Dear Agriculture Enthusiasts,

On behalf of Virginia Cooperative Extension and our partners, the Virginia Grain Producers Association and the Virginia Soybean Association, I would like to invite you to attend the 2014 Virginia Ag Expo taking place August 7 at Bleak House Farm in Lottsburg, Virginia. We are proud to be part of this premier agricultural event.

The Ag Expo is being held in Virginia’s Northern Neck, and the 2014 theme, “Northern Neck Agriculture – 400 Years and Still Growing,” reminds us of the important role agriculture has played in Virginia’s history and its ongoing status as the commonwealth’s largest industry.

This year also marks the 100-year anniversary of the Smith-Lever Act, which established the national Cooperative Extension System. Early farm demonstration work consisting of face-to-face instruction and practical demonstrations in agriculture and home economics laid the foundation for today’s Extension service. Ag Expo allows us to continue Extension’s important outreach function as we deliver knowledge from Virginia’s two land-grant institutions — Virginia Tech and Virginia State University — to farmers and agricultural enthusiasts gathering from across the commonwealth.

Ag Expo provides an ideal opportunity to highlight the latest technology in crop production and current research findings from faculty members in the College of Agriculture and Life Sciences, the Virginia Agricultural Experiment Station, and Virginia Cooperative Extension.

More than 140 exhibitors will also be on hand to showcase and demonstrate products and services that can help producers continue to succeed. We encourage you to check out the latest models of tractors and sprayers and compare seed varieties, fertilizers, and crop production products.

We would like to thank the Downing family for hosting this year’s Ag Expo and for sharing their Virginia Century Farm with us.

We hope you can join us for the day, enjoy the Expo, and take home a wealth of information you can use in your day-to-day farming operations.

Sincerely,

Ed Jones, director
Virginia Cooperative Extension
Be Proud of U.S. Soy’s Sustainability Performance

Customers have different demands for U.S. soy, but one demand that many customers have in common is soybeans grown in a sustainable manner. The National Soybean Checkoff Program decided to demonstrate why U.S. soy and the farmers who grow it should already be considered sustainable.


Because so many customers demand responsibly sourced materials, farmers can consider sustainability a way to ensure that U.S. soy demand stays strong. The Checkoff Program and its partners — such as the U.S. Soybean Export Council and American Soybean Association — continue to use sustainability information in marketing efforts, but farmers can help spread the word, too. For example:

- Soil erosion per bushel of soybeans is down 66 percent since 1980.
- Soybean yields have increased by 55 percent in the last 30 years, using fewer inputs and less water.
- Ninety-eight percent of all the farmers who are subject to review are in compliance with USDA conservation standards.

These are great facts for customers to know. Learn about these nuggets and many more in the easy-to-read sustainability guide. Reference the information when talking to other farmers about the importance of sustainability. Share it through social media channels. And tell nonfarming friends about how U.S. soybean farmers are responsibly raising their crops.

The data show U.S. soybean farmers employ sustainable practices. Be proud of it!

Want to Know More?

Do Foliar Fungicides Pay in Soybean and Corn?

Over the past decade a variety of factors — including increased market prices for corn and soybean, actual and perceived disease threats, and the availability of new fungicide products for disease control and “plant health benefits” in corn and soybean — have prompted growers to invest more in protecting their yields. However, increased yields are typically realized less than 50 percent of the time (fig. 1).

Hillary L. Mehl, Extension Plant Pathologist, Tidewater Agricultural Research and Extension Center, and Assistant Professor of Plant Pathology, Physiology, and Weed Science

So when are fungicide inputs worth the additional cost and effort? An integrated pest management approach to fungicide applications is one tool that can be used to increase the profitability of crop production while minimizing environmental impacts. Here are six points to consider:

1. How susceptible or resistant is your cultivar? Varieties have a high turnover rate, so check with your local Virginia Cooperative Extension office or seed dealer for current information on which varieties have some level of resistance to diseases in the region.

2. Yield potential: What are you protecting? If yield potential is low, you do not have much to gain, and fungicide applications are unlikely to be profitable.

3. Crop growth stage and timing of fungicide applications — Diseases are more likely to impact yield at particular growth stages of the crop (typically during development of the grain), so timing fungicide applications accordingly is key.

4. Previous crop and cropping system (for example, no till) — Many pathogens are able to survive on crop residues. Keep in mind that some diseases overwinter on crop debris in Virginia (for example, frogeye leaf spot and gray leaf spot), whereas others require a living plant host and must move in from warmer regions each year (for example, Asian soybean rust and southern corn rust).

5. Disease pressure — Which diseases, if any, are present and how widespread are they? Scouting and accurate pathogen/pest identification are critical components of any integrated pest management program.

6. Weather — Temperature and humidity greatly influence the onset and development of disease. Even if the crop is susceptible and a pathogen is present, the risk of yield loss to disease may be low if environmental conditions are not conducive to pathogen growth and reproduction. Warm, humid conditions are favorable for many diseases in our region.

Based on this final point, we are currently developing a weather-based disease advisory model for timing of foliar fungicide applications in soybean. Based on seven years of prior data, weather parameters conducive to the development of soybean diseases have been identified (table 1). Starting this summer, we will be validating and further optimizing this model and evaluating the profitability of different fungicide spray schedules based on yield response and input costs. Ultimately, we hope to develop a Web-based disease advisory alert system for soybean and, eventually, for other crops, including corn.
Join VGPA Today!

The Virginia Grain Producers Association is a nonprofit, farmer-run association representing the corn and small-grain producers of Virginia on a variety of issues. VGPA promotes and protects Virginia corn and small-grain producers and provides value to the surrounding industry through our role as an information source, producer advocate, and provider of end-user resources.

Your checkoff dollars fun ongoing research and education projects to support and promote corn and small-grain production. VGPA partners with these research facilities, academic institutions, end-users, and other trade and commodity associations to promote production and industry

The association has successfully represented Virginia producers on policies and programs that allow farmers to keep their land in production. VGPA’s highest priority is securing effective, efficient programs and policies that positively impact Virginia’s corn and small-grain producers.

Join VGPA Today and Receive the Benefits of Membership!

- Promotion of grain production through outreach and education.
- Eligibility for the National Corn Yield Contest and VGPA scholarship.
- Significant member discounts at Cabela’s, Enterprise, Dell, Ford, NASCAR, and other partners.
- Increased market opportunities for growers.
- Information resources for growers, industry, and legislators.
- Representation and advocacy on behalf of Virginia’s corn, wheat, and barley producers.

Join VGPA today and help enhance and protect Virginia agriculture!

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On-Farm Test Plots Evaluate Corn Production Practices

Keith Balderson, Extension Agent, Agricultural and Natural Resources
Wade Thomason, Extension Grains Specialist and Associate Professor of Crop and Soil Environmental Sciences

For the past 23 years, the Virginia Corn Board has provided funding to area Extension agents to evaluate corn production practices through a series of on-farm plots planted in cooperation with farmers and agribusiness personnel. In addition to hybrid demonstration trials, the plots have evaluated such practices as deep tillage, nitrogen injection, slug management, fungicide use, and others.

The objective of the project is to provide farmers and agribusiness personnel with results from long-term, on-farm replicated studies that help farmers produce maximum economic corn yields.

Results from the plots are documented annually in a numbered Virginia Cooperative Extension publication and posted to the VCE website (www.ext.vt.edu). About 500 hard copies of the publication are distributed to corn producers and agribusiness personnel.

During the past three years, variable rate nitrogen applications to corn have been a significant part of the project. The plots have consisted of three treatments:

1. A fixed rate of sidedress nitrogen determined by the farmer’s yield goal and nutrient management plan.
2. A variable rate of sidedress nitrogen based on yield zones.
3. A variable rate of sidedress nitrogen based on Greenseeker (sensor-based) technology.

Nitrogen is very important in producing a profitable corn crop. The grain in a 150-bushel-per-acre corn crop removes 135 pounds of nitrogen. In addition, nitrogen is very mobile in soils and — with the exception of the pre-sidesided nitrate test used with organic nitrogen sources — there is no soil test for making nitrogen recommendations. Moreover, nitrogen is a significant expense in corn production, currently costing as much as $100 per acre. Nitrogen is also one of the nutrients responsible for algal blooms in the Chesapeake Bay and its tributaries.

Improving nitrogen-use efficiency in corn production would offer both economic and environmental benefits. Our plot work in 2012 was limited by extreme drought conditions, but over 2012–13, we were able to harvest four plots. To date, the Greenseeker technology shows some promise in improving nitrogen-use efficiency. Over the four plots, all three treatments averaged about 197 bushels per acre. However, the Greenseeker technology used 10 pounds per acre less nitrogen than the fixed-rate plots, and 15 pounds per acre less than the zone-based, variable-rate plots. All treatments had very good nitrogen efficiencies, but the Greenseeker treatment was the best with 0.846 pound of nitrogen applied per bushel of yield.

The work is being continued this year. We hope these field-size research plots evaluating variable-rate technology will help growers decide if they want to adopt the technology.
At present, Virginia’s 20-year trend line soybean yields are about 36 to 37 bushels per acre, which lags behind the national average of 42 to 43 bushels (fig. 1). The lag is largely due to nearly half of Virginia’s acreage being planted after wheat harvest in a double-crop system, where soybean yields are lower. It can also be attributed to Virginia’s less productive soils, relative to the Midwest. Regardless, when Mother Nature is kind and everything falls into place, soybean farmers in Virginia can yield with the best of the best.

Figure 1. Virginia versus U.S. soybean yield (1994-2013).

Figure 2. Soybean yield gap in Virginia (1980-2013).

Recently, I spoke to Michael Downing about the goal of 100 bushels per acre. Following are his answers to some of my questions. Note that I am parrothing Michael’s responses; these are not his exact words.

**Q:** Why such an interest in soybean?
**A:** When I first started, my job was to plant the soybean, and I took great pride in getting a good stand. I soon recognized that soybean had much more yield potential than others were giving the crop credit for. By giving the crop the attention it deserves, yields can be really good.

**Q:** There seems to be more interest, nationally and in Virginia, in the corn yield contest. Why do you focus on the soybean yield contest?
**A:** I grow corn and I, too, want to get as much yield from that crop as possible, but it’s too hit-or-miss. It’s very hard to push corn yields on our Northern Neck soils. But soybean is different; you can push those yields. Soybean is tougher and more resilient than corn, and the crop is much more profitable, year in and year out.

**Q:** What are your standard production practices in soybean?
**A:** First, I’m constantly changing and trying new things. So my standard practices are constantly evolving. But at the moment, my goal is to have all of my full-season soybean planted by mid- to late-April. I’ve found this to be a key for good yields. I plant a mid-maturity group IV, Roundup-Ready/STS variety at 125,000 seeds per acre. Because I’m planting in April, I treat the seed with both fungicide and insecticide and also with an inoculant. Many farmers would leave the inoculant out, but we’ve seen it occasionally increase yield and, over time, it pays for itself many times over. It’s a very good insurance treatment that ensures the crop is fixing all the nitrogen it needs. I also include a 2-inch by 2-inch band of 15-15-0-5 (N-P-K-S) with zinc starter fertilizer on about 50 percent of my plantings. The starter provides the nitrogen necessary for good growth early on, keeps the SDS from spreading farther. In addition, we’re experimenting with a sidedress of 20 gallons of 15-15-0-5 with zinc around the first of June in our 30-inch row soybean. We’ve done this for the last three years but cannot yet confirm whether this helps or not. I’m definitely not sold on this practice.

**Q:** Do you do anything different with your yield contest plots?
**A:** Yes, of course. I usually designate about four or five different places on the farm for this. Here, I’ll try new things and keep on trying things that I think may have worked in the past. All of these plots are planted in April, some in 30-inch rows with a starter fertilizer and some that are drilled. The foliar feeding and fungicide is usually included. We have had SDS (sudden-death syndrome) in our yield contest plots and throughout the farm when the soybeans are growing well. I’ve found that a timely fungicide application after we first start seeing the symptoms keeps the SDS from spreading farther. In addition, we’re experimenting with a sidedress of 20 gallons of 15-15-0-5 with zinc around the first of June in our 30-inch row soybean. We’ve done this for the last three years but cannot yet confirm whether this helps or not. I’m definitely not sold on this practice.

**Q:** What have you learned?
**A:** Early planting pays. Treating the soybean seed with fungicide, insecticide, and inoculant is well worth it. Don’t let the soybean experience stress. This means taking care of them. Moreover, you can’t take care of them unless you regularly walk the fields, every three to four days.

**Q:** Any parting words of advice?
**A:** Walk your beans if you want them to yield. Stay on top of them. Don’t let them stress.

I am truly impressed by the drive shown by Michael and Mark to improve themselves and their farm and also by their desire to learn and do things better. Although many of Michael’s practices are not in my list of recommendations, they may be one day. Regardless, it has been a pleasure to work alongside the Dowings this year. I think that everyone is benefitting.

Along with this theme of economically increasing soybean yields, we have established some maximum economic yield plots at the Downing farm. The plots are set up in an omission treatment structure, where the “maximum input” plot includes 15-inch versus 30-inch rows, chicken manure, starter fertilizer, controlled-release nitrogen inoculant, and a foliar fungicide. The other plots contain all of these treatments minus one of the inputs. From this, we hope to discern which inputs are making the biggest impact.

In addition, there will be soybean variety, fertility, foliar fungicide, and insect control plots. There will be lots to see in both soybean and corn. I look forward to the Ag Expo and the results coming from our plots, and I hope to see everyone there.
The Tidewater Agricultural Research and Extension Center sits on 336 acres in Suffolk in the coastal plains region of Southeast Virginia. It was established on April 6, 1914, and celebrates, along with Virginia Cooperative Extension, its 100-year anniversary in 2014.

The facility itself has humble beginnings. It was started with one person, 20 acres of rented land, a tiny white-frame two-room building, and a mule.

Applied research and Extension education programming at the Tidewater AREC is focused on economically important field crops, such as cotton, soybeans, peanuts, corn, small grains, and alternative crops, and on commercial swine production. The Tidewater AREC’s Field Tour on September 11, 2014, will allow the public and other interested parties to see firsthand how the AREC conducts valuable research and the importance of its mission to the state.

Plant-and crop-focused research efforts are directed at real-world agricultural problems that seek to improve disease management. For example, peanuts — a top agricultural export in the commonwealth in 2013 — are susceptible to sclerotinia blight, a common fungus that can be devastating to peanut crops and costly to treat. Researchers are in the process of developing cultivars of peanuts that are genetically resistant to the blight, leaving more money in farmers’ pockets.

Fungus also attacks another one of Virginia’s superstar exports: soybeans. Hillary Mehl, assistant professor of plant pathology, physiology, and weed science, studies if fungicides for control of foliar diseases in soybean,” said Mehl. “Ultimately, this will allow growers to forgo fungicide applications when they are not needed and optimize application timings when they are needed to protect yield.”

Pork is another top export of the state, and animal scientists at the Tidewater AREC address issues in commercial swine production, including controlling excess nutrient excretion and waste management techniques to minimize the potential for negative environmental impact. Swine physiologists are developing management and nutritional approaches for improving swine fertility in artificial insemination programs used on commercial hog farms.

“With fewer farmers growing soybean each year, it has never been more important to make sure that research in Virginia’s major agricultural field crops. The 2014 tour will focus on agronomic, physiological, and crop protection research in cotton, soybeans, peanuts, sorghum, and corn. Research highlighted will include fungicide use and disease management in row crops; soil fertility issues in cotton and soybeans; variety evaluation in cotton, soybeans, peanuts, and sorghum; and in-season management of insect pests in row crops.

Those who attend the field tour generally include researchers, industry personnel, and producers, but the general public is also welcome to attend. This year marks the 100-year anniversary of Virginia Cooperative Extension as well as the 100-year anniversary of agricultural research at the Tidewater AREC. There will be a luncheon and celebration to honor the faculty and staff members who have served at the AREC, as well as the introduction of the new director, David Langston. Langston is currently a professor of plant pathology at the University of Georgia-Tifton; he begins his new role at the Tidewater AREC on August 15.

Please join us September 11. Registration begins at 7:30 a.m. with tours starting at 8 a.m. and concludes with lunch. For more information, contact Hunter Frame, Extension agronomist, at whframe@vt.edu or call 757-657-6450.
The Law of the Minimum Applies to More Than Just Plant Nutrients

Wade Thomason, Extension Grain Specialist and Associate Professor of Crop and Soil Environmental Sciences

Liebig’s Law of the Minimum states that crop growth or yield is not limited by the total amount of resources available to the plant but by whichever resource is in the scarcest supply. If the available amount of that resource is increased, growth will increase until the next resource limitation is encountered.

Plant nutrients are the classic example for this and the reason why we use soil testing, yield goals, and sometimes even tissue testing to ensure that everything the plant needs is in adequate supply to meet the yield potential that the environment can support. It is extremely important to use all these tools regularly to monitor the crop’s nutrient status. It’s also important to apply this philosophy to the other essential things a corn plant needs to thrive — mainly water, sunlight, and air.

The plant extracts carbon dioxide from the air, and that carbon is the basic building block for all the plant’s cells. We can’t really supply more CO₂, but the rate of carbon captured by the plant is often limited when the crop is under drought stress. Specialized leaf cells that control the release of water close up to retain that water, but that also means the CO₂ can’t enter. It takes adequate water to utilize the CO₂ in the air effectively.

While we often can’t control the amount of water (rain) a field receives, we can influence how much of that water is retained in a useful form. Surface residue — either old crop or cover crop — can help slow runoff, improving infiltration. Similarly, that residue can shade and cool the soil and reduce evaporative losses.

Finally, improving soil organic matter can improve water-holding capacity and increase infiltration. Sunlight is most abundant in Virginia during the summer, but it doesn’t guarantee an efficient conversion of that energy to plant material. Plant populations that are less than optimum don’t harvest as much available sunlight as higher populations. Similarly, corn hybrids with more upright leaves, especially in the upper canopy, can be planted closer together without sacrificing light interception. Anything that reduces leaf area hurtsthe conversion as well, so plants should be protected from damaging levels of insects and diseases in order to operate as efficiently as possible.

There are numerous soil-related factors at work as well. Corn root access to nutrients and water can be limited due to compaction or restrictive layers, so it’s important to diagnose these issues in a field-specific manner. There is evidence that improving overall soil health can help improve crop productivity. In addition to the documented physical and chemical factors associated with healthy soils, there is a biological component that is finally receiving its share of attention. Understanding these interactions may help unlock future productivity increases.

Achieving the best possible corn yields and using inputs efficiently involves a careful assessment of what the limiting factors are in each field, each year, and managing to minimize their occurrence.

Pioneers of Virginia Cooperative Extension: Pierce and Sandy Pave the Way

The first two Extension agents in Virginia were John B. Pierce and T.O. Sandy — men who made the idea of teaching agriculture through demonstration work a reality in the commonwealth. They were handpicked to start farm demonstration work before Extension officially existed under the Smith-Lever Act of 1914.

In 1906, H.B. Fissell, president of Hampton Institute and the person who brought the idea of demonstration work to Virginia — asked Pierce to serve black farmers in the state. Later, in 1914, Extension would disgregate its work force. At the time, however, Pierce led the black farmers using resources that Hampton Institute, while Sandy led the white farmers using resources at Virginia Polytechnic Institute.

Pierce had been working as a biology teacher and school gardener at Hampton Institute. He grew up in a household that valued education and earned his undergraduate and graduate degrees at Hampton Institute, along with formal training at Tuskegee Institute.

Pierce’s first assignment as an agent was in Gloucester County, where he helped farmers revitalize their poor-quality, sandy soil into soil that could be used for growing a variety of produce. Before long, Pierce was directing agents in the region that encompasses Virginia, North and South Carolina, West Virginia, Kentucky, Maryland, Tennessee, Arkansas, Delaware, and Missouri.

Pierce was known as the “live-at-home crusader” because he made larger profits, feed their families and livestock, and encouraged farmers to raise edible crops so they could improve their standards of living.

Sandy was enlisted by Seaman Knapp, who invented the concept of Extension, to carry out the first farm demonstration in 1906. Sandy’s previous experience with applying modern techniques to farming made him well-suited for demonstration work. Knapp was so impressed with Sandy’s first demonstration that he appointed Sandy the state agent for Virginia in 1907: Farmers have hailed Sandy as the “father of farm demonstration.”

Sandy surrounded himself with assistants whom he could trust to do a good job. For example, he hired Southall Farrar, who started Virginia first 4-H clubs in 1906, as well as Ella Agnew, who headed the girls program and formed the tomato clubs as the first female home demonstration agent in the nation.

Sandy also contributed by funding projects for his projects. For example, in 1908 Sandy worked with J.D. Eggleston, president of what was then Virginia Polytechnic Institute, to secure a $5,000 appropriation from the Virginia Senate to fund girls and boys clubs — the precursor to 4-H. Eggleston is quoted in “Extension Work in Virginia, 1907-1908: A Brief History” as authored with J.A. Hutchinson-Coon (1941), as saying, “T.O. Sandy’s usefulness to Virginia ranks among the foremost. Among the good and great of the alumni of the Virginia Polytechnic Institute, I make bold to say that not one surpasses him. He had rare common sense, a finely poised judgment; a passion to be of service.”

Pierce and Sandy advanced demonstration and Extension work in Virginia through their sound leadership and hard work. Without them, Virginia Cooperative Extension would not be what it is today.

Bonus Online Content:
Virginian archives world record corn yield through hard work and innovation.
www.anr.ext.vt.edu/ag-expo/
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