What Bill Nye Got Wrong in His About-Face on GMOs

in

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The Science Guy's errors let the pesticide/biotech industry off the hook.
By Doug Gurian-Sherman and Margaret Mellon on June 3, 2015

Earlier this year, Bill Nye, renowned as the "science guy," made news for changing his mind about genetic engineering (or GMOs) after a visit to Monsanto, the pesticide and seed giant at the forefront of the biotechnology industry.

Nye is an emblematic science educator, who has done a lot to kindle the interest of young people in science, to defend the validity of evolutionary science, and raise awareness about climate change. Until recently, he spoke and wrote about GMOs as environmentally risky technology.

In a video shot backstage after an appearance in March on Bill Maher's "Real Time," Nye told an interviewer that he was revising the chapter about GMOs in his latest book. "I went to Monsanto, and I spent a lot of time with the scientists there, and I have revised my outlook, and I'm very excited about telling the world," he said.

So what did Nye learn at Monsanto headquarters that changed his mind? In a recent interview with the Huffington Post, Nye said that he does not believe genetically engineered crops are inherently bad. To the contrary, he said he now believes that they have been beneficial to agriculture.

To illustrate his point, he explained that GMO crops "put the herbicides and pesticide inside the plant, rather than spraying it on them and having it run down into streams."

In the case of herbicides, Nye is simply incorrect, and it's an important error to point out.

More Herbicides, Not Less

GMO herbicide-resistant crops are made to withstand the spraying of herbicides, primarily glyphosate (or Roundup), in quantities that would otherwise kill them. GMO Bt crops, on the other hand, are engineered to produce an insecticidal toxin within the plant. Rather than decreasing toxic pesticides in streams, the former products contribute to their presence. Glyphosate is now widely detected in our country's water, according to government scientists. And recently, a major, independent body of scientists determined that glyphosate is probably carcinogenic, raising the stakes.

Compounding these problems, herbicide-resistant GMOs have led to an explosion in herbicide use due to the emergence of herbicide-resistant weeds. Monsanto genetically engineered corn, soy, cotton, and more recently alfalfa and sugar beets, to resist herbicides, and by 2012 their use led to an estimated 527 million more pounds of herbicide being used in the U.S. than if these crops had not been commercialized.

This was great news for Monsanto, which sells both GMO seeds and pesticides, but not for the environment. The emergence of glyphosate-resistant weeds has led us backward, away from weed control strategies that work with the environment, and toward monoculture (farming that relies on growing the same crop every year)—the opposite of the diverse cropping system Nye says he wants.

To deal with the problem of resistant weeds, Monsanto and other pesticide companies are doubling down with GMO crops that can withstand a combination of glyphosate and old herbicides like dicamba and 2,4-D, setting the stage for the evolution of weeds resistant to multiple herbicides and

even further escalation of herbicide use.

These glyphosate-resistant weeds are a direct result of GMO crops and the herbicide used on them. Resistant weeds arise in response to herbicide use—susceptible weeds are killed, leaving rare individuals that carry a resistance gene. The greater and more continuous the herbicide use, the faster resistant weeds arise, and the faster they spread. GMO crops allowed much greater use of glyphosate, and encouraged more continuous use because of their convenience. There was only one weed resistant to glyphosate prior to the emergence of genetic engineering, despite the fact that it had been sprayed for nearly 20 years beforehand. There are now 14 glyphosate-resistant weeds in the U.S. alone.

As these weeds appear on more farms, the market for herbicides is exploding—a fact that might explain Monsanto's desire to acquire Syngenta, the world's largest seller of pesticides (a large class of chemicals that include herbicides).

It is hard to see how Nye could have so misunderstood this. After all, herbicide resistance is the primary commercial application of GMO crops in the U.S. and worldwide.

Nye understands that industrial agriculture causes big ills, including reduced biological diversity and increased chemical pollution. But he fails to recognize that the major applications of GMO crops are intimately entwined with that system, and actually contribute to it.

The Monarch Connection

Nye commendably noted his concern about the 90 percent decline in the population of the monarch butterfly, which he calls "catastrophic."

Several research studies have linked the loss of milkweed, the sole food of monarch caterpillars, directly to glyphosate use on engineered crops. But Nye inexplicably dismisses the connection between monarch decline and GMOs, and lets biotech off the hook by blaming the monarch demise on industrial monoculture generally. In the Huffington Post video, he blames it on, "the efficiency of farming and the expansion of cities."

But glyphosate is especially toxic to milkweed. In Iowa and the surrounding states through which monarchs migrate, glyphosate has virtually eliminated milkweed from corn and soy fields. Before GMO crops were introduced 20 years ago, enough milkweed remained in crop fields to support a healthy population of monarchs despite the use of "efficient," "modern" farming.

Nye spoke favorably about the plans Monsanto and Cargill have announced to establish new habitat for butterflies now that the milkweed is gone. And indeed habitat enhancement is welcome. But there is likely too little land for milkweed outside crop fields to support the butterflies, because so much of the Midwest is devoted to corn and soybeans.

Nye did not mention that the best way to protect the monarch is to limit the use of glyphosate (and other pesticides) and allow milkweed to harmlessly exist alongside crops in the fields.

Nye also gives GMO crops undue credit for raising productivity over the last 150 years, when in fact it has only been commercialized for about 20 years. In fact, genetic engineering has contributed only marginally to crop productivity since it was first commercialized, for only a few crops, and much less than other technologies.

So back to the original question: What did Bill Nye learn from Monsanto?

Everyone has a right to change their minds. But Nye is an important science educator who could contribute positively to the understanding of the complex issues swirling around the GMO debate. Either way, if he's going wade into the debate, he has to get the science right.

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