trials. We also expanded to include studies using edible black bean (Phaseolus vulgarus) to determine if the similar results would be seen in grain legumes that are more commonly eaten directly by people, especially by vegetarians or poor people in developing countries.

We had two field sites for the black beans, one at the Beltsville Central Maryland Research and Education Facility and one at the Upper Marlboro facility. The Upper Marlboro field has a finer textured soil than the Beltsville site. We had four treatments and six replicates at the Beltsville facility and five at the Upper

Figure 1. Results of a sampling survey of Maryland soybeans fields conducted in 2013. (Left) Cysteine and Methionine content vs N/S ration of seed. (Right) Cysteine and Methionine content vs. Total S content of seed.

Want to stay up to date throughout the year and between Agronomy News postings?

Check out the Maryland Agronomy Blog. It is a searchable site that includes past and present articles. You can also subscribe to get emails when new information is posted.

http://blog.umd.edu/agronomynews/
Marlboro facility. Preliminary data from Beltsville shows that the gypsum treatments (G) had an effect on black bean yield, but the Epsom treatments (E) did not have a significant effect on yield.

Standard soil tests used in Maryland (Mehlich-3 extraction) are not thought to be very predictive of where S is needed. We are working on evaluating other soil tests for sulfur. At this time, we suggest that soybeans grown on loamy sand and sandy loam soils without recent manure additions are likely respond to sulfur applications in both yield and quality. Sulfur deficient soybeans generally appear lighter green in the upper canopy, but the symptoms may not be noticeable without a sulfur-fertilized comparison.

While there is currently no premium paid for quality, collaborating farmers’ fields with strip tests have shown an extra 150 to 400 kg/ha (3 to 8 bushels/acre) of soybeans with the application of a foliar spray of Epsom salt at first flowering. We tentatively recommend applying 36 lbs/acre Epsom salt (6 lbs S/acre) at first flowering. Rates as low as 12 lbs of Epsom salts have shown responses and rates as high as 77 lbs/acre Epsom salt (12 lbs S/acre) have also worked.

During extremely hot and dry conditions in the summer of 2018 there was some indication that the highest rate (77 lbs/acre Epsom salt) may have caused additional drought stress.

*Figure 2.* (Left) Soybean yield vs. treatment for 2017 Beltsville Soybean trials. Average of one full season and one double crop soybean study.

*Figure 3.* (right) Amino acid response vs. S treatment in 2017 Beltsville Soybean trials. Averages for one full season and one double crop soybean study.

*Figure 4.* Black Bean yield vs S treatment in 2018 Beltsville field trial on sandy soils. The gypsum treatments (G) had an effect on the Black Bean yield, but the Epsom treatments (E) did not have a significant effect on yield.

**Grain Marketing Update**

**January 10, 2019**

Chesapeake College, Harford County, Somerset County

For more information email sdill@umd.edu or visit [www.extension.umd.edu/grainmarketing](http://www.extension.umd.edu/grainmarketing)
Maryland Department of Agriculture Extends Deadline for Planting Cover Crops to November 12

Maryland Department of Agriculture press release

Due to a late harvest and saturated soil conditions, the Maryland Department of Agriculture has extended the Nov. 5 planting deadline by one week for farmers who have signed up to plant cover crops this fall with the Maryland Agricultural Water Quality Cost-Share (MACS) Program. Farmers now have until Nov. 12 to plant qualifying cover crops of rye, wheat and triticale on their fields.

The extension is only available to farmers who use the following planting methods: no till, conventional, or broadcast with light, minimum or vertical tillage. With the extension, farmers must certify their cover crop with their local soil conservation district within one week of planting and no later than Nov. 19 in order to be reimbursed for associated seed, labor, and equipment costs.

“Extending the planting deadline allows farmers enrolled in our popular Cover Crop program to plant more acres of protective cover crops on their fields this fall in order to control soil erosion, reduce nutrient runoff, build healthy soils, and protect water quality in the Chesapeake Bay and its tributaries,” said Hans Schmidt, the department’s Assistant Secretary of Resource Conservation. “Importantly, the extended forecast calls for mild temperatures which should allow for germination to take place.”

Cover crops are cereal grains that grow in cool weather. They help slow down rainwater runoff during the winter, when the soil would otherwise be exposed, and recycle any nutrients remaining in the soil from the previous summer crop. Cover crops are a key feature in Maryland’s efforts to reduce the amount of nutrients entering the Bay.

Maryland’s Cover Crop program is funded by the Chesapeake Bay Restoration Fund and the Chesapeake and Atlantic Coastal Bays Trust Fund. For more information, farmers should contact their local soil conservation district or the Maryland Agricultural Water Quality Cost-Share Program at 410-841-5864.

Winter Pesticide Storage

Bryan Butler, Agriculture Extension Educator
University of Maryland Extension, Carroll County

Winter will soon be here and the fields dormant and the equipment will be put away till the spring. But one more crucial job remains -- organizing and properly storing unused pesticides.

Proper storage of herbicides, fungicides, and insecticides is important for protecting the health of farmers, homeowners and their families who use these products. It is also important to remember that storing these pesticides correctly protects the environment and preserves the quality of the chemicals.

Pesticides should always be stored in their original container, making sure the product label is legible. Also be sure to maintain a storage inventory to help keep track of unused pesticides.

Keeping an inventory helps you plan for the next growing season so you don’t buy more of one type of product than you need. For the inventory, write down the product name, active ingredients, date of purchase, date of storage, and volume stored.

The storage area should be a secure, well-
ventilated dry area, protected from heat and cold. There should be enough room to keep fertilizers, fungicides, insecticides and herbicides separated. The storage area should be enclosed so leaks or spills can be contained or cleaned without affecting the area’s soil or water quality.

Some other elements of safe storage that must be addressed when establishing a storage area include:

- Proper lighting is obviously important so that products can be located and to reduce the chance of tripping or spilling while selecting the pesticide for the job.

- Ventilation. Ventilation is a must for human health. Ventilation also is important to prevent volatile chemicals from contaminating other materials in storage. Some lawn chemicals are volatile enough to be absorbed by garden fertilizers. Thus possibly turning a fertility product into a herbicide.

- Flammable liquids. Any flammable liquids should be stored outside living areas and away from ignition sources.

- Dampness. Dampness reduces the shelf life of many chemicals and can cause deterioration of metal or paper containers. All fertilizer products are combinations of chemical salts that attract moisture. Some products can absorb enough moisture during winter storage to create a thick syrup in the spring.

- Temperature extremes. Intense summer heat increases the volatility of chemicals, particularly herbicides. Freezing temperatures can cause ruptures in some types of containers. Freezing also can alter the chemical quality of liquid products, reducing their effectiveness. Look for directions on the package label for special storage temperatures.

- Flooding. Pesticides should be stored well off the floor to prevent pesticide contamination if flooding should occur due to heavy rains or spring snowmelt.

- It is also important to keep cleaning supplies near the storage facility or area. At a minimum, these supplies should include rubber gloves, absorbents such as kitty litter or paper towels and a container to seal the used clean-up materials.

As a reminder, Pesticide Recertification and Training have been scheduled, so check the MDA website for a complete list.

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**Agricultural Conservation Leasing Workshops**

Why are conservation practices less common on leased farmland?

*Lack of communication ● Lack of knowledge ● Lack of security in the rental relationship*

These train-the-trainer workshops will give agricultural service providers communication and leasing strategies to help landowners and farmers overcome the challenges of implementing conservation practices on leased farm land. **Interested landowners and farmers are also encouraged to attend!**

**Nutrient Management Continuing Education Credits Available!**

More information and registration available at: [https://agresearch.umd.edu/agroecol](https://agresearch.umd.edu/agroecol)

For questions, translation assistance, and/or special accommodations contact:

Nancy Nunn, 410-827-8056 or nnunn@umd.edu

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<td>1/8/19 8 am – 3 pm Chesapeake College HPAC 177 1000 College Circle Wye Mills, MD 21679</td>
<td>1/17/19 8 am – 3 pm Charles County Soil Conservation District 4200 Gardiner Rd Waldorf, MD 20601</td>
<td>1/23/19 8 am – 3 pm Frederick County Extension Office 330 Montevue Ln Frederick, MD 21702</td>
<td>1/28/19 8 am – 3 pm Baltimore County Ag Center Cockeysville, MD 21030</td>
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This material is based upon work supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, through the Northeast Sustainable Agriculture Research and Education program under subaward number NE18-151.
Do neonicotinoid seed treatments impact soil health and quality in grain crops?

Aditi Dubey, Galen Dively, Maggie Lewis, and Kelly Hamby
Department of Entomology, University of Maryland

Background: As a protection against early season insect pests, seeds from various crops are treated with neonicotinoid insecticides. However, when neonicotinoids are used this way, only 1.6 to 20% of the active ingredients are taken up by plant, with the rest remaining in the soil. The persistence of neonicotinoids in the soil depends on a number of factors such as microbial activity, temperature, soil moisture and soil pH. Field studies performed in other regions indicate active ingredients from neonicotinoid seed treatments (NSTs) persist in the soil from 80 days up to multiple years, and how long the active ingredients from NSTs remain in the soil in Maryland is unknown.

In the soil, neonicotinoids could negatively impact various soil organisms including predatory arthropods like ground beetles and rove beetles. Lab studies have shown that neonicotinoids are lethal to earthworms at high doses and can affect behavior and physiology at low doses. Neonicotinoids can also alter the abundance, community structure and activity levels of soil microbes. Earthworms and soil microbes play an important role in maintaining the physical and chemical properties of soil; therefore, neonicotinoid persistence in the soil could reduce soil health and fertility.

Another potential impact of neonicotinoids remaining in the soil is the uptake of active ingredients by non-crop plants. Neonicotinoid residues have been found in the flowers of plants growing around NST treated fields, which could be a source of exposure for pollinators.

To address these concerns, we conducted a three-year study to better understand the risks of using two neonicotinoid seed treatments, Cruiser® 5FS (thiamethoxam, Syngenta) and Gaucho® 600 Flowable (imidacloprid, Bayer) in a 3-year grain crop rotation of full-season soybean, winter wheat, double-cropped soybean and corn.

Objectives: To determine the effects of NSTs on 1) soil physical and chemical properties and 2) abundance and community structure of soil microbes. We also 3) test whether neonicotinoids remaining in the soil can be taken up by non-target plants, specifically flowering winter annual plants. By conducting the study over three years, we can determine whether there are any cumulative impacts of repeated NST use.

Experimental Design & Soil Collection: The study was conducted at two sites in Maryland (Beltsville and Queenstown). At each site, we planted four replicate plots of each of the following treatments using standard Mid-Atlantic production practices:

1. Control (bare seed)
2. Fungicide (fungicide seed treatment)
3. Cruiser + Fungicide (insecticide + fungicide seed treatment)
4. Gaucho + Fungicide (insecticide + fungicide seed treatment)

In all cases, soil was collected from each plot by taking 30 soil cores of roughly 5-inch depth. Cores were taken across the entire plot area both between rows and within them. The soil was mixed thoroughly and combined into a single sample per plot.

Physical & chemical soil properties: Before planting soybean in 2015, soil was collected and used to measure several important soil health parameters, namely: pH, soluble salt content, active carbon, percent carbon, hydrogen and nitrogen, available nitrogen...
(nitrate and ammonium ion concentration) and wet aggregate stability. These starting measurements were used to ensure plots were relatively similar at the start of the experiment. At the end of the experiment, after corn was harvested in 2017, these measurements were repeated to measure treatment effects. While we did not expect these values to be directly affected by NSTs, they could be altered indirectly by the impact of the insecticides on soil organisms like earthworms and microbe communities. Our analysis found that soil parameters were similar between plots at the beginning of the study. NSTs did not impact any of the soil quality parameters that we measured at the end of the study (Fig. 2).

**Microbial analysis:** During each crop cycle, we collected soil from each plot at several time points for microbial analysis. A portion of the sample was used for Solvita basal respiration tests (Fig. 1). This test measures the rate of CO2 release from the soil as an indicator of general biological activity in the soil. It is designed to be used by growers to test soil health in the field. Some of the soil was also frozen for future analysis of microbial abundance and community composition through quantitative PCR and Illumina sequencing of the 16S ribosomal RNA gene. The Solvita test kit did not detect differences in soil respiration between treatments in any of the crops (Fig. 3). Neonicotinoids may alter the soil microbial community composition without affecting overall microbial abundance. We will be able to ascertain this after completing the Illumina sequencing.

**Uptake by non-target plants:** To determine whether neonicotinoids are taken up by non-crop plants, we collected flower buds from weedy winter annual plants (common chickweed and common henbit, Fig. 4) growing within our plots in the early spring. In 2016 (when wheat was in the ground), we were able to gather enough henbit at Beltsville and chickweed at Queenstown. In 2017 (after double cropped soybean was harvested), we collected both plants at Beltsville and chickweed at Queenstown. The buds were tested for the presence of imidacloprid, thiamethoxam and clothianidin, which is a break down product of...
thiamethoxam. In 2016, neonicotinoid residues were not found in any of the samples. In 2017, no neonicotinoid residues were found in the chickweed samples from Queenstown or the henbit samples from Beltsville. Trace amounts of imidacloprid were found in four of the chickweed samples from Beltsville. As the chemical was present in plots of all four treatments in very low concentrations, its presence does not appear to be correlated to the experiment.

Conclusions: Our results so far indicate that NSTs do not impact soil physical/chemical properties or respiration when measured by Solvita basal respiration tests. As Maryland tends to have sandy soil and a lot of rainfall, it is possible that neonicotinoids, which are highly water soluble, get washed into water bodies instead of persisting in the soil. Our microbial analysis will determine whether neonicotinoids alter the soil microbial community. We also found that neonicotinoids from seed treatments were not taken up by winter annual flowers in our study; though trace residues indicate that these flowers may be capable of taking up active ingredient from the soil. Because our samples were taken prior to planting, residues likely did not come from planting dust or insecticide sprays. Measurable neonicotinoid residues have also previously been found in the pollen and nectar of wildflowers collected in the spring and summer following fall planting of neonicotinoid treated crops.

In this study we also found no pest suppression or yield benefits from NSTs, likely due to low early season insect pressure throughout the study (2017 Agronomy News, Issue 7). Producers can make the best use of NSTs where they regularly have high early season insect pest pressure and they should only be used where needed.

Acknowledgements: Funding for this research was provided by the Maryland Grain Producers Utilization Board, the Maryland Soybean Board and by USDA NIFA award number 2015-38640-23777 through the North East SARE program under sub-award number GNE16-11B-29994. We would like to thank Terry Patton, research farm staff, and all the members of the Hamby and Dively labs who worked on this project.

References:

Spotted Lanternfly Confirmed in Maryland
Maryland Department of Agriculture press release, abridged

The Maryland Department of Agriculture has confirmed that a single adult spotted lanternfly has been found on a trap in the northeast corner of Cecil County near the border of Pennsylvania and Delaware. This is the first confirmed sighting of the invasive species in Maryland, and the department does not believe there is an established population of the pest in the state.

The spotted lanternfly poses a major threat to the region’s agricultural industries as they feed on over 70 different types of plants and crops – including grapes, hops, apples, peaches, oak, pine and many others. Originally from Asia, the spotted lanternfly is non-native to the U.S. and was first detected in Berks County, Pennsylvania in the fall of 2014. As a known plant-hopper and hitchhiker, the spotted lanternfly has spread to 13 counties within Pennsylvania and has confirmed populations in Delaware, Virginia, and New Jersey.

The department’s Plant Protection and Weed Management Program continues to work with the University of Maryland Extension, the U.S. Department of Agriculture (USDA), the USDA Animal and Plant Health Inspection Service (APHIS), Plant Protection and Quarantine (PPQ), and others to monitor the insect in Maryland via trap surveys. The department has also launched outreach and education campaigns aimed at
agricultural operations and the general public. There is no spotted lanternfly quarantine for businesses or homeowners in Maryland at this time.

Throughout the fall and into the winter the department will continue to conduct surveys and visual inspections for spotted lanternfly egg masses on the tree-of-heaven (Ailanthus altissima)—the spotted lanternfly’s preferred tree to feed on. As cold weather continues to set in, adult spotted lanternflies will start to die off, and egg masses can be seen from now until late spring. Come spring time, egg masses will hatch producing 30-50 black and white-speckled nymphs.

If you suspect you have found a spotted lantern fly egg mass, nymph, or adult, snap a picture of it, collect it, put it in a plastic bag, freeze it, and report it to the Maryland Department of Agriculture at Don’t Bug M.D.@maryland.gov. Deceased samples from any life stage can be sent to the Maryland Department of Agriculture—Plant Protection and Weed Management at 50 Harry S. Truman Parkway, Annapolis. For more information about the spotted lanternfly, please visit the Maryland Department of Agriculture’s website at mda.maryland.gov/spottedlanternfly.

UME Seeks Custom Rate Survey Responses

Shannon Dill, Agriculture Extension Educator
University of Maryland Extension, Talbot County

Calling All Custom Rate Operators:

We need your assistance in securing up-to-date information about farm custom work rates, machinery rental rates and hired labor costs in Maryland. This information is being updated and published by the University of Maryland Extension. It is widely used across the state, so we need the best information available. Please respond even if you know only a few rates. We want information on actual rates, either what you paid to hire work or what you charged if you perform custom work. Custom Rates should include all ownership costs of implement & tractor (if needed), operator labor, fuel and lube.

Reported rates will be summarized in the Custom Rate Survey to show a range and average for the state. NO individual names or reported rates will be published in the Custom Rate Survey. Please complete the survey by December 15, 2018. The results will be available at local Extension Offices and will be available online at https://extension.umd.edu/grainmarketing. We hope this publication will be beneficial to you as a custom farm operator and thank you for your cooperation with this effort.

If you have any questions or comments regarding the survey please contact me at (410) 822-1244 or sdill@umd.edu.

To complete the survey online go to: https://go.umd.edu/2019customrates or email sdill@umd.edu for an electronic copy. Thank you for your time!

To view previous Custom Rate reports, click here.

2018 Agricultural and Environmental Law Conference

Make plans to attend the 2018 Agricultural and Environmental Law Conference. The event will be held on Thursday, November 8, 2018, at The Crowne Plaza Hotel in Annapolis, Maryland.

This annual event features a range of experts who will share ideas and information on current legal issues impacting the Delmarva’s environmental and farming communities. The law is always changing, this conference can help keep you up to date.

Featured Panels Include:

- The Legalization of Industrial Hemp
- Developing Topics in Agricultural and Environmental Law
- Phase III of the Watershed Implementation Plan for Bay Restoration and What It Means for Farmers.
- 2 Maryland Pesticide Applicator Credits in Category 1 (A) available to attendees.
- 4.8 Delaware Continuing Legal Education Credits Available.
- Beginning farmers eligible to receive 50% of the cost of registration*

For more information or to register for this event visit https://go.umd.edu/aleiconf.
2019 Maryland Crop Production Meetings

**Agronomy Meetings**

**Southern Maryland Crops Conference**
November 27, 2018. 4:30 p.m. - 9:00 p.m.
Baden Fire Hall, Baden, Maryland.
Register by calling the Charles County UME Office at 301-934-5403.

**Washington County Crops Conference**
November 28, 2018. 9:30 a.m. – 2:30 p.m.
Fairplay Firehall, 18002 Tilghman Rd, 21733 Fairplay, Maryland.
Register by calling the Washington County UME Office at 301-791-1304 or jsemler@umd.edu.

**Northern Maryland Field Crops Day**
December 6, 2018. 9:00 a.m. - 3:00 p.m.
Friendly Farms, Foreston Road in Upperco, Maryland.
Register by calling Baltimore County UME Office at 410-887-8090 or ecrowl@umd.edu.

**Carroll County Mid-Winter Farm Meeting**
January 17, 2019. 9:00 a.m. - 3:00 p.m.
Burns Hall, Carroll County Ag Center, Westminster, MD.
Register by calling the Carroll County UME Office at 410-386-2760.

**Cecil County Winter Agronomy Meeting**
January 23, 2019. 9:00 a.m. to 3:00 p.m.
Calvert Grange, Rising Sun, Maryland.
Register by calling the Cecil County UME Office at 410-996-5280 or dbehnke@umd.edu.

**Lower Shore Agronomy Day**
January 30, 2019. 8:00 a.m. – 3:30 p.m.
Somerset Civic Center, Princess Anne, MD
Register at the Register at the Somerset County UME Office at 410-651-1350 or shirsh@umd.edu

**Harford County Mid-Winter Agronomy Meeting**
February 12, 2019. 9:00 a.m. - 3:00 p.m.
Deer Creek Overlook at Harford 4-H Camp
8 Cherry Hill Road, Street MD 21154
Register by calling the Harford County UME Office at 410-638-3255 or akness@umd.edu

**Caroline County Agronomy Day**
February 20, 2019. 4:30 p.m.
Caroline County 4-H Park
8230 Detour Rd, Denton, MD 21629
Register by calling the Caroline County UME Office at 410-479-4030.

**Montgomery-Howard-Frederick Agronomy Day**
February 27, 2019. 9:00 a.m. – 2:30p.m.
Urbana Fire Hall
3602 Urbana Pike, Frederick, MD 21704
Register by calling the Montgomery County UME Office at 301-590-2809.

**Queen Anne’s Agronomy Day**
March 1, 2019. 9:00 a.m. - 2:30 p.m.
Queen Anne’s County 4-H Park
101 Dulin Clark Road, Centreville, MD 21617
Register by calling the Queen Anne’s County UME Office at 410-758-0166.

**Forage Meetings**

**Delmarva Hay and Pasture Conference**
January 15, 2019. 9:00 a.m. - 3:30 p.m.
Delaware Ag Week. Harrington Delaware

**Southern Maryland Forage Conference**
January 16, 2019. 8:00 a.m. - 3:30 p.m.
Baden Fire Hall, Baden, Maryland.
Register by calling the St Mary’s UME Office at 301 475-4484.

**Tri-State Hay and Pasture Conference**
January 17, 2019. 9:00 a.m. - 3:30 p.m.
Location TBA
Register by calling the Garrett County UME office at 301-334-6960.

**Central Maryland Forage and Livestock Conference**
January 18, 2019. 9:00 a.m. - 3:30 p.m
Jefferson Ruritan Center, Jefferson, MD
Registration information will be forthcoming

**Vegetable Meetings**

**Central Maryland Vegetable Growers Meeting**
January 24, 2019. 9:00 a.m. - 3:00 p.m.
Friendly Farms, Foreston Road in Upperco, Maryland
Register by calling UM Extension Baltimore County Office at 410-887-8090 or ecrowl@umd.edu

**Eastern Shore Vegetable and Fruit Meeting**
February 12, 2019
Eastern Shore Hospital Center, Cambridge MD
Register at https://www.eventbrite.com/e/eastern-shore-vegetable-growers-meeting-2018-tickets-38584279619 or by calling the Dorchester County UME office at 410-228-8800.

**Southern Maryland Vegetable and Fruit Meeting**
February 7, 2019
St. Mary’s County—Exact location TBD
Register by calling the St Mary’s UME Office at 301-475-4484

**Fruit Meetings**

**Western Maryland Fruit Meeting**
February 2019, date TBA. 8:00 a.m. to 4:00 p.m.
Western Maryland Research and Education Center, Keddsysville MD
Register email sbarnes6@umd.edu or call 301 432-2767 ext.301.

**Bay Area Fruit Meeting**
February 2019, date TBA. 8:30 a.m. to 3:30 p.m.
Wye Research and Education Center, Queenstown MD
Register call phone: 410-827-8056

Contact the respective county Extension Offices for more details about any of the meetings.
Agronomic and economic evaluation of fungicide seed treatments for soybean production

Andrew Kness, Agriculture Extension Educator, University of Maryland Extension
Nathan Kleczewski, Field Crops Pathologist, University of Illinois

Although seedling pathogens such as *Fusarium* spp., *Pythium* spp. and *Rhizoctonia solani* occur sporadically on soybean in the region, some growers routinely utilize fungicide seed treatments on much of their planted soybean acres. Reasons for this include perceived plant health benefits and an “insurance policy” against diseases.

Over the past few years, many new fungicides have been marketed as having plant health benefits in addition to disease suppression, even in the absence of any noticeable diseases. To address whether commonly used seed treatments provide benefits in the absence of disease, field trials were established in 2017 at four locations (Georgetown, DE; Queenstown, MD; Beltsville, MD; and Keedysville, MD) lacking history of seedling diseases. Treatments included Acceleron®; ILeVO®; Trilex®; and an untreated control applied at commercial rates to the soybean variety SS4514NR2 by a local seed dealer. Treatments were replicated five times per site and arranged in a spatially balanced, random complete block design.

Plots were planted between May 17 and July 3 into soybean residue with a no-till drill at the rate of 150,000 seeds per acre on 15” row spacing. Plots were managed in accordance with Maryland Extension recommendations for fertility and pests. Foliar fungicides were not utilized.

Emergence and stand counts were conducted 14 days after planting. Plots were harvested using a small plot combine to collect yield and test weight data. An economic analysis was conducted using University of Maryland crop budgets for each plot based on yield, local market price for soybean ($9.10 USD per bushel), and initial investment cost for each treatment. All data were analyzed using a mixed model and treatment effects were separated using Fisher’s LSD.

**Results**

Emergence: The fungicide seed treatments, Acceleron® and Trilex®, significantly increased emergence over untreated seed (P=0.02, Figure 1). ILeVO® suppressed emergence.

Yield: There were no significant differences in yield (P=0.30, Figure 2) or test weight (P=1.00, data not shown) between treatments when averaged across locations. There was a significant treatment effect at two locations (Queenstown, MD and Georgetown, MD) where fungicide seed treatments significantly decreased yield compared to the untreated control (data not shown).

Economics: Untreated soybean seed returned the...
highest average net profit per acre ($368 USD) across all locations, statistically greater than all other treatments (P=0.0002, Figure 3).

These data indicate that fungicide seed treatments may increase soybean emergence over untreated seed in low-pressure soilborne disease situations but do not increase yield or profit. Currently, the data do not support using fungicide seed treatments on soybeans in low pressure disease situations; however that is not to say that they don’t have their utility. Additional research has been conducted in 2018 to optimize recommendations, but we are still waiting to harvest the plots. At this time, the data support our recommendations that fungicide seed treatments may be the most economical to utilize in fields where 1) that are planted early (prior to about May 15); 2) have a history of seedling diseases, damping off, or poor stands; or 3) fields that have poor drainage. Seedling diseases are favored by cool, wet soil conditions; therefore, fungicide seed treatments are more likely to have an effect where soybeans are planted early and/or soils become saturated.

We would like to thank the Maryland Soybean Board for funding this work; University of Maryland, Agriculture Experiment Station and staff, University of Maryland Variety Trials staff, and University of Delaware, Carvel Research and Education Center and staff, for helping plant, manage and harvest these trials.

University of Maryland Extension is currently taking applications for a **Dairy and Beef Specialist**.

The Extension Specialist is responsible for planning, organizing, developing, implementing, and evaluating educational programs for Maryland communities and citizens. Specifically, this position will provide leadership and delivery of educational programming related to dairy and beef production systems, and large ruminant health and nutrition.

Minimum qualifications include:

- Master’s degree in animal or dairy science, or a related field of study.
- Field research experience in dairy or beef production that involves the application of nutrition, health, conservation practices, and advanced agricultural technology systems.
- Demonstrated leadership and management abilities along with evidence of the ability to work with colleagues, students, industry, and other clientele.
- A flexible work schedule is required for delivery of evening and weekend educational programs and activities as determined by clientele availability and need.

Interested candidates should submit their applications online through [ejobs.umd.edu](http://ejobs.umd.edu) by **November 8**. Search for position number **117738** for the complete job description.
Farm Transfer Workshops

This winter, the Department of Agricultural and Resource Economics (AREC) is partnering with the Agriculture Law Education Initiative (ALEI), the University of Maryland Extension, the Maryland Department of Agriculture, and Nationwide Insurance to host a series of one-day farm succession workshops around Maryland.

As of 2017, the average age of principal farm operators in Maryland is 59, according to the USDA-National Agricultural Statistics Service’s state agriculture overview, illustrating the increasing need for the farming community to understand how to pass on the farm to the next generation.

Seven winter workshops are split into two series designed around the idea that the succession process requires financial planning, communication, and a general understanding of business planning and estate planning tools.

The first series of workshops, Transferring the Farm to the Next Generation, includes five workshop dates and features speakers like Farm Management Specialist; Dale Johnson, Craig Highfield with Alliance for the Bay, and Extension Legal Specialist Paul Goeringer. This series will discuss business planning techniques, attached forested land, estate planning, tax basics, and more. For more information on the Transferring the Farm to the Next Generation workshop series, or to register, click here.

The second series of workshops, Investing in your Farm’s Future, includes two workshop dates. These workshops will feature Extension Agent Jesse Ketterman, ALEI Research Associate Mayhah Suri, Professor and Department Chair Dr. Lori Lynch, and Extension Legal Specialist Paul Goeringer. This series will include discussions on the specifics of retirement planning and what individuals can do to fulfill their wishes after the succession process, communication strategies, use of conservation easements, and estate planning case studies illustrating what can happen when the process isn’t properly conducted. For more information on the Investing in your Farm’s Future workshop series, or to register, click here.

**Dates and locations for both workshop series are:**

**Transferring the Farm to the Next Generation Workshop Series Dates and Locations:**
- Queen Anne’s County – Monday, November 26, 2018, 8:30 a.m. - 3:00 p.m. - Chesapeake College - Eastern Shore Higher Education Center 1000 College Cir, Queenstown, MD 21658
- Allegany County – Thursday, December 6, 2018, 8:30 a.m. - 3:00 p.m. - Allegany College of Maryland, 12401 Willowbrook Rd, Cumberland, MD 21502
- Wicomico County – Wednesday, December 12, 2018, 8:30 a.m. - 3:00 p.m. - Wicomico County Extension Office, 28647 Old Quantico Rd, Salisbury, MD 21801
- Howard County – Wednesday, January 16, 2019, 8:30 a.m. - 3:00 p.m. - Howard County Fairgrounds, Dining Hall, 2210 Fairgrounds Rd, West Friendship, MD 21794
- Baltimore County – Thursday, January 17, 2019, 8:30 a.m. - 3:00 p.m. - Baltimore County Extension Office, 1114 Shawan Road, Cockeysville, MD 21030

To register for any event in this series, click here.

**Investing in Your Farm’s Future Workshop Series Dates and Locations:**
- Talbot County - Wednesday, January 30, 2018, 8:30 a.m. - 3:00 p.m. - Chesapeake College, 1000 College Circle, Wye Mills, MD 21679
- Prince George’s County – Thursday, January 31, 2019, 8:30 a.m. - 3:00 p.m. - Prince George’s County Soil Conservation District Office, 5301 Marlboro, Race Track Rd, Upper Marlboro, MD 20772

To register for any event in this series, click here.

*This material is based upon work supported by USDA/NIFA under Award Number 2015-49200-24225.*
FARMER TRAINING & CERTIFICATION
Winter 2019
“Write Your Own Nutrient Management Plan”

The Farmer Training and Certification workshops provide opportunities for producers with cropland and pastures who use commercial fertilizer and/or manure to learn how to write nutrient management plans for their operation that meet Maryland Department of Agriculture’s regulations.

Individuals with fields or pastures high in soil test phosphorus may require additional training and a greater time commitment.

Required Skills:
Competency in high school math, familiarity with using a keyboard, and the ability to save and retrieve files is essential for completion of the course and nutrient management plan development.

You will receive:
- A comprehensive training binder – the training binder will be used during the class, serve as a reference during the exam, and as a valuable resource when you write future plans for your operation.
- Certification – producers who pass the exam will be certified by MDA to write their own nutrient management plans.
- Voucher training credits – this class will fulfill the nutrient applicator voucher training requirements.

Registration Information
- Space is limited and registrations are accepted on a first-come basis; therefore, register early.
- Paid registrations must be received 10 days before the first class. For more information, please call 410-841-5959. Classes will be cancelled if there is insufficient enrollment.

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<tr>
<th>#</th>
<th>University</th>
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<tr>
<td>#1</td>
<td>University of Maryland Wye Research and Education</td>
<td>January 22 (snow date January 25) and February 5 (exam and plan writing) (snow date February 8)</td>
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<tr>
<td>#2</td>
<td>University of Maryland Extension Frederick County office</td>
<td>January 28 (snow date February 1) and February 11 (exam and plan writing) (snow date February 15)</td>
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<tr>
<td>#3</td>
<td>University of Maryland Extension Howard County Office</td>
<td>February 6, 13, 20 and 27 (exam) and March 6 (plan writing) (snow date March 13)</td>
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6 – 9 PM each evening ($20 certification fee)

Keep this portion for your records

Return this portion with your payment.

Please register me for class #___________. Enclosed find my payment for the class.

Name _____________________________________________

Mailing Address _____________________________________

County __________________________ City ______________ State _____ Zip Code ______

Telephone __________________________ E-mail _____________

Special accommodations needed?

Submit a separate form for each person. Make check payable to Maryland Department of Agriculture.
Mail completed form and payment to: Nutrient Management Program, Maryland Department of Agriculture, and 50 Harry S Truman Pkwy, Annapolis, Maryland 21401
Currently, 0% of the State is under any type of drought. One-month temperature outlook for November predicts a 33-40% probability of warmer than normal temperatures. There is a 40-60% chance of above-normal precipitation for the month of November.
Other Publications & Resources From University of Maryland Extension

University of Maryland Vegetable & Fruit Headline News (published monthly during the growing season)

University of Maryland TPM/IPM Report (published weekly during the growing season for nursermen and greenhouse growers)

Great resources are just a click away!

Maryland Grain: http://extension.umd.edu/grain

University of Maryland Agronomy News Blog: http://blog.umd.edu/agronomynews/

Agriculture Law: http://extension.umd.edu/aglaw

Agricultural Nutrient Management Program: http://extension.umd.edu/anmp

Women In Agriculture: http://extension.umd.edu/womeninag

University of Maryland Plant Diagnostic Laboratory: http://extension.umd.edu/plantdiagnosticlab

If you have any requests or suggestions for future articles, contact Andy Kness at: akness@umd.edu or (410) 638-3255.

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Crop Reports

Western Maryland
After a few periods where it was dry enough to be in the field, harvest is finally in full swing. A good majority of the corn has been harvested and reports are looking good so far. Sprout was a concern early on, but it seems to be affecting yield very little. Soybeans are starting to come off as well. The early planted beans seemed to have the most problems with sprout and rotted or stained beans. Later planted beans are faring well with only minor quality issues. There is also a lot of late hay being made at this time. Wheat and other small grain planting is rolling along and most are caught up to the combine at this point. There are a lot of wet spots that had to be planted around! -Matt Morris

Northern Maryland
Some relatively decent weather (for a change) has allowed harvest and planting to catch up. Most of the corn in the region is harvested, but it will still be another few weeks before it’s all in the bin. Reports on corn yield are variable, but in general, the crop fared pretty well and better than most expected. Soybean harvest is progressing slowly. Full season beans, where they haven’t sprouted, appear to be yielding well. Most double crop beans in the area are average to below average in yield, but are generally of better grain quality. Planting small grains started slow, but has picked up and plants have emerged nicely. -Andy Kness

Upper & Mid Eastern Shore
Corn harvest is almost complete. Generally, the earlier planted corn yielded better than the late planted corn. Much of the late planted and replanted corn was nacked down from the hurricane remnants (4-5” rain and 40-50 mph winds). Bean harvest has been stressful with very few good “bean cutting” days. We just can’t seem to get good NW winds!! Early bean yields have also been low this year with poor quality beans and small seed size. Late beans look much better. Wheat and barley planting is on schedule. -Jim Lewis

Lower Eastern Shore
Corn has been harvested and the attention has moved to soybean. Soybean harvest is only about 10% complete, due to the lack of sunny, dry days. Wheat planting is behind schedule as well, with about half already planted. It’s been a rough year for cover crop planting. For example, Somerset County had 17,000 acres signed-up, are predicting only 12,000 acres will actually be planted, of which only 6,000 acres have been planted to-date. The cover crop planting deadline has been extended until November 12th. We have no recent reports of pest outbreaks, although herbicide-resistant Palmer amaranth and common ragweed are becoming more apparent as the beans dry down. In problematic fields, farmers are encouraged to clean equipment between farms using a leaf blower or high pressure air, as weed seed is often spread from field to field by the combine. –Sarah Hirsh

Southern Maryland
Season Wrap-up—According to the National Weather Service, between January 1 and October 15th, we have received a total of 60.63 inches of rain at the Mechanicsville station in St. Mary’s County. That is compared to an average precipitation of 36.34 inches for that same period and far exceeds the record for most rainfall received of 54.22 inches in 1934. With that amount of rain, it goes without saying this year is anything but normal. Throw in the three weeks of hot and dry conditions during corn pollination to the mix and it’s no surprise that yields are only average at best.

The corn crop this year was better than I expected. There were plenty of fields that either were not planted or not harvested due to saturated fields, but overall corn yields ranged just below average. We even had some fields that received an extra rain during the dry spell in July and are putting out well over 200 bushels. Soybean harvest is continuing in both full season and double-crop fields. Depending on the field, soybean yields have been average to very good. Double crop is trending higher than full season compared to average. Soybean quality has been a challenge. Double crop soybeans are much better. Wheat and barley planting continues with very good germination and establishment so far. Some folks are still trying to get dry hay made.

Vegetables have been challenged with wet feet all season. For vine crops like pumpkins and watermelons, fruit rot has been prevalent. Phytophthora root and fruit rot has been particularly bad, in poorly drained fields or fields where standing water was present following heavy rains. Downy mildew is another disease that likes the rainy weather. Wet feet wasn’t the only problem. The lack of sunshine created some ripening issues with crops like tomatoes. Root crops suffered as well from waterlogged and tight soils. Unfortunately there isn’t much that can be done immediately this season to curtail problems resulting from rainfall amounts almost double the average. However, long-term strategies that do help in years like this include longer rotations to reduce disease inoculum levels, improving soil health and structure to improve drainage, installing drainage ditches and/or tiles, and using raised beds. –Ben Beale