

Growing Together

>>> 3Q | 2014

thrive[®]

SOW STRONG



Match Seed to Field to Boost Yield

- > DATA BRINGS PRECISION,
GREATER PROFIT POTENTIAL
- > MAKE THE MOST OF
YOUR WATER

syngenta[®]

contents

10 Seeds of Success
Syngenta seeds lead the way to higher yields in soybeans and corn, thanks to the company's extensive germplasm pool and innovative traits.
By Darcy Maulsby

14 Water₂Corn
Water-optimization technologies are helping growers efficiently convert available water to grain.
By Karyn Ostrom

18 Managing With Metrics
Secure data-based insights can help growers boost the profitability on their operations.
By Darcie Borden

1 WELCOME
Measuring Sustainability
Data is key for telling a grower's sustainable sourcing story.
By Jennifer Shaw

2 WHAT'S IN STORE
Learn about product updates, new and future technologies, and trade shows.

5 BEST PRACTICES
Weed Watch
By Mary Kornegay

6 DATA POINT
Grow More From Less

8 POLICY MATTERS
Trait Moves
By Cindy Snyder

22 ASK THE EXPERTS
Optimizing the Digital Farm
Interview by Susan Fisher

24 KNOW-HOW
Power Plots
By Suzanne Bopp

26 RIPPLE EFFECT
Read about ag community-related initiatives and the Syngenta Breeding Academy.

ON THE COVER Syngenta seeds draw on innovative technologies to deliver local solutions that help growers boost yields. Photo: Syngenta

THIS PAGE A grower and retailer inspect a field of soybeans in the Midwest. Photo: Syngenta



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.

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

Please send them to thrive@syngenta.com. For more information, visit the FarmAssist website at www.farmassist.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, services and solutions, and to provide them with the information they need to succeed in today's complex marketplace.



Measuring Sustainability

Since the dawn of agriculture, growers have embarked on a journey to produce the greatest amount of food using the fewest resources possible. Today, most people refer to this concept as “sustainable farming.” At Syngenta, we simply call it “growing more from less.”


For decades, our industry has made remarkable gains in using land, water, fertilizer and energy more efficiently. Filled with successes too often unsung, this evolving story of continuous improvement has no end in sight. Its latest chapter features a new set of players—major processors, manufacturers, consumer-market retailers and food-service companies—asking how sustainable is the production of agricultural commodities that they use in their products or sell in their stores. The answer requires growers and suppliers like you to produce documentation of your current sustainable footprint. This baseline information can then help you identify strategies and document on-farm improvements, which are beginning to factor into buyers’ sourcing decisions.

In concept, the process of collecting, securing and analyzing farm data seems easy, but in practice, it’s difficult. My team’s role within Syngenta is to develop the knowledge and systems you will need to facilitate this process and protect the confidentiality of your data. Our goal is to help you gain access to the tools, products and information that will enable you to tell your story effectively and credibly so that you, in turn, can successfully meet emerging downstream expectations.

This issue of *Thrive* chronicles some of our most valuable offerings. The AgriEdge Excelsior® program is one example. It uses metrics from Field to Market®: The Alliance for Sustainable Agriculture and integrates them into

Land.db™ farm management software to make data collection and entry efficient, accurate and secure, with no extra systems or steps required. The program also features a dedicated team of Syngenta experts who support and advise participants along the way.

Of course, our greatest assets are our people and their commitment to our science, which is featured on almost every page that follows. From high-yielding seeds and traits to integrated water-optimization strategies, we are developing the tools that will help our industry bridge the gap between what is available now and what will be needed later.

The Good Growth Plan publicly affirms our pledge to boost resource efficiency, rejuvenate ecosystems and strengthen rural communities. To accomplish these objectives, we proudly join stakeholders from across the globe in mapping out lasting solutions that can lead us toward a brighter, more sustainable tomorrow. If we can work together and get it right, perhaps we can authentically tell our own story that ends with handing the next generation a world better than we found it. 

“Our goal is to help you gain access to the tools, products and information that will enable you to tell your story effectively and credibly so that you, in turn, can successfully meet emerging downstream expectations.”



JENNIFER SHAW

JENNIFER L. SHAW, Ph.D.

Head, Sustainable Sourcing Solutions
Syngenta



What's in Store

New and future technologies advance crop solutions; news helps growers and retailers make key decisions.

PRODUCTS UPDATE

> Brassicas, Carrots Benefit From FarMore

Growers of cabbage, cauliflower, broccoli and carrots seeking early-season insect and disease protection now have a powerful new tool available to them. FarMore® Technology from Syngenta is the first comprehensive combination of separately registered seed protection products, proprietary application technologies and dedicated seed treatment services that maximize production value by enhancing performance and quality.

"The benefit of both FarMore® FI400 Brassica and FarMore® FI400 Carrot is consistent performance," says David Long, Seedcare product lead for Syngenta. "Growers will see enhanced seedling emergence, maximized plant stand establishment, as well as early-season vigor and plant health—not to mention the yield potential they'll protect."

FarMore FI400 technology combines the three fungicides found in FarMore® F300 technology with thiamethoxam insecticide to provide protection against a broad spectrum of early-season diseases and insects.

To learn more about the complete portfolio of Syngenta products for brassicas and carrots, visit vegetables.farmassist.com.



FarMore FI400 Brassica is now registered for use on high-value, small-seeded vegetable crops, such as broccoli.



NEW TECHNOLOGIES

> New 2015 Corn and Soybean Seeds

For the 2015 planting season, Syngenta will introduce U.S. growers to 52 new corn hybrids in its Golden Harvest® and NK® corn brands as well as 21 new NK soybean varieties. Developed from one of the largest germplasm pools in agriculture, the lineup will include new-to-market genetics as well as upgraded trait versions with proven high-performing seed technologies that offer protection against yield-robbing pests and other crop stresses.

In corn, these new hybrid introductions offer growers the powerhouse combination of breakout genetics with breakthrough traits, with options that will include advanced Agrisure Artesian® hybrids, Agrisure Duracade™ and Agrisure Viptera® trait stacks, as well as Enogen® trait technology. In soybeans, all new launches will feature the Genuity® Roundup Ready 2 Yield® trait, and four varieties also are stacked with the sulfonylurea-tolerant (STS) herbicide-tolerance trait. In addition, relative maturities 0.9 and later will have built-in soybean cyst nematode (SCN) genetic resistance.

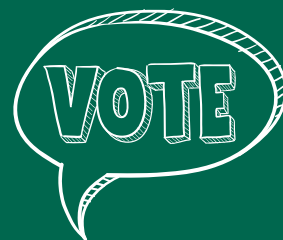
Based on its successful track record, the Syngenta seeds portfolio is expected to stack up well against the competition in 2015. For example, hybrids from both Syngenta corn brands—Golden Harvest and NK—out-yielded DeKalb® and DuPont Pioneer® hybrids in 2013 Syngenta field trials by an average of 3 bushels per acre, winning 61 percent of almost 15,000 national yield comparisons. And the new 2015 NK brand soybeans launch class has out-yielded the market leader by at least 3 bushels per acre in maturity groups 00 through 5 in 2013 Syngenta research trials.

Your Vote, Your Voice

Syngenta thanks everyone who has submitted entries to the Drive to Thrive contest, which invited readers to describe what makes their farms or agribusinesses thrive. From new technology to family, the topics of participants' responses were both thoughtful and heartfelt. Although the decision was difficult, our panel of judges has narrowed the field of competitors to 10 finalists—each of whom will receive a touchscreen tablet.

Now, we need your vote to help us determine who the grand prizewinner of a \$500 gas card will be. All you need to do is go to www.syngentathrive.com, click on the Drive to Thrive link under "Special Features" and vote for your favorite. Online voting ends Sept. 1, 2014, with Syngenta announcing the grand prizewinner in October.

For more information on the Drive to Thrive contest and Official Rules, visit www.syngentathrive.com.



>> New Winter Wheat Varieties

Syngenta will introduce three new AgriPro® brand winter wheat varieties for 2014 fall planting:

- > **SY 007**, a soft red winter wheat variety with very good winter survival, will be available to growers in the eastern Corn Belt this fall. It offers excellent straw strength and very good *Rhizoctonia* tolerance, as well as very good tolerance against soil virus and spindle streak mosaic virus. This medium-early maturity variety also provides a fast dry-down time, which allows for earlier double-crop soybean planting.
- > **SY 474** is a new soft red winter wheat variety bred to withstand the tough winters of the eastern Corn Belt. It offers excellent yield potential and standability under intense management strategies, while still providing above-average milling and baking characteristics. SY 474 offers a very good leaf disease tolerance package, as well as good plant height and straw strength.
- > **SY Clearstone CL2**, a hard red winter wheat variety bred for Montana and western North Dakota, is a taller semi-dwarf variety with good test weight and winter hardiness. It offers high protein content; and with two-gene herbicide tolerance, it also gives growers improved weed management options, while still offering high yield potential.

FOR MORE INFORMATION, visit www.syngentaseeds.com.

Trade Shows and Conferences

The weather is heating up and so is the summer trade show season. Please visit the Syngenta booth at any of the events listed below:

AUGUST 2014

- 13–14 **Citrus Expo**, North Ft. Myers, Florida
- 26–28 **Farm Progress Show**, Boone, Iowa

SEPTEMBER 2014

- 9–11 **Husker Harvest Days**, Grand Island, Nebraska

Pipeline Preview

Science is the fuel that drives Syngenta forward. Every day, the company spends \$3.4 million in global research and development (R&D). With more than 5,000 employees dedicated to developing and discovering agricultural innovations, Syngenta has built the industry's broadest portfolio of integrated, whole-farm solutions to meet today's toughest challenges. The company also has one of agriculture's most robust global R&D pipelines, currently filled with an estimated **21 new active ingredients, 15 traits and stacks, 13 label and use expansions, 10 solutions, 10 premixes, and ongoing genetics development**—all of which promise to ignite an even brighter tomorrow. Its U.S. pipeline alone contains more than 60 novel technologies that will help growers optimize yields, use resources more efficiently and minimize a multitude of crop stresses, from too little water to too many pests. This exclusive "Pipeline Preview" describes two of the most promising discoveries, both still pending EPA approval. Future issues of *Thrive* will provide additional "sneak peeks" into what's coming next from Syngenta.

Acuron Herbicide

Acuron™ herbicide, on track for a 2015 introduction, is a corn herbicide premix containing a new active ingredient, bicyclopyrone, and three complementary modes of action. The premix will offer pre- and post-emergence control of more than 70 broadleaf weeds and annual grasses, including giant ragweed, common ragweed, Palmer amaranth and waterhemp. Research shows that Acuron will deliver better, more consistent weed control than today's standards. Syngenta also is working on a second bicyclopyrone premix that will provide effective, consistent control of large-seeded broadleaf weeds. Syngenta anticipates registration of this second premix for the 2016 season. (See "Weed Watch," page 5, for more information.)



Solatenol Fungicide

Solatenol™ fungicide is a new active ingredient from Syngenta. The SDHI fungicide will be available for use on a variety of crops, including cereals, corn, soybeans, cucurbit and fruiting vegetables, grapes, peanuts, pome fruit, and potatoes. It is expected to control rusts, leaf spots, apple scab, powdery mildew, *Alternaria* and *Cercospora*. Syngenta expects federal registration in early 2015.

BY THE NUMBERS

60+
Innovations in current U.S. pipeline

Weed Watch

A new broad-spectrum, residual herbicide is the latest innovation from Syngenta weed control experts.

The No. 1 priority for the herbicide team at Syngenta is continuously developing and evolving technologies that target growers' most problematic weed challenges. With weeds causing up to \$2 billion¹ in damage each year to crops, its work has never been more important—or urgent. In a 2013 survey, growers identified waterhemp, Palmer amaranth, marestail, giant ragweed and morningglory as the top five most difficult weeds to control in corn².

The team's newest herbicide, with registration expected in time for the 2015 growing season, controls these weeds and more. Acuron™ herbicide has four active ingredients, including a brand-new chemistry, as well as three modes of action that work together to provide control of more than 70 broadleaf weeds and grasses. Syngenta expects a flexible application window for the new herbicide premix—from 28 days pre-plant (including burndown) up to 12-inch corn.

Continuing a Legacy

Because it contains mesotrione, Acuron has strong ties to the Callisto Plant Technology® (CPT) family of herbicides. Callisto®, the first herbicide to feature mesotrione, debuted on the market in 2001. Since then, Syngenta has steadily introduced new CPT family members, including Lumax®, Lexar®, Halex® GT, Callisto Xtra, Zemax®, Lexar EZ and Lumax EZ, and, most recently, Callisto GT.

Acuron is the company's next step in herbicide evolution. In addition to mesotrione, it contains S-metolachlor, atrazine and bicyclopyrone, a new active ingredient that delivers improved, consistent control of small- and large-seeded broadleaf weeds in corn.

"At one point, an application of Callisto could control difficult weeds," explains Gordon Vail, Ph.D., technical product lead at Syngenta. "But as weeds are becoming harder to control and resistance is gaining momentum, it's important to continue developing products with different active ingredients and modes of action. If you follow the progression of the brands over the years, you can see that Acuron reflects the market very nicely."

Acuron Tech Squad

Vail is one of the many Syngenta team members who have played a role in the development of Acuron. From research and development to supply chain, the Acuron technical team has worked on perfecting the product since bicyclopyrone



An Iowa test plot shows the difference a pre-emergence treatment of Acuron herbicide can make in corn.


was first synthesized. Through the development process, more than 600 field trials have included the new active ingredient.

"In the mid-2000s, we started screening different herbicides to find something that would complement mesotrione," says Vail. "Bicyclopyrone is the bridge that will give growers better weed control. The mesotrione/bicyclopyrone combination is an innovation in chemistry. It took some time, but once we developed Lexar and Lumax and saw how outstanding they were, we knew we weren't going to introduce another pre-emergence herbicide until we could match or exceed the performance growers could get with those products."

Something Truly New

The addition of bicyclopyrone to the Syngenta lineup represents a step forward for growers looking for a new solution to their weed challenges. In a market with few new active ingredients, Acuron will offer a brand-new chemistry for weed control.

"There are a lot of products in the marketplace that are merely a combination of already-existing products, but this is something new," says John Foresman, commercial product lead at Syngenta. "It brings something to the table that is unique, and what we're seeing in trials leads us to believe it will really stand out from the products currently available."

Growers and retailers can see the value of Acuron for themselves at Syngenta Grow More Experience Sites and university trials across the U.S. this summer. For more information on a location near you, please contact your Syngenta representative.  **STORY BY MARY KORNEGAY**

¹ Basu C, Halfhill MD, Mueller TC and Stewart Jr. CN, "Weed Genomics: New Tools to Understand Weed Biology." *Trends in Plant Science*; 9 (8): 391-398 (2004).

² 2013 Syngenta market research: cocklebur, kochia, marestail, morningglory, ragweed (common, giant), waterhemp (common, tall).



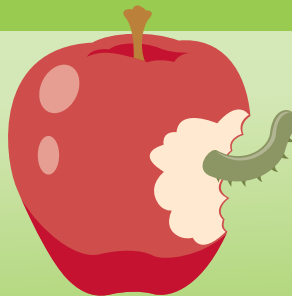
Grow More From Less

As the world's population continues to expand exponentially, growing more from less has never been more important. According to the United Nations' Food and Agriculture Organization, we have 200,000 more people to feed every single day. The organization also reports that producing more food will largely depend on increasing crop yields, not farming more land.

CHALLENGES AHEAD

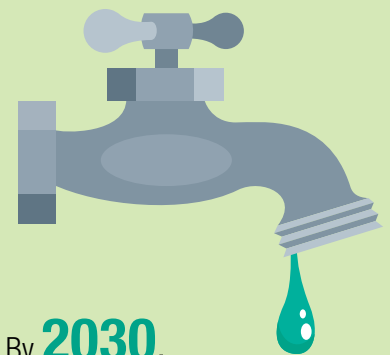


In **2050**, there will be **9 billion** people in the world to feed, which will require a **70 percent increase in food production**



40%

of the **world's harvest** is lost to **insects, weeds and diseases**



By **2030**, **water needs will exceed** current supplies by **40%**

PROGRESS SINCE 1980¹

ENERGY SAVINGS

44%

reduction in energy use per unit of production in corn



YIELD IMPROVEMENTS

55%

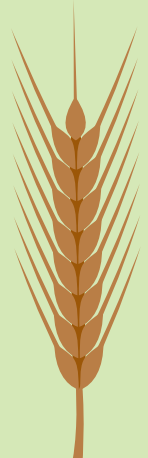
increase in bushels per planted acre of soybeans



WATER SAVINGS

12%

decrease in irrigated water applied to wheat per unit of production



¹ Statistics from Field to Market[®]: The Alliance for Sustainable Agriculture (2012 v2), *Environmental and Socioeconomic Indicators for Measuring Outcomes of On-Farm Agricultural Production in the United States; Summary Report: Second Report (Version 2)*, December 2012 cover the years 1980 through 2011.

² "Top 10 Conservation Tillage Benefits." *Conservation Technology Information Center*, 2014.

³ Data is based on 4,075 Syngenta on-farm strip trials, 2010–2013. Syngenta defines a yield environment of 50–99 bu/A as severe and fewer than 50 bu/A as extreme.

⁴ 2011: Data analyzed from 19 sites in eastern Colorado, Nebraska and western Kansas. 2013: Data analyzed from five sites in eastern Colorado, Nebraska and western Kansas.

⁵ Savings calculated based on Enogen trial and commercial results at Midwest ethanol plants.

⁶ Bruce E. Hibbard, Daniel L. Frank, Ryan Kurtz, Eric Boudreau, Mark R. Ellersieck and J. Frederick Odhiambo, "Mortality Impact of *Bt* Transgenic Maize Roots Expressing eCry3.1Ab, mCry3A, and eCry3.1Ab Plus mCry3A on Western Corn Rootworm Larvae in the Field," *Journal of Economic Entomology*. 2011, 104 (5): 1584–1591.



SYNGENTA CONTRIBUTIONS



High-performing Syngenta **herbicide technologies** help reduce the need to control weeds through tillage. Benefits of conservation tillage have included²:

2"

of **additional water** available in late summer

90%

reduction in soil erosion when compared to an unprotected, heavily tilled field

3.5

gallons per acre of average fuel savings

Water™ Intelligent Irrigation Platform improves yield with up to

25%

less water compared with other programs⁴



In a 100 million-gallon ethanol plant, **Enogen®** grain can result in an annual savings of⁵:

68

million gallons of **water**



10

million kilowatts of **electricity**



350

Btu of **natural gas**



13.7%

higher yields

produced with **Agrisure Artesian®** corn hybrids compared to the plot average in more than **4,000 Syngenta on-farm trials** under **severe and extreme drought stress**³



The **Agrisure Duracade™** trait **reduces** adult **corn rootworm beetle emergence** by

99.79%



helping growers avoid significant yield losses⁶

Trait Moves

Asynchronous global approvals for new genetically engineered traits create a trade challenge for growers and agribusinesses.

Since the first biotech traits came on the market nearly two decades ago, growers have been putting the technology to work and reaping the benefits. The International Service for the Acquisition of Agri-Biotech Applications reports that biotech crops have decreased production costs and increased productivity valued at \$116.9 billion. It's no wonder more and more corn growers are choosing genetically engineered seeds. According to the U.S. Department of Agriculture (USDA), American growers planted 90 percent of their corn acres with genetically engineered hybrids last year, up from just 25 percent in 2000.

That relentless pace of adoption has made the U.S. the most efficient country in the world to grow corn. Everyone benefits from that efficiency: from producers, who can economically reduce production risks, to American consumers, who spend less than 10 percent of their disposable income on food, to exporters.

"It's capitalism at its best," says Chuck Lee, head of corn for Syngenta.

But those gains in efficiency are at risk because some countries that import a portion of U.S. harvests don't approve new biotech traits in the same time frame as most other nations where the technologies are grown or imported.

Asynchronous Approval

The first hurdle for approval comes in the country where a company develops the trait. In the U.S., for instance, the USDA must review and approve or deregulate a trait or biotech event. If the trait is insecticidal, the Environmental Protection Agency must approve it as well. Trait developers also voluntarily submit traits to the Food and Drug Administration (FDA) for its review. It's a lengthy, expensive process, but one that's also predictable and science-based. Companies like Syngenta know what information regulators expect and when agencies are likely to make a decision.



The next step is to seek approval in the countries that are most likely to import the harvested crops with the trait. That's where the process becomes complicated, explains Lisa Zannoni, global head of regulatory and stewardship for Syngenta.

"There is no harmonization on format or data requirements," Zannoni says. "Every country adheres to its own timelines."

Mexico, for example, will allow companies to begin the import approval process for a new product once the FDA approves a trait; but China won't begin its review until another country has granted cultivation approval.

Once the approval process begins, most countries have a predictable time frame for how long it will last. But in some countries, the clock stops when regulators ask questions and begins again when a company submits a response.

Not Just an American Problem

China's rejection of U.S. grain shipments said to contain the Agrisure Viptera® trait (MIR 162) this winter garnered a great deal of media attention. But the problems caused by the world's discordant approval processes affect all biotech companies and not just those in the U.S.

As companies increase their deployment of new biotech traits in Canada, Brazil and Argentina, these countries are also feeling the impacts of asynchronicity. Even China is beginning to consider what it means to be a production country as biotech rice nears commercialization.

The biotech industry and grower groups have been working to achieve review and approval harmonization for many years, but it was a lonely fight when the U.S. was virtually the only production country. Now that Brazil and Argentina have emerged as major production countries, the three leading corn-exporting countries are working together on market access and streamlining regulatory processes for biotechnology. MAIZALL, a strategic alliance formed by the U.S. Grains Council (USGC), the National Corn Growers Association (NCGA) and the leading corn producers' organizations in Argentina and Brazil, is an example of those efforts.

Right to Grow

Syngenta is hopeful that its participation with the USDA, other nations, producer organizations and other biotechnology companies will result in a streamlined global regulatory review process that has a predictable time frame and is based on science.

But progress comes slowly. Efforts to set a low-level presence threshold for genetically engineered traits that will enable importers to accept shipments containing a small amount of a not-yet approved product began nearly a decade ago. Countries haven't yet agreed on a globally accepted threshold.

"It's just not an easy process," Zannoni says. "Governments must answer to their own citizens while balancing trade with public acceptance of the technology." Still, she is optimistic that governments can resolve the issues, especially as the major production countries work together.

In the meantime, Syngenta is using an innovative approach to help U.S. growers market grain from the company's latest traited corn seed, Agrisure Duracade™, the cutting-edge corn rootworm (CRW) control tech-

nology that has been approved in the U.S. In February, Syngenta announced an agreement with Gavelon Grain, LLC, that provides grain marketing opportunities for farmers who choose to plant seed with the Agrisure Duracade trait. If a grower's usual grain marketing outlet will not accept Agrisure Duracade grain, Gavelon will accept that corn at market price, while

providing stewardship and distribution services for producers.

Many ag professionals have hailed the program as a model for how to make biotech traits available to U.S. farmers while protecting valuable export markets, at least until a more uniform review process is in place.

"We need a globally aligned review process to provide everyone in the value chain with the incentive to develop or plant the latest trait technologies," Lee says. "The risk of continuing on the current course is that the innovation needed to maximize the quality and yield of American crops will slow, and that could have a ripple effect on food security around the world." 🌱 STORY BY CINDY SNYDER

"We need a globally aligned review process to provide everyone in the value chain with the incentive to develop or plant the latest trait technologies."

—CHUCK LEE

FOR MORE INFORMATION, please consult these websites and resources:

- > Agrisure Duracade "Right to Grow" website, www.agrisureduracade.com, then click on **"Right to Grow"**
- > National Corn Growers Association's Know Before You Grow website, www.ncga.com/for-farmers/know-before-you-grow

Seeds of Success



A grower examines
NK soybean seeds.



Advanced germplasm and elite genetic traits help growers push yields higher and higher.

By Darcy Maulsby

What's confidence worth? It's priceless to Andy Swanson when he selects corn hybrids and soybean varieties to provide a foundation for maximum yield potential on his farm in North Bend, Nebraska.

"I like NK[®] corn and soybeans from Syngenta because they typically have better plant health and good consistency throughout the field," he says. "There's a lot of research that goes in before Syngenta releases a hybrid or variety. Having the research and science behind every bag of seed is important to us and is becoming even more important, as we try to squeeze every bushel out of an acre."

Of course, effectively controlling profit-robbing pests and diseases is an essential step on the road to higher yields. "One of the big challenges in my area is Goss's Wilt," says Cole Anderson, who farms near Beaver Crossing, Nebraska, and plants Golden Harvest[®] corn hybrids from Syngenta. "A lot of hybrids are susceptible, but Golden Harvest genetics are solid, so I don't have to worry."

Both Swanson and Anderson appreciate the diversity of Syngenta corn and soybean genetics. No one-size-fits-all system, the extensive Syngenta seed portfolio offers the depth to meet growers' specific needs. "Some growers are really interested in disease resistance, while stalk strength is important to others," says Anderson, who is also a Syngenta Seed Advisor. "When you have the flexibility of high-yielding genetics that contain a range of other crop-sustaining options, you can put together a whole-farm package no one in the industry can match."

Breakout Genetics

With crop genetics, diversity provides a foundation for exceptional yield. The challenge is to capitalize on the most useful genetics for specific environments. "You never know what the growing season will bring, so genetic diversity is vital," says Eric Boersma, head of corn seed product management at Syngenta.

Soil types, insect pressure, disease issues and growing conditions that vary from region to region and farm to farm also call for



Syngenta Representative Matt Dolch (left) and Syngenta Seed Advisor Cole Anderson in Beaver Crossing, Nebraska.

NK SOYBEAN MILESTONES

1969

The Northrup King (NK®) soybean research program begins with the hiring of John Thorne, Ph.D. Thorne establishes a soybean research site in Iowa.

1973

NK becomes the first private company (not a university) to sell a proprietary soybean variety.

1989

NK releases its S31-33 variety, the first soybean cyst nematode (SCN) resistant NK variety in the Midwest.

1992

NK grows its first genetically engineered soybeans.

1994

NK pilots Q-Bit®, the first plastic box bulk soybean container.

1996

Sandoz and Ciba merge to form Novartis, one of the largest corporate mergers in history.

1997

NK sells its first Roundup Ready® soybeans.

1999

NK introduces TruBulk®, a program that allows growers to pick up bulk soybean seed directly from participating local outlets.

2000

Novartis and AstraZeneca merge their agribusinesses to form Syngenta, the first global group focused exclusively on agribusiness.

2004

Syngenta acquires the Golden Harvest® and Garst® brands. Both companies begin selling NK soybeans.

2004

Thorne receives the Genetics & Plant Breeding Award for Industry from the National Council of Commercial Plant Breeders at the Crop Science Society of America annual meeting.

2009

NK 1 Class Soybeans become a new standard in soybean performance.

2013

NK grows its first Roundup Ready 2 Xtend™ soybean lines in multi-location trials across the Midwest.

2013

Syngenta launches the Yield Engineering System (Y.E.S.) Marker-Assisted Breeding innovation; data analytics accelerate NK product development and NK soybean yield gains.

2014

Syngenta sells an SCN management tool that complements SCN-resistant NK varieties—Clariva™ Complete Beans nematocide/insecticide/fungicide seed treatment, a combination of separately registered products.

seeds that are uniquely engineered. Syngenta accesses germplasm globally to produce genetics tailored to a variety of local growing conditions.

In corn, Syngenta researchers evaluate more than 1 million new genetic lines annually. By selecting top-performing hybrids, the company has developed genetics that have consistently closed the yield gap against competitors. These genetics, combined with exceptional traits from Syngenta, are part and parcel of the Syngenta corn brands Golden Harvest and NK.

“Crop genetics are like a football team,” says Dan Dyer, Ph.D., head of seed product development at Syngenta. “You need a mix of 400-pound linemen and 180-pound wide receivers. This depth offers lots of options for success, just like the Syngenta germplasm pool.”

Options are critical because growers only have about 40 growing seasons during their farming careers to integrate the right technology to maximize yields, Dyer says. “While it can take a lifetime to reach this goal individually, Syngenta is integrating solutions to deliver proven results faster.”

Say Y.E.S. to Higher Yields

Syngenta is achieving this goal through its innovative Yield Engineering System (Y.E.S.). “Y.E.S. shaves years off the process of bringing new corn and soybean genetics to market,” says Dyer, who notes that Syngenta applies the highest level of science to its plant breeding and trait conversion processes.

Researchers use state-of-the-art molecular marker technology to create corn hybrids and soybean varieties with high genetic yield potential. “Markers are like ‘signposts’ on the genetic highway,” says Doug Tigges, soybean genetics product manager at Syngenta.

Genetic markers help identify agronomic traits that growers want, such as tolerance to drought, gray leaf spot and iron deficiency chlorosis (IDC), as well as protection against soybean cyst nematode (SCN) and sudden death syndrome (SDS). “Molecular marker technology takes a lot of the guesswork out of plant breeding, while our accelerated trait conversion helps speed up the development cycle to get products to market faster,” Tigges notes.

This is appealing to Matt Rausch, who farms near Winamac, Indiana. “My top considerations when choosing corn hybrids are

yield, along with drought and stress tolerance,” says Rausch, who has planted Golden Harvest corn for six years. “I’ve found that yields and dry-down are better with Syngenta corn genetics.”

Nathan Baker, a grower from Waldron, Michigan, also sees a competitive advantage when it comes to NK soybeans. “We haven’t used any competitor brands for a few years now,” says Baker, who grows 3,700 acres of corn, soybeans and wheat with his father and uncle. “Anytime we have had side-by-side beans with competitive brands, the NK beans always yield better and outperform everything else around here.”

Innovations in Corn

In the past five years, Syngenta has launched more traits and technologies than any of its competitors, Boersma says. These industry-leading innovations in corn include:

- > **Agrisure Artesian® hybrids:** Artesian™ corn hybrids convert water to grain more effectively than other hybrids to maximize yield when it rains and increase yield when it doesn’t.
- > **Agrisure Duracade™ trait:** This powerful trait features a brand-new mode of action and delivers unmatched corn rootworm control. “Rootworms are a big issue in my area, especially with corn-on-corn acres,” Rausch says. “Syngenta trait packages can help a lot.”
- > **Agrisure Viptera® trait:** Second-to-none in terms of efficiency against the multi-pest complex, Agrisure Viptera trait stacks offer unsurpassed control of a broad spectrum of above-ground lepidopteran pests, including corn earworm, black cutworm, fall armyworm and western bean cutworm.
- > **Enogen® trait technology:** This is the first genetically modified output trait in corn, engineered specifically to enhance the productivity and efficiency of dry-grind ethanol production.

“Syngenta offers some of the best traits in the industry,” Anderson says. “It’s really exciting to talk to growers about all the options that are available.”

Agrisure® traits are available in the Syngenta corn brands—Golden Harvest and NK. Enogen corn is available through Syngenta Seed Advisors and NK retailers in areas where it is being contracted for use in ethanol plants.

Proven Soybean Performers

In addition to corn, Syngenta offers one of the industry’s largest, most advanced germplasm pools in soybeans. Thanks to a rich 45-year history of soybean breeding at Syngenta and its legacy companies, products in the NK soybean portfolio deliver outstanding disease-tolerance and high-yield potential.

“The start of a good soybean crop is elite genetics,” says Tigges. “NK soybeans integrate the latest genetics and traits to help growers break the yield barrier.”

New NK products introduced for the 2014–2015 season have proven to out-yield the market leader by at least 3 bushels per



“Anytime we have had side-by-side beans with competitive brands, the NK beans always yield better and outperform everything else around here.”

—NATHAN BAKER

Syngenta Representative Megan Moll and grower Nathan Baker review information on a touchscreen tablet.

acre in maturity groups 00 through 5, based on 2013 Syngenta research trials. In addition, NK soybean genetics provide strong protection against SDS and increased tolerance to IDC.

NK soybeans also offer the traits growers need most today, including Genuity® Roundup Ready 2 Yield® and SCN-resistant varieties treated with Clariva™ Complete Beans seed treatment, a combination of separately registered products that provide season-long defense against SCN as well as early-season insect and disease protection. This is important to Rausch, who farms in a high-SCN-pressure area and plants NK soybeans. “All my soybeans this year include Clariva,” he says. “I also go with NK because we’ve had some really good yields—up to 70 and 80 bushels per acre—with them.”

Once deregulated, Syngenta will enhance the lineup with products that include Roundup Ready 2 Xtend™, a next-generation technology that offers glyphosate and dicamba tolerance.

The company remains focused on finding new NK soybean seed solutions to fit growers’ changing needs, says Scott Erickson, head of soybean seed product management at Syngenta. “The NK brand maintains a long history of excellent performance. We will carry on this tradition by delivering high-performing soybeans with superior agronomic traits to maximize yield potential.”

As environmental and growing conditions evolve, the need for efficient, sustainable corn hybrids and soybean varieties—combined with local expertise—becomes more important than ever. Boersma encourages retailers, dealers and growers to put Syngenta genetics to the test. “Give them a try, and let the results speak for themselves.”

WATER₂CORN

Integrated, targeted solutions are helping growers convert water to grain more effectively.

By Karyn Ostrom



When David Elser thinks back to his childhood visits to an Iowa county fair, what he remembers most vividly isn't the rides, the food or the livestock. What he recalls instead are intense public discussions on corn yields and angst about rainfall—something that likely resonates with most growers, particularly those in the Corn Belt.

Formerly head of water optimization at Syngenta, Elser often recounts this story when speaking with researchers and colleagues about the importance of providing growers with tools to address the age-old irony of agriculture—that the most critical input in growing a successful crop is also the most variable and unpredictable.

“There’s a reason why so many growers say a successful crop is dependent on Mother Nature—because it’s all about water,” says Elser, who is now head of U.S. corn and soybean seeds customer operations. “As an industry, it’s up to us to provide growers with technologies and solutions that can help them make the most of the water they have.”

The Landscape for Water Optimization

The need for water optimization, which Syngenta defines as the conversion of more of the available water to grain, has never been more pressing. Findings from a recent Syngenta global research report confirm the public’s belief that producing more food for a growing population will be an important

challenge in the next decade. But when asked to assess the role of water, respondents were stumped. The consensus that agriculture will require more water was accompanied by a recognition that an increase in water use will lead to greater water scarcity.

This reality—that water is the greatest limiting factor in the world’s ability to feed a growing population—is what motivates members of the Syngenta water optimization team as they develop solu-

tions to help growers convert water to grain more effectively. From technical research projects to commercial programs that encompass irrigated and non-irrigated platforms, the team focuses on several initiatives.

“We can meet the 21st century water challenge,” Elser says. “But technology acceptance and integration are crucial. Our commitment to water optimization is bolstered by research, technical depth and a robust portfolio of water-optimized inputs and solutions.”

“Water is the common denominator on any farm—from the irrigated fields in the western Corn Belt to the rain-fed soils in the East. No acre is exempt.”

—SYLVIO PETTO



Water Optimization Realized

As the current head of water optimization at Syngenta, Chris Tingle spends a lot of time thinking about water, which, he points out, is something growers think about every day. But more specifically, Tingle’s efforts focus on growing more corn with less water, which has become a reality on more than 40,000 acres of irrigated cornfields across the Corn Belt, thanks to Water™ Intelligent Irrigation Platform. This integrated solution brings together market-leading agronomic products, irrigation technologies, and services from Syngenta and Lindsay Corporation, a leading provider of irrigation systems.

“At the most basic level, when we talk about ways corn growers can optimize water to maximize yield in both irrigated and non-irrigated settings, we focus on planting the best hybrids, controlling weeds early in the season and protecting the plant from disease and harsh environments,” Tingle says. “There are several flagship water-optimization technologies within the Syngenta corn portfolio that growers have come to recognize as game changers.”

These technologies include Agrisure Artesian® corn hybrids, which contain scientifically selected genes to offer season-long drought protection; Quilt Xcel® fungicide, which improves the plant’s water-use efficiency by reducing water loss; and Lexar® EZ and Lumax® EZ pre-emergent residual herbicides, which eliminate weeds that compete with plants for water and nutrients.

Growers who participate in Water™ Intelligent Irrigation Platform benefit from the support and strategic counsel of a service team that advises them on crop inputs and management practices, Tingle explains. Participating growers also gain access to FieldNET® by Lindsay wireless irrigation management, allowing for real-time remote control and monitoring of their pivots.

With FieldNET, growers stay informed about their crop irrigation, and have more information about and greater control over their operations, while spending less time in the field.

Optimizing Water in Any Environment

Growers in any production environment can benefit from water optimization. Its benefits extend far beyond the

Water™ Intelligent Irrigation Platform delivered improved yield with 25 percent less water use than in comparable programs.



high-yield irrigated corn acres for which Water® Intelligent Irrigation Platform is designed, says Sylvio Petto, business development manager for corn and soybean crops at Syngenta.

“Water is the common denominator on any farm—from the irrigated fields in the western Corn Belt to the rain-fed soils in the East,” Petto says. “No acre is exempt.”

Rick Johnson, a Syngenta Seed Advisor and grower from northeast Illinois, shares Petto’s sentiment. It was Johnson’s experience with Artesian™ hybrids that changed his perspective on what water optimization means for his farm. What he found in Artesian was a hybrid that helped him manage the variable soils that constitute much of his cropland by optimizing the available moisture.

“One of the most striking differences we saw when comparing the Artesian corn hybrids with the non-Artesian hybrids was that even in the heat of the day, when there wasn’t a lot of moisture to support plant growth, the leaves of the Artesian hybrid were staying open, and the plant was still working,” Johnson says. “In other hybrids, the leaves were rolling, and you could see that the plants were starting to give up. That visual difference was an indication to us that the plant stayed healthier longer into the season.”

At the end of the 2013 season, as Johnson suspected, the differences between his Artesian and non-Artesian plants were more than visual; his yield report showed an advantage of 30 bushels per acre for his Artesian hybrids. In his most stressed areas, he noticed as much as a 60-bushel advantage.

“It’s rare that we see a year where there’s not some drought stress in some part of the major growing region,” Johnson says. “Artesian hybrids are really going to allow all growers across the country to benefit.”

The Syngenta Commitment

Later this year, after all of the corn has been harvested and the 2014 season comes to an end, growers will still be talking about the weather—perhaps estimating the number of bushels that might have been added to their yields had it not been for “that one dry spell” or evaluating what they might do differently in 2015. Such discussions resonate throughout the coffee shops and co-ops of farming communities, says Elser.

“For growers, water will always be top-of-mind,” he says. “But the landscape and dialogue are changing. Growers have never had so many tools or resources to help them optimize water.” 🌱

Water’s Worth

Fred Below, Ph.D., a professor of crop physiology in the department of crop sciences at the University of Illinois, has devoted much of his career researching the various factors that limit crop productivity. On his website Seven Wonders of the Corn Yield World, Below ranks weather as the No. 1 factor affecting corn yields. All seven factors and the reasons they made Below’s list are described below:



Weather: Below’s research indicates that weather is the most important factor in achieving high-yielding corn, and it interacts with each of the other yield wonders.

7
N
Nitrogen
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Nitrogen: This is the biggest factor under the grower’s control that impacts corn yields, but one that weather heavily influences, Below notes.



Hybrid selection: Advances in biotechnology have resulted in significant differences in yields among hybrids, Below notes, so selecting the right one is critical.



Previous crop: Continuous cropping of corn costs yield, Below says. On fields where growers rotate corn with soybeans, plants have better vigor and produce higher yields.



Plant population: Higher yields come from higher plant populations. Below recommends narrower rows where growers can increase plant populations without decreasing the in-row plant spacing.



Tillage: Reduced tillage saves soil and helps retain moisture and nutrients that plants need to yield better.



Growth regulators: Below defines growth regulators as any compound that positively impacts plant growth. For example, he recommends protecting plants against foliar disease with a strobilurin fungicide. The results include greener leaves, healthier plants and improved yield performance.

“Of all these factors affecting crop yield, it’s ironic that the most important one is also the most uncontrollable, unpredictable and unmanageable,” Below says. Fortunately, integrated water-optimization technologies and strategies are helping growers overcome a lot of the uncertainty around weather—at least when it comes to rainfall or lack thereof.



Managing WITH Metrics

A program that measures costs and captures other key farm data helps growers build more productive, profitable operations.

By Darcie Borden

They say you can only manage what you can measure. Growers have never been afraid of technology, and they're managing their farms better because of the metrics they capture through field data. As technology continues to improve, so do their farms' productivity and profitability.

The Syngenta AgriEdge Excelsior® program gives growers a way to manage their farm operations more efficiently. One of the program's most popular components is its data and record-keeping software called Land-db™, which helps growers measure the costs of everything they do.

"Making sure you don't overspend has always been, and always will be, the main issue for farming," says Pace Hindsley, who operates Coffee Creek Farms in Marvel, Arkansas. "This program helps to control and watch what you spend on each crop."

The software, developed by Ag Connections, captures information associated with a farm, including yield, timing of sprays and compliance reporting, as well as input costs and return on investment. Then it tracks, measures and examines each acre to see if it's profitable—or not. The newest version is cloud-based and can run offline or online across multiple devices.

Pete Clark and Rick Murdock, co-owners of Ag Connections, worked previously as retailers. They both know the industry and what drives the farming business. "We are putting tools in the hands of growers, so that they can track their inventory, revenue and yield," says Murdock.



Photos: (left to right) Moss Farms agronomist Jason Cook says the AgriEdge Excelsior program is helping him operate more efficiently; AgriEdge specialist Jared Fannon (left) provides on-farm support to grower Pace Hindsley about using the software technology available through the AgriEdge Excelsior program.

Safe and Secure

Extensive data gives growers the opportunity to measure their performance so they can make better farm management decisions; but, understandably, they are concerned about privacy and security. Syngenta has implemented several safeguards to help ensure privacy, including housing data through a third party and implementing contracts.

“The control has always been in the grower’s hands,” says Jack Schuyler, Syngenta sustainable sourcing lead. “The AgriEdge Excelsior program incorporates a contractual agreement around grower data usage, security and confidentiality, whereby Syngenta only sees the data if the grower gives permission.”

The Ag Connections Data and Privacy Policy complements and reinforces its trusted relationship with growers, notes Murdock. As a result, four simple principles guide the policy:

- > **Grower data is the property of the grower.**
- > **Ag Connections only uses the data to support the grower and as authorized by the grower.**
- > **Ag Connections only shares grower data as requested or authorized by the grower.**
- > **Ag Connections does not analyze, aggregate or data mine grower data unless requested or authorized by the grower.**

The Syngenta AgriEdge specialists provide a different, but important, kind of security for growers—comfort in knowing that the specialist assigned to them will personally come to their farms to help them learn and navigate the software technology. The specialists have a full understanding of the entire AgriEdge Excelsior program, which encompasses the product portfolio, the technology and optional risk management. Also, Ag Connections has support personnel who are available via phone or Web to address any questions or concerns about the Land.db software.

A Win-Win for Retailers

Whole-farm management, the cornerstone of AgriEdge Excelsior, relies on collaboration with a grower’s business partners. “We have a solid working relationship with Syngenta,” says Steve Seamon, national marketing manager for Helena Chemical Company in Memphis, Tennessee. “The AgriEdge Excelsior program has enhanced that relationship even more, and it’s enhanced our collaborative relationship with the grower. It’s a win-win.”

Seamon says that while it took time on the front end to work through the program’s logistics, it has proven to be well worth the effort. “There’s a lot of work that goes into the program, a lot of moving pieces,” he says. “But the goal is simple: Build the relationship with our growers together and provide better solutions for them. The end result builds a better business for everyone.”

The Good Growth Plan

Syngenta has developed The Good Growth Plan to bolster its commitment to sustainability and address the critical challenges the world faces in feeding a growing population. The plan outlines six core commitments that focus on the principles of more food, less waste; more biodiversity, less degradation; and more health, less poverty. They are as follows:

Make crops more efficient by growing more with fewer resources
Rescue farmland | Help biodiversity flourish | Empower smallholders
Train farm workers on safety | Strive for fair farm labor conditions

“The Good Growth Plan builds on what, we, as a company and an industry, are already doing to fulfill these commitments,” says Jill Wheeler, head of sustainable productivity at Syngenta. “To make an even deeper, more meaningful impact, Syngenta understands that we cannot act alone. We must forge lasting partnerships with stakeholders from across the world who share our mission to create a better tomorrow through agriculture.”

For more information on The Good Growth Plan, go to www.goodgrowthplan.com.



Grower Scott Smith uses a touchscreen tablet to input data from his farm.

Sustainability by the Numbers

“Sustainability is an integral part of farmers’ businesses,” says Jennifer Shaw, Ph.D., head of sustainable sourcing solutions at Syngenta. “Their livelihoods and the long-term productivity of their land, which they hope to pass on to the next generation, depend on stewardship of water, soil and air.”

Syngenta shares this commitment and is tapping into its AgriEdge Excelsior® program to make on-farm sustainability efforts measurable. The program uses the Land.db™ software platform to serve as the foundation for several sustainable sourcing initiatives. Partnering with Field to Market®, The Alliance for Sustainable Agriculture, Syngenta is helping growers map out ways to measure and improve a farm’s overall environmental footprint.

Piloting a Better Approach

In the sustainable sourcing initiatives, Syngenta uses critical measures, such as land use, water, soil and greenhouse-gas emissions, to establish baseline environmental footprints. This process builds a foundation for changes in practices associated with tillage, irrigation, harvesting and crop inputs that can lessen that footprint over time. “The greatest challenge that growers and the people who purchase their crops face today is collecting, securing and analyzing the farm data needed to benchmark current performance and identify strategies for significant improvement,” says Shaw.

Jason Cook of Rupert, Idaho, participated in a sustainable sourcing initiative and says it opened his eyes to a better way of fulfilling his duties as farm agronomist for Moss Farms. “From a sustainability standpoint, the AgriEdge Excelsior program has really changed the picture for us on Moss Farms,” he says. “It helps us identify our strengths and weaknesses on an energy consumption basis and recognize our more profitable areas. On the reporting side of sustainability, I believe there will be major benefits from being able to show customers that we are working toward a more efficient, sustainable type of operation.”

“I believe there will be major benefits from being able to show customers that we are working toward a more efficient, sustainable type of operation.”

— JASON COOK

Meeting Market Demands

AgriEdge Excelsior helps farmers grow more with fewer resources, which helps the planet. But it also helps growers better market their crops to companies like General Mills, Pepsi and McDonald’s, which are under increasing pressure to minimize their environmental impact. “Growers are able to secure access to important markets,” says Shaw. “Through AgriEdge Excelsior and the Land.db farm-management software, growers can provide

their downstream buyers with what they need to meet the demand for sustainability from the broader marketplace.”

AgriEdge Manager Reagan DeSpain is already seeing increased pressure on growers to provide evidence that the food they are bringing to the table is produced sustainably. “Companies are demanding the sustainability benchmark, so they’re going to put more pressure on growers to show that they’re sustainable and compliant,” he says. “People are going to question where the food is coming from and where it was processed.

It’s going to get stricter in the vegetable markets particularly. That’s where we’re seeing it now.”

Growers are becoming more aware of this reality. “The end user wants to see that we produced a healthy crop,” says Brad Macauley, who operates Merrimac Farms in Groveland, New York. “The closer we are to the end user, the better we can maintain those relationships, and AgriEdge helps us to do that.”

Scott Smith agrees. He has been using the AgriEdge Excelsior program and Land.db software at Triple S Smith Farms in Windfall, Indiana, for the past several years, and it helps him keep a strong relationship with his buyers. “It starts with the farmer,” he says. “We’re going to be held more accountable down the road. I’m already held accountable by my buyers. One of these days, we’ll wake up, and this will be required, so I want to already be there.”

Optimizing the Digital Farm

The right combination of technology and expertise improves the accuracy of on-farm management decisions.

Q. What is digital farming?

A. Aaron Deardorff, digital farm manager, Syngenta: Digital farming is a combination of digital technology assets—data collection, data storage and management, analytics, and decision modeling—that work together to unlock farming's potential. Of course, the retail channel is no stranger to digital farming. Some of our key retail customers have advanced their original investment in precision agriculture to include analytics, decision modeling and sales-aid tools. A recent study by Purdue University reveals that these types of investments will continue, with a heavy focus on variable-rate seeding recommendations and further automation.

Q. Why is Syngenta participating in digital farming?

A. At Syngenta, we believe digital farming empowers solutions designed to simplify the complexities of 21st century farming.

We want to help growers make better decisions that will lead to optimal operations and productivity improvements. By building on our current offerings and integrating technologies, we will bring a solution to the industry that will help realize a farm's potential by placing data insight, information and intelligence at a grower's fingertips.

To achieve this goal, we are focused on creating an integrated digital environment that provides value to our industry partners through essential information, tools and processes. We feel this is best accomplished through a collaborative approach, utilizing the channel's and digital companies' core competencies along with our vast agronomic knowledge to turn data into insights and actionable decisions.

Q. What is Syngenta offering in the digital farming space?

A. Digital farming is not new to Syngenta. Since 2001, we've collaborated with our strategic partner Ag Connections to provide the farm data-management software that powers our AgriEdge Excelsior® program. This whole-farm program offers industry-leading farm management software, risk management, a broad service model and access to our vast portfolio. It's also the foundation for our targeted sustainable sourcing initiatives. (See "Managing With Metrics," page 18.)

In recent years, we've developed Water⁺™ Intelligent Irrigation Platform. It's a comprehensive irrigated corn production system that integrates our agronomic portfolio and expertise with irrigation technologies from our partner Lindsay Corporation. (See "Water₂Corn," page 14.)

Digital farming is also an integral part of our Enogen® trait technology, the first genetically modified output trait in corn engineered specifically to enhance the productivity and efficiency of dry-grind ethanol production. Enogen360™ grain contracting system helps growers manage their contracts and stewardship obligations quickly and efficiently. This encrypted system is secure, straightforward and easy-to-use and allows Enogen growers to coordinate and track the status of their Enogen contracts with their local ethanol plants, Enogen dealers and Syngenta.

Finally, FarmAssist® (www.farmassist.com) is a Syngenta Web service that provides weather information, including growing-degree-day calculations; commodity updates; market commentary; product information, such as labels, pest targets and material safety data sheets; crop information; and agricultural news.



Future developments will encompass deeper analytics, decision modeling and a user interface that digitizes the agronomic sales process.

Q. What are the benefits of digital farming to growers and industry partners?

A. For the grower specifically, there's timely critical knowledge, reduced complexity, improved environmental stewardship and actionable decision-making to enhance overall farm productivity. For retailers, benefits include agronomic empowerment, field marketing and connectivity, all of which enhance their service and sales models. Other advantages of the Syngenta digital farming offer include:

- > **Collaboration:** Partners, such as Lindsay and Ag Connections, bring core competencies that empower Syngenta solutions and our channel partners' efforts in this space.
- > **Whole-farm management:** The technology and analytics provided through the AgriEdge Excelsior program allow growers to manage their entire farming operations, calculate return on investment and analyze nearly every aspect of their business to maximize profitability.
- > **Sustainable sourcing:** Growers are using AgriEdge Excelsior as a foundation for data collection. Analyses of the data through metrics from Field to Market®. The Alliance for Sustainable Agriculture provide growers with sustainability indicators on a field-by-field basis. This information allows growers to make actionable decisions that meet the sustainable sourcing needs of the people who purchase their crops and that safeguard their businesses for future generations.

“Our ultimate goal is to help growers receive more value on the acre and a greater return on investment.”

—AARON DEARDORFF

Q. Should users be concerned about data privacy issues?

A. Users should be knowledgeable about who has access to their data, where their data is going from both a storage and security standpoint, and how it is being utilized. Syngenta makes sure these questions are at the forefront of our conversations by incorporating a contractual agreement around grower data usage, security and confidentiality. We also have a public Syngenta pledge that outlines the culture we set with data privacy.

Q. What future advancements from Syngenta can users look forward to experiencing?

A. Our ultimate goal is to help growers receive more value on the acre and a greater return on investment. To this end, we are continually searching for partners who empower our digital farming efforts and ultimately provide value to our

customers. Internally, we are working to further enable and enhance our agronomic advice through data capture as well as analytics and modeling technologies by collaborating with select vendors and linking these core competencies to our industry partners' digital farming systems. We also will continue to play an active role in AgGateway, a nonprofit consortium made up of agricultural retailers, basic manufacturers and precision-ag companies.

These are exciting times in agriculture as our industry continues to embrace technological advancements. Our Syngenta digital farming vision is focused on turning data and information into actionable decisions for our retailer and grower customers, all the while ensuring their confidentiality. 🌱

INTERVIEW BY SUSAN FISHER



AARON DEARDORFF
Digital Farm Manager
Syngenta



Power Plots

Well-organized seed plots can help growers select the most profitable hybrids and varieties for their farms.

To end up with a healthy, productive crop, you have to start with the right seeds; and while researchers work to continuously create new seed hybrids, growers continue to ask the same question: How will they perform on my farm? Nothing answers that question better than a seed plot.

Even so, growers recently are planting their own seed plots less and less frequently, says Doug Kirkbride, Syngenta field product specialist. A seed plot takes time, and they get trickier to manage as farm equipment gets larger. “Over the last few years, there’s an increased reliance on third-party data,” he says. That creates an opportunity for retailers to plant their own seed plots and make the results available to their customers. But no matter who is growing the plot, there are some best practices to keep in mind:

Before Planting

> **Begin with the end in mind.** “Ask yourself what you want to observe: Yield differences? Disease resistance differences? Seed treatment differences? Then build your trial around that,”

Kirkbride says. “Often we try to do too many things in one trial. Yes, you can do several things in one trial, but you have to keep the data separate.”

- > **Focus on uniformity.** “Some fields have small areas with variable conditions,” says Duane LeFord, Syngenta field science expert. “Then the plants don’t get the same treatment. There are some micro-environment issues like that; the one that comes up most frequently is a saturated part of the field, but small areas of lighter soil can also impact data uniformity.” Make sure crop rotation, tillage and pesticide/fertilizer application are also all the same. Uniformity creates confidence in trial results, and confidence is what allows you to predict future performance accurately.
- > **Keep it focused.** “I’ve seen trials with four entries and 40 entries—but that’s on the high side,” Kirkbride says. “Statistically, you can’t just try to compare entry #1 to entry #40.” He recommends breaking large trials into subgroups of about 10 each in your data, based on such factors as plant height or plant maturity.
- > **Make a written plan.** “When you have a protocol on paper rather than from memory, you’re more likely to execute it well,” says Mark Hamilton, Syngenta scientist. “Having the plan before rolling the planter out of the shed is an important detail to work out at your desk.”
- > **Plant at least four rows of each hybrid.** “Six or eight is even better,” says Chris Cook, Syngenta head of technical training and resources. “There’s an edge effect.”

During the Season

- > **Keep a plot journal.** “Especially when you have multiple people involved, it’s good to schedule a farm meeting after planting the plot and write down what happened,” Kirkbride says.
- > **Write down observations during the season.** “How is the plant standing? Did it stay intact? How was the early vigor? It’s not just about yield, but harvestability,” Cook says. Go back throughout the year to get more information.
- > **Note entry differences and discuss them.** “Become an objective observer,” Hamilton says. “Then communicate those product observations to your dealer, your agronomist, your neighbors.” Multiyear evaluations are another way to increase the power of the data.

After Harvest

- > **When analyzing data, match up in-season notes with yield to help explain some agronomic effects.** “Don’t ignore your in-season notes and go directly to a yield sort.” Hamilton says. “Try sorting by increasing maturity or plant population or weed/insect pressure (or lack of); every entry order sort may reveal hidden trends.”
- > **Be mindful of making like comparisons.** “It’s not fair to compare insect-resistant hybrids to non-insect-resistant hybrids,” Cook says. “They’re different technologies.” Also make sure you are comparing similar maturity products.
- > **Fill out trial planting forms as completely and as soon as possible.** “Any kind of notes and as much information as you can enter are helpful,” Cook says. “This exercise provides more ways to cut up that data.”
- > **Get help with data analysis.** Knowing what differences are statistically significant requires some calculation. The iYield system, which is an internal Syngenta program that summarizes plot results, can help. “Retailers and growers can contact their local Syngenta representative and get reports from the iYield system, with statistically significant differences bolded and underlined,” Kirkbride says. “Or they can submit raw data from their own trials to the iYield database for calculation.”

Even with interpreted data in hand, individual growers will look at results differently. “Some just care about yield; others want corn that stands like a tree so they can run the combine quickly and get every kernel,” Cook says. To help growers make selections, retailers should ask questions and find out what they’re looking for.

Whatever the grower’s ultimate need, Syngenta will probably be able to provide it. “We have the broadest profile, with herbicides, insecticides, fungicides and genetics all included in the mix,” Cook says. “That adds another dimension to seed trials and some of the neat stuff we can help decipher from them. We can actually answer the question, ‘What does it really take to grow a crop?’ It’s not just, ‘Here’s the seed—good luck.’”

STORY BY SUZANNE BOPP

RESISTANCE FIGHTER

OF THE YEAR

LEADERSHIP PROGRAM

Are you passionate about helping growers fight resistance?

Do you want an opportunity to learn, travel, interact with industry leaders and enrich your career?

Visit www.resistancefighter.com to learn more about the program and apply. Accepting applications through September 15, 2014.

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Ripple Effect

Two calls for entries, a new wheat blog, the Syngenta Breeders Academy and other educational offerings empower ag professionals.

AWARDS, GRANTS AND COMMUNITY

> Call for Seed Grant Applications

Syngenta is now accepting applications for its second annual Grow More Vegetables Seed Grant Program, which helps schools and community organizations establish or enhance garden programs. The aim of the program is to create hands-on educational opportunities that demonstrate the benefits of growing and consuming fresh vegetables.

Grant recipients will receive garden packages that include vegetable seed, supplies and a monetary award. Syngenta will select one recipient in each of the following categories:

- > **Elementary and middle schools**
- > **High schools and FFA chapters**
- > **Community groups and organizations**

"In its first year alone, the Grow More Vegetables Grant Program received more than 200 applications, showing just how passionate schools and community organizations are about their gardens," says Mary Streett DeMers, Syngenta vegetables communications lead. "We learned about some wonderfully innovative ways that communities are being educated on the benefits of fresh vegetable production and consumption. We can't wait to see what's in store this year."

Applications for 2014 grants are being accepted through midnight Sept. 15. To apply or learn more about the program, visit www.vegetables.syngenta-us.com.





>> **Voices 4 Wheat Shares Growers' Insights**

Syngenta introduces Voices 4 Wheat, a blog that features the experiences of four wheat experts from different areas throughout the 2014 growing season. Formerly known as Voices Across the Plains, the website shares each blogger's unique story through photos, videos and written posts. Check out www.voices4wheat.com and join retailer Daryl Wacker with Ag Services, Inc., in Kansas, as well as growers Mike Miller in Washington, Danny Schnitker in Illinois, and Mark and Jenny Rohrich in North Dakota, as they provide updates about the latest wheat news of the season.



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Soft winter wheat reaches the mature harvest stage in late spring in eastern Arkansas.

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EDUCATION

➤ Breeding Success

Syngenta promotes a team approach to plant breeding through educational opportunities, such as the Syngenta Breeding Academy.

Plant breeding is currently undergoing rapid developments in genomics, analytics and other technologies. As a result, in addition to plant breeders, breeding programs need molecular biologists, computer scientists and numerous other specialists working together to bring advanced genetics and integrated crop solutions to market.

“Breeding is becoming more of a team sport,” says Heather Merk, program lead for the Syngenta Breeding Academy. The better the training of each team member and the smoother the teamwork, the more likely the team will be productive, she explains.

The Syngenta Breeding Academy is the first-of-its-kind global learning initiative designed to enable the continued development of scientists at Syngenta and beyond. “In addition to building stronger individual and team capabilities, one of our goals is to help create a broader understanding of why breeding is important to our company and the world as a whole,” Merk says. “The Academy also shows Syngenta employees the value of crossing disciplines and functional collaboration in the development of innovative products that benefit growers.”

Syngenta also is working with leading universities to help prepare students for careers in plant breeding and related

disciplines. For example, it sends participants (and pays their registration fees) to the University of Nebraska–Lincoln’s (UNL) Plant Breeding for Non-Breeders course. “This program educates participants,” says Keenan Amundsen, Ph.D., assistant professor in UNL’s Agronomy & Horticulture Department. “The added knowledge helps develop a better understanding of how to answer questions like ‘Why is my seed so expensive? Why do we use GMOs? Why do breeders introduce genetic diversity if we want uniformity in our crops?’ and so on.” UNL delivers the 10-week course online to accommodate students in different time zones around the world. These and other university courses are also becoming a core component of the “curriculum” available to Syngenta Breeding Academy participants.

North Carolina State University’s (NCSU) Plant Breeding Symposium also receives funding from Syngenta. NCSU students in the Plant Breeding Club learn leadership skills through the planning and implementation of this biennial symposium, says Charles Stuber, Ph.D., the club’s advisor and director of the NCSU Plant Breeding Center. The program provides opportunities for plant breeding faculty, commercial plant breeders and students to network with their peers and symposium speakers, which can help further their careers.

Merk also serves on the Education Committee of the National Association of Plant Breeders. The Committee’s goal is “to develop strategies promoting and enhancing plant breeding education and training opportunities and experiences, fostering future workforce development for public and private global plant breeding, and securing sustained, long-term funds supporting plant breeder development through mentoring.”

All of these activities foster team spirit and leadership in the evolving world of plant breeding—and help bring innovations to the world’s growers. 🌱 STORY BY LYNN GROOMS

“The added knowledge helps develop a better understanding of how to answer questions like ‘Why is my seed so expensive? Why do we use GMOs? Why do breeders introduce genetic diversity if we want uniformity in our crops?’”

—KEENAN AMUNDSEN



The success of the Syngenta Breeding Academy relies heavily on teamwork from key players, including (from left to right) Heather Merk, Sarah Cady and Ray Riley.

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