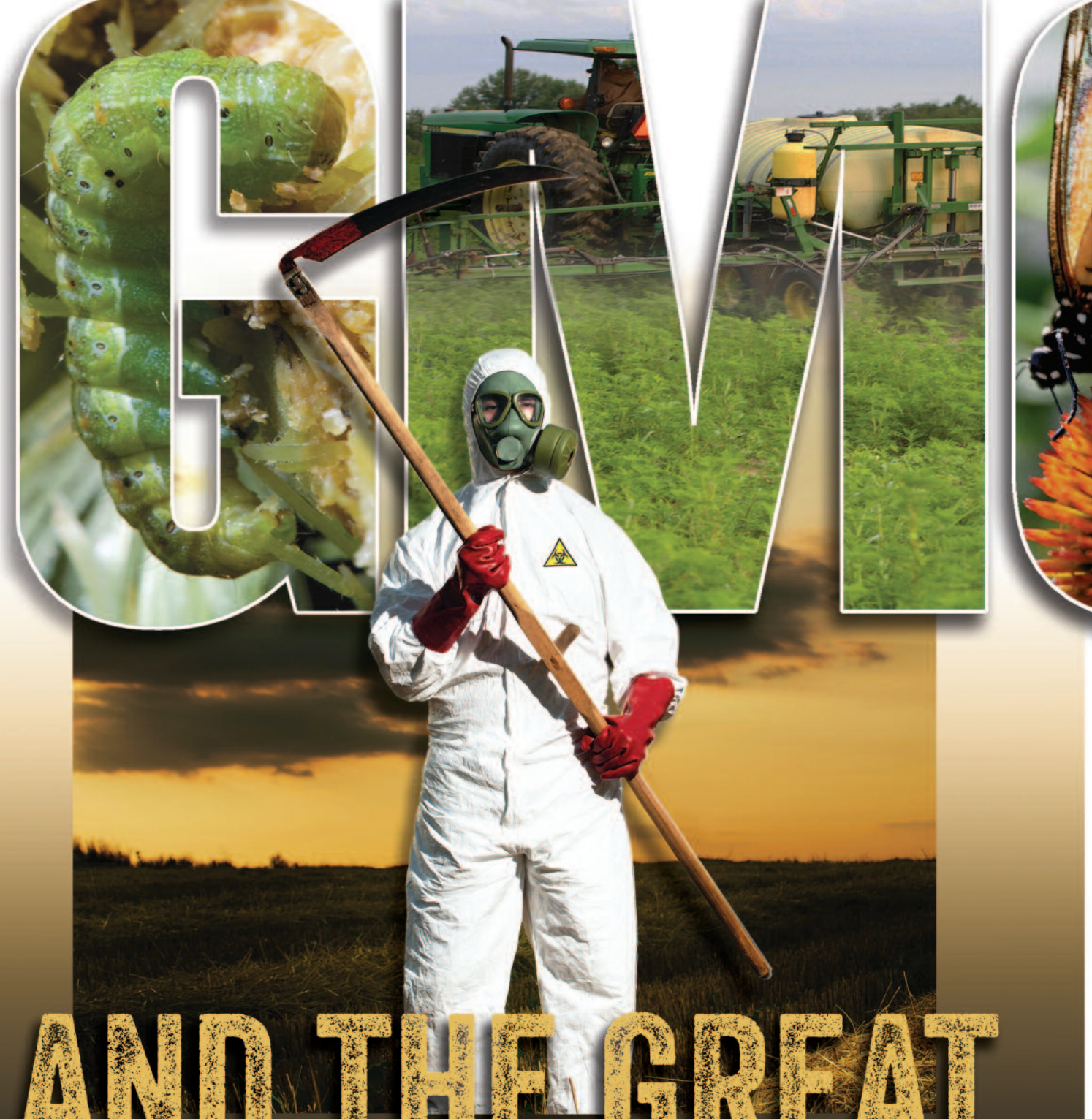


GMO AND THE GREAT CONTROVERSY

Genetically Modified Organisms are the result of a highly controversial, extremely technical, hotly debated method of altering a plant's genetic makeup so that it acquires desired characteristics.

"Let food be thy medicine and medicine be thy food," taught Hippocrates some 400 years before Christ.[1] Yet here in the 21st century, 842 million people in the world do not have enough to eat,[2] and almost half of the 3.1 million childhood deaths each year are attributed to poor nutrition.[3] Contrast these statistics with the rates of over-nutrition and obesity. While nearly a billion people are unable to function well for lack of food, another billion suffer from obesity.[4] And the projections are that within this decade, two-thirds of the world's diseases will be associated with diet.[5] How could Hippocrates have been so right so long ago?

Serious diseases at both ends of the food-availability continuum motivate many to seek solutions that provide more food for the hungry, more nutritious food for the undernourished, and to do it all with less environmental impact. One of those solutions involves the development of Genetically Modified Organisms (GMOs), a highly controversial, extremely technical, hotly debated method of altering a plant's genetic makeup so that it acquires desired characteristics.

No doubt you have heard about the huge GMO controversy. And where there are human controversies, Christians are wise to view them in the context of "The Great Controversy," the cosmic battle between Christ and Satan, which explains the double meaning of the title above. This article is primarily about the earthly controversy over GMOs, but at the end, I will touch briefly on how GMOs may play a role in the larger cosmic conflict.

Voices on both sides of the GMO debate are often strident. And if you listen carefully, you hear the same points made over and over, with people talking past one another. Have you wondered why anti-GMO activists destroy fields of food crops and create Websites filled with anti-GMO polemics?[6] Have you heard of scientific breakthroughs with apparently great potential to improve nutrition by growing more food at lower cost and reducing the risks of toxic pesticides—but these innovations languish because of stiff public opposition?[7] Perhaps you have seen the labels on prepared foods that boast "GMO Free" and wondered whether that means it is good or bad. If so, you are not alone.

As a long-time, dues-paying member of the Society for In Vitro Biology,[8] I used to think that GMOs would provide a satisfactory answer to the problems of world hunger while at the same time reducing the heavy ecological impact of farming. As time passes and I continue to learn, I have had to adjust to the reality that, while biotechnology does have some helpful solutions, it can't solve these problems alone, and it

BY DAVID A. STEEN

Transgenic Strawberries

Various transgenic lines of strawberries have been developed that exhibit freeze, pest, and herbicide resistance as well as delayed softening after ripening and picking. Though many of these lines are morphologically and otherwise phenotypically similar to the control berries shown here, to date, none of the transgenic lines has been commercialized.

inevitably produces some unintended consequences.

Nathanael Johnson was a strong anti-GMO advocate and writer. When he decided to set aside his bias and get to the bottom of the GMO controversy, he changed his mind.[9] Another outspoken anti-GMO critic, Mark Lynas, recently reversed himself in a well-publicized speech,[10] apologizing for his obstruction of what he now considers a good thing, and for the deaths that may have resulted in part because of his activism. So as you learn about GMOs, perhaps you, too, will decide to adjust your position based on recent data.

In this brief overview, I will first share a few of the literally hundreds of fascinating stories about GMOs. Then we will explore the current state of the ugly food fight over GMOs and discuss how to think about the topic rationally. Finally, we'll try to discover how this all fits into the great controversy between Christ and Satan.

Definition

As mentioned earlier, *GMO* is simply an acronym that stands for Genetically Modified Organism. What does that imply? To unpack those three words, the term means changing the genetic composition of an organism.[11] More precisely, it involves altering the genetic composition of the organism using laboratory protocols that rely on modern molecular biology. Scientists add or subtract genes from a genome (the sum total of an organism's genes), usually taking the genes from one organism and getting them to function well in another organism or perhaps produce an altered gene expression. For example, strawberries now resist late spring freezes because the plants have been given a functional antifreeze gene from a deep-sea fish.[12]

About now, I'm sure some of you are saying, "Eeew, that's not normal!" Or, "Gross, that's not the way God designed it to be." Others may react, "What's the big deal? Genetic modification is a normal and routine biological process. Who cares if we use advanced technology to make it happen? Plant and animal breeders do it. Even as long ago as Old Testament times, Jacob did it with his employer's sheep and goats[13] to fatten his take-home pay." Others might observe: "Genetic modification is an important result of sexual reproduction. I am a genetic modification of my two parents. I am a GMO. In fact, everything genetic undergoes modification over time."

Most definitely there is a lot of confusion out there. We need to be clear on our definitions. The term *GMO*, as currently used, doesn't mean cross breeding or general genetic modification. It has a much more restricted usage, referring to high-tech genetic engineering (GE) conducted in a laboratory.

Incidentally, *GMO* is NOT an acronym that biologists normally use for one organism expressing the artificially introduced genes of another organism. The word they use to describe a strawberry expressing a fish gene or rice expressing a carrot gene is *transgenic*. Transgenic organisms have genes from another organism that give them specific

Larvae of the European Corn Borer *(Ostrinia nubilalis)*

The larvae of a European corn borer is commonly found tunneling and feeding on ears of untreated corn, leaving a copious wake of unsightly fecal waste. The lighter strands are corn silk, which provide a size comparison. Organic farmers generally protect their crop by spraying a suspension of bacteria called *Bacillus thuringiensis (Bt)* on their fields, which produces a crystalline protein called *Cry* that perforates the digestive tract of the larvae, killing them quickly without the use of toxic poisons. Transgenic *Bt* corn expresses the *Cry* gene, providing the same protection from this destructive pest.

capabilities or functions. A related term that appears often in context with the acronym *GMO* is "recombinant DNA" or "rDNA." Not to be confused with genetic recombination (a natural result of chromosomal crossover during meiosis in sexual reproduction), rDNA refers to a process of bringing DNA from various sources together in the laboratory to create novel sequences that do not occur naturally. This lab-based recombination happens in various ways, one of which uses cloning vectors such as bacterial plasmids or viruses that can reproduce, transport, and insert the novel sequences of genes into the genome of an organism, giving it new capabilities or characteristics.

I well remember attending an international congress of plant molecular biologists in the early 1980s and hearing one of the presenters talking about GMO and how that specific term, "Genetically Modified Organism," was carefully and intentionally designed by anti-GMO activists to be pejorative. It was chosen to conjure negative thoughts and dark feelings about any organism that had its genes tinkered with. In fact, anti-GMO activists designate any transgenic food as "Frankenfood," purposefully eliciting visions of Mary Shelley's novel *Frankenstein* and "mad scientists." I think it unfortunate that zealous anti-transgenic crusaders have stolen the show to the extent that "GMO Free" is now printed on many cans, bags, or cartons of processed food, and the language is now all about GMO instead of the more neutral and accurate terminology of *transgenic* or *genetically engineered*.

Now that we have defined what GMO means, let's get to a few stories.

Bt Corn and *Bt* Cotton

We have all seen them chowing down on the edge of a leaf. And even with their big eyes and soft bodies, only a mother (and perhaps some entomologists and hungry birds) could love a fat juicy caterpillar. It's one of nature's best-designed eating machines, one that can increase its body size several thousand fold in just a couple of weeks. In the process, caterpillars (or more accurately, the larvae of moths and butterflies) cause enormous crop damage. We tend to see them most often as inchworms, corn earworms, corn borers, cotton bollworms, tomato hornworms, and the like. Amazingly, after this often-destructive early lifestyle, these larvae pupate, transforming into harmless and often beautiful nectar-feeding adult moths and butterflies. The adults then mate and lay eggs that hatch into the next generation of destructive caterpillars.

So what does this have to do with GMO? In an attempt to reduce and even halt the use of tons of toxic chemical pesticides to kill the destructive worms, agricultural scientists found an ally in nature, a common soil-dwelling bacterium by the name of *Bacillus thuringiensis* (*Bt*),[14] whose remarkable insecticidal properties were discovered in 1911. *Bacillus* is a large genus of mostly harmless soil bacteria, which include the probiotics found in yogurt. When the going gets tough for *Bacillus* and their ilk, they usually move into a defensive mode, making hard, resistant spores called endospores. Scientists

Red Milkweed Beetle *(Tetraopes tetrophthalmus)*

The red milkweed beetle is commonly found feeding and living on mature milkweed plants, where it apparently derives some protection from consuming the toxic plant juices.

(Inset) Monarch Butterfly Egg

A monarch butterfly egg recently deposited on the bottom side of a milkweed leaf. The female typically places only one egg on each young milkweed plant, assuring an adequate food supply for her future offspring. This image reveals the detail of the egg case structure.

learned that during the process of making endospores (sporulation), the bacteria make a crystalline protein, abbreviated *Cry*, that paralyzes and perforates the soft digestive tract of many insect larvae, particularly moth and butterfly larvae, causing them to stop feeding and starve to death. Fortunately, the *Cry* protein is harmless to mammals, birds, plant pollinators, and most beneficial insects (see the sidebar on page 9). *Bt* is considered to be so safe that organic gardeners have sprayed these bacterial endospores on their plants for nearly a century.

But with the discovery of the structure of DNA, and more recently, as scientists learned to manipulate the molecules, the bacterial gene that codes for the *Cry* protein could be artificially inserted into plant DNA. Which plants were candidates for *Cry* protein? Big-production cash crops of corn and cotton were incredibly susceptible to the corn earworm or cotton bollworm, both larvae of moths. Annual corn losses from the European corn borer in the U.S. alone are estimated to be between $1 billion and $2 billion.[15] So it made economic sense to focus research on them. After years of research, through rDNA technology, bacterial *Cry* genes were inserted into corn and cotton DNA, making them transgenic plants. So plants are now able to produce *Cry* on their own and can protect themselves by killing the larvae that try to eat them. Plants no longer have to rely on farmers to spray toxic insecticides or even solutions of bacterial endospores to get protection from these worms. In these cases, developing positive applications in transgenic plants was quite successful.

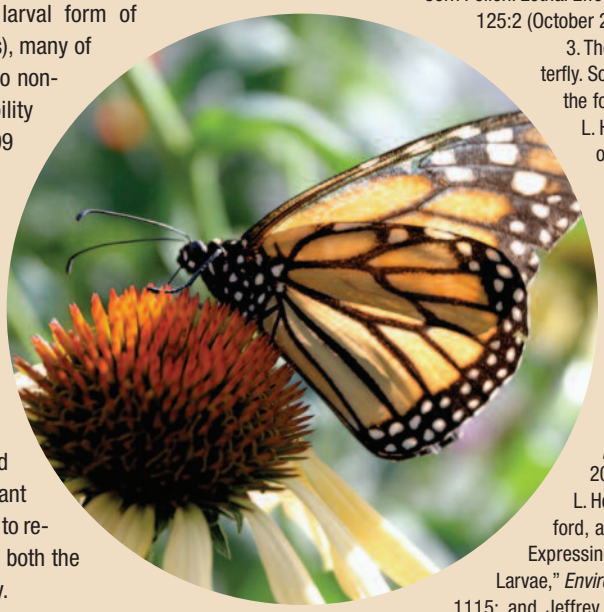
Golden Rice

Here is another story—that of Golden Rice. This year, 2014, if all goes well, Golden Rice is scheduled for initial free seed distribution to farmers in the Philippines.[16] The story actually begins in the 1980s, when Ingo Potrykus, a professor at the Swiss Federal Institute of Technology in Zurich, was dismayed to learn about the large number of people in some populations who suffered from blindness and even died from the effects of too little vitamin A in their diets,[17] which consisted mostly of white rice. During the 1980s, Potrykus worked hard on the stubborn problem of achieving transformation in rice as the first step in figuring out how to get rice plants to synthesize their own vitamin A. To make this happen, he collaborated with Peter Beyer, professor for cell biology in the Faculty of Biology of the University of Freiburg. They made little progress until they brought in Syngenta, a biotech and agrochemical company, to help with the lengthy, costly, and complicated regulatory approval and intellectual property-rights processes. And even with this excellent team working hard to bring Golden Rice to local farmers in order to improve general nutrition, it has taken more than three decades to finally introduce the seed into just one country.

True, the technical GE problems were a major factor in making the journey long and costly. But other bigger, and even more difficult, challenges arose in operating within the boundaries of stringent regulatory and safety guidelines. The researchers also battled

Bt –A Threat to Butterflies and Bees?

Despite the fact that *Bt* has been used for more than 100 years to control insect pests, some fear that desirable insects such as butterflies and helpful bees might be in danger. These fears are not unfounded because the *Cry* protein is effective precisely because it specifically targets the larval form of lepidopterons (moths and butterflies), many of which are pests. The fear of harm to non-target species gained great credibility and huge publicity following the 1999 publication of a brief preliminary laboratory study[1] describing heavy mortality (44 percent) in monarch butterfly larvae forced to feed on milkweed leaves dusted with *Bt* corn pollen. Though an earlier (and much more thorough and carefully designed) field study was reported at meetings and then later published,[2] it was largely ignored even though it, too, reported significant mortality. Those two papers continue to reverberate in the media and to scare both the public and policy makers even today.



But they shouldn't. Now, with 15 years of hindsight and hundreds of additional studies, it is clear that those earlier studies investigated *Bt* corn pollen from a type of corn that produced a particularly potent and abundant form of the *Cry* protein that is no longer commercialized. The predominant types of *Bt* corn now being planted have variants of *Cry* genes that are not expressed well in corn pollen but continue to be expressed where the destructive pests feed. The encouraging results appear to be effective pest control that has a negligible effect on monarch butterflies,[3] no effect on black swallowtail butterflies,[4] and even some beneficial effects on bees.[5] Specifically, by bringing *Bt* corn pollen into the hive, the bees are unwittingly helping to control waxworms (larvae of the wax moth), a destructive parasite of bee colonies.

Multiple review articles describe the effects of *Cry* proteins on a small sample of other non-target species.[6] All agree that more data is needed and that field testing is preferable to laboratory studies. Most studies have been done in the U.S. on monarch butterflies, with little attention to the vast array of other invertebrate species. But one thing is certain: As world acreage of *Bt* corn and *Bt* cotton has increased, the use of insecticides known to be highly toxic has dramatically decreased.

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(Inset) A 4 mm Monarch Butterfly Larvae

Only about half (2 mm) of this larvae is visible from the bottom of the milkweed leaf, where it eats from the leaf edge.

Monarch Butterfly on Milkweed

When preparing to lay an egg on the underside of a milkweed leaf, monarch butterflies choose carefully. After hatching, the larvae feed exclusively on milkweed. The milky white latex in the leaves contains cardiac glycosides that make both the larvae and the adult butterfly that develops from it distasteful and poisonous to birds and other vertebrate predators.

(Right) Before Roundup®

Weeds grow bigger and faster than soybeans, robbing this valuable crop of moisture, nutrients, and sunlight.

stiff opposition by anti-GMO activists, who even resorted to trampling test plots of the transgenic rice.[18]

Roundup Ready®

One more fragment of a story: Roundup® is a well-known herbicide that many people use in their yards. The reason I prefer it over other herbicides is because it is a relatively nontoxic[19] but highly effective weed killer. We use it to kill poison ivy and grasses growing in the cracks along the driveway. Most users are unaware that the active ingredient in Roundup® is glyphosate.[20]

In 1970, John Franz, a chemist working for Monsanto, discovered glyphosate, a common amino acid glycine with a phosphonomethyl group attached that inhibits an enzyme with the complicated name "5-enolpyruvyl-shikimate-3-phosphate synthase" (EPSPS).[21] This enzyme is found only in plants and some bacteria, where it catalyzes the synthesis of three important amino acids. Animals get the three amino acids in their diet. Plants have to make them. So Roundup® kills plants by simply shutting down this important biochemical pathway.

Because of its effectiveness and extremely low toxicity, Roundup® became one of the most used herbicides, especially after Monsanto's biologists successfully engineered crop plants (soybeans in 1996 and later corn, cotton, alfalfa, sugar beets, and canola) to be insensitive to Roundup. These GE plants are known as "Roundup Ready®"[22] because a farmer can plant the engineered seeds and leave the fields alone until the weed seeds have all sprouted and are growing vigorously. Then just one application of glyphosate sprayed on the whole field selectively kills the weeds, leaving the Roundup Ready® crop unaffected.

So what explains a plant's Roundup® tolerance? These genetically engineered plants have genes coding for an alternative form of the EPSPS enzyme, one not inhibited by glyphosate. These precisely engineered alternative genes have sequences of DNA derived from other organisms. While a complicated tale, it is a success story, judging by the millions of acres of crops grown the world over.[23]

Other Stories

There are many more fascinating stories for which we simply don't have time or space. But if you're interested, read about the Flavr Savr tomato[24] with its longer shelf life, strawberries that resist early spring freezes,[25] or transgenic papaya that resist the ringspot virus disease.[26]

For more than a decade, William Langridge and his associates at Loma Linda University's Center for Molecular Biology and Gene Therapy, Department of Biochemistry, have had remarkable success in getting GMO plants to produce vaccines against infectious and autoimmune diseases.[27] There are several obvious benefits of these plant-based vaccines: (1) They do not contain any type of pathogens. Instead, transgenic plants such as banana or potato are made to produce small pieces of characteristic proteins that elicit the immune response. (2) These

I have concluded that GMOs are not the panacea that some promoters suggest. They do solve some of the problems some of the time. Neither are they the extreme dangers that the anti-GMO activists would lead you to believe.

foods containing the vaccines can be eaten regularly to maintain immunity.

Plants are not the only beneficiaries of GE research. For example, bacteria have been outfitted with a human insulin gene so they can make this critically important product and scientists no longer have to extract it from pigs or other animals. Bacteria also make human growth hormone and enzymes for laundry detergents. Transgenic goats produce various medicines in their milk. GE has resulted in exotic goldfish, knockout mice for studying a host of disease conditions, and green glowing species of several types for research use. The list of exciting results and possibilities seems endless.

Examining the Pros and Cons

But all is not exciting and wonderful. Controversy abounds. You probably have many of the same questions that I do: "What am I to believe about genetically engineered plants and animals? Are genetically modified (GM) foods safe to eat? Could these engineered genes escape into the environment? Should I be for or against GMO?" The voices promoting and decrying genetically engineered plants and animals are often loud and angry. The science is incredibly technical. How does one decide? What should you tell your students?

After wrestling with this topic for many years, I have concluded that GMOs are not the panacea that some promoters suggest. They do solve some of the problems some of the time. Neither are they the extreme dangers that the anti-GMO activists would lead you to believe. A number of other scientists have independently arrived at similar conclusions.

Remember Nathanael Johnson? As a writer, he dedicated a few years of his life to exploring the GMO issue in order to understand the pros and cons. His clear-eyed research resulted in a series of 27 articles called "Panic-Free GMOs" published in GRIST, an online source with a mission to clarify green living.[28] Johnson learned that, contrary to what many claim, food GMOs are indeed highly regulated. But that the extent and quality of the regulation is difficult to deter-

mine because much of it involves self-testing and regulation imposed by the Food and Drug Administration or the Environmental Protection Agency. He cites personal communications with Val Giddings, a former biotech regulator who wrote to Johnson in an e-mail, "In my opinion it is misleading to and past the point of dishonesty to claim that FDA does not require safety testing, . . . A Jesuit would blush at the rhetorical convolutions to which the activist opponents resort to make it seem otherwise."[29] From a corn-insect scientist at Cornell University, Johnson learned that the big seed companies used to prevent other scientists from using their patented seeds in their research, but not anymore. Strict guidelines regulate how the seeds can be used. Some companies are more difficult to work with than others. "Monsanto gets a lot of pain in the public press, but they are the company that interacts the best with public scientists—they have always been on the forefront of pushing public research forward."[30]

Johnson writes that genetic engineering is not likely to introduce unintended consequences because plant breeders always work with the modified crops to eliminate problem traits. He says that we have to think seriously about the few valid studies that have shown harmful effects from GMOs. But he says we have to also consider the hundreds of studies that show them to be safe and conclude that the risks are low. He concluded that GMOs have not noticeably helped poor farmers, as they have richer ones. But that is changing, as some science is now focused specifically on the poor.[31] Johnson's investigation led him to conclude that GMOs have not yet made a significant difference in feeding the world's hungry, as most GMO crops are used for animal feed and biofuels.[32]

But what about that big question, "Are GMO foods really safe?" My simple, straightforward current opinion is "Yes." And here is why. The scientific consensus is clear and unambiguous. After reviewing a list of statements by 22 highly regarded national and international organizations regarding GMO food safety,[33] I feel more secure about this

"Many international health organizations that have examined the evidence have come to the same conclusion: consuming foods containing ingredients derived from GM crops is no riskier than consuming the same foods containing ingredients from crop plants modified by conventional plant improvement techniques."

(Page 12) Roundup Ready® Soybeans

This field of genetically engineered soybeans is not affected by the herbicide that has effectively killed nearly all the weeds because the Roundup® was applied when the weeds were young and actively growing.

(Left) Spraying Roundup® on a Soybean Field

Early morning, when the winds are calm, is the best time to apply Roundup®. Although weeds have overtaken this soybean field, in a week's time, the weeds will be down, and the rows of young Roundup Ready® bean plants will continue growing strong.

conclusion. Some of these organizations perhaps have a reason to be biased. But others, such as the United Nations and various national medical associations, are not in the business of selling seeds or herbicides, so they should be impartial. This, by the way, is perhaps one of the most important concepts to teach your students. When there are strident voices on all sides of an issue, how does one choose good sources? The wise course is to listen to those without a product to sell and those without a political agenda. In most cases, they will be the most objective AND the least biased. Granted, it is hard to find those voices in the GMO controversy.

In their official October 2012 statement concerning the labeling of GMO foods, the board of the American Association for the Advancement of Science supported the opinion of the entire European Union when it said, "The EU, for example, has invested more than €300 million in research on the biosafety of GMOs. Its recent report states: 'The main conclusion to be drawn from the efforts of more than 130 research projects, covering a period of more than 25 years of research and involving more than 500 independent research groups, is that biotechnology, and in particular GMOs, are not per se more risky than e.g. conventional plant breeding technologies.' The World Health Organization, the American Medical Association, the U.S. National Academy of Sciences, the British Royal Society, and every other respected organization that has examined the evidence has come to the same conclusion: "consuming foods containing ingredients derived from GM crops is no riskier than consuming the same foods containing ingredients from crop plants modified by conventional plant improvement techniques."[34] Another convincing source is a joint publication of the Brazilian Academy of Sciences, the Chinese Academy of Sciences, the Indian National Science Academy, the Mexican Academy of Sciences, the National Academy of Sciences of the U.S.A., the Royal Society (U.K.) and the Third World Academy of Sciences entitled *Transgenic Plants and World Agriculture,*[35] which states that "Foods can be produced through the use of GM technology that are more nutritious, stable in storage, and in principle, health promoting—bringing benefits to consumers in both industrialized and developing nations." The World Health Organization also states that GMO foods have essentially the same risk as conventional foods.[36] Perhaps Key, Ma, and Drake, writing in the *Journal of the Royal Society of Medicine,* answer the big question best with this statement: "Foods derived from GM crops have been consumed by hundreds of millions of people across the world for more than 15 years, with no reported ill effects (or legal cases related to human health), despite many of the consumers coming from that most litigious of countries, the USA."[37]

An important caveat: Just because there is consensus doesn't necessarily make something true. Good science doesn't appeal to authority or consensus as proof—rather, it relies on repeated testing. And in the case of GMOs, repeated testing has failed to produce credible evidence of serious health concerns. Clearly, this is a journey still in progress, and in my opin-

ion, ongoing scientific research will doubtless expose any GMOs that pose significant risks to society. So we need to stay informed. But we also need to choose good sources with minimal bias and teach our students how to evaluate the quality of various sources. That means eschewing both activists' and industry sources. Reports on independent research may be hard to find, but they are well worth the effort.

The Great Controversy

Now back to the connection between GMOs and the Great Controversy. Besides being at the center of an ugly, intensely controversial fight, do GMOs have any relevance in the battle between Christ and Satan? I have heard and read comments of deeply committed Christians, people whom I respect, disparaging GMOs as evidence of an end-time crumbling ecology and the results of corporate greed. I accept these statements as off-the-cuff observations echoing what we all read and hear in the news. But let's look briefly at the spiritual implications of GMOs. Obviously, there just isn't room in this article to analyze this aspect extensively, but some key elements can provide important springboards for ongoing discussions during teachable moments.

Christ, the Creator of all, loves each of us unconditionally. He desires all to have life that is joyful and abundant.[38] He gave us intelligent and curious minds to figure things out. Scientific discoveries that make life better for humanity such as those in hygiene, medicine, agriculture, nutrition, and healthful living may be examples of God's many gifts to us. Could the discovery and use of genetic engineering tools be yet another of God's blessings? I am thinking in particular about those discoveries that increase the abundance and nutrient content of food or significantly reduce our dependence on toxic pesticides or herbicides—such discoveries decidedly enhance human health and well-being. I think that a strong argument could be made supporting an affirmative answer regarding the blessings of GMOs.

In stark contrast, the devil's highest goal is to destroy God's creation and kill humanity.[39] And though God cannot lie or deceive and will never coerce or force us to believe, the devil is all about coercion, deceit, distraction, and destruction. He loves a good fight—the uglier and more destructive the better, for it blemishes God's character, destroys His creation, and hurts His children.

On which side of the cosmic battle do genetic engineers usually stand? What about anti-GMO activists? What tactics are generally used by these opposing entities? Let me be very clear here. It is too easy to paint all with the same broad brush, but that would be very wrong, for all institutions and groups have goodhearted, honest people as well as some with malevolent intent. For example, some genetic engineers are in the business just for the financial profit. Others do their work because they care deeply and passionately about the environment and about human health. They want to be part of the solution to very real problems. The same can be said for some anti-GMO activists.

In the extensive reading that I have done on this topic, I see a preponderance of destructive, deceitful, coercive activity coming from the anti-GMO side.[40] The result has been the tragic death of millions of people, not to mention exacerbating hunger and malnutrition among the most needy on this planet. The pro-GMO side tends to work more often within the law and within guidelines of stringent safety measures to improve the lot of humanity. They don't force others to use their products, and model numerous examples of charity and selfless giving—a good definition of love.

When I take a long look at the big picture, the GMO controversy may well be another way that the devil blights God's creation and distracts us from what is truly important. So how does one decide? The wise man Solomon said it best: "In all thy ways acknowledge him, and he shall direct thy paths" (Proverbs 3:6, KJV). ✐

This article has been peer reviewed.

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