

Anti-GMO Activism and Its Impact on Food Security

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A PATH FORWARD:

Science should drive public policy and the public's understanding of the strengths and limitations of GM crop and food advances. Activists have dismissed the opinions of the world's leading scientists to undermine public trust in the benefits of GM crops and foods containing ingredients from them. Holding activists accountable for increased regulatory costs and public policy proposals that limit innovation in the public and private sector is vital to ensuring that millions of consumers can realize the crop, environmental and nutritional benefits offered by GM technology.

- Activists dismissal of science to oppose GM technology negatively impacts the public discussion and the regulatory environment.
- Activists limit the ability of lawmakers to develop sound policy that fosters technology innovations.
- Activists ignore credible scientists and foster distrust of safe food-system technology and innovations that can improve nutrition and environmental sustainability.
- Public acceptance of beneficial food technology is undermined in an environment where activists lead the public discussion while ignoring sound science.
- Holding activists accountable will foster an environment that advances research and development in the field of GM food and crop science.



“Food is a personal and cultural topic. It is the stuff on the table in front of us, it is the sustenance we present to our families and dearest friends. For these reasons it is a ripe topic on which to manufacture fear.”

One of the hallmarks of an anti-intellectual movement is the promotion of ideas and philosophies that run counter to accepted scientific consensus. The movement against biotechnology has much in common with movements that oppose vaccines, deny climate science or contend evolution is a myth. Biotech opponents often ignore sound science

and credible scientists, and instead rely on low-quality data, spread misinformation, appeal to fear, and present an addiction to logical fallacy.

Critics of GMOs (for this report, “transgenic,” “genetically modified,” “GM” and “GMO” are synonymous) wage aggressive campaigns against existing technologies that have demonstrated to be advantageous to the farmer, the environment, the consumer, and the poor locked in nutritional deficit. Biotech opponents exploit the human desire to avoid risk, impeding progress in using transgenic technology as a tool to improve the human condition.

Science Denial in the GM Realm

“The non-scientific vilification of sound technology is the foundation of the anti-GMO movement.”

Anti-GMO activists rely on information that does not reflect research by independent scientists in high-impact, peer-reviewed journals. Each year there are hundreds of scholarly papers that reinforce the utility, efficacy and safety of transgenic technologies that rarely receive attention from mainstream media, despite the fact that these reports must pass rigorous peer review before they are assimilated into scientific literature. Yet activists frequently revisit and quote from the same handful of low quality, non-reproducible studies, ignoring the abundance of reliable, independent GM information available.

One example in November 2013 is headlined, “GMOs linked to gluten disorders plaguing 18 million Americans –report” [1]. The article offered no data or references to research. The claims originated by Jeffrey Smith, a popular anti-GMO crusader with no scientific credentials, and his interview with a chiropractor. None of what was reported was actual research; there was no “link” to actual research. The article reflected the opinion of a non-scientist. Yet it was widely distributed and read around the world. News outlets often mistake speculation as science. Bold headlines capture attention and sensationalism fuels the news cycle, permitting unsupported scientific claims that transform into headlines. These unfound claims are picked up by news outlets and propagate quickly. Social media spreads these claims even further, even among otherwise credible outlets.

Blaming New Technology for Historical Problems

“The most troubling part of this false blame is that less attention is paid to the discovery of the actual causes.”

Weed and insect resistance have been cited as significant drawbacks stemming from adoption of GM technology. The activist hyperbole speaks of “superweeds.” Yet they are hardly “super”; they are resistant to one herbicide, a challenge facing modern agriculture for decades preceding the introduction of GM crops.

Much of the criticism focuses on the use of the herbicide glyphosate (the active ingredient in products such as Roundup) used in conjunction with many herbicide resistant GM crops. Farmers have been able to substitute glyphosate for chemicals with greater handling and environmental restrictions, reducing the impacts of agricultural herbicides. While the increase in acreage and number of weeds resistant to glyphosate is a legitimate problem [2], the

same challenges occur in every cultivation system. The use of a single herbicide simply reveals the age-old battle between weeds and man's attempts to control them. It is an endless arms race, and glyphosate resistance is just another example of that reality.

Many authors and activist speakers point out a suite of maladies they claim has increased in concert with the adoption of GM foods: obesity, liver disease, autism, asthma and many other chronic diseases [3]. Yet there is no evidence that demonstrates actual mechanistic links between the products and any of these disorders. The increased incidence of these health issues matches precisely the increased consumption of organic foods as well, and of course, there's no likely connection. This common confusion of correlation with causation underlies the rhetoric within anti-GM websites and literature. Good science seeks to connect cause and effect and move beyond simple correlation, but the anti-GM peer-reviewed scientific literature trumpets these associations that are likely not authentic. Rarely, if ever, have we seen evidence that demonstrates mechanisms linking treatment and outcomes, or dose-response relationships as is required by good science.

The most troubling part of this false blame is that less attention is directed at trying to discover the actual causes of modern disease. The real reasons for disorders mentioned by activists are likely multifactorial, meaning, for instance, that genetic predisposition is exacerbated by environmental or other stressors. While transgenic crops have never been linked to any of these diseases, it does not stop anti-GM activists from promoting imagined associations as hard facts.

Because of the fears these campaigns generate, crops proven to resist disease, drought, flooding and many other cultural stresses are locked in laboratories worldwide. Plants with higher nutrition content and enhanced fertilizer utilization have been developed but remain unreleased. Proven solutions to production or postharvest problems, nutrition, and environmental stresses sit idle, in part, because opposition to biotechnology freezes these potentially useful technologies in place. This reality harms mostly those in developing nations.

Recognizing a Scientist from an "Expert"

"Public scientists that are experts in this area are dismissed...yet charlatans, without data, are invited to shape the scientific conversation."

Some of the most cited anti-GMO literature is not primary research, but cherry-picked literature reviews and surveys that have not been subjected to peer scrutiny, such as GMO Myths and Truths. Other published work arrives at speculative conclusions that are not necessarily supported by data or other cited work. In addition, a new breed of journals has emerged, posing as scientifically credible sources, but sometimes publishing almost anything if the authors are willing to pay, including research that has been retracted or rejected by credible journals. These are frequently cited as "Predatory" journals, and many offer soft review and gentle editorial treatment. The retracted study of Gilles-Éric Séralini was republished without additional peer review in a low-impact open access journal [4].

Leading "experts" often cited by the anti-GM movement may be experts in some area of science, but have little scholarly expertise on transgenic crops. They use their association with credible institutions or "celebrity" status to promote books and websites espousing the dangers of GMOs. Claims linking to an individual's website are not a substitute for credible and substantiated research and many make claims without evidence of formal training or experimentation. While charlatans, without data, are allowed to shape the scientific conversation, public scientists

who are experts in the field are often dismissed by activists as agents of a conspiracy and stooges of multinational corporations. This disparity is a critical problem, as the public places their trust in those that confirm their beliefs, not those who are trained to discover scientific facts.

And then there are the pseudo-scientific, credible-sounding organizations that claim to speak for the broad scientific community, yet are actually activist fronts. Three such examples are the Institute for Responsible Technology, Center for Food Safety and the Environmental Working Group. Despite a lack of peer-reviewed scientific information, these groups are frequently cited by activists and even many journalists as authorities in the science of GMO. The Union of Concerned Scientists is quoted as an authority against transgenic technology, yet few consider the “Consensus of Unconcerned Scientists”—the overwhelming majority of scientists who are supportive of GM technology because they rely on data and evidence.

Discrediting Good Science

“If the data appear to support a position of GM crop safety and efficacy, they are dismissed as products of scientific malfeasance.”

Critics of GM technology claim that financial incentive and collusion guide experimental outcomes from independent scientists who secretly conspire with publishers, reviewers and editors to hide the harms of transgenic technology. Biotech critics frequently claim that independent public scientists are “bought off” or coerced by corporate entities to generate desired results and conclusions.

Much of the research on GM crops and animals is totally independent. Funding to public universities is transparent, accessible and open. Corporations sponsor a small fraction of any university’s research. University researchers are sought out to perform important work to independently verify or refute corporate research claims.

However, there is a keen desire to commercialize innovations—to get them to farms where they can do some genuine good. As a result, corporations do occasionally interact with academic, government or other industry scientists, utilizing their expertise and resources to accelerate product development. If the data appear to support a position of GM crop safety and efficacy, skeptics immediately and reflexively dismiss the data as products of scientific malfeasance. A simple question: Why would companies pay for independent verification or further testing if the results were to be fabricated and the products were to fail, or leave them with huge liabilities if there were deleterious environmental or health consequences? If results were simply fantasy, they could be generated in-house much less expensively.

The United States, which grows and consumes the most transgenic food on the planet, is also the most litigious. There is no incentive for a company (agriculture, pharmaceutical, automotive, etc.) to present a product for public use without vetting it to the extreme. Critics and proponents can agree that a central interest of corporate agriculture is generating revenue, remaining profitable, and promoting investor returns. This does not happen when products are dangerous, fail to perform, or kill customers. The specter of litigation and the pursuit of profitability are just two reasons to ensure that there will be extensive testing of product safety.

While biotechnology critics levy allegations about public scientists on the take, they excuse more egregious potential conflicts of interest among experts with whom they agree, while assuming public-sector scientists are willing to “sell-

out” for a cheap grant and destroy hard-earned careers. There are profiteers in the anti-biotech movement with financial incentives, closed books and vocal opposition that provides unending job security and a place in the limelight.

Exploitation of Perceived Risk and Social Media “Groupthink”

“From chemtrails to JFK, the internet and social media provide a pipeline to communicate and spread bad information, including that around transgenic crops.”

In addition to U.S. government agencies assessing the safety of GMOs, various professional scientific and medical bodies worldwide also have evaluated the safety of GMOs. Those independent professional bodies often appoint a blue-ribbon panel of experts in the relevant fields, including genetics, medicine, nutrition, agronomy, etc., and spend as long as two years on an investigation. All such studies to date—there have been dozens issued by global science organizations—have concluded that no agriculture or food production method is risk free, whether GMO, conventional or organic, but that, on balance, GMOs are as safe, or safer, than other methods.

Collateral Damage of Anti-Science Activism

“There is a need to comprehend how these technologies serve farmers, decrease environmental impact, and can assist, if not rescue, individuals in dire need.”

The public at large, especially in affluent countries where food is abundant, needs to understand the true strengths and limitations of biotechnology within each specific application. There is a need to comprehend how these technologies can serve farmers and decrease environmental impacts. Across the world of plant biology, scientists worldwide lament the actions of activists and their effective campaigns of GMO demonization, which has limited useful innovations:

- **Bt and glyphosate resistant crops are dismissed rather than improved**
- **Golden Rice, which can free millions from the impacts of vitamin A deficiency [5], is stalled**
- **Increasing regulation and associated costs limit participation of innovative small businesses, universities and government laboratories in the field**
- **Reliance on less useful or unproven breeding techniques are adopted without rigorous safety testing**
- **Crop, environmental and nutritional benefits and improvements are not realized.**

At a time when the U.S. needs to emphasize science, technology, engineering and math (STEM) disciplines to maintain international competitiveness, attacks on science from the anti-GMO movement undermine public trust in credible researchers and scientists as well as our public research institutions. This environment makes it much more difficult to help the public better understand the role the scientific method can and should play in ensuring sound public policy and personal choice based on fact, rather than fear.

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SOURCES/CITATIONS

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