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2Q 2022

PATH OF LEAST RESISTANCE

Managing Herbicide-Resistant
Weeds in Corn Requires a
Multifaceted Approach

Plan Ahead to Weather the
Supply Chain Storm

The Ag Community Steps
Up to Help Fund a Filipina Girl's
Cancer Treatment

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Brent Gloy

Thrive is produced quarterly for a nationwide agricultural audience. Its purposes are to update readers on Syngenta products, research, services and solutions, and to provide them with the information they need to succeed in today's complex marketplace.

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ON THE COVER

Al Hill, who farms 3,100 acres of corn and soybeans in Deep Run, North Carolina, stands in front of his freshly planted cornfields. Photo: Justin Kase Conder

THIS PAGE

Cornfields at Al Hill's High Yield Farms are planted, fertilized and sprayed with Acuron® herbicide in one pass. Photo: Justin Kase Conder

ACURON IS A RESTRICTED USE PESTICIDE.

thrive®



CORRECTION: In the 2022 first quarter issue of *Thrive* on page 17, the crop in an aerial harvest photo was misidentified in the caption. The photo depicted soybean harvest at Seven Springs Farms in Cadiz, Kentucky. We apologize for the error.

Read articles online at syngentathrive.com.

Plan to Profit

It's been said that a goal without a plan is a dream.

Regardless of commodity price, those who don't plan are just dreaming about profit.

Two big topics as I write this are commodity prices and input costs. But then, those should be our focal points every season. Regardless of price or cost in any given year in any given business — on- or off-farm — we must know our costs and our price potential.

In this issue we introduce a new column, Economics of Agronomics. The writers for this new column are the co-founders of Ag Economic Insights (AEI.ag), David Widmar and Brent Gloy. Syngenta partners with AEI.ag on several economic fronts, and we asked them to participate in *Thrive* so our readers also have the benefit of their economic acumen.

Their first column (page 28) focuses on understanding on-farm production costs and dives into calculating cost by the bushel or by the acre.

As input providers, we find value in using cost per bushel to compare performance of various inputs. For instance, our research shows a significant yield advantage for corn farmers who use Acuron® herbicide or Trivapro® fungicide. Evaluating inputs based on the additional profit opportunity for our customers feels right. After all, though we greatly enjoy the quality of life that agriculture offers, all of us are in the business of making a profit.

This is the year to go to the wall putting everything in that you can, do it before interest rates go up, and support production with inputs that drive profit opportunity. Our goal with the products we offer is to support environmental and economic sustainability for farmers. We hope this new content helps you do that. 🌱



Lynn Sandlin

“Regardless of price or cost in any given year in any given business — on- or off-farm — we must know our costs and our price potential.”

LYNN SANDLIN

Business Intelligence Lead
Syngenta Crop Protection, LLC

ACURON IS A RESTRICTED USE PESTICIDE.

PHOTO: PATRICK PRIEST

Prepare Lines of Defense

Experts from two different regions explain how a few key strategies can help growers protect their yields from Southern rust in corn.

Q: Why was 2021 a breakout year for Southern rust in corn? What do you expect to see in 2022?

A. Phil Krieg, Illinois agronomy service representative at Syngenta: 2021 was a breakout year for Southern rust because of the near-perfect weather conditions that we had for the disease to establish, infect and spread north throughout the Corn Belt. When conditions favor rust development, the infection cycle continually repeats itself — spreading disease throughout the plant and helping it to readily move from plant to plant. Because Southern rust does not overwinter in the Midwest, it's always a wait-and-see game as to whether the disease presents itself in any given year, so we have no idea if we'll see it in 2022.

A. Travis Faske, Ph.D., professor and extension plant pathologist at the University of Arkansas: Southern corn rust is an annual occurrence in the mid-Southern United States, and severity depends on environmental conditions and the corn growth stage when rust is first detected. In 2021, several factors contributed to the severity of Southern rust development. First, widespread rainfall delayed planting, which contributed to a wide range of corn growth stages when Southern rust was reintroduced in the region. Second, when rust arrived in July, the weather conditions were very good for rust development. Third, hybrids were susceptible to Southern rust. This year, rust will return to the region, but arrival time and summer weather conditions are the unknown factors.



"Grain yield losses have ranged from 20% to 40% in Arkansas when Southern rust occurred at tassel and the severity and percent of leaf area (ear and nearby leaves) affected at dent was above 40%."

— TRAVIS FASKE, PH.D.

Extension Plant Pathologist at the University of Arkansas

Q: How can growers identify Southern rust in corn? What environmental conditions foster the disease, and how does it spread?

A. Krieg: Southern rust pustules are orange to tan, circular or oval, and about 1/16 inch in diameter. Most pustules develop on upper leaf surfaces. The fungus that causes Southern rust can infect a plant after approximately six hours of leaf wetness. Dew usually provides enough moisture to cause infection, but frequent rainfall can promote severe disease development. Conditions that favor Southern rust development are high relative humidity and temperatures around 80 to 90 degrees Fahrenheit — especially at night. Each year, wind currents from southern, more tropical areas carry rust spores north and begin new infections. The weather conditions outlined above take over after the spores arrive and infect the plant, determining the spread and severity of the disease.

A. Faske: Southern rust produces orange-colored pustules that rupture through the upper leaf surface. Pustules are often surrounded by a light green halo and clustered near the first pustule from the initial infection. These pustules are commonly detected in the mid-to-upper canopy. The most common misdiagnosis is common rust. Common rust produces dark-red-colored pustules that can rupture through the lower leaf but are more common on the upper leaf surface. The environmental conditions that favor Southern rust are frequent rainfall causing four to eight hours of leaf wetness, high relative humidity, and warm temperatures (82 to 88 degrees Fahrenheit). Wind spreads the rust spores to infect nearby plants. During the cropping season, windblown spores move progressively northward — infecting new fields.

Q: What is the yield impact of Southern rust in corn when left untreated?

A. Krieg: The Southern rust fungus uses a plant's nutrients for growth and reproduction, which affects grain fill and ultimately reduces yields. Rust pustules also rupture leaf epidermal tissue, which can interfere with the regulation of water loss by stomata. Consequently, severe rust outbreaks make it harder for plants to use water efficiently, so infected plants may exhibit symptoms of mild to severe drought stress. In severe cases, these infections may



KEY FEATURES

- Last year's weather conditions led to a breakout of Southern rust in corn.
- If left untreated, the disease can lead to major yield losses.
- The best defense against Southern rust is applying fungicides at certain stages of corn plant growth if the disease is identified.

predispose plants to secondary infections by stalk rot pathogens, which leads to lodging and yield loss. Yield losses of up to 45% have been reported with severe disease.

A. Faske: Grain yield losses have ranged from 20% to 40% in Arkansas when Southern rust occurred at tassel and the severity and percent of leaf area (ear and nearby leaves) affected at dent was above 40%. However, grain yield losses ranged from 5% to 10% when Southern rust started later at milk, with a similar degree of severity at dent.

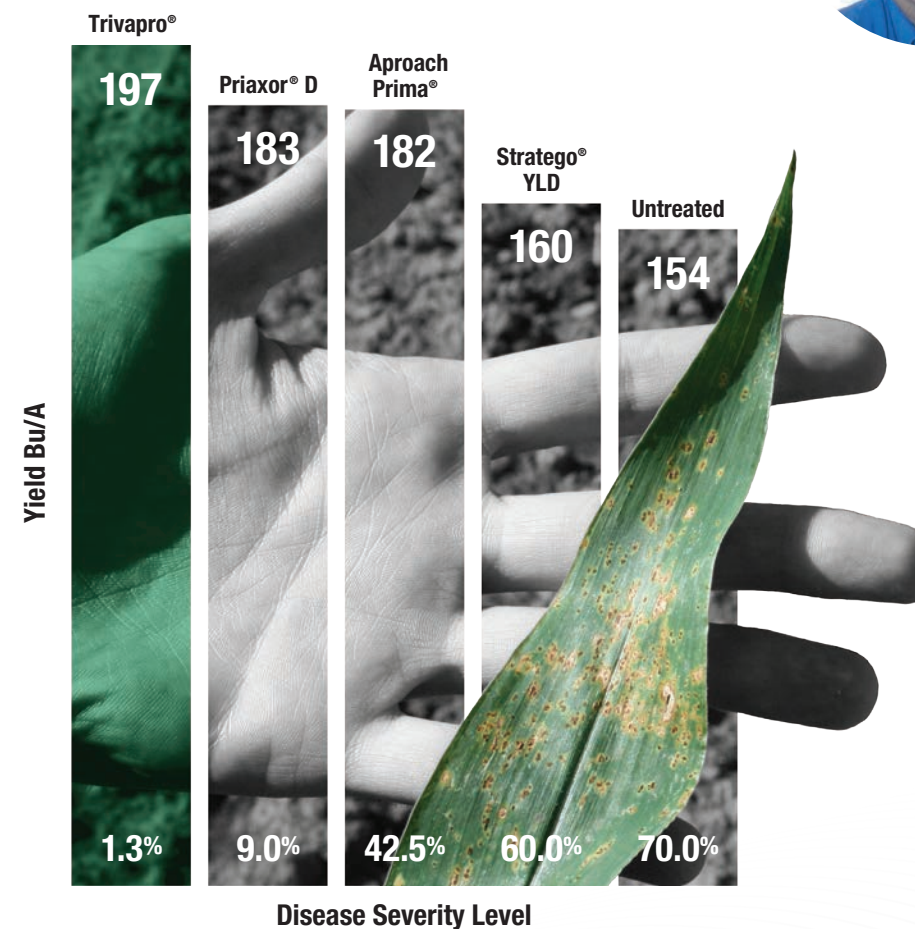
"When conditions favor rust development, the infection cycle continually repeats itself — spreading disease throughout the plant and helping it to readily move from plant to plant."

— PHIL KRIEG

Illinois Agronomy Service Representative at Syngenta



Southern Corn Rust Control



Q: What fungicide strategies do you recommend to control Southern rust in corn?

A. Krieg: Applying Trivapro® or Miravis® Neo fungicides before the disease establishes in corn helps give the best return on investment (ROI) and yield protection. In 2021, two-pass fungicide applications helped provide the best ROI and yield response due to the early onset of the disease and the extended period of infection throughout the region.

A. Faske: Scout corn at tassel and later reproductive stages for Southern rust. If detected and conditions favor disease development — and corn growth stages are tassel, silk, blister or milk — protect yield potential with a fungicide. Good coverage is important to protect leaves at mid-canopy. Several fungicides have good efficacy against Southern rust. These fungicides contain a strobilurin fungicide plus at least one other class of fungicide.

Interviews by Anna Boisseau

Jefferson County, AR- 2015; Dr. Travis Faske - UA Extension. Replicated Trial. All treatments applied at R1 Yield and % disease severity (ear leaf) at 29 DAT. Product performance assumes disease presence.

PHOTOS: (BAR GRAPH) SYNGENTA, (INSET) COURTESY OF PHIL KRIEG

Monitor Crop and Soil Moisture for Turn-Key Decision Making

Move from simple data collection to putting data in action.

By Sonja Gjerde

Because California only receives around 21 inches of rainfall annually, growers in the state know how to do a lot with a little. For example, they use irrigation and smart water techniques to ensure orchards, row crops and livestock succeed.

“We have no other choice in California — being water conscious is a necessity,” says Ethan Nichol, a California independent crop consultant.

Water management from California to Maine and every state in between is complex. It requires data about soil moisture and crop moisture uptake, and information about current and upcoming weather conditions. New technologies are more important than ever when it comes to water management in flood, drip and center-pivot irrigation.

Understand Farm Water Consumption

It's difficult to measure improvement without benchmarking. Growers must know where fields stand today to measure savings from better water-use efficiency.

“One of the biggest struggles I've seen is farmers don't always know how much water they're putting down on fields,” says Dayna Gross, sustainability manager of partnership and programs for Syngenta North America. “Step one is increasing monitoring to understand what is actually being put out on the field.”

“That measurement piece and record keeping are key,” says Steven Wall, sustainability development manager for Syngenta North America. “And new tools can help you understand soil

To understand where your operation stands, USDA's Sustainable Agriculture Research and Education group recommends the following steps:

1. Collect data.

Map fields, location of water supply networks, inventory pumping plans, and meters or measuring points. USDA also recommends noting field slope and soil information, including texture, type and infiltration rates. If the field uses irrigation, then document the irrigation method, the schedule, and well construction and testing records.

2. Audit the operation.

Perform a physical irrigation audit to verify water use by reviewing water- and energy-use efficiency on the farm.

3. Create a report.

Data collection and audit information will provide evidence needed to generate a report about equipment, irrigation schedules and water uses across the operation. This report will provide practical information, such as when to schedule maintenance and how to improve irrigation systems overall.

moisture and plant health so you can use all of this information to get the right amount of water to the plant at the right growth stage.”

Use Technology to Inform Decisions

The days of walking fields to check for moisture stress aren't over yet, as soil probes are still widely used, but certain tools help focus scouting efforts. From satellites and drones to stationary soil monitors and plant-sensing technologies, growers can increasingly turn information into action.

“Remote sensing is a great tool, and imagery is a great way to get a feel for how crops are doing,” Wall says.

“Aerial imagery is one way to see discoloration or other indicators of plant stress.”

Seed and agronomy companies are taking note. Syngenta, for example, launched the Water+™ Intelligent Irrigation Platform, allowing users to control irrigated corn production and grow corn with less water. It's a collaboration with growers, industry partners and Lindsay Corp.

Growers have more precise information about irrigation on-farm with the Water+ Intelligent Irrigation Platform, which brings together Syngenta genetics, crop protection inputs, agronomic advice, and irrigation technology and equipment. It informs planting, controls pivots, and provides crop monitoring — including irrigation recommendations and updates — from laptops or phones.

Monitoring crops for moisture use enables greater efficiency than soil sensing alone. In California, Nichol saw an 800 pound-per-acre difference in almond yields field-to-field when he gave trees moisture as needed instead of using a flat rate across the operation. He began using an irrigation decision support tool from Phytech in 2016 to make these changes.

In California, Ethan Nichol saw an 800 pound-per-acre difference in almond yields field-to-field when he gave trees moisture as needed instead of using a flat rate across the operation.

Pressure sensors placed on the irrigation system monitor actual irrigation in each block.



KEY FEATURES

- Smart water management saves farmers money and supports agricultural sustainability.
- Tools available today track water usage by field and farm for whole-operation decision making.
- In-field and in-soil technologies help shore up water-use efficiency.

The Phytech sensor-based system works directly on the plant, informing operators about plant health and water needs based on moisture uptake.

Comparing two orchards where he used the Phytech technology, Nichol found that the one he expected to produce higher yields was

demanding 20% less water than the other. It turned out that due to pest pressure, the orchard was not performing as well as usual. By giving the trees what the monitors indicated was needed, he saved critical water resources.

“If I was only looking at the soil moisture probes, I would have over-irrigated for sure,” he says. “Without that feedback, we would have wasted water and money.”

Smart water resource allocation not only reduces costs, but it also means farmers, ranchers and orchard operators are being more sustainable.

“What's exciting as we start using more technologies for irrigation is creating greater efficiencies,” says Wall. “If we reduce pumping because we see that we're using too much water, we save energy and water consumption costs while maintaining productivity. On top of that, we benefit aquifers and the environment overall. It's a win-win.”



Phytech sensors show when and how much water is needed to produce high-quality yields.



Plan Ahead to Weather the Supply Chain Storm

The dynamic plans of Syngenta allowed it to navigate a stretched supply chain.

By Martha Mintz

C OVID-19 chucked a boulder into the global and local supply chain ponds, and the resulting waves will ripple outward for quite some time. With the surplus safety net gone, securing supplies last minute is no longer an option. Farmers, retailers and manufacturers who plan ahead and stay flexible are better situated to stay afloat until things settle.

“In just two years, as a country and industry, we’ve gone from essentially free-flowing supply of all materials to an environment where there’s a strained supply of many,” says Kevin Duhe, head of supply for Syngenta North America. “In the ag industry and even in our personal lives, we’ve seen — and will continue to see — longer lead times for ordering and receiving all sorts of goods.”

While suppliers of crop protection products fared better in the short term than those needing microchips, there’s still cause for long-term concern. Conditions in 2022 create an especially challenging situation for crop protection products.

Find Balance

Farmers are faced with a careful balancing act in 2022. While input costs have risen substantially due to various factors, including inflation and exponential increases in transportation costs, strong commodity markets continue to offer profit opportunities.

These factors combine to drive increased demand for crop protection products. Growers must plan long-term to ensure the necessary products and tools are available to help them protect higher-than-normal investments, maximize yields and increase income potential.

When planning for crop protection purchases, growers should include a fluid assessment of current pricing, as experts believe inflation will continue accelerating through 2022. These factors contribute to pricing increases on products in most industries, including crop protection.



KEY FEATURES

- Constrained supply of crop protection products will continue through at least 2022.
- Strategic planning prior to the pandemic gave Syngenta and its customers more reliable supply.
- Growers should work with local retailers and Syngenta agronomists to plan for adequate supplies.

“In the ag industry and even in our personal lives, we’ve seen — and will continue to see — longer lead times for ordering and receiving all sorts of goods.”

— KEVIN DUHE
Head of Supply for Syngenta North America

“Retailers and farmers will need to lean into their agronomic teams,” says Jeff Cecil, Syngenta head of crop protection marketing. “Agronomists should be ready with recommendations that can help maximize a farmer’s return on investment through the best inputs available. This includes where a farm will get the biggest benefit as they navigate increasing costs and potentially limited product availability.”

Consider Supply Chain Complexities

Syngenta is well-positioned to meet farmer needs, Duhe says. The company planned for larger supplies of its crop protection products

Crop protection products are especially vulnerable to supply chain disruption for several reasons. For one, most require months to produce. Then, there’s the global travel time.

Crop protection product manufacturing spans the globe — with the early stages of the process sometimes starting in distant locations like China and India. Multiple stages require fabrication of chemicals, and manufacturers move products several times before they get to local formulation and packaging.

This complexity creates many potential pain points, especially since each product contains multiple components — chemicals, stabilizers, surfactants, colorants, plastic bottles, caps, labels, printer ink, glue, boxes and more.

“Not having any one of those components can delay or keep a product off the shelf,” Duhe says. “Everything might be done, and then the cap didn’t show up because the plant that produced it had

to slow down due to COVID. That throws off the schedule by a week or more. Those situations aren’t easy to plan for, but that’s what we’re all adapting to — us, retailers and farmers.”

Have a Long-Term Plan

When the pandemic hit, those who had full pantries and freezers — maybe even a spare roll of toilet paper or two — were probably less stressed. The pantries at Syngenta were well-stocked, company leaders point out, thanks to years of strategic long-term planning.

“What positioned Syngenta so well to handle upheaval in the supply chain compared with other crop protection companies and industries is that long before any crisis hit, we formed long-term strategic collaborations across our entire supply chain,” Duhe says.

The company and its customers continue to realize benefits from its strategic planning as the world hopscoches from one supply chain disaster to the next, including a global pandemic, canal-blocking ships, clogged ports, power outages in China, and war.

Syngenta secured long-term contracts with guaranteed levels of service and supply end to end — from raw materials to packaging to transportation. And as a long-standing contracted partner, Syngenta has priority when orders continue to come in but supplies or space on transport run low.

One way Syngenta planned ahead for potential disruptions was

Prior to 2020, Syngenta secured long-term contracts with guaranteed levels of service and supply end to end — from raw materials to packaging to transportation.

locking in rates with partners. For example, Duhe says, Syngenta signed a long-term contract with global shipping titan Maersk years ago. Prior to 2020, the Maersk deal may not have looked so savvy to outsiders. However, it wound up cementing rates and securing a consistent supply of space on Maersk container ships during an unexpectedly turbulent time.

“Traditionally, spot market buys could sometimes be lower than the rate Syngenta secured by contract. But by 2020, costs had skyrocketed from \$3,000 to \$20,000 to get a shipping container from China and to the United States,” Duhe says.

While companies needed to adjust even contractual rates with such a wild swing, Syngenta was positioned for capacity and cost benefits due to its long-term supplier relationships.

Track for Success

An innovative tracking system also helps Syngenta — literally in this case — navigate around supply chain issues. The company invested in a cutting-edge global online tracking and visibility platform that helps it assess where in the world its products are at all times, Duhe says.

“We have a global team with people who work around the clock in all time zones and constantly track our raw materials and products around the world,” he adds.

The real-time digital tracking and constant surveillance allow Syngenta to detect transit and supply problems sooner. When issues arise, it can redirect and adjust plans to keep things moving.

Even as the world optimistically looks for the pandemic to wind down, supply chain issues persist. Syngenta supply teams are doing their best to insulate farmers from feeling the effects, but it’s an ongoing battle. It will take time to work through global supply chain backlogs. Cecil and Duhe point out that careful planning and contingency plans are always good business strategies. They’re even more critical now. ■

“Retailers and farmers will need to lean into their agronomic teams. Agronomists should be ready with recommendations that can help maximize a farmer’s return on investment through the best inputs available.”

— JEFF CECIL
Syngenta Head of Crop Protection Marketing

for the 2022 growing season than in 2021, and all products in the portfolio should be available.

“We don’t have an unlimited supply, but we’re in a good spot,” Duhe says.

That’s not to say all products will be freely available all season. When there’s a shortage of a major product, such as the glyphosate shortfall Bayer announced, there is a domino effect on the supply chain. In this situation, demand for herbicides that work similarly increases, explains Mike Hollands, Syngenta head of global supply and operations.



it takes a village

The U.S. ag community supports a young girl who is fighting leukemia half a world away.

By Dana M. Anthony

A child fighting leukemia in the Philippines faces a significant disadvantage compared with a child in this country. For one girl, the U.S. agricultural community stepped up to make a difference. Thanks to Bob Kemerait, Ph.D., extension specialist in the College of Agriculture and Environmental Sciences at the University of Georgia, the world has gotten a little smaller and a lot more compassionate.

Global Ties
 “I work a lot in agriculture around the world,” Kemerait says. “And one of the places where I work is the Philippines.” Over the past 20 years, he has worked closely with colleagues in the country, visiting frequently to help the farmers there, and ultimately acquiring a wide array of friends. He and his wife, who is from the Philippines, also vacation there.

Kemerait’s trips are normally routed through Manila, and he’s come to know some of the families living in the capital city — including some from impoverished backgrounds. During his stays, he often invites them to participate in fun activities to bring a little sunshine into their lives.

On a visit to Manila several years ago, Kemerait invited Rema, a family friend, and her children to go swimming and then to eat at a local restaurant. Rema brought along her cousin’s 6-year-old daughter Rhianna “Ula” Jhane — whom she refers to as her niece.

“Ula stood out from the other children because, though she was small in stature, she was filled with exuberance,” Kemerait says.
 Ula lives with her mother, Josiephine, and her 3-year-old brother, Ar-J, in Navotas, a hard-scrabble coastal town located within Metro Manila.

Exuberance to Exhaustion
 In 2021, Josiephine noticed that Ula was having difficulty walking and experiencing pain in her hips. The once active Ula had little to no energy. Josiephine scraped together the money to take Ula to the hospital. Following that visit, she called on Kemerait to help her understand the diagnosis. Kemerait and his wife, Pam, working through the medical system, eventually learned that Ula had Childhood Acute Lymphoblastic Leukemia (ALL).

Childhood ALL is a type of cancer that affects the blood and bone marrow and worsens without proper treatment, such as chemotherapy and radiation therapy. However, this type of treatment requires access to appropriate medical care and money to fund it, both of which can be major obstacles for children from Navotas. Kemerait’s research revealed that a child in the United States who is diagnosed with this same type of cancer has a 90% chance of survival; for a child without ready access to medical care, the disease is a death sentence. This disparity was inconceivable to him.



KEY FEATURES

- A young girl with leukemia from the Philippines grabbed the hearts of an extension specialist's social media following.
- Social media support quickly grew to unsolicited financial backing.
- You can follow the child's progress on Bob Kemerait's Facebook page.



“After Rema told me about Ula’s diagnosis, I decided I had to do something for that sweet girl, her mother and her aunt. I didn’t quite know what could be done; but I knew if Ula would fight, then I would fight beside her.”

— BOB KEMERAIT, PH.D.

Extension Specialist in the College of Agriculture and Environmental Sciences at the University of Georgia



Bob Kemerait, Ph.D., shares Facebook updates about the cancer treatment of family friend Ula, an 11-year-old girl from the Philippines.



“After Rema told me about Ula’s diagnosis, I decided I had to do something for that sweet girl, her mother and her aunt,” Kemerait says. “I didn’t quite know what could be done; but I knew if Ula would fight, then I would fight beside her.”

Social Support

As this ordeal developed, Kemerait shared Ula’s story on social media. The outpouring of support he received for Ula was immediate and astonishing. People he hadn’t seen in years — and current acquaintances like Chip Blalock, the executive director of the Sunbelt Agricultural Expo — wanted to help support Ula’s treatment.

“When a man like Dr. Kemerait champions a cause, you know it’s important,” Blalock says. “He has never asked for a dime [for Ula], and it shows how much people think of him when they are willing to help someone on the other side of the globe.”

Blalock decided to help Ula and asked if Kemerait had Venmo®. Kemerait responded, “Well, I do now.”

Kemerait also familiarized himself with other electronic payment platforms that made donations to Ula possible, including Zelle®, PayPal® and Cash App®.

Ag Steps Up

Kemerait says it’s incredible how many people in the industry came together to support a child thousands of miles away. Upon learning of Ula’s plight, attendees from various growers’ conferences came forward quietly to hand him donations. Meanwhile, farmers from four states reached out to contribute.

“At one growers’ conference, a colleague slipped a \$100 bill in my hand,” Kemerait says. “Farmers from all over, some of whom I’ve never met personally, joined to support Ula’s cause.”

Randy Thrash of Randy Thrash Farms and Produce in Albany, Georgia, is one such farmer. Thrash regularly donates to St. Jude’s Children’s Hospital; but after reading Ula’s story on Facebook, he felt compelled to help.

“Farmers are some of the most compassionate people there are,” Thrash says. “I have more respect for Dr. Kemerait because of what he’s doing for that child.”

The financial support farmers and others in the ag community provided helped Ula celebrate her 11th birthday and Christmas with her family this past year.

Contributions for Ula’s treatment range from \$10 to \$5,000. In total this past year, Kemerait raised close to \$20,000. He carefully reviews bills from the hospital and attending physicians, then pays for Ula’s medical expenses and sends extra to Rema and Josiephine to buy nutritious food, such as bananas and other fresh fruits and vegetables, which would otherwise be out of reach financially for Ula’s family.

“It is important that Ula gets proper nutrition to help with the treatment,” Kemerait says. “It’s not only the illness we are treating, but we’re meeting her nutritional needs as well.”

Moving Forward

Kemerait emphasizes that this story is about Ula, and he’s just the liaison to the rest of the world. Unfortunately, it is a common story for families around the world without access to life-saving medical care.

For Ula, however, the future is bright. She finished an aggressive treatment regime and is now in the maintenance phase of fighting cancer. Her condition continues improving, and her doctors are optimistic she will recover. Josiephine is grateful for the care and love that everyone has shown for Ula and her family.

“I would do anything I could to make my Ula healthy again,” Josiephine says. “But life is hard here, and it is so very difficult to take care of medical needs for this cancer. I am grateful to my cousin Rema for helping us. It is because of Rema that we know Dr. Kemerait and his family. As a mother, I am so very grateful to them.”

The doctors say that it will take a total of three years before Ula will be cancer free. Even though she still worries about her

daughter’s continued health care needs, Josiephine trusts Kemerait and those contributing to Ula’s expenses. Their help is a bright light in a once hopeless place.

Kemerait only intended to share Ula’s story with his social media network. Now, almost a year later, his intention has brought much needed medical assistance to Ula and united many in the single goal to save a child.

If you would like to follow Ula’s story, please contact Kemerait on Facebook, where he shares daily updates and pictures about Ula’s progress. 🍓

“When a man like Dr. Kemerait champions a cause, you know it’s important.”

— CHIP BLALOCK
Executive Director of the Sunbelt Agricultural Expo



PATH

OF LEAST RESISTANCE

Managing herbicide-resistant weeds in corn requires a multifaceted approach.

By Charles Johnson

Corn popping through freshly planted soil gives farmers a little spring in their steps. There's nothing quite like it for folks who love farming. All too often, however, that step goes flat when farmers see tough weeds emerge alongside those corn plants. Those weeds reduce yield starting with that first leaf. With widespread herbicide resistance increasingly commonplace in weeds, farmers must develop management plans to wipe out weeds and protect their yield.

Crop rotation, which in corn country generally means planting soybean in alternate seasons, is one tactic to consider. Crop rotation gives farmers the option to use different herbicides, increasing the modes of action available to combat weeds.

"A comprehensive weed control program should include tools to reduce incidence of herbicide resistance," says Sudeep Mathew, mid-Atlantic area agronomic service representative at Syngenta. "In the mid-Atlantic, we not only have resistant Palmer amaranth, common ragweed and grasses like barnyardgrass, foxtail and Italian ryegrass, we also have resistant horseweed, which was first identified in this area."



KEY FEATURES

- Palmer amaranth can grow two to three inches a day.
- Research shows every leaf stage of delay from V1 to V11 causes a 2% yield loss.
- Growers may end up with a 10% loss in yield if they delay use of post-emergence herbicides.

Fortunately, growers have choices. Halex® GT and Acuron® GT are effective post-emergence herbicide options because they provide control of emerged and unemerged weeds. Acuron GT is an herbicide developed specifically for post-emergence. Because it contains the full-season label rate of bicyclopyrone, it cannot be used if Acuron was used preemergence. However, if growers want to use Acuron GT post-emergence, they can use Lexar® EZ, Lumax® EZ or Bicep II Magnum herbicides for preemergence.

Al Hill, who farms 3,100 acres of corn and soybeans in Deep Run, North Carolina, says a one-pass approach in corn using Acuron herbicide, a premix formulation of bicyclopyrone, mesotrione, S-metolachlor and atrazine, with a burndown application, such as Gramoxone® SL 3.0 herbicide, works well for him.

"Doing it in one pass simplifies things and works for me," Hill says. "I start with a fall application of [herbicide] to keep weeds from overwintering. We tend to have mild winters in eastern North Carolina, and this keeps weeds from popping up. Then I come back with Gramoxone SL 3.0 and with Acuron when we plant corn in late March and early April. We spray Acuron as we plant, right behind the planter. That way, the ground is fresh. There's a little moisture in the soil, which helps activate the herbicide."

Hill also strip-tills corn in 20-inch rows so it can canopy quickly, shading out late weed emergence.

Walker notices farmers taking more comprehensive approaches to weed management, which he sees as necessary to deal with today's weeds. Farmers, he says, are more innovative because they've seen the writing on the wall and know long-term farming requires maintaining soil health and reducing the seed bank.

Don't Delay

A quick start to corn weed control programs protects against yield loss. Mathew advises initiating weed removal at least four to five days before the critical period of weed control, which is the V1 to V11 corn growth stages.

Some weeds can surprise you with lightning-fast growth. Palmer amaranth, for example, can grow two-to-three inches a day.

"People underestimate it," Mathew says. "They see it, then look at it again in four or five days, and it's gone from a two-leaf weed to a six-leaf weed. Don't underestimate these weeds. Be sure you apply proper herbicide rates to control them."

"Research tells us that for every leaf stage of delay from V1 to V11, there's a 2% yield loss," Mathew continues. "You can easily get a 10% yield loss just by delaying post-emergence herbicides. For \$6 per bushel corn, that adds up." 🌱

For effective control and to anticipate herbicide resistance, Johnson says, "Most Indiana farmers use a glyphosate product along with something else as a post-emergence program."

Acuron® herbicide from Syngenta is effective preemergence because it combines four different active ingredients with three modes of action. Acuron contains the active ingredients atrazine, mesotrione, S-metolachlor — also sold under the brand names of AAtrex®, Callisto®, and Dual II Magnum® herbicides, respectively, — and bicyclopyrone, a novel active ingredient designed to improve weed control and consistency. The four active ingredients together provide broadleaf and grass control for over 70 weed species.

Ikley likes to see farmers use a multiple mode-of-action approach like that.

"When you get three or four active ingredients spanning three modes of action, you're more likely to help your situation with resistance," he says. "Most of our soybean farmers have gone to Roundup Ready 2 Xtend® or Enlist E3® technology, which helps with resistance."

Choose Wisely

It's important for farmers to stay alert and inspect fields for escaped weeds. Johnson says weeds like velvetleaf, cocklebur and jimsonweed, which seemed to be easily controlled a few years ago,



"We spray Acuron as we plant, right behind the planter. That way, the ground is fresh. There's a little moisture in the soil, which helps activate the herbicide."

— AL HILL

Owner of High Yield Farms in Deep Run, North Carolina

have returned in some areas. In North Dakota, Ikley says he's seeing more wild oats and green foxtail. Waterhemp, too, seems to be a never-ending challenge — with seeds arriving in floodwaters as well as being moved by harvest equipment.

AATREX 4L, AATREX NINE-O, ACURON, BICEP II MAGNUM, CALLISTO XTRA, GRAMOXONE SL 3.0, LEXAR EZ AND LUMAX EZ ARE RESTRICTED USE PESTICIDES.

PHOTOS: JUSTIN KASE CONDER

Resistant weeds vary between regions. In North Dakota, waterhemp and kochia show resistance to both glyphosate and ALS inhibitor herbicides, says Joe Ikley, Ph.D., assistant professor and extension weed specialist at North Dakota State University.

Waterhemp also causes problems in the western Corn Belt, says Bill Johnson, Ph.D, Purdue University weed science professor. However, Johnson points out, farmers farther east are more concerned with weeds like giant ragweed, foxtail, lambsquarter and morningglory.

In the mid-South, Palmer amaranth resistance to glyphosate appeared more than a decade ago and presents a particular challenge.

"Mississippi may rank at the top of the list for resistant weeds," says Tripp Walker, Syngenta area agronomy service representative in Mississippi and north Alabama. "I think there are 13 weed species here with herbicide resistance. To get control now, you have to diversify your strategy."

Plan Intensively

Starting with a solid weed management plan is essential.

"Crop rotation is really your biggest strength," Walker says. "If you're having a resistant-weed problem, rotate to a monocot crop like corn on some acreage. Then you have more tools for effective weed control. You can reduce the weed seed bank that way."

Walker and Mathew recommend a two-pass herbicide approach on fields where potentially resistant weeds are present. They say the best approach is to consider these weeds herbicide-resistant from the beginning.

"You have to think differently these days. Using multiple modes of action is the key," Mathew says. "Be sure to use herbicides effective against the weeds. If you use a preemergence herbicide at corn planting, plan to come back within 21 to 28 days with a post-emergence application of a different herbicide. Overlay a residual product before canopy closure."

According to Walker, growers should design weed-control programs that include pre- and post-emergent applications.

"You should design a total weed control program with a preemergence herbicide followed by a post-emergence material as a priority, and use multiple modes of action," Walker says.

Additionally, Johnson says, "Scout fields. See what's leaking through."

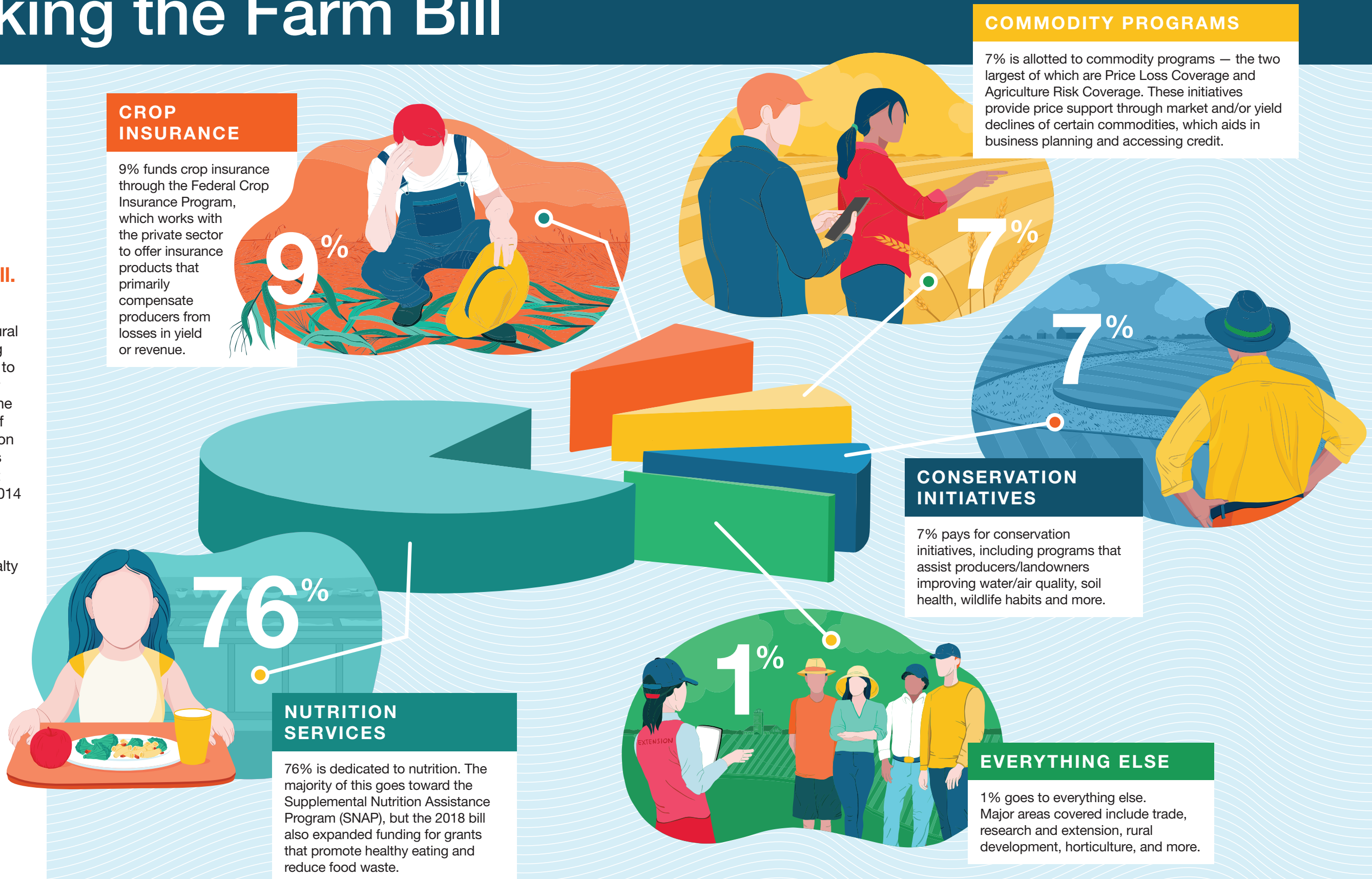
A tractor at High Yield Farms applies Acuron® in a single pass during planting.

Unpacking the Farm Bill

Approximately every five years, most recently in 2018, Congress passes a package of program authorizations and funding commonly known as the farm bill.

The legislation has immense consequences for the agricultural industry as it covers everything from crop insurance programs to farmer training to sustainability initiatives. The latest version, the Agriculture Improvement Act of 2018 (2018 Farm Bill), expires on Sept. 30, 2023. The Act builds upon previous farm bills — but with a few changes from the 2014 legislation. Notably, the \$867 billion package expanded programs related to trade, research and extension, specialty crops and organic agriculture, among others.

As we enter the final years of the legislation, we break down the major areas funded by the 2018 Farm Bill.



See (Tar) Spot Run

Growers can get a jump on tar spot with these scouting and treatment tips.

By Amy Campbell

Midwest corn growers are coming off their worst season for tar spot since 2018, when many saw it for the first time. By 2021, they had some experience with the disease but were hit hard and suffered severe yield losses, according to Purdue University's Darcy Telenko, Ph.D.

"I think when we get final data in, we'll probably see more yield loss in 2021 than the other three years combined," says Telenko, field crop extension pathologist.

Still reeling from their 2021 encounter with tar spot, growers got more bad news: Scientists found viable spores in the season's field debris. This means the disease will likely be back next season.

"We know it survived in the debris, so it is overwintering," Telenko says. "From now on, it's going to be about how much inoculum is in your field, plus the weather conditions."

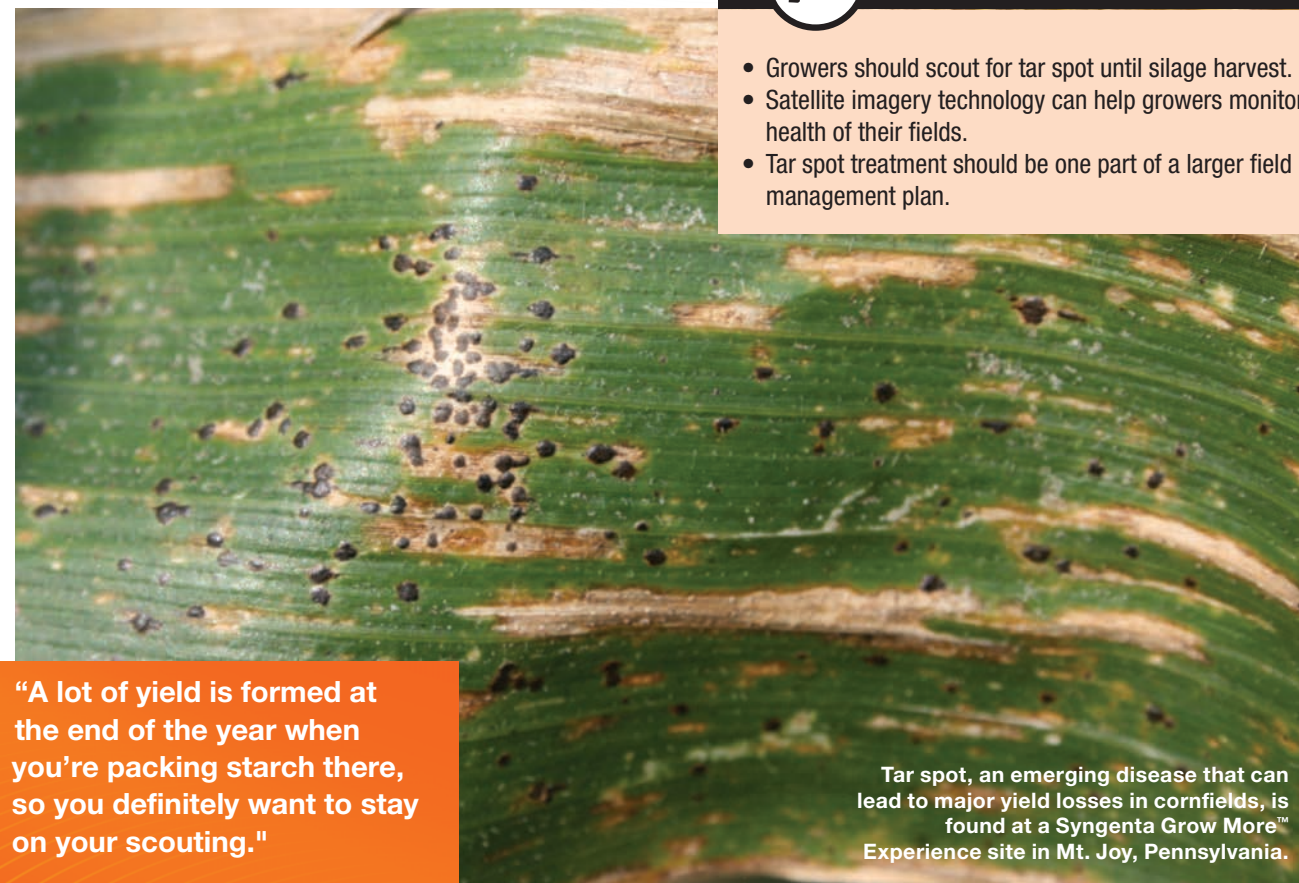
Nick Groth, Syngenta agronomy service representative in Wisconsin, says tar spot's *Phyllachora maydis* spores have definitely been on the move in his state. The disease expanded its host range over the past few years, and it is currently affecting cornfields throughout Wisconsin.



"A lot of yield is formed at the end of the year when you're packing starch there, so you definitely want to stay on your scouting."

—NICK GROTH

Syngenta Agronomy Service Representative



KEY FEATURES

- Growers should scout for tar spot until silage harvest.
- Satellite imagery technology can help growers monitor the health of their fields.
- Tar spot treatment should be one part of a larger field management plan.

Tar spot, an emerging disease that can lead to major yield losses in cornfields, is found at a Syngenta Grow More™ Experience site in Mt. Joy, Pennsylvania.

Don't Stop Scouting

Tar spot hit with full force in 2021 in the second week of August for many growers, and those who weren't ready for it realized significant yield loss. That's why Groth encourages farmers to scout until silage harvest.

"By mid- to late-August, growers may think they're done scouting, that they don't need to worry anymore because the yield is made, since by then it could be a month passed tassel," he says.

But according to Groth, research from Purdue shows that even at full-dent stage, tar spot can result in up to a 20% yield loss*.

"A lot of yield is formed at the end of the year when you're packing starch there, so you definitely want to stay on your scouting," Groth says. "We like to say until silage harvest time — that's about half milk line — and by then, yield loss will be a lot less."

Andrew Tucker, precision agronomist at Nutrien Ag Solutions in Mineral Point, Wisconsin, helps his customers with scouting by participating in Cropwise™ Imagery — the Syngenta satellite imagery product that helps growers monitor field health by comparing satellite photos taken every three to five days.

"Cropwise Imagery has detected issues in the field that we could scout and figure out exactly what was going on way before harvest," Tucker says, adding that he recently used it to monitor a

trial of hybrids with tar spot. "You could see the differences clear as day."

Know Your Pest

Josh Pickel, crop specialist at Insight Farm Services in Marshall, Wisconsin, says treatment for tar spot should be one part of a field management plan, not its sole focus. In his area, tar spot had a big impact in corn-on-corn fields where rootworm beetles had already damaged the crop.

"I think we put a lot of blame on tar spot, where if we controlled the root worm feeding early, we probably wouldn't have had such severe tar spot," Pickel says.

In hard-hit areas where corn was going from grass-green to brown in 10 days, Pickel conferred with Groth to find a solution.

"We needed to get a three-mode-of-action fungicide on to reduce the tar spot and protect the plants," Pickel says.

Miravis® Neo fungicide fit that need. With the active ingredients azoxystrobin and propiconazole, and Adepidyn® technology, Miravis Neo provides broad-spectrum disease control and plant-health benefits for increased yield opportunity and harvestability in corn and soybeans.

"It's been proven in the market and has a long-lasting residual activity," Pickel says. "We've seen really good results with it."

Tucker has, too.

"Last year we saw a big response [in plant health] to two applications of Miravis Neo, and it gives us one of the widest windows of protection for the plant," Tucker says.

The agronomists agree that a management plan should consider field history and all potential threats. And tar spot isn't the only obstacle to maximizing yields in corn, says Tyler Harp, technical development lead for Syngenta.

"Miravis Neo does much more than provide good tar spot control such as providing broad-spectrum disease control on difficult diseases like Fusarium ear rot and gray leaf spot, and it provides significant plant health benefits," Harp says. "This is one reason why Miravis Neo helps provide consistently higher yields across the Corn Belt — tar spot or no tar spot — compared with other products in the market. Being good on tar spot is very important, but it needs to do more than that to consistently maximize yield potential. That's the power and benefit of Adepidyn technology and Miravis Neo."

Choosing a hybrid for its tar spot resistance may seem like a no-brainer, but Tucker says growers should make sure they're considering what's best for their ground so they don't sacrifice yield before they plant.

"We can treat for tar spot," he says. "You can't treat for a hybrid that's not the right fit for a field. It isn't going to yield for you if you don't have the right genetics out there." 🍌

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* Adapted from Carter and Hesterman, 1990. Handling Corn Damaged by Autumn Frost NCH-57. Purdue Univ. Cooperative Extension Service, W. Lafayette, IN 47907.

Root Out Pathogens

Sample soil for *Phytophthora* root rot before tree health and yield potential deteriorate.

By Vicky Boyd

Many tree nut and citrus growers recently watched their margins erode due to increasing input costs, questionable water availability and lackluster crop prices. *Phytophthora* root rot, which can reduce tree efficiency and yield potential, puts further pressure on their bottom lines.

“Here in California, growers are running on razor-thin profits,” says Garrett Gilcrease, Syngenta agronomy service representative based in Hanford, California. “Even a minor *Phytophthora* infestation can cost thousands of dollars a year.”

In Florida, citrus producers face added challenges from *Diaprepes* root weevils and Huanglongbing (HLB), or citrus greening, both of which damage tree roots.

“When you combine HLB, which can cause major root loss, with *Diaprepes* root weevil and *Phytophthora*, it’s a recipe for tree loss,” says Zach Langford, Syngenta sales representative based in Lake Wales, Florida.

Get Ahead of *Phytophthora*

Gilcrease and Langford say growers can get ahead of *Phytophthora* root rot with an integrated approach that includes proper irrigation management, resistant rootstocks, soil and root sampling, and fungicide treatments, if warranted.

A water mold, *Phytophthora* thrives under wet conditions, infecting tree roots and reducing their ability to pull water and nutrients from the soil.

Gilcrease says the pathogen was common when California orchards were flood irrigated. It waned as growers converted to pressurized irrigation systems and began planting on berms. But *Phytophthora* root rot resurged recently because drip and micro-sprinklers only wet the top foot or so of the soil surface, he says, noting that the key to preventing the disease is proper irrigation management. This includes not overwatering, especially in the spring before trees have fully leafed out and use less water. Growers also should avoid soil compaction and use practices that aid water infiltration.

As a soilborne pathogen, *Phytophthora* may infest nut and citrus tree roots years before above-ground symptoms appear. Tree



Phytophthora infects a citrus tree.

health declines as the infection progresses, causing reduced fruit set, poor vegetative growth, early leaf drop and even tree death.

Take Advantage of Free Soil Programs

Langford and Gilcrease recommend scouting and soil sampling to catch issues early. Syngenta offers a Soil Pathogen Assessment (SPA) program to gauge *Phytophthora* propagules in California and Arizona orchards. In Florida, Syngenta provides the similar Citrus Soil Assay program.

Charlie McKee, a Florida-based citrus producer in Lake Wales and production manager with Donley & Myers Grove Caretaking, says he has used the Citrus Soil Assay program for 10 to 15 years. It provides information on his own groves and gives him statewide data about citrus tree health.

“It helps you see what’s going on with the root mass and propagules, so you can get the best timing for treatment,” says McKee. “It helps maximize your dollar as much as possible.”

In California and Arizona, Gilcrease says the SPA program began about 10 years ago for citrus growers. It has since expanded into tree nuts. Each year, Syngenta representatives in the two states collect about 1,200 samples for testing. They initially collected only soil samples, which were assayed for *Phytophthora* propagules — a type of vegetative reproductive body. If a *Phytophthora* species wasn’t active at the time of sampling however, lab soil tests often didn’t detect them. Gilcrease says Syngenta representatives now collect soil as well as root samples. As part of pathogen assessment, the laboratory runs ELISA (Enzyme Linked Immunosorbent Assay) tests on roots to detect a protein unique to *Phytophthora*.

Langford says he also looks at the disease load metric, which is a treatment threshold based on the number of propagules found in the soil, when making treatment recommendations.

“This metric adds another layer of information to help make the best recommendation,” Langford says.



KEY FEATURES

- *Phytophthora* can further squeeze razor-thin margins on tree nut and citrus farms.
- Root infestations damage tree health and yield before above-ground symptoms appear.
- Early treatment is efficacious, minimizes cost and increases profit opportunity.

Garrett Gilcrease, Syngenta agronomic service representative, examines citrus leaves for diseases such as *Phytophthora* root rot, which can erode citrus growers’ profit margins.

Develop a Resistance Management Program

When lab results warrant a fungicide treatment, Gilcrease and Langford say growers have a handful of options they can rotate for resistance management. Phosphorous acid is a Group 33 fungicide

Ridomil Gold® SL fungicide, a Group 4 soil-applied fungicide from Syngenta, protects trees from soilborne oomycete diseases, including *Phytophthora* root rot. It is injected through micro-sprinkler or drip systems.

Ridomil Gold GR fungicide is a soil-incorporated granular formulation. The active ingredient in both Ridomil Gold GR and Ridomil Gold SL products — mefenoxam — builds up around roots stopping current and preventing future infections.

And Orondis® fungicide — a Group 49 soil-applied fungicide also from Syngenta — controls 11 *Phytophthora* species, according to UCR trials*. Injected through micro-sprinkler or drip systems and using oxathiapiprolin as its active ingredient, Orondis reduces soil propagules and moves systemically within the tree to improve tree vigor and health.

For more information about the Soil Pathogen Assessment or Citrus Soil Assay programs, contact your local Syngenta representative. 🍋

“Even a minor *Phytophthora* infestation can cost thousands of dollars a year.”

— GARRETT GILCREASE
Syngenta Agronomy Service Representative

also widely used as a fertilizer. According to University of California - Riverside (UCR) studies, several *Phytophthora* species have developed resistance or reduced sensitivity as a result.

* <https://rd.almondboard.com/files/2019%20PATH15%20ADASKAVEGBROWNE-DISEASE%202.PDF>

What's in Store

Read about industry awards, the launch of virtual Grow More Experience sites, and a new sustainability-focused app for growers.

AWARDS & HONORS

Head of US Crop Protection Field Development Named Purdue University Distinguished Agriculture Alumnus

Purdue University recently presented Gordon Vail, Ph.D., head of U.S. Crop Protection Field Development at Syngenta, with a Distinguished Agriculture Alumnus (DAA) award. Vail received his doctorate in botany and plant pathology from Purdue.

"When I was on campus receiving the award, I discovered that Vern Hawkins — Syngenta Crop Protection president and North American region director — is also a past recipient of the Purdue DAA, so receiving this award certainly puts me in elite company," Gordon says.

The nominating committee recognized Vail for his many contributions to Syngenta and legacy companies over his 28-year career. The committee also selected Vail because of his continued investment in Purdue, noting that he visits campus for an annual research update hosted by the Purdue Weed Science group.

"When returning to campus, he can be counted on to interact with faculty and students, offer professional guidance on projects, and perhaps mention that his resume still proudly notes that he was a coach and member of Purdue's first-place team at the 1993 North Central Graduate Student Weed Contest," the awards committee wrote.



Gordon Vail continues to contribute to Purdue University through annual visits to work with students in the university's Weed Science group.



Tony Driver has worked at Syngenta on various cropping systems in south and central Texas and eastern Oklahoma for 38 years.

Syngenta Agronomist Receives 2021 Norman Borlaug Lifetime Achievement Award

Tony Driver, Syngenta agronomic service representative, recently received the 2021 Norman Borlaug Lifetime Achievement Award from the Texas Plant Protection Association (TPPA). Driver has worked at Syngenta on various cropping systems in south and central Texas and eastern Oklahoma for 38 years.

"Tony is a well-respected agronomic service representative with Syngenta Crop Protection. He has served TPPA as an officer and board member and been a sponsor for the conference for many years," Bob Sasser, TPPA Executive Director and Driver's former colleague, told *Farm Progress*. "He is well-deserving of this award; he is supportive of TPPA and encourages others to be involved."

Growing up in a farming community in Humphrey, Arkansas, Driver's interest in agriculture started at a young age. In high school,

he joined Future Farmers of America, and his instructor encouraged him to pursue an undergraduate degree in agriculture at the University of Arkansas at Pine Bluff. After graduating, he worked for the Arkansas Soil and Water Conservation District as a soil conservationist. He later received his master's degree in weed science from the University of Arkansas at Fayetteville.

"I am honored to receive this award because it demonstrates that my dedication and commitment to the agricultural industry is recognized by the growers and customers I work with and support," Driver says. "It is also an honor to join past recipients of the Dr. Norman Borlaug Lifetime Achievement Award. This recognition is one that I will always cherish."

Visit texasplantprotection.com/awards.html to learn more about the Norman Borlaug Lifetime Achievement Award.

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NEWS & EVENTS

Grow More Experience Sites Go Virtual

It can be a challenge to keep up with innovations and understand how new crop protection products can improve a farming operation. While in-person Grow More™ Experience sites have provided local opportunities for growers to touch, see, tear, and dig into site trials, traveling to events doesn't always fit with busy schedules.

Syngenta now offers Grow More Experience Virtual Tours that are only a click away. Eastern and western Midwest regions each have nine tour stops that highlight the latest trials, practices and crop management insights — all delivered from local agronomic experts. With topics ranging from soybean seedcare to corn rootworm management, the virtual tours have information that will be beneficial to all growers in the Midwest.

Start a tour today at SyngentaUS.com/Virtual-GME.

New App Helps Growers Plot Path to Sustainability

A new app from Syngenta provides clear steps that farmers can take on their journey to sustainable operations.

The Sustainable Outcomes in Agriculture (SOA) standard is part of the Cropwise™ Sustainability App. Growers who use the app to complete a self-assessment about their practices will receive a performance report, including a sustainability leadership score and actionable insights to identify how they can improve sustainability in their operations.

This one-of-a-kind tool also promotes sustainability on a larger scale by benchmarking growers to others in their region. Learn more about climate-smart practices for your own farm by downloading the Cropwise Sustainability App on the Apple® App Store® or Google Play™ Store.



Cropwise Sustainability App

PRODUCT UPDATES

EPA Approves Registration for CruiserMaxx APX Seed Treatment for Early-Season Soybean Protection

With increasing pressure from *Pythium* and *Phytophthora* infections posing a significant threat to soybean yield, growers are looking for an additional tool to protect their crop.

The Environmental Protection Agency recently granted federal registration for that tool: CruiserMaxx® APX seed treatment. Harnessing the novel active ingredient picarbutrazox, CruiserMaxx APX adds unmatched *Pythium* and *Phytophthora* protection to the proven broad-spectrum disease and insecticide protection base seed treatment. CruiserMaxx APX offers more uniform emergence, stronger roots and quicker speed-to-canopy.

CruiserMaxx APX will be available for limited trials in 2022 and more broadly available in 2023.

To learn more, visit SyngentaUS.com/CruiserMaxxAPX.

Weed Control With Trait System Flexibility

Soybean growers can start clean with a recently registered herbicide that fits across trait platforms. Tendovo™ herbicide for preemergence use in soybeans received registration from the Environmental Protection Agency earlier this year.

The first and only soybean three-way herbicide premix with cloransulm, S-metolachlor and metribuzin, Tendovo provides early-season preemergence weed control without the crop injury of competitive brands. With three sites of action, Tendovo effectively controls more than 70 yield-robbing weeds.

Across 15 head-to-head replicated trials at five weeks after emergence, Tendovo provided greater than 95% control of pigweeds and grass weeds versus competitive herbicides¹. In addition, those same trials showed soybean fields treated with Tendovo canopied more quickly, had better stands, and — on the whole — looked healthier. For season-long control and optimum yield protection, Syngenta recommends using Tendovo preemergence in a planned two-pass program following post-emergence application of Sequence® or Tavium® Plus VaporGrip® Technology herbicides.

To learn more, visit SyngentaUS.com/Tendovo.

1. University and Syngenta Trials – 2020 – MD, NE, MO (2), IA, IL (3), MN (2), IN (2), OH, MI, AR. Use Rates: Tendovo 1.2 to 2.35 qt/a; Sonic® 4.5 to 8 oz/a; Fierce® XLT 3.75 to 5.25 oz/a; Zidua® Pro 4.5 to 6 oz/a; Authority® Edge 6 to 9 oz/a.



The new Syngenta North American Crop Protection headquarters represents an investment in the Greensboro, North Carolina, community.



Syngenta recently held a groundbreaking for its redeveloped North American Crop Protection headquarters, which includes a new 100,000-square-foot office building.

Syngenta Breaks Ground for North American Crop Protection HQ

Syngenta recently held a groundbreaking event to celebrate the redevelopment of its North American Crop Protection headquarters in Greensboro, North Carolina.

Syngenta leadership shared a preview of the architectural renderings and innovative site features, including the more than 100,000-square-foot office building that will connect to an existing laboratory facility on campus.

At the event, state and local officials also discussed the local impact of the new headquarters and the legacy of Syngenta in the Greensboro community. For example, the company hired North Carolina subcontractors to make its vision for the redesigned headquarters a reality — an undertaking that will shape the physical and social landscape of Greensboro.

Visit SyngentaUS.com/Newsroom to explore more about the new workspace design.



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What's the Deal With Cost per Bushel?

Growers can unlock marketing insights comparing cost per bushel and cost per acre in their fields.

By David Widmar and Brent Gloy

There has been an ongoing debate in farm management circles about calculating cost per bushel versus cost per acre throughout our careers. To be honest, we've wrestled with this over time. At some points, cost per bushel seemed like a clever, highly intuitive metric, but at other times it feels like hand-waving and just dividing total costs by a different number.

The Rub

The crux of the debate gets down to a mismatch of units: Inputs are purchased (or applied) on a per acre basis, while outputs are sold on a per bushel basis. We probably know our cost per acre, but we usually don't sell corn, soybean, or cotton by the acre.

The biggest challenge with cost per acre is that we often don't know what final yields will be until the end of the growing season. Even under irrigated conditions, yield variations can be enough to move the needle. Given this uncertainty and variability, cost per bushel can become confusing.

The short of this is simple — both have their advantages and flaws. Neither is a perfect, end-all measure of production expenses. At the end of the day, producers must know their costs — per bushel, per acre, total, etc.

Scenarios

To consider how per acre and per bushel can be relevant — or confusing — to producer decision making, consider the following scenarios:

- **Buying or renting land** — The per acre measure has a strong advantage in farmland situations. Social norms are such that submitted farmland bids are on a per acre basis. While bidding might take place for the entire parcel, everyone is doing the per acre math in their head.

While farms aren't often purchased on a per bushel basis, it can be a helpful metric for benchmarking, especially across several years of data. Furthermore, it is common to see soil productivity metrics used to adjust for quality variations.

- **Selecting inputs** — Comparing only per acre costs of alternative inputs can be very shortsighted, especially when there are different yield outcomes. There are two ways to reconcile cost and yield differences.

The first option is to calculate the total per bushel cost of each alternative. For example, start with your initial budget assumptions and consider two alternative scenarios. For each herbicide program, plug in the yield assumptions and per acre costs. The program with the lowest per bushel cost is the better deal.

The second option is partial budget analysis. For each alternative, consider the revenue gains minus the costs. The program with the highest return is preferred. For example, one fungicide program might cost \$30 per acre and generate \$45 per acre of additional revenue for a net benefit of \$15 per acre. The alternative might cost \$20 per acre but only generate \$30 per acre in additional revenue.

With both measures, the goal and outcome are the same: Don't singularly focus on cost per acre and overlook potential yield differences.

- **Initial budget projections** — When creating farm-level budget projections, per acre measures are often the natural starting point. As previously discussed, inputs are typically discussed on a per acre basis.

While challenging, converting and reviewing initial budget projections on a per bushel basis can unlock powerful management insights. You will need to establish a consistent method for the "average" yield used to divide by, but doing this can be insightful for benchmarking across fields or over time. Again, this isn't easy but can be a powerful tool when done appropriately.

- **Corn versus soybeans** — This is the rare case where there is a clear winner: per acre basis. Compare the returns of alternative crops by comparing the per acre contribution margins or returns after variable expenses are paid — and what is left to cover the fixed expenses.

The per bushel calculation of profits or contribution margins isn't insightful at all. Why? Yields are different across the crops. For example, corn will almost always have small profits per bushel compared with soybeans but yield considerably more bushels. On the other hand, we'd expect soybeans to have more returns per bushel but considerably fewer bushels.

- **Early growing season marketing decisions** — Again, this is the rub: Inputs are per acre, but you are selling bushels. Perhaps the most significant advantage of per bushel measurement is when making early growing season marketing decisions. Initial cost projections — from budgets — reported on a bushel basis are decisive for making preharvest marketing decisions. While yield assumption must be made, the per bushel measure is extremely valuable in sizing up any market rally opportunities.

- **Post-harvest marketing decisions** — Producers will often rely on both measures when making post-harvest marketing decisions. Starting on a per acre basis allows for all revenues to be considered (government payments, crop insurance proceeds, etc.). From there, producers can calculate the per bushel prices needed to reach their break-evens.

There can be a few challenges when allocating fixed expenses, such as machinery or family labor, across different crops (irrigated versus non-irrigated) or a livestock enterprise. For example, the machinery cost of planted irrigated and non-irrigated corn will be about the same on a per acre basis, but the per bushel basis will differ given higher irrigated yields. Therefore, it's helpful to start with the per acre basis, capture all the variables and convert the final numbers to the per bushel basis.

- **Yearly review** — Per acre measures make managerial sense for reviewing the financial performance, especially when benchmarking over time or versus initial budgets.

Producers will need to use caution with per bushel measures as production abnormalities, such as the drought of 2012 or prevented planting of 2019, can heavily skew the results. Did final production costs come in over budget because Mother Nature walloped yields or input expenses were high? The implications are not always intuitive.



KEY FEATURES

- Because inputs are purchased on a per acre basis and outputs are sold on a per bushel basis, there is a units mismatch.
- Reviewing budget projections on a per bushel basis can unlock powerful management insights.
- Great managers across business sectors understand their costs.

The Big Picture

Most of the time, conversations and debates about the cost per bushel versus cost per acre miss the big picture: You have to know your costs! At the end of the day, this is an exercise of allocating costs over units. In some cases, it makes more sense to consider the cost structure on an input basis (per acre). In other situations, it makes more sense to consider the cost structure on an output basis (per bushel). Set procedures and practices in place that allow you to have an accurate and up-to-date understanding of your costs. Then you can start to decide which metric is more insightful and intuitive for the questions at hand.

While we've focused on crops, the lessons are similar for livestock — cost per acre of pasture versus per cow (or calf sold), pens sold versus head (or pounds) of cattle sold, or per stall versus per hog.

This leads us to the last point: Sometimes, this debate comes across as an ag-related problem. In reality, it's a situation every business and sector face. Only a few retailers buy bananas at wholesale and pass the same product along at a higher price. Airlines have seats, fuel, trips and hours flown as inputs, with passengers, seats and revenues as outputs. Whether a farmer or ag input supplier, great managers know their costs and challenge their thinking to generate, capture and utilize insights. Start simple and build a system that works for you. 🌱

Widmar and Gloy are the co-founders of Ag Economic Insights (AEI.ag). Founded in 2014, AEI.ag helps improve decision making for producers, lenders, and agribusiness through: the free Weekly Insights blog; the award-winning AEI.ag Presents podcast, featuring Escaping 1980 and Corn Saves America; and the AEI Premium Platform, which includes the Ag Forecast Network decision tool. Visit AEI.ag or email Widmar (david@aei.ag) to learn more. Stay curious.

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