GMOs Turn 20

Monsanto's Robert Fraley — who helped develop GMOs — emphasizes the technology's safety and importance to the planet's future.

*by **Kindra Gordon,** field editor*

2016 marks the 20th anniversary of crops developed with genetically modified organisms (GMOs) being introduced in the marketplace. Back in 1996, Monsanto introduced the first Roundup Ready® corn and soybeans to American farmers.

At that time, Robert Fraley was a 40-something Monsanto researcher who had been with the company since 1981 and had an integral role in developing those GMO crops. Today, he is executive vice president and chief technology officer at Monsanto Co., and he continues to champion the important role GMOs have — and will continue to have — in feeding the world. Currently, there are 30 countries growing GMO crops on more than 450 million acres, which is about a quarter of the world's farmland.

At the Cattlemen's College® hosted Jan. 27, 2016, in conjunction with the Cattle Industry Convention & Trade Show in San Diego, Calif., Fraley gave insight into why he believes his technology is so important to the world, as well as the continuing efforts by Monsanto to bring improved products to agriculture and bridge the communication gap with consumers.

Global challenge

Top of mind for Fraley is the expanding world population, which is projected to grow from 7.3 billion today to 10 billion in 2050.

"That seems like a long time away, but it's only 34 years," Fraley says. "Between now and 2050, we need to produce more food than we have in the entire history of the world."

Fraley notes that addressing this challenge is paramount for "our kids and grandkids and the world we leave them in terms of food security and the environment."

Additionally, he points out the fact that food production will need to be achieved in a world with decreasing water availability, challenging weather conditions, and tighter government regulations. Plus, he notes that beef production can't increase without increases in crop production to supply the feed. As an example, in 2015, 2 billion bushels (bu.) of corn were produced, but by 2050, 2.8 billion bu. of corn will be needed to raise enough beef to meet the world's growing food demands.

In spite of challenges ahead, Fraley says, "I absolutely believe we have the tools and technologies to address those challenges and meet the global food demand."

Specifically, Fraley believes science is leading to new opportunities for ag production. He credits two important scientific advancements, including:

- advances in biology and the ability to sequence genes in crops, livestock and humans; and
- advances in data sciences of farm production practices.

Fraley says, "These tools are coming together to change farming and, I think, improve it. … Genetic sequencing allows for using that information to design new medicines and better crops and better food. Precision data helps farmers produce more — and more precisely — and in a way that can enhance the environment."

To give an example of the progress that has been made with scientific advancements, Fraley shares that Monsanto spends more than $1.5 billion annually on research and development, with half of that budget focused on plant breeding.

"Breeding has changed enormously in both plants and animals," he says. "The reason it's changed is we have technological tools and capabilities to understand every single gene. We can create unique traits with higher yield potential, higher disease resistance, and the ability to resist drought and stress. In 1970 the average corn yield was about 75 bushels per acre; today it's about 170 bushels per acre. That's been achieved through breeding and technology."

To this he adds, "As good as food production is today, to fulfill food security by 2050 we need to continue to make more improvements in yield using technology."

He also emphasizes that cooperation among universities and companies will be essential.

"All of us collectively must work together in a system to address key challenges and the tools available," Fraley says.

Genetic progress

From a historical perspective, Fraley also wants consumers to understand that science has helped bring the abundance of food to the world. He points out that sunflowers and strawberries are the only food crops native to the United States.

"Everything else we grow in the U.S. came from somewhere else," he notes. "Everything we grow today was adapted and genetically modified … genetic improvements have been made to increase crop [food production] for thousands of years."

He explains that crops have been genetically modified through history by a variety of techniques — from natural mutations to mutagenesis and cell fusion and the recombinant DNA and gene editing techniques of today.

Of the GMO crops available today, Fraley says, "This technology has helped farmers increase yield by reducing insect and weed pressure — and reducing the need to apply pesticides."

He adds, "Now, having the precision and accuracy of today's technology to put a specific gene into a plant to alter a trait or characteristics will be key going forward."

Most importantly, he wants consumers to understand the focus on safety in the development of GMO products. "There is an eight- to 10-year process and $150 million invested for each new trait we develop, and at each step in the process, safety is our number one priority," Fraley explains.

He adds, "EPA (Environmental Protection Agency), USDA and FDA (Food and Drug Administration) are all involved in the regulatory oversight, but it doesn't stop there. With corn and soybeans exported worldwide, Monsanto also gets approvals from 70 countries to launch the technologies. So these products are the most thoroughly studied food products in our food and feed system. As a result, they are the safest foods in the marketplace."

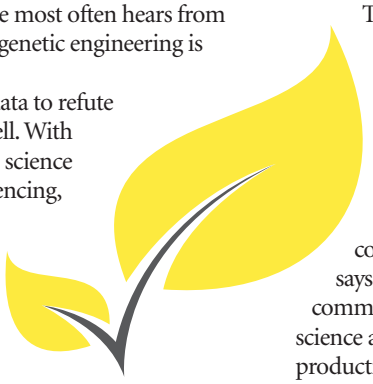
Fraley also shares that more than 2,000 peer-reviewed studies have found that GMO crops are as safe as those developed through traditional breeding. Additionally, research has shown GMO crops are digested in the same way as conventional crops, and GMOs have never been detected in the meat, milk or eggs derived from animals fed GMO feeds. Additionally, feeding livestock GMO crops has been found equivalent to feeding conventional feed sources in terms of nutrient composition, digestibility and feeding value. In one instance, Fraley shares that Bt grains are actually more nutritious.

With that track record, Fraley says, "After 20 years of experience with GMOs in our food and feed supply, the thing I'm most proud of is there's not been one single food or feed safety issue ever associated with the technology."

Known in nature

Even with that stellar track record, Fraley says the concern he most often hears from consumers is that genetic engineering is "unnatural."

He has ample data to refute this concern, as well. With recent advances in science and genome sequencing, Fraley shares that the scientific community has learned that nature is a pretty good natural genetic engineer.



As an example, Fraley cites the yew tree, which produces a taxol compound used to treat cancer. He explains that when sequencing the genes of the yew tree, scientists learned taxol developed as the result of a fungal organism invading the yew tree and introducing their gene into the tree.

The gene sequencing of the sweet potato last year revealed that all sweet potatoes contain the same bacterial gene that is used to create GMOs.

Also of interest: Fraley reports that with the sequencing of the human genome, it's been discovered that humans contain genes from as many as 200 other species.

He says, "The point of all this is: Genes are moving all the time. Nature is genetically engineering all the time. That's how we continue to evolve and advance. So it turns out GMOs are pretty natural."

Consumer communication

In spite of all that scientific evidence, Fraley says the remaining hurdle in taking leaps and bounds forward with GMO technology is the need to bridge the acceptance gap between science and society.

"There's clearly a gap between what science can do and what the average person understands and feels comfortable with," says Fraley. He points to a recent *National Geographic* article that reported many people don't even accept or believe the science that a man landed on the moon.

Another indication of the gap in consumers' acceptance of science: a Pew Research Center survey found only 37% of the public think GMOs are safe, while 88% of the world's top scientists believe they are safe.

Fraley says to address this "gap," two things are needed.

Foremost, is encouraging more Science, Technology, Engineering & Math (STEM) education in school systems.

"We are the most technological society," he says. "We need to raise our standards from an educational perspective."

Second is improving communication to the public. Fraley says, "We've done a lousy job in communicating to the public about why science and technology is important to food production and food security. We [Monsanto] didn't take time in 1996 when we launched GMO crops to talk to consumers. We did the regulatory work and focused on farmers, but didn't talk to consumers. In the absence of that, social media exploded and those who didn't like agriculture, or GMOs, or Monsanto filled that space with nasty things that aren't true. We need to reach out and correct that."

Over the last three to four years Monsanto has gotten more involved in outreach to consumers, and Fraley says, "We've learned to listen and to engage and to communicate in the way the public wants to get information."

Specifically, that means reaching the public via social media such as Twitter or Facebook.

"They want connectivity and dialogue, and it's important to provide them sources of information they can view," says Fraley. He himself is on Twitter (@RobbFraley), and the company promotes several web resources, including: *http://gmoanswers.com, www.americasfarmers.com,* and *http://discover.monsanto.com.*

Everyone in agriculture is needed to help spread the need for technology in agriculture, Fraley says. "We need to bridge the gap, and we need to all get engaged. I grew up on a family farm in Illinois. It was my dad's farm, and before that it was my grandpa's farm. At that time 50% of the people in Illinois lived on farms. They knew how food was produced. Today, it's 1% or less. We are the 1%. We have the responsibility and obligation to communicate and engage and let the other 99% of the population know of our passion, sincerity, and the efforts we put into production of grain and livestock, and the care we take for the environment. That's our role. It's so important."

He continues, "The challenge is 34 years from now there will be 10 billion people on the planet. We need to get our act together. We are going to need all of these tools to meet that challenge, and the only way we can do that is if the public understands and accepts GMO technology and regulators make the right decisions for the right reasons. … The decisions and approaches we take today will determine your opportunities for the future. It's important for all of us."

Fraley concludes, "My own personal belief is that we have the tools that can meet the challenge of food security by doubling the food supply, and we can increase yields and productivity to such an extent that we will have the ability to take some of the land that probably shouldn't even be farmed today out of production. … If we do this correctly, we can meet the food security needs of the world and improve the planet. For me, that's the dream. That's what wakes me up in the morning, and that's the legacy I want to leave my kids."

Editor's Note: *Kindra Gordon is a cattlewomen and freelance writer from Whitewood, S.D.*