

Growing Together

»» 3Q | 2019

# thrive<sup>®</sup>

## NUTRITION MISSION

**Collaboration Delivers  
Efficient Nourishment  
for Cattle**

**INSIGHTS ON  
RECRUITING  
YOUNG AG  
TALENT**

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**SMART SEED  
SELECTION  
SETS THE STAGE  
FOR SUCCESS**

**syngenta<sup>®</sup>**



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**thrive** 

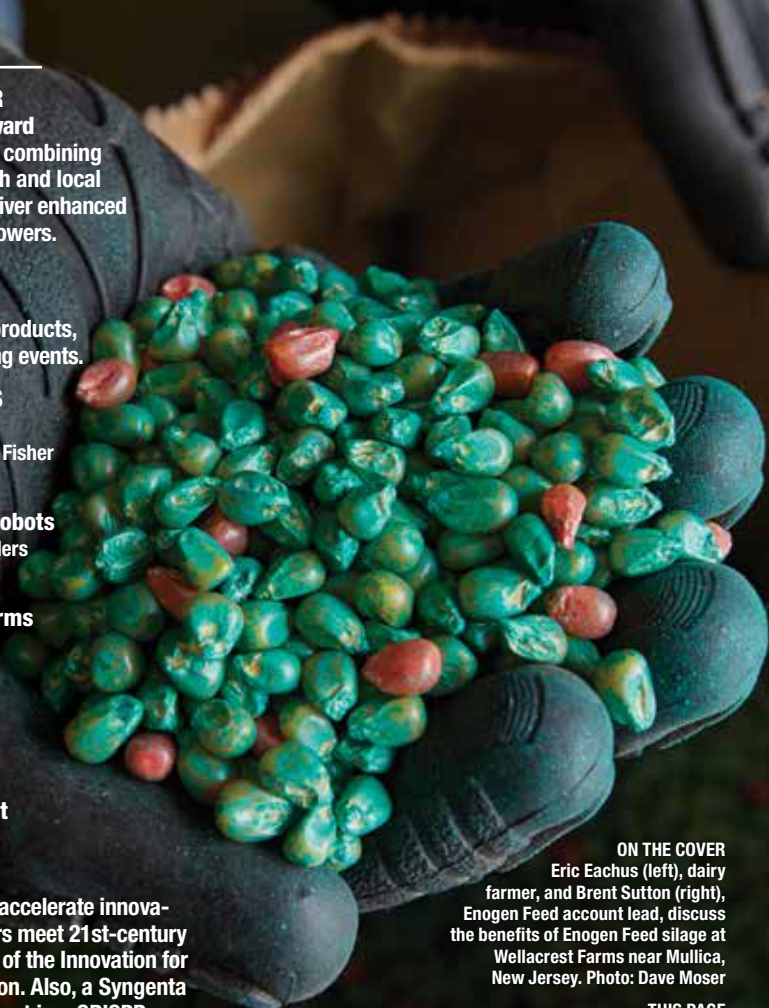
Even if you love your print edition of *Thrive*, you'll still want to check out the magazine's website. You'll find more content and links to important resources to help you succeed in today's marketplace. The online version also makes it easy to share specific articles with others.

Scan this QR code to take the fast track to the *Thrive* website, or go to [www.syngentathrive.com](http://www.syngentathrive.com).



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Syngenta plans to accelerate innovation to help growers meet 21st-century challenges as part of the Innovation for Nature collaboration. Also, a Syngenta researcher takes part in a CRISPR documentary, and a female grower explains her family's sustainability practices on "FarmHer on RFD-TV."



**ON THE COVER**  
Eric Eachus (left), dairy farmer, and Brent Sutton (right), Enogen Feed account lead, discuss the benefits of Enogen Feed silage at Wellcrest Farms near Mullica, New Jersey. Photo: Dave Moser

**THIS PAGE**  
E-Z Refuge® seed blend from Syngenta can help growers start strong and realize their corn's yield potential. Photo: Michael Kleveter

**We welcome your story suggestions and comments about *Thrive*.**

Please send them to [thrive@syngenta.com](mailto:thrive@syngenta.com). For more information, visit the Syngenta U.S. website at [www.syngenta-us.com](http://www.syngenta-us.com), or call the Syngenta Customer Center at 1-866-SYNGENT(A) (796-4368).

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*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.



# A Better Path Forward

The American farmer's enduring spirit is the force that propels agriculture forward and the inspiration behind our industry's most significant advancements. That's why we at Syngenta Seeds are renewing our focus on farmers with a clearer, less obstructed view of their challenges and opportunities.

To attain this insight, we're increasing our investment in research and local field support, with the end goal of identifying and meeting the unique needs of individual farmers. A key part of our strategy is the alignment of Syngenta breeders, agronomists and marketing teams to specific regional zones across the country. From a product development standpoint, we're tapping into the global horsepower of our leading geneticists and breeders and channeling their knowledge locally, so farmers can have access to the right seed for every acre they plant. When it comes to service, we're merging high tech with high touch by adding experts to our local sales and agronomy teams and expanding our digital agriculture prowess.

This issue of *Thrive* explores some of the most innovative tools the Syngenta Seeds engine is fueling. One article features two Syngenta researchers who are using different, but complementary, scientific methods to bring higher yielding, better quality hybrids and varieties to farms at an unprecedented pace. Another article showcases our digitally driven seed selector tool that evaluates years of environmental and performance data to help Syngenta resellers more precisely select the best seed product for each field. This same article explains how the development of Syngenta soybeans starts with one of the largest, most diverse germplasm pools in the industry and results in varieties that target a broad range of pest, soil, weather and other environmental conditions.

*Thrive* also highlights two specific seed technologies in corn that are delivering greater opportunity and value to the farmers who use them: Agrisure Duracade®, a unique *Bt* trait that offers a different mode of action against the costly corn rootworm, and Enogen® Feed hybrids, which can potentially boost profitability by helping to provide more available energy to feedlot and dairy cattle.

Of course, we realize without our reseller partners, our focus on farmers would be a little less clear, with a greater number of obstacles blocking our view. After all, our NK® retailers and Golden Harvest® Seed Advisors are the links that connect us to farms across the country—and the lens through which we can forge a better path forward. 🌱



ERIC BOECK

“When it comes to service, we’re merging high tech with high touch by adding experts to our local sales and agronomy teams and expanding our digital agriculture prowess.”

A handwritten signature in black ink that reads "Eric Boeck".

**ERIC BOECK**  
Head of Marketing  
Syngenta Seeds, LLC





# What's in Store

Stay up to date on new products, the *Thrive* TV debut, and news about Syngenta people, initiatives and upcoming events.

## NEW PRODUCTS

### AgriPro Brand Winter Wheat Varieties

Syngenta has introduced three AgriPro® brand winter wheat varieties\* bred to address local growing conditions and marketing needs while delivering consistent performance.

- **SY Legend CL<sup>2</sup>** is a consistent yielder with excellent test weight and rust tolerance for the western Central Plains. It shows good bake quality to give growers more marketing options.
- **SY 576** is a tall plant with excellent straw strength, good scab tolerance, and very good leaf and stripe rust tolerance. It's an ideal fit for the environmental conditions from the eastern Midwest to the Mid-Atlantic.



Syngenta has introduced three new AgriPro brand winter wheat varieties, including SY Richie.





- **SY Richie** features very good test weight and top-end yield from the Mid-South to the East Coast. Its medium-early maturity makes it a good fit for late-planting situations.

Visit [www.agriproheat.com](http://www.agriproheat.com) for additional information.

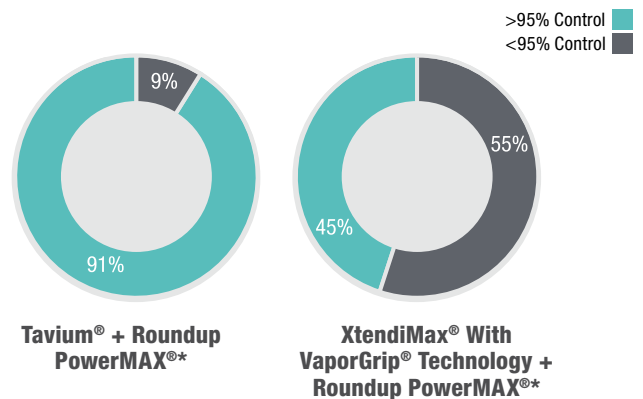
\*Some or all of the varieties may be protected under one or more of the following: Plant Variety Protection, United States Plant Patents and/or Utility Patents and may not be propagated or reproduced without authorization.



### Tavium Plus VaporGrip Technology Receives EPA Registration

The newest herbicide from Syngenta, Tavium® Plus VaporGrip® Technology herbicide, has received registration from the U.S. Environmental Protection Agency. As the market's first premix residual dicamba herbicide, Tavium contains built-in residual control to manage resistant weeds and maintain clean fields throughout the season.

Tavium, a proprietary Syngenta premix, can be used preplant, at planting and early post-emergence on Roundup Ready 2 Xtend® Soybeans and Bollgard II® XtendFlex® Cotton. The premix of dicamba and S-metolachlor offers growers a convenient new tool to manage key ALS-, PPO- and glyphosate-resistant broadleaf and grass weeds. For more information, visit [www.syngenta-us.com/herbicides/tavium](http://www.syngenta-us.com/herbicides/tavium).



Tavium provides greater than 95% control of *Amaranthus* species more often than the competition.

\*Applied early post-emergence. 2017 University Trials: DE, KS, KY, IA, IL, IN, MO, MS, NE, OH, TN and WI.



NEWS AND EVENTS

**A New Way to Thrive**

*Thrive* is making its debut on the small screen with a new miniseries on RFD-TV. *Thrive* TV reporter Shane Norris will take you inside stories about how Netflix® inspired seed genetics, what the Syngenta Ag Scholarship means to recipients each year, how agricultural policy gets shaped in Washington, D.C., and more.

“Over the past 12 years, we’ve worked hard to make *Thrive* a trusted source of news, information and inspirational stories, which we proudly share with our readers,” says Wendell Calhoun, communications manager for Syngenta. “*Thrive* TV

represents an exciting new chapter in the magazine’s evolution, and we’re so excited to bring to life—in a more visual, audible way—the stories of the people who make this industry thrive.”

Viewers can catch *Thrive* TV during “Market Day Report” on RFD-TV

(with simulcasts on Rural Radio 147 SXM) every Monday from July 8 to Sept. 30 at 9:25 a.m. and 1:25 p.m. Eastern. After the stories air, *Thrive* readers can also watch episodes at [www.syngentathrive.com](http://www.syngentathrive.com).

**“*Thrive* TV represents an exciting new chapter in the magazine’s evolution, and we’re so excited to bring to life—in a more visual, audible way—the stories of the people who make this industry thrive.”**

—WENDELL CALHOUN



Above: Shane Norris from *Thrive* TV reports from a Syngenta Grow More™ Experience site in Kinston, North Carolina.

**Young Syngenta Leaders Recognized**

Millennials are making a significant mark on agriculture, bringing fresh perspectives and digital savvy to an ever-evolving industry. *Seed World* magazine recently recognized two Syngenta employees for their contributions to agriculture as part of its 20 Under 30 coverage: Andrew Lauver, industry relations manager, and Josh Miller, key account manager for Digital Agriculture and founder of FarmShots™ satellite imagery service provider.



JOSH MILLER

In addition to this honor, Lauver is a member of AgGrad’s inaugural 30 Under 30 class. He attributes his success to values he learned on the farm. “Growing up on a family farm ingrained in me the importance of hard work, community involvement, personal tenacity, time management and negotiation skills to enhance the lives of others,” he says.



ANDREW LAUVER

**Syngenta Opens Major Seeds Office Near Chicago**

Syngenta recently opened the doors of a new Global and North America Seeds office in Downers Grove, Illinois, a western suburb of Chicago. The new site is home to Syngenta leaders in Seeds, putting the company at the heart of the U.S. Corn Belt. The company has also opened a new Digital & Technology Hub in downtown Chicago, which is focused on innovation in digital agriculture.

“We are investing significantly in our U.S. Seeds business, adding talent, accelerating the development of new products and bringing digital solutions to farmers,” says David Hollinrake, president of Syngenta Seeds, LLC, and North America region director. “Our new locations in Chicagoland place us closer to the majority of our customers and business collaborators. This will enable us to develop more solutions for a market demanding innovation and choice.”

For more information on the company’s seeds portfolio, go to [www.syngentaseeds.com](http://www.syngentaseeds.com).

**New Pilot Program Delivers Innovative Digital Technology**

Syngenta is working with select retailers and agronomists to integrate its FarmShots™ satellite imaging software with Sony’s new drone-driven Smart Agriculture Solution. This 2019 pilot program provides users with access to sensing and processing technologies that capture imagery and data simultaneously. As



a result, the program enhances crop scouting and real-time decision-making, enabling users to produce highly accurate, in-season crop insights in the field without the need to connect to a network.

"This offering furthers our ability to provide meaningful, implementable information to a group of growers' most trusted advisers," says Dan Burdett, global head of digital agriculture at Syngenta.

For more information on FarmShots, go to [www.syngenta-us.com/agriedge/farmshots](http://www.syngenta-us.com/agriedge/farmshots).

### Syngenta and Ram Trucks Add Value for Growers

Syngenta has teamed up with Ram Trucks to help U.S. farmers overcome today's and tomorrow's challenges through the Ram AgPack initiative. Ram AgPack is a unique collaboration offering farmers the opportunity to save potentially thousands of dollars on items they already planned to purchase.

Any grower or rancher who buys a new Ram truck from one of more than 200 Ram Agriculture Dealers will be eligible for a package of ag tools from varying agricultural organizations. Syngenta is offering a \$250 rebate on 40 units of NK<sup>®</sup> soybeans or a \$1,000 rebate on 40 units of NK corn. Growers may also qualify for a one-year subscription to the AgriEdge<sup>®</sup> whole-farm management program.

Learn more about Ram AgPack at [www.ramagdealer.com/ram-agpack-promo](http://www.ramagdealer.com/ram-agpack-promo).



Syngenta and Ram Trucks are partnering to save growers money on key production tools, including AgriEdge and NK corn and soybeans, through the Ram AgPack initiative.

# VOTE!

## For Your Favorite #RootedinAg Finalist and You Could Win \$50.

Syngenta is grateful to everyone who entered the 2019 #RootedinAg contest. The stories the entrants told about the people who most nourished their agricultural roots were heartfelt and inspirational. Although it was difficult, a panel of judges has narrowed the field of competitors to three finalists—each of whom has received a mini touch-screen tablet.

We now need your help in deciding who will be the grand prizewinner of a \$500 gift card, a \$1,000 donation to the winner's favorite local charity or civic group, and a special photo shoot with the person they honored.\* Just go to [www.syngentathrive.com/contest](http://www.syngentathrive.com/contest) and vote for the entry you think is most deserving. Your votes along with our judges' scores will determine the winner. By casting your vote, you could win a \$50 gift card in a special drawing. Online voting ends Aug. 30, 2019, with Syngenta announcing the grand prizewinner this fall.



\*NO PURCHASE NECESSARY. See Official Rules for more details.

### UPCOMING TRADE SHOWS

As planning for 2020 begins, please stop by our booth at either of the shows listed below to find out what's new and exciting at Syngenta.

#### AUGUST 2019

27–29 Farm Progress Show, Decatur, Illinois

#### SEPTEMBER 2019

10–12 Husker Harvest Days, Grand Island, Nebraska



**ROBIN THOMAS**  
National Commercial  
Recruitment Lead,  
Syngenta

# Recruit Pursuit

Given today's high demand for top ag talent, two experienced recruiters share ways employers can stand above the competition.

**Q. What are the biggest recruitment challenges agribusinesses face?**

**A. Beth Hales, talent solutions director, AgCareers.com:** The biggest challenges center around demand and awareness. While enrollment in agricultural programs is increasing, it isn't anywhere close to the industry's demand for talent. Less than 1% of total postsecondary enrollment is in the field of agriculture, while the number of job openings in our industry is nearly two times the number of qualified students. Awareness in general is the other challenge. Given the shortage of industry talent, we know we need to be reaching people with transferable skills and key interests. We should be educating people about the wide variety and scope

“Younger employees ... are typically very adept at finding new ways of working and bringing new ideas to the role and their team with energy and enthusiasm.”

—ROBIN THOMAS

of opportunities in agriculture. The general public isn't routinely exposed to the fact that agricultural companies use truly innovative science and focus on developing sustainability strategies.

**A. Robin Thomas, national commercial recruitment lead, Syngenta:**

Relocation is probably our No. 1 challenge because our hiring needs span across the entire country. Many of our roles require relocation, and career advancement sometimes involves moving to a different area. A second challenge for us is finding recruits with the soft skills needed to succeed in today's market. Those skills include work ethic, leadership, teamwork and problem-solving. Students from institutions that prepare them for career fairs, networking events and job interviews stand out, especially when training starts at the freshman level.

**Q. What tools and resources are available to help?**

**A. Hales:** AgCareers.com is passionate about building the pipeline of talent in the agriculture industry. We've created more than 250 agricultural career profiles that are accessible under "job seeker resources" on our website. These comprehensive profiles help provide a clear pathway to successful entry into our industry. Additionally, students can find the most comprehensive list of available internships in the ag industry on our website, and an internship experience is a great way to get started on a career path.

As the strategic career success partner of the National FFA Organization, AgCareers.com has provided direct connections to real-time career opportunities within FFA's AgExplorer.com. This site offers a career-finder assessment that helps students learn more about which careers in agriculture could be a fit, given their specific interests. Once students complete the assessment, the site will display the career profile information relevant to them, along with the related job opportunities with industry employers that are active on AgCareers.com.



**WATCH NEW VIDEO** For an in-depth interview with Robin Thomas, check out the new video posted to the *Thrive* website ([www.syngentathrive.com](http://www.syngentathrive.com)).



**A. Thomas:** At Syngenta, our best resource is our people. Our corporate and field employees interact with young people through local and national FFA chapters, 4-H and other student organizations. We're involved in classroom activities as well for high school and college students, and sometimes offer job-shadowing opportunities to those who are interested.

We also maintain a collegiate talent pipeline to build relationships with candidates over time with multiple touch points. We get to know the candidates better, they have a broader insight into our culture and values, and we both have a better opportunity to assess mutual fit before the student graduates.

**Q. What unique benefits do younger employees bring to a business?**

**A. Hales:** There's a steady revolution going on across the country today to join the agriculture advocacy conversation. I've seen many instances where younger employees have harnessed the power of social media to support the industry by telling their ag stories. This "agvocacy" spills over to help promote your company brand to potential future employees.

Younger employees can also be hungry to innovate and make a difference, which typically means they aren't bogged down by "the way it's always been."

**A. Thomas:** Younger employees bring diversity of thought with a different way of seeing situations and finding solutions. They are typically very adept at finding new ways of working and bringing new ideas to the role and their team with energy and enthusiasm. I look forward to seeing what the future holds, as we're now hiring from Generation Z. This is the first generation of young people who've grown up immersed in technology. They understand and use technology as an integral part of their personal and professional lives. Combined with their competitiveness and drive for achievement, they should be instrumental in advancing technology in the agriculture industry.

**Q. What recruitment tips can you share?**

**A. Hales:** College/university recruiting and creating a formal internship program are the top two methods for attracting new graduates, according to more than 100 agribusinesses participating in our annual survey, Agribusiness HR Review. Given how tight the job market has gotten, employers are ramping up their campus recruiting efforts to meet staffing needs. Great talent tends to share stories and resources with other great talent. After one student tells his or her friends about a fulfilling internship experience, your company may have an easier opportunity engaging other solid candidates. However, a bad experience could damage your employer brand. The key is to get your opportunities in front of the right talent. In the current market, it's even more important to fine-tune your engagement and retention strategies.

**A. Thomas:** The most important recruitment tips I can share are to start early and maintain a relationship throughout the individual's academic career. This steady interaction strengthens your talent pipeline and gives the student a competitive edge for a position following graduation. At Syngenta, we understand that the people who stand behind our brands are at the heart of everything we do. Our goal is to keep that heart beating strong by helping talented, hard-working young people launch long-term, successful careers with us. 🍀 INTERVIEWS BY SUSAN FISHER

**"After one student tells his or her friends about a fulfilling internship experience, your company may have an easier opportunity engaging other solid candidates."**

—BETH HALES



**BETH HALES**  
Talent Solutions Director,  
AgCareers

# Make Room for Robots

Syngenta uses robotics to speed up otherwise time-consuming tests, aiding in the development of new products.

**A**s a formulations chemist for Syngenta, King Nelson recently helped develop a new herbicide. For Nelson, the next step in that process is to run a series of tests to determine its compatibility with other formulations, which requires him to put together a list of all the products a grower might use with it in a tank mix.

“It’s not just other formulations,” Nelson says. “You have to consider surfactants, fertilizers and additives like crop oil, hard water and soft water. And then there are Syngenta products; there are competitors’ products; there are generic products. When you start thinking about all the possible combinations, you’re looking at more than 1,000 of them. It’s daunting.”

Even if Nelson and his team worked 24 hours a day, it would take months for them to determine whether their new herbicide

formulation is field ready. “And that is if we had the stamina to do the same test over and over and over again,” he adds.

For the last 10 years, Greensboro, North Carolina-based Nelson has depended on a secret weapon, housed in the Syngenta Jealott’s Hill, England, research facility, that makes those tests possible. Named after the Greek goddess of hunting, ARTEMIS, also an acronym for Automated Robot to Evaluate Millions of Interesting Solutions, is a robot that can run 1,500 experiments in a week. Not only do those experiments arm Nelson with the information he needs to answer growers’ questions on tank-mix compatibility, but they also give Syngenta a leg up when it comes to bringing leading-edge technologies to market.





## Getting It Right, Every Time

From his Jealott's Hill lab, Ian Tovey, formulation automation team leader at Syngenta, manages all of the experiments conducted on ARTEMIS. Tovey explains ARTEMIS' name: "It's challenging to find the perfect composition for components that hold together physically and chemically during manufacturing. ARTEMIS helps us *hunt* down these optimum areas."

Tovey says that his job is to take the active ingredients that chemists have discovered and use them to create products farmers find useful. "ARTEMIS allows us to generate liquid-based formulations," he says. "Anything that comes from a can, we can reproduce."

In addition to tank mixing, ARTEMIS is able to create formulations and screen surfactants. "So, for example, if we have a recipe for a formulation but we want one of the components to change or the amount to vary—or both—the robot can do that for us," Tovey says.

In 2018, Syngenta acquired a second robot, ARES, an acronym for Automated

Robot Evaluating Solubility and the name of the Greek god of war. It tests the solubility of active ingredients and products—giving valuable insights that speed new-product development timelines. A third robot to help test tank-mix compatibility is on the way.

Before ARTEMIS, Nelson says Syngenta devoted a lot of manpower to finding detailed information about new surfactant technologies. "The company can now devote that time and those resources elsewhere," he says. "The great thing about the robot is that it doesn't care; it can do the same thing over and over again and is fine with the repetition. I guarantee you that after the fifth day of a human doing the same thing over and over, his or her mind will start to turn to mush, resulting in human error."

That's not to say robots will replace the need for humans in labs, Tovey insists. "It's just another tool in our toolbox to give us extra data," he says. "Ultimately, the process of developing a formulation is very much a human-driven project. People take the lead when it comes to using what comes out of an ARTEMIS experiment and turning it into a viable product."

**"[The robot is] just another tool in our toolbox to give us extra data. Ultimately, the process of developing a formulation is very much a human-driven project."**

—IAN TOVEY

## On the Leading Edge


When Syngenta invested in ARTEMIS 10 years ago, the company seized an opportunity that continues to pay off today, despite rapidly developing technologies and daily advancements in automation.

As Syngenta continues to build its automation capability, questions about future requirements are only natural. "This is an area that's moving quickly," Tovey says. "It's difficult to know with any certainty that what you build today is foolproof for the next five to 10 years."

But Syngenta researchers have learned that it doesn't pay to fixate too much on planning ahead. Instead, you should plan for the needs of today.

"What you need to ensure is that it does what you need it to do—and that it does it well," Tovey says. "Hammers have been around for thousands of years, but everybody still owns one because it's the right tool for the job."

The same goes for automation: "If you build your automation so that it works for you—and so that it's flexible—it doesn't matter if somebody else has a better version. As long as you have something you know you are happy with and it does the job you need it to do, it can live a good, long life."

Ultimately, Nelson measures success by the data he's able to share with growers. "When questions come up in the field and I get a call from a technical rep, I can say that we've looked at something close to that situation in the lab, and I can make a recommendation," he says. "And if I don't have the answer, I can set up an experiment to find out. We're trying to give the best information to people who depend on it to grow better crops. That's what this is all about."  STORY BY ROBIN SUTTON ANDERS







SEE MORE PHOTOS.  
[www.syngentathrive.com/farmproduction](http://www.syngentathrive.com/farmproduction)

# seed ma

WHEN SELECTING SEEDS FOR 2020, FARMERS CAN TAKE



Bruce Battles, seeds agronomy technical manager at Syngenta, checks out a field of young corn at the company's Slater, Iowa, seed research facility.

A man in a black Syngenta jacket and blue jeans is kneeling in a field of young corn plants. He is looking down at a small plant in his hands. The field is dark brown soil with rows of small green corn plants. In the background, there are trees and a building under a clear blue sky.

# ttters

**PROACTIVE STEPS TO OVERCOME POTENTIAL CHALLENGES.**

*By Glenn Bertram*



Each season presents its own set of challenges for U.S. growers. Pests, weeds and weather conditions can put formerly productive fields in jeopardy. Market fluctuations can threaten margins and cut into profits. As decisions about 2020 planting draw near, informed seed selection can help growers stay prepared.

Syngenta is committed to providing growers and resellers with the resources they need to make smart seed decisions. Each year, the company makes a \$1.35 billion investment in research and development (R&D). This commitment to science gives seed breeders access to state-of-the-art tools and techniques, such as industry-leading trait conversion capabilities, which allow Syngenta to bring the latest, most desirable herbicide-tolerant and insect-control trait packages to market with the newest genetics.

“We continue to offer high-yielding genetics from multiple sources of germplasm that are improving every year,” says Todd McRoberts, NK® agronomy manager at Syngenta. “We’re offering a unique germplasm pool that enables farmers to diversify their seed portfolio.”

### Digging Deep

Syngenta is dedicated to expanding the number of seed choices available to growers. The company’s commitment to R&D ensures a robust trait pipeline that will deliver value to resellers and growers for years to come.

The company’s soybean and corn portfolios are particularly robust. For example, NK, a Syngenta subsidiary, was the first brand in the U.S. to develop a proprietary soybean variety. (See “NK Seeds: A Legacy of Innovation,” this page.) Likewise, for its corn lineup, Syngenta continues to tout trait packages, which include Agrisure Viptera® aboveground insect control and Agrisure Duracade® rootworm control traits.

“Syngenta is one of the few companies left on the innovation front to solve the challenges that come up for growers,” says Dustin Voss, NK sales rep. “We’re the leading technology provider. We’re able to bring you solutions that are designed to positively affect your business and that should bring you differentiation when you go to market.”

Syngenta doesn’t stop at providing growers with a wide range of traits; Syngenta agronomists also work with resellers to determine which seeds should perform well in each grower’s local environment, soil conditions and management practices.

“We really dig in deep to understand what the customer needs and wants,” says Bruce Battles, seeds agronomy technical manager at Syngenta. “Then, we find the product that matches those needs.”

### Making a Good Selection

For growers selecting corn hybrids and soybean varieties for 2020, it’s important to take a proactive, detail-oriented approach that considers potential obstacles from multiple angles.

*(continued on page 15)*



**“NK has done a fantastic job putting people on the ground, which allows for more experts in the field for both our employees and our customer base.”**

**—MIKE EGGER**

## NK Seeds: A Legacy of Innovation

The Syngenta seed brand leads the way in seed selection.

Since its establishment in 1884, NK® Seeds and its legacy companies have been at the forefront of innovation in the seed industry. Of today’s operating seed companies, NK was the first to sell “seed corn.” Later, it became one of the first to create a formal seed research program. It was also the first private company to develop a soybean variety, and the first to market *Bt* seed corn.

Today, NK is building on that legacy of innovation by offering new and unique solutions that improve the farming experience. The brand’s history drives its efforts to combine cutting-edge product technology and digital tools with personal, knowledgeable service. According to NK head of sales Quinn Showalter, the brand is working to provide the kind of service growers and ag retailers haven’t been receiving elsewhere.

“We want to provide our customers with a choice, and we want to do it in a manner that gives them a better overall seed experience,” he says. “We’ve seen a lot of ag retailers support NK lately, and we believe it’s the





Matt Dolch (left), Syngenta district manager for the western Corn Belt and NK retail channel, and Mike Egger (right), master seed advisor at Central Valley Ag Cooperative in York, Nebraska, work together to make sure area growers have access to the seed technologies they need.

result of that choice we're bringing to the marketplace. It's simple to work with us, and we truly believe in providing technology, genetics and value."

### The Power of Partnerships

Partnerships, like the Ram AgPack initiative, are a key part of the plan to deliver value. This unique collaboration enables eligible buyers of a new Ram truck to receive a rebate on NK hybrids or varieties. Growers may also qualify for a one-year subscription to the AgriEdge® whole-farm management program. The idea behind the Ram AgPack initiative, which also involves other agricultural organizations, is to maximize growers' return on investment potential by helping them save money on items they already planned to purchase. (See "Syngenta and Ram Trucks Add Value for Growers," page 5.)

NK's artificial intelligence-driven seed selector tool also figures into delivering value to customers. The tool evaluates years of environmental and performance data to help retailers and growers identify the best NK product for their individual fields.

For Mike Egger, master seed advisor at Central Valley Ag Cooperative in York, Nebraska, resources like these give retailers a significant strategic

advantage over the competition. "Having those tools at our disposal really allows us to fully invest our efforts in helping our customers with their business decisions," he says.

### Broad Portfolio and Local Support

The brand's product offerings are another boon for business. NK soybeans are developed from one of the industry's largest and most diverse germplasm pools. The pool offers varieties for a broad range of soil, weather and other environmental conditions and also offers multiple herbicide trait options.

Meanwhile, Syngenta breeders produce and test more than 1 million corn genotypes every year to find the most effective solutions for the unique needs of each grower and each retailer. The emphasis on personal, dedicated on-the-ground service from NK ensures those solutions don't go to waste.

"NK has done a fantastic job putting people on the ground, which allows for more experts in the field for both our employees and our customer base," Egger says. "They're investing in our company and collaborating with our senior management to help us excel." —STORY BY GLENN BERTRAM



## The Core of Golden Harvest

Golden Harvest showcases its values through strong genetics, agronomy and service.

“**R**ooted in Genetics, Agronomy & Service” is more than a brand line—it’s the core value of Golden Harvest. When farmers purchase Golden Harvest® hybrids and varieties, they’re getting more than high-quality seed. They’re also gaining access to high-yielding genetics; local, in-depth agronomics; and dedicated Golden Harvest Seed Advisors.

### Unique Genetics

Powered by broad genetic diversity, every Golden Harvest hybrid and variety is bred to meet farmers’ local needs.

“We want to give farmers the best chance of reaching their maximum yield potential, so our seeds are bred to perform well, no matter what soils, weather conditions, pests or diseases they encounter,” says Clayton Becker, head of the Golden Harvest West Commercial Unit.

By growing Golden Harvest seed, farmers also gain access to the latest traits and technologies for their corn and soybean crop. The Agrisure® traits portfolio offers exceptional insect control, water optimization and herbicide tolerance in corn. Enogen® corn hybrids help enhance ethanol production, and Enogen Feed corn unlocks the

energy potential of feedlot or dairy rations. (See “Energized Nutrition for Cattle,” page 20.)

Golden Harvest also offers farmers trait options with the new Enlist E3™ soybean seed, Genuity® Roundup Ready 2 Yield®, Roundup Ready 2 Xtend® and LibertyLink® soybeans—all available for the 2020 planting season.

### Agronomic Expertise

Genetics are only one part of the formula for success. Strong agronomics are, too. As a result of the five-year \$400 million incremental investment in Syngenta seed, Golden Harvest trialing will increase by 33%.

“This investment shows how important strong agronomics are to Golden Harvest,” Becker says. “We’re increasing our R&D initiatives so we can deliver more new products into the hands of farmers.”

While delivering more new products is crucial, understanding how to agronomically manage each unique hybrid is just as important, notes Bruce Battles, seeds agronomy technical manager at Syngenta. One example of how Golden Harvest is increasing its hybrid knowledge is through a three-times increase in seeding rate response trials in 2019 on every hybrid, prior to launching. “This information is critical to developing hybrid-specific seeding rate prescription for our customers,” Battles says.

Farmers will be able to see this investment firsthand at their respective local Agronomy in Action sites. With dozens of locations





This healthy young corn plant from a field in Brownton, Minnesota, sprouted from a Golden Harvest hybrid. Bottom right: Experts at Slater sort seed packets of individual hybrids and then send them to multiple locations across the U.S. to be planted in yield trials.

(continued from page 12)

Soil sampling is a crucial first step in assessing the challenges that may arise in the upcoming year.

“Going through sampling after harvest really helps even out your work slate and get things done in a timely manner,” Battles says. “It allows you to pull samples and process them in time to get lab results for building nutrient management plans for the next growing season.”

To manage fertility, growers should conduct tests every three to four years. Sampling can also help growers identify problems, such as high pH soils and soybean cyst nematode (SCN), which can be better managed through variety selection.

“There are varieties with varying levels of resistance commonly used for managing SCN,” Battles says. “SCN sampling can be a really valuable tool for developing a long-term strategy that minimizes the reproduction rates of SCN in the soil.”

In addition, growers should diversify fields by selecting a wide array of corn hybrids and soybean varieties with varying maturity ranges. By diversifying, growers can spread risk and implement a balanced defensive strategy. They should also pick hybrids and varieties that consistently perform well across multiple locations and years in a region.

“For example, if you’re in an area where you have a higher level of disease in a field, you want to look at positioning hybrids with resistance or tolerance to those diseases, when possible,” McRoberts says. “Or, if you’re in a geography where you often experience drought, you will want to choose hybrids that handle stress, not only through their agronomic profiles but also through technology that can help you maximize water efficiency throughout the year, like the Agrisure Artesian® corn hybrids.”

Growers should also select hybrids and varieties that match the specific conditions, challenges and management practices of their operation. Working with an advisor who knows the farm and has access to the best tools can help ensure that a customized, geography-specific strategy doesn’t fall to the wayside. (See “The Core of Golden Harvest,” page 14.)

Armed with this wealth of knowledge, growers can make choices that allow them to overcome future roadblocks. That kind of preparation removes some of the uncertainty from the process and enables them to move forward with confidence. 🌱

across the Corn Belt, Agronomy in Action sites bring the agronomics directly to the farmer with corn and soybean demonstrations and opportunities to connect with local agronomists and Seed Advisors.

### Personal Service

Seasonal challenges always threaten to rob crops of their maximum yield potential, but today’s farmers don’t have to face these challenges alone. From planting to harvest, Golden Harvest Seed Advisors are dedicated to helping farmers maximize profit potential.

“Our Seed Advisors always put their farmers’ needs first,” says Chad Stone, head of the Golden Harvest East Commercial Unit. “They’re with farmers every step of the way, from planting to harvest. They have the local knowledge and agronomic expertise to help farmers get the most out of every acre.”

Seed Advisors also have access to more than 15 years of environmental and trial data built into Golden Harvest’s exclusive E-Luminate® digital agronomy platform. This powerhouse of data enables Golden Harvest Seed Advisors to more precisely select and place well-suited products for each field to optimize the farmer’s potential return on investment.

“Golden Harvest Seed Advisors care deeply about farmers’ success,” Stone says. “Their commitment to serving farmers throughout the season really sets them apart.” —STORY BY SARAH POHLMAN



# A WINNING EQUATION

Two Syngenta researchers who use vastly different scientific methods multiply the impact of innovation in seeds.

*By Cindy Whitt*

**E**ven though their work at the Syngenta Innovation Center in Research Triangle Park, North Carolina, is vastly different, researchers Laura Potter, Ph.D., and Tim Kelliher, Ph.D., share a common goal: to deliver better seeds to farmers through innovation.

Potter analyzes complex data to help breeders make better decisions in seed product development. Kelliher's breakthroughs in reproductive biology have accelerated the genome-editing process, so seed technologies can be made available to farmers in a shorter time frame. Both are making giant leaps forward in their fields by using leading-edge methods.

## **Turning Data Into Knowledge**

As the global head of Analytics & Data Sciences at Syngenta, Potter analyzes data to determine which seed products will be the best match for the company's customers. She compares her work to how Netflix® uses data to make recommendations to its subscribers.

"Breeders have to predict which genetics will perform best in different environments to meet our customers' varied needs," Potter says. "It's like what Netflix does every

day when it's helping customers figure out which movies or shows are going to become new favorites."

Potter and her team of mathematicians, geneticists and genomicists turn biological and environmental data into knowledge that can help researchers make decisions throughout the research and development process, from product discovery to commercial launch. During discovery, their recommendations can help researchers select the best genes for producing desirable traits—via genome editing—with algorithms, which combine data, ranging from the small-scale interactions of genes in a cell to the large-scale effects on plant performance in the field.

"We also use algorithms to figure out where to place our trials, so that when we do develop our products, they are growing in environments that match the conditions our customers experience," Potter says.

When a product is ready to launch, algorithms help predict the optimal market for each variety, so the seeds will meet the agronomic needs of the customers in that particular location.

## **Descriptive, Predictive and Prescriptive Analytics**

Potter and her team analyze data in three ways, depending





“

Breeders have to predict which genetics will perform best in different environments to meet our customers' varied needs. It's like what Netflix does every day when it's helping customers figure out which movies or shows are going to become new favorites.”

— LAURA POTTER

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Laura Potter, global head of Analytics & Data Sciences at Syngenta, uses advanced analytics to deliver better seeds to farmers.



Tim Kelliher, a science fellow at Syngenta, co-invented HI-Edit, a novel, time-saving gene editing technique.

on what they are trying to accomplish. Descriptive analytics show past performance data, which can also offer insight for future projects.

“If I’m a breeder and I’ve planted a bunch of trials this past season, then I have performance data from those different genetics and locations,” Potter says. “A descriptive algorithm will tell me how the different genetics performed in those environments.”

Predictive analytics aim to determine seed performance in particular areas. With limited land available for conducting trials, predictive analytics can help breeders narrow down which hybrids will perform best when tested in certain environments.

Potter says Syngenta is moving toward using prescriptive analytics to find the best seed hybrids that can perform consistently for the next several years—a process she calls “designing the future.”

“You’re not just predicting performance, but you’re also able to use analytics to tell you how to do something,” she says. “It helps answer the question, ‘How am I going to get a stable yield that’s going to give a reliable performance in the field this year and several years out?’”

Just as Netflix continues to change its algorithms to better meet the needs of its subscribers, Potter sees her team’s work evolving to help design products that are more specific to customer needs.

“For the longer term, it’s really about developing these prescriptive analytics that are going to design the genetics of the future faster and more precisely, so we can better meet customers’ needs more quickly,” Potter says.

### Improving Genome Editing

Another powerful technology that allows Syngenta breeders to improve seed performance is genome editing; but of the



hundreds of commercial crop varieties, only a handful are responsive to direct genetic manipulation. For the varieties that are responsive, breeders develop seed products to help growers manage their changing needs—from weather conditions to damaging pests and weeds. But with so many genetic combinations for breeders to edit, it can take years before the genetics are available to growers.

Kelliher, a science fellow, and Qiudeng Que, Ph.D., a senior group leader of transformation at Syngenta, co-invented a novel genome-editing technique that works across crop varieties and reduces the time it takes to make direct genetic improvement. They call it HI-Edit™, which stands for haploid induction editing.

“This discovery makes the concept of genome editing much more realistic for farmers,” Kelliher says. “It can improve farmers’ seeds in a much shorter time frame than was possible even just a year ago.”

HI-Edit is a one-step technique that uses haploid induction—the process of reproducing plant cells—with genome-editing machinery like CRISPR, a powerful tool that allows researchers to easily alter DNA sequences and modify gene function. The combination of tools accelerates the transfer of desirable genes and allows breeders to make more precise edits.

“The beauty of HI-Edit is that it combines the process of gene editing and the process of haploid induction into one step,” says Gusui Wu, Ph.D., head of seeds research at Syngenta. “Haploid induction has been routinely used in the breeding process for many years. HI-Edit takes advantage of that process to rapidly produce varieties with precise gene edits.”

Kelliher’s team used HI-Edit successfully in field corn and sweet corn crops. They also tested it on wheat and a genus of plants related to other crops, including tomatoes and soybeans, so they have evidence the technology could work across different crops.

### Innovation Is a Team Sport

Kelliher credits his team’s success in discovering the groundbreaking technology to the resources available at the RTP facility, which include the Advanced Crop Lab, where a variety of crops grows throughout the year.

“When we had the idea, we already had corn crops for testing,” he says. “It only took us two months to get the data we needed to prove it worked. It usually takes 10 times as long.”

Innovation is a team sport that takes creative scientists collaborating on an idea and carrying out experiments, but it also needs a supportive organization, according to Wu. “We try to foster an environment at Syngenta where discoveries like this happen,” he says. “When they do, it’s extremely gratifying.” 🍀

## Winners of the 2019 Syngenta Crop Challenge in Analytics

This spring, winners of the fourth annual Syngenta Crop Challenge in Analytics celebrated their victory during the INFORMS Conference on Business Analytics & Operations Research. Since 2015, the challenge has fostered cross-industry collaboration between agriculture and data analytics to help address growing global food demands. Participants in this year’s competition were asked to develop models to assess corn hybrids’ ability to handle heat and drought stresses.

The 2019 winning team represents the Fraunhofer Research Center for Machine Learning in Germany, one of Europe’s leading research institutions for applied big data and artificial intelligence.

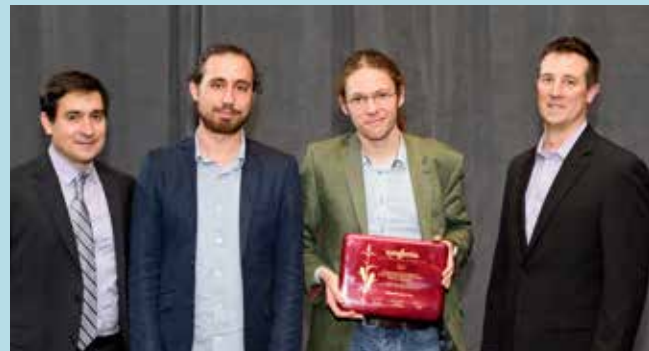
“Our institute has recently become interested in combining machine learning with agriculture,” says team member Kostadin Cvejovski. “In the future, we are going to work more on solving agricultural problems.”

In addition to Cvejovski, the five-member team includes Bogdan Georgiev, César Ojeda, Jannis Schuecker and Anne-Katrin Mahlein. They received \$5,000 for their submission, “Combining Expert Knowledge and Neural Networks to Model Environmental Stresses in Agriculture.”

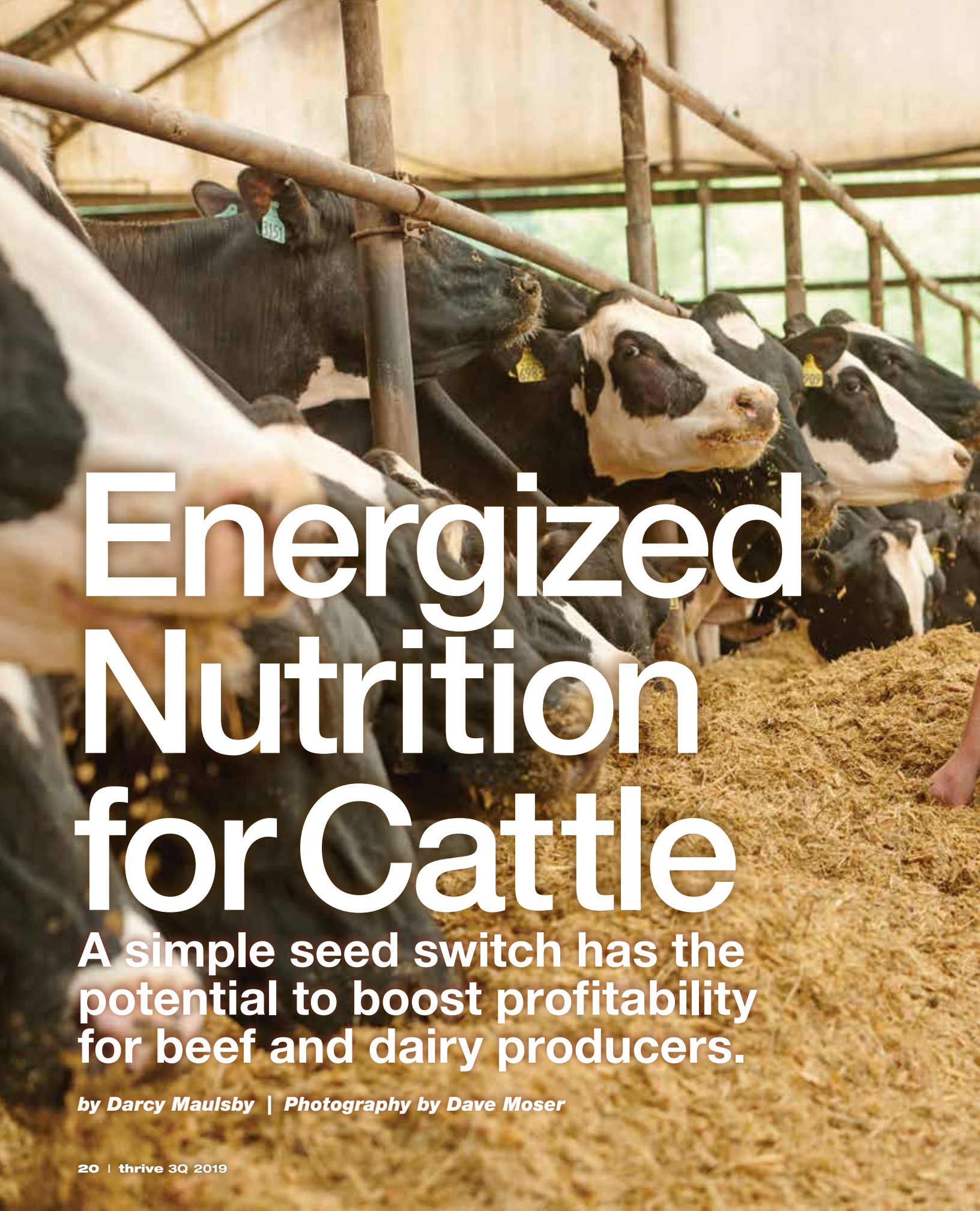
Saeed Khaki and Zahra Khalilzadeh from Iowa State University secured second place and received a \$2,500 prize for their submission, “Crop Stress Classification Using Deep Convolutional Neural Networks.”

A team from the BioSense Institute in Serbia, whose members include Gordan Mimić, Sanja Brdar, Milica Brkić, Marko Panić, Oskar Marko and Vladimir Crnojević, won third place and received a \$1,000 prize for their submission, “Engineering Meteorological Features to Select Stress-Tolerant Hybrids in Maize.”

The 2020 Syngenta Crop Challenge in Analytics will launch later this year.



Left to right: At the awards ceremony for the fourth annual Syngenta Crop Challenge in Analytics, Nicolas Martin, Ph.D., PMP, chair of the event and assistant professor at the University of Illinois at Urbana–Champaign; 2019 Crop Challenge winners Kostadin Cvejovski and Bogdan Georgiev, representing the Fraunhofer Research Center for Machine Learning in Germany; and Greg Doonan, Syngenta head of novel algorithm advancement, celebrate the results.



# Energized Nutrition for Cattle

A simple seed switch has the potential to boost profitability for beef and dairy producers.

*by Darcy Maulsby | Photography by Dave Moser*





Dairy producer Wally Eachus (center) holds a handful of Enogen® Feed corn silage, while discussing its benefits for dairy cows with his son, Eric Eachus (left), and Brent Sutton (right), Enogen Feed account lead, at Wellcrest Farms near Mullica Hill, New Jersey.



SEE MORE PHOTOS.  
[www.syngentathrive.com/farmproduction](http://www.syngentathrive.com/farmproduction)

Saying that profit margins in farming are slim right now is an understatement. Just ask Eric Eachus, a fourth-generation dairy producer looking for ways to cut costs and boost profitability.

"I'm focused on becoming more efficient, but I can't afford a tonnage loss with my silage," says Eachus, who raises 1,500 cows with his father, Wally, at Wellacrest Farms near Mullica Hill, New Jersey.

That's why Eachus was willing to try Enogen® Feed hybrids on some of his acres last year. He had heard how the higher levels of sugar and starch availability in Enogen provide more available energy, which translates into greater feed efficiency.

Eachus planted 50 units of Enogen Feed corn in 2018 for silage and conducted his own feeding trials. "Feed intake went down with Enogen," says Eachus, who was so pleased with the results that he planted 100% Enogen Feed hybrids this year. "This could be the difference between staying in business and going out of business."

### **Beef Producer Makes the Switch**

Once farmers try Enogen Feed corn, it's not uncommon for them to make a total switch to Enogen. "You have flexibility with Enogen Feed corn," says Easton Eggers, Enogen Feed lead for Syngenta. "We've seen additional value, whether producers feed dry corn or silage. Farmers like Enogen Feed corn because it performs in the field and it provides more available energy to their cattle."

Cole Baker, a beef producer from Ashton, Nebraska, switched 20% of his corn acres to Enogen Feed in 2018, increased this to 50% this year and plans to plant 100% Enogen Feed in 2020.

"My father-in-law started feeding Enogen to his cattle, which caught my attention," says Baker, who has approximately 3,700 head of cattle in his feed yard at any one time.

Baker feeds about a third of his Enogen Feed corn as silage and the rest as dry-rolled corn.

While Baker worried that this efficiency would come at the cost of yield drag, that didn't happen. "To date, I've had record yields with Enogen."

### **From the Ocean to the Field**

The Enogen trait is available in approximately 30 corn hybrids in a wide range of maturities. It's interesting to note that the key to this trait was discovered at the bottom of the sea.

"Syngenta scientists found bacteria that could withstand the high temperatures in thermal vents on the ocean floor," says Duane Martin, Ph.D., commercial traits manager for corn and soybean product marketing at Syngenta.

"We wanted a thermostable amylase because it would be efficient and effective in the temperature ranges used in the cook phase of ethanol production."

In the early 2000s, Syngenta scientists studied ways to modify corn to carry alpha amylase to convert starch to sugar more efficiently. Their goal? Provide corn hybrids that enhance ethanol production efficiency.

Syngenta debuted Enogen hybrids in 2011. Shortly after, trials began to evaluate the benefits of Enogen corn for cattle feed. Initial results published by the University of Nebraska-Lincoln confirmed that Enogen Feed corn improves feed digestion in feedlot cattle.

"Because of the unique alpha amylase enzyme in Enogen Feed corn, the nutrients in the feed are more digestible, which means animals can utilize more of the energy in the ration," says Eileen Watson, Ph.D., global project lead for corn trait projects at Syngenta.

### **Studies Document 5% Feed Efficiency Boost**

Documented feed efficiency gains of about 5% have been recorded for beef stocker and finishing cattle, when Enogen is fed as whole corn, dry-rolled corn or silage.

"For beef producers, a simple switch to Enogen Feed corn hybrids can help you lower your feed costs, finish cattle faster and boost your profit potential," Martin says.

Dale Blasi, Ph.D., an animal science professor and extension beef specialist at Kansas State University, has studied Enogen corn versus #2 yellow corn in feed rations for post-weaning cattle. "Our 90-day trial reflect real-world

## **ENOGEN HELPS FUEL THE FARM ECONOMY**

When profit margins are tight, seed choice can make the difference between profit and loss. That's why more farmers have been switching to Enogen® corn for ethanol, which provides the opportunity to earn a per-bushel premium for grain delivered to ethanol plants.

"Enogen corn is a step change for agriculture," says Chris Tingle, head of commercial operations for Enogen. "Many growers are getting \$50 to \$60 more per acre with Enogen corn, thanks to increased yield potential and premiums from ethanol plants."

Growers access Enogen corn through a technology license with Syngenta and a production contract with an ethanol plant that has entered into a commercial agreement with Syngenta. Enogen corn is available in approximately 30 high-yielding hybrids with the latest germplasm from Syngenta. Growers



conditions that growing calves face,” he says. “Our first study showed a 5.5% increase in feed efficiency among calves fed Enogen Feed corn. A second study with Enogen silage showed a 4% increase in feed efficiency.”\*

Researchers have observed feed-efficiency gains, whether calves were fed whole corn or dry-rolled corn. The scientists saw these positive results as early as day 14 in a 90-day study. In addition, researchers tended to see lower dry-matter intake with Enogen Feed corn, Blasi says. “There appears to be more complete digestion with Enogen Feed corn. You’re gaining efficiency, plus you don’t give up yield.”

Syngenta is collaborating with feedlots in Nebraska, along with University of Nebraska scientists, to conduct larger-scale feeding trials with Enogen Feed corn. “We’re bridging the gap between small-scale trials and farm-scale settings,” says Watson, who notes that Syngenta is also working with Kansas State University and the University of Illinois to test Enogen Feed corn in swine and poultry diets.

### Dairy Studies Report Multiple Benefits

For dairy operations growing their own corn silage, switching to Enogen Feed corn hybrids can boost the feed value through higher yield potential, increased starch digestibility and increased total digestible nutrients (TDN), according to research from the University of Minnesota Waseca and Pennsylvania State University.

For example, at dairy feed ration costs of \$0.12 per pound dry matter and milk prices at \$15.50 per hundredweight, the average Enogen Feed corn user may see a financial benefit of \$0.90 to \$1 per head per day for lactating cows, due largely to reduced feed intake, which decreases costs for the producer.

“When our nutritionist, Robert Fry, first heard about Enogen Feed, he thought it sounded too good to be true,” Eachus says. “Now he’s sold on it.”

The consistency of results through multiple university trials through multiple feedstuffs speaks volumes about Enogen Feed corn, adds Steven Burback, an Enogen account lead for Syngenta in Nebraska. “Gaining these advantages is as easy as switching the bag of corn you plant.”

As a high-value product, Enogen Feed corn must be grown as an identity-preserved crop and fed on-farm only. Growers must comply with specific, yet simple, stewardship requirements; and the Syngenta team is ready to help them get started.

“Margins are definitely tight, and you need every advantage you can get,” says Baker, who has been in the cattle business since 2012. “That’s why I choose Enogen Feed corn.”

For more information about Enogen Feed corn hybrids, contact your local Golden Harvest® Seed Advisor or NK® retailer. 🌱

\*Kansas State University Research Studies, 2017 to 2018.

Enogen corn enzyme technology gives growers a chance to earn a per-bushel premium, while helping to support the U.S. ethanol industry.

who plant these hybrids, which range from 85-day varieties to 118-day varieties, receive ample support on how to follow specific, yet simple, stewardship requirements, like planting border rows around an Enogen cornfield, cleaning out planters and combines, and reserving bin space for all Enogen grain.

Growers across the country—from Maine to Florida to Arizona and throughout the Midwest—are embracing this seed technology. While there were approximately 20,000 acres of Enogen corn grown for ethanol in 2011, the first year the technology hit the market, this total has soared to 800,000 acres today.

“The ethanol industry has paid growers more than \$100 million in premiums for Enogen in the last seven years,” Tingle says. “See for yourself how Enogen can perform in your fields and help keep your operation viable.”

For more information go to [www.enogen.com](http://www.enogen.com).



# Root Out Rootworms

There is no silver bullet for the billion-dollar bug, but smart planning and a robust Syngenta portfolio can help keep it under control.

**H**umans domesticated modern corn over thousands of years from an ancient grass called teosinte. But it took only a fraction of that time for corn rootworm (CRW) to adapt to several typical pest management practices. Given that CRW costs growers around \$1 billion in lost yield and control measures each year, finding a way to manage it is crucial. While there's no one-size-fits-all solution, there are steps growers can take to plan strategically for long-term CRW management.

"They've overcome almost everything that growers have tried to throw at them: crop rotation, different types of corn genetics, insecticides and transgenics," says Erin Hodgson, Ph.D., associate professor and extension entomologist at Iowa State University. "They're just really adaptable pests."

## Fighting Adaptations

Hodgson and most experts agree that crop rotation is still the single most effective way to control CRW. The practice works by starvation. The only mobile form of the insect is the adult beetle. After the adult beetles lay eggs in a cornfield, the grower can rotate to soybeans or other crops the following year to starve the larvae and end the cycle.

This practice works for most of the Corn Belt; however, two species have adapted to this strategy. Beginning in the 1990s in areas of the Eastern Corn Belt within Illinois and Indiana, the western CRW variant females began to lay their eggs in soybean fields, reducing the benefits of rotation. This variant of the Western corn rootworm has now crossed into neighboring states, so growers are advised to monitor its movement and consult with their local Syngenta resellers on appropriate control practices. Areas of the Northern Corn Belt face extended diapause, where eggs of the northern CRW can stay dormant in soil for two or more years, waiting for corn to be planted in the field again.

These examples and other adaptations that make corn rootworm more difficult to manage are the reasons why many experts, including Syngenta Traits Product Manager Tim O'Brien, say that a long-term, multifaceted strategy is the best way to deal with the billion-dollar pest.

"The larvae feed on the roots, damaging their ability to uptake water and nutrients," O'Brien explains. "This places stress on the



In York, Nebraska, a hybrid with Agrisure Duracade (left) has a healthy root system, while a hybrid without Agrisure Duracade (right) has weakened roots.

plants and leads to yield reductions. Damage to brace roots can lead to standability concerns, making plants susceptible to lodging. Come harvest, growers find it really stressful and difficult to get lodged corn to feed into a combine."

## A Novel Trait

When crop rotation isn't an effective option for CRW control and growers need to consider other management strategies, using *Bacillus thuringiensis* (*Bt*) traits for CRW can be an excellent option. *Bt* is a soilborne bacteria that produces proteins affecting digestion in the gut of specific insects. Researchers first documented the activity that these proteins have on larvae in the early 1900s. For nearly 100 years, growers have used the proteins to control insects—with the introduction of the first transgenic traits developed from *Bt* for insect control taking place during the 1990s.

In the two decades since, Syngenta scientists have continued to refine the technology. One of the newer tools from Syngenta that can help tackle CRW is a *Bt* trait called Agrisure Duracade®.

"It's a unique mode of action versus competitive traits in the marketplace," says Todd McRoberts, NK® agronomy manager at Syngenta. "It's a novel protein, engineered in the lab, which attacks a different site in the stomach of the rootworm."

Agrisure Duracade offers a new tool against CRW larvae. The Agrisure Duracade trait expresses a protein that binds differently in the gut of CRW than any other trait on the market. Additionally, it is always pyramided with a second mode of action against CRW and





provides effective control of western, northern and Mexican CRW.

A unique trait product, like Agrisure Duracade, provides an ideal foundation for a CRW control plan. However, O'Brien suggests that all operations should use a range of technologies and strategies to combat the pest.

"The one thing you don't want to do is keep using the same thing in the same field year after year," he says. "You've got to consider all the tools in the toolbox and try to use those tools to expose CRW to something different through a multiyear field-by-field plan."

In addition to crop rotation and different transgenic traits, traditional insecticides, including the Force® family of insecticides, are tools that growers should continue to consider.

"When growers pair Agrisure Duracade with some of our other insect control technologies, like Force, the Agrisure Viptera® trait

and our insecticide seed treatments, they can achieve the broadest spectrum of insect control in the industry," O'Brien says.

For example, trait stacks featuring Agrisure Viptera offer cutting-edge control of aboveground insects, including western bean cutworm and corn earworm. Avicta® Complete Corn 250 and Avicta Complete Corn 500 seed treatments defend against a wide array of damaging nematodes and seedling pests.

### Staying a Step Ahead

McRoberts and O'Brien both suggest building out a long-term program to take on CRW. By sitting down with their resellers, growers can take the issues specific to their fields and lay out a plan for this year and the next several years. The plan may need to change each season, depending on pressure, but having it in place gives growers a head start. And when it comes to keeping programs effective, there's no substitute for good scouting.

"The single most effective thing I recommend for all growers, no matter what strategies they're using, is to assess their crops at the roots," Hodgson says. "It's not fun to scout and dig up roots in July, but the best way to make sure your program is working is to get out there and check."

For more information on developing a field-by-field corn rootworm management plan, please refer to the "Take Control of Corn Rootworm" decision guide, which can be found at the bottom of the [www.agrisureduracade.com](http://www.agrisureduracade.com) website. 🌱

STORY BY SHANE NORRIS

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# Making the Case

With the Leadership At Its Best program, Syngenta equips association leaders with the skills they need to confidently advocate for today's farmers.

As a longtime corn producer and the president of the Nebraska Corn Growers Association, Dan Nerud pursues every professional development opportunity that comes his way. “Whenever I can advance my skills and interact with others in the industry, I jump at the chance,” he says.

And that's exactly what he did when given the opportunity to participate in Leadership At Its Best (LAIB), a longstanding Syngenta-organized program that helps current and future U.S. ag leaders improve their skills to advocate for American agriculture.

During the weeklong program, held earlier this year in Research Triangle Park, North Carolina, and Washington, D.C., Nerud absorbed

briefings from industry leaders, enthusiastically participated in training sessions and activities, exchanged insights with fellow participants representing nine industry groups, and met with elected officials on Capitol Hill.

Among the program offerings Nerud found most beneficial was the media training workshop. Just weeks after participating in that training, he put his learnings to good use when the nation's attention turned to Nebraska and the state's farmers who were affected by devastating floods. Local, regional and national reporters looked to Nerud to share situation updates and important information resources—a role he embraced and approached with confidence, thanks, in part, to his LAIB experience.

## Revitalized Program

In an industry rife with complexity and change, advocating for farmers and their freedom to operate has never been more crucial. Recognizing the reality that grower associations and industry groups often shoulder much-needed advocacy efforts, Syngenta established LAIB, which has trained approximately 4,500 leaders—many of whom are growers like Nerud—since 1986.

Now at the helm of LAIB is Mary Kay Thatcher, senior lead of federal government relations at Syngenta in the U.S. and one of the country's foremost farm policy experts. “Agriculture faces complex challenges, and LAIB helps

“Agriculture faces complex challenges, and LAIB [the Leadership At Its Best program] helps farmers learn skills to answer the call and stand up for our industry.”

—MARY KAY THATCHER



As part of the 2019 Leadership At Its Best program, Brent Vogt (left) with the National Agricultural Aviation Association in Elmwood, Nebraska, speaks with U.S. Senator for Nebraska Deb Fischer (far right), while her legislative aide, Cicely Batie, takes notes, at a Washington, D.C., event.



farmers learn skills to answer the call and stand up for our industry,” she says.

In 2019, Thatcher and her colleagues revitalized the program’s structure and curriculum, introducing refreshed modules based on current leading thoughts, ideas and techniques. “The revamped program focused on key aspects of leadership training and priority issues facing agriculture,” Thatcher says.

Instead of holding separate smaller training programs for individual industry groups, as had been done in previous years, the 2019 program brought together representatives from multiple organizations. In 2020, the following 12 groups plan to participate:

- Agricultural Retailers Association
- American Agri-Women
- American Farm Bureau Federation (AFBF) Women
- American Soybean Association
- Independent Professional Seed Association (IPSA)
- National Agricultural Aviation Association
- National Association of Conservation Districts
- National Association of Wheat Growers
- National Corn Growers Association
- National Cotton Council of America
- National Potato Council
- National Sorghum Producers

### Lifelong Relationships

The opportunity to engage with advocates representing multiple facets of agriculture fostered cross-organizational exchange and helped cultivate what may well become lifelong relationships—a highlight for participants like Chris Cornelius and Laura Vaught.

While Nerud, Vaught and Cornelius represent different industry interests, the challenges they seek to overcome are often the same, particularly public perception regarding large farming operations, biotechnology and product safety.

Cornelius, who serves on the IPSA board and is the executive assistant for Cornelius Seed, has worn a lot of hats since joining the family-owned independent seed company in 1983. For her, education and community outreach are inextricably linked to the business functions of her role.

“It’s not like I wake up and say, ‘Today I’m going to focus on advocacy,’” she says. “It’s just part of what I do.”

During her time in the industry, Cornelius has seen firsthand the dawn of the biotechnology age, the benefits that biotech traits have brought to growers and the challenges of gaining public acceptance for biotechnology. “As an industry, we have to do a better job of communicating the benefits and safety of biotech traits,” she says.

That’s why Cornelius was eager to hear from Hope Hart, foresight and advocacy lead for product safety at Syngenta.



During Hart’s presentation to the group, she shared practical tips for discussing the science and safety of genetically modified organisms with non-ag audiences.

The 2019 Leadership At Its Best class poses for a group photo at The Westin Alexandria Old Town in Alexandria, Virginia.

Vaught, a Tennessee-based attorney whose practice focuses on representing farmers and who is active in AFBF Women, also appreciated the guidance Hart imparted. “She helped us think about analogies to use when speaking with consumers,” Vaught says. “When talking about agriculture, we tend to use terms that we understand and know, so it was helpful to have a scientist like her explain how to better tell the story.”

From attending skills-based workshops and having access to company executives and Washington insiders to forging connections with others in similar roles, Vaught’s LAIB experience far exceeded her expectations. “Because I chose a transactional path in law school, I wasn’t trained to be an oral advocate,” she says. “Participating in LAIB has helped me communicate better, which will ultimately help me better serve farmers.”

STORY BY KARYN OSTROM

# The Biotech Effect

New traits developed through biotech are crucial to agriculture's future—and so are timely, science-based regulatory evaluations of them.

**B**iototechnology has proven to be an important tool for growers. The new and improved traits it has brought forward have helped increase productivity, while protecting the environment.

"For example, consider the biotech products, like *Bt* corn, that protect yield," says Scott Huber, Syngenta regulatory head of seeds and traits.

"The uptake is greater than 85% in many crops—meaning farmers see them as hugely beneficial to maintaining a profitable business—and protecting yield means better utilization of resources. That's good for the environment, and it's good for a steady food supply."

The positive environmental impact of biotech is "a story that hasn't been told well enough," says Fan-Li Chou, biotechnology coordinator at the U.S. Department of Agriculture's (USDA's) Office of Pest Management Policy. "Studies show farmers who incorporate insect-resistant trait crops into their operations decrease the amount of insecticide they're using. I remember at a USDA Agricultural Outlook Forum, a farmer from Maryland said it's been really important for him to be able to grow GE [genetically engineered] crops to meet the Chesapeake Bay protection goals that the U.S. Environmental Protection Agency (EPA) had put in place to decrease the impact on the Chesapeake Bay."

The American Soybean Association (ASA) represents farmers across the U.S. who rely on biotech traits to grow their crops, says Renee Munasifi, ASA regulatory affairs manager. "Things change all the time, and our farmers need those tools to be able to address pests, disease, herbicide resistance—all the things

coming at them daily. Our farmers need new technologies like biotech to continue to meet global demand and grow soybeans more sustainably."

Growers also rely on USDA to evaluate new biotech crops before they come to market, Munasifi says. "But it's important for regulation to be founded in science and based on real-world risks—and to be done in a timely manner."

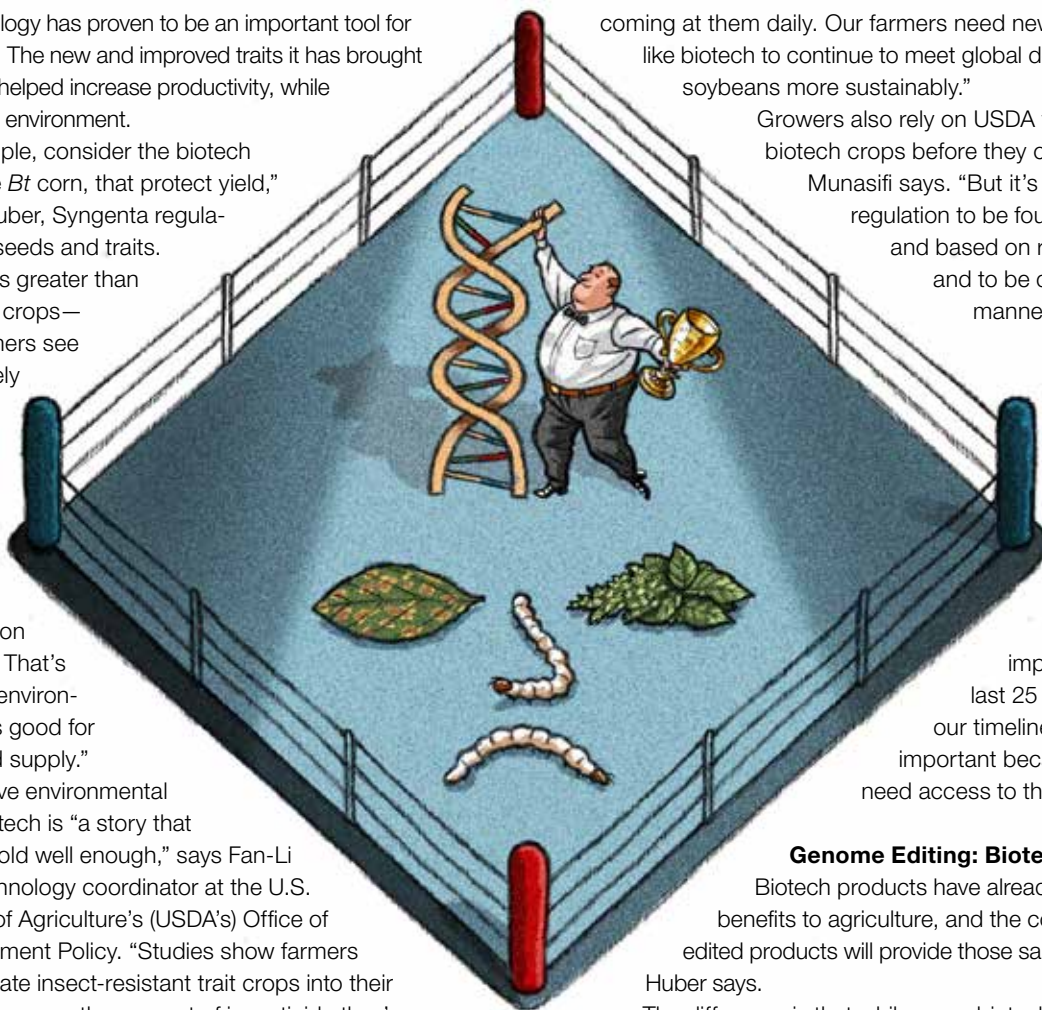
The process should also be as predictable as possible, and that's a goal at USDA, Chou says. "We've implemented a lot of business process improvements in the last 25 years to improve our timeliness. It's really important because our farmers need access to these tools."

## Genome Editing: Biotech's Latest Tool

Biotech products have already provided huge benefits to agriculture, and the coming genome-edited products will provide those same kind of benefits, Huber says.

The difference is that while many biotech products have some added DNA—*Bt* corn, for example—gene editing usually adds no foreign DNA to the plants. "We can potentially just make certain changes to those plants—maybe to increase yield or nitrogen efficiency or drought tolerance," Huber explains. "The products are very similar to what you get with conventional breeding, which could be labeled as organic."

Genome editing is just a more precise, targeted means to get to a particular end result, Munasifi says. "And we need that more precise, more efficient method of improving soybean varieties so that agriculture and soybean farmers can adapt to challenges."





That targeting ability means plant breeders can use this tool to facilitate other resistance—not just resistance to insect pests, but also to pathogens and bacteria. “Those are much harder to get at from a conventional plant-breeding perspective,” Chou says. “Pathogens and bacteria evolve very quickly with resistance; and genome editing, because of its ability to quickly get at a target, will help growers better manage these disease resistance issues.”

For now, this tool is still on the horizon. “No genome-edited ag product is widely available commercially at the moment, but something coming to market over the next two to five years is very likely,” Huber says.

When it comes to oversight of those new products, USDA, Food and Drug Administration (FDA) and EPA will have shared responsibility, depending on the intended end use of the product. In March 2018, the U.S. Secretary of Agriculture put out a statement clarifying USDA’s intentions with genome-edited products. In the statement, USDA released guidance suggesting that if the modification to a product’s genome would have been possible through traditional, conventional breeding, but was instead achieved via genome editing, USDA does not intend to regulate that product under its biotechnology regulations.<sup>1</sup> Ag industry experts expect FDA and EPA to clarify their positions and approval processes as they move forward.

### What Syngenta Is Doing—and What Readers Can Do

Syngenta actively advocates on behalf of biotech products, either directly with the agencies or through industry groups. “We also advocate with local governments for science-based, predictable regulatory systems,” Huber says. “At the same time, we have internal processes to make sure our products are safe at very early stages. We’re confident in the safety of our products by the time we take

them to regulatory agencies.” Huber hopes growers and retailers will learn what they can about biotech tools, get confident about their benefits and then advocate for them.

Consider reaching out to government agencies, too, Munasifi adds, and make them aware of how beneficial these tools are. “Talk with USDA, FDA and EPA and let them know it’s important

**“No genome-edited ag product is widely available commercially at the moment, but something coming to market over the next two to five years is very likely.”**

—SCOTT HUBER

that the U.S. government is coordinated and consistent on its approach to gene editing,” she says. “We need the U.S. to continue to coordinate its message internationally, too, so we can bring along other like-minded countries and embrace the technological advances in agriculture.” 🌱 STORY BY SUZANNE BOPP

1. See [www.usda.gov/media/press-releases/2018/03/28/secretary-perdue-issues-usda-statement-plant-breeding-innovation](http://www.usda.gov/media/press-releases/2018/03/28/secretary-perdue-issues-usda-statement-plant-breeding-innovation).



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# Ripple Effect

Syngenta plans to accelerate innovation to help growers meet 21st-century challenges, while a company researcher appears in a CRISPR documentary and a female grower shares her sustainability practices on “FarmHer on RFD-TV.”

## INNOVATIONS & HONORS

### Accelerating Innovation in a Changing World

Syngenta recently announced its commitment to accelerate its innovation to address the increasing challenges growers face globally and the changing views of society. The announcement follows the completion of more than 150 listening sessions with various stakeholders throughout the world.

“Farmers today need to manage climate change, soil erosion and biodiversity loss, as well as the changing consumer expectations and views on agricultural technology,” says Alexandra Brand, chief sustainability officer at Syngenta. “There is a clear call for innovation and more action to address these challenges in ways where everybody wins—from growers to consumers and the environment.”

To help fulfill this commitment, Syngenta is working with organizations that share its goals and vision for a more sustainable future. In a new multiyear collaboration—Innovation for Nature—Syngenta is working with The Nature Conservancy on practices aimed at improving soil health, resource efficiency and habitat protection in major agricultural regions worldwide. The goal in the U.S. is to help growers—who are already among the world’s most productive, best stewards of the environment—understand more about what everyone can do.

For more information, visit [www.syngenta.com](http://www.syngenta.com) and [www.goodgrowthplan.com](http://www.goodgrowthplan.com).





Field margins designed to enhance pollinators, beneficial insects and overall biodiversity grow alongside a wheat crop.



## CRISPR Technology Featured in Documentary Film

It's a rare day when a research scientist has a moment in the limelight, let alone on the silver screen. However, Ian Jepson, Ph.D., head of trait research and developmental biology and site business head at Syngenta in Research Triangle Park (RTP), North Carolina, recently experienced both. Jepson was among the experts featured in "Human Nature," a documentary film that explores the immense potential that CRISPR genome-editing technology holds.

In a scene filmed at the Advanced Crop Lab in RTP, Jepson shared how CRISPR is a vital tool for developing drought-tolerant crops. "The genes we edited control how the pores on the outside of the leaves open and close," Jepson explains, holding the leaf of a corn plant. "The stomata pores in plants will [typically] stay open during dry conditions. ... In the edited plant, those stomata pores close sooner under dry conditions, and the water is retained inside the plant."

During the "Human Nature" screening at the Full Frame Documentary Film Festival in Durham, North Carolina, Jepson along with Rodolphe Barrangou, Ph.D., a world expert in CRISPR technology from North Carolina State University, joined Adam Bolt, the film's director, to answer audience questions about CRISPR and its applications.

"CRISPR is an incredible tool for finding new genes and has enormous potential for agriculture," Jepson told the audience.

"Human Nature" debuted at the South by Southwest festival in Austin, Texas, in March 2019. Screenings at additional conferences and festivals followed, including the festival in Durham, which Jepson attended in April, as well as screenings in Copenhagen, Denmark; Toronto, Canada; and Newport Beach, California.



From left to right: Rodolphe Barrangou, a North Carolina-based CRISPR researcher; Shujie Dong with Syngenta; Chris Tutino with Syngenta; film director Adam Bolt; and Ian Jepson and Hua-Ping Zhou, both with Syngenta, celebrate the screening of "Human Nature" at the Full Frame Documentary Film Festival in Durham, North Carolina.

# thrive

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# Caring for the Land

An upcoming episode of “FarmHer on RFD-TV” shares the story of a female farmer and her family’s successful commitment to sustainability.

**A**nnie Dee says she’ll “talk agriculture” with anyone who will listen. That’s why she jumped at the opportunity to be featured in an episode of “FarmHer on RFD-TV” when Syngenta invited her. The episode showcasing Dee and her

family-owned Dee River Ranch near Aliceville, Alabama, airs during the television show’s fourth season, which begins this fall.

Syngenta has been a sponsor of “FarmHer on RFD-TV” since its inaugural season in 2016. The series shares the multifaceted stories of women in agriculture.

“Syngenta gave us the ability to really get going and

has been a very important part of our success,” says Marji Guyler-Alaniz, president and founder of FarmHer. “The women Syngenta recommends for feature episodes reflect the commitment females bring to agriculture. Annie is so passionate and knowledgeable about farming—and it shows.”

**“Sustainability requires economic as well as environmental and social components. Those must be in balance to be sustainable.”**

—ANNIE DEE

Syngenta became involved to highlight the variety of career paths and the diversity of agriculture, says Wendell Calhoun, communications manager of marketing services at Syngenta. It’s also been an opportunity to showcase the contributions women are making to improve the future of the industry.

“Like many of the FarmHers featured on the show, Annie’s mission in agriculture resonates with Syngenta,” Calhoun says of Dee’s commitment to sustainable agriculture practices. “We highlight individuals whose tremendous contributions in agriculture reflect our core values and principles as an organization.”

In 2017, Syngenta sponsored the No-Till Innovator Awards. Dee and her 4,000-acre row-crop operation won the award in the crop protection category. The family has been no-till farming for more than 20 years. They also were early adopters of cover crops. The combination of both practices has increased soil-organic matter more than threefold, Dee says. The conservation practices also have significantly increased water-holding capacity and soil health.

“With our heavy clay soil, that capacity has helped keep us sustainable,” Dee says. “We’ve also saved time, labor and fuel. Sustainability requires economic as well as environmental and social components. Those must be in balance to be sustainable.”

In addition to the row-crop operation, Dee’s family has a 1,000-head herd of Brahman-Angus cattle. The cross-bred cattle fit into the ranch’s sustainability program. Brahmans tolerate heat and insects well, and Angus are known for their high-quality meat.

Dee says she’s looking forward to sharing with FarmHer viewers her insights into how her family strives to achieve sustainability and meet the ever-changing demands of agriculture.

To view some of the highlights from the first three seasons of “FarmHer on RFD-TV,” go to [www](http://www.syngentathrive.com/farmher)

[.syngentathrive.com/farmher](http://www.syngentathrive.com/farmher).  STORY BY LYNN GROOMS



Grower Annie Dee’s grandchildren (on left, from foreground to background), Anna Katherine More, Mason More and Grant More, show off Dee River Ranch’s reservoir near Aliceville, Alabama, as two members of the FarmHer crew watch and take photos.



➤ Read article online at [www.syngentathrive.com/community](http://www.syngentathrive.com/community).

Grower Annie Dee of Dee River Ranch checks corn health in a field near the Mississippi-Alabama state line.





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