Why activists, but few farmers, complain they can't save patented seeds

Pity the poor farmer who saves seeds. According to anti-GMO activists, the hapless seed saver who's simply trying to raise crops more cheaply by not paying for new seeds each year, is being oppressed by evil "Big Ag" — companies that only want to sell their hybrid and patented seeds (often, but not always, genetically modified) every year.

Of course, GMOs are implicated as the cause of all this, because all of their seeds are patented. Oh, greed!

But there's another reason to pity the poor seed-saving farmers: They are probably going to see crops with reduced yields, increased susceptibility to disease — and are even risking an increase in crop failure. And this is not because of Monsanto, GMOs or patent law.

It's because of some basic biology lessons we all learned in high school. Or should have.

Blogs like this one in Alternet claim that "for as long as humans have been growing food, farmers have saved seeds from their harvest to sow the following year." The meme, and it's a familiar one in anti-GMO circles, goes on to accuse large agricultural companies of changing the game by developing crop varieties and receiving patent protection to prevent farmers from saving the seeds they purchased. Some critics even imply that these nasty companies have developed "terminator" seeds–sterile seeds designed so they can't grow again.

But because of that 19th-century Austrian monk we should all remember from high school, there's another, better reason why seeds shouldn't be saved.

Around the same time Gregor Mendel was doing his work, in the United States, farmers moving westward began farming plants new to the New World. Many saved seeds, which had variable results. The U.S. government (and some states) began distributing seeds and plants for free, in the hope that farmers would use the latest, most improved varieties. Those county and state fairs where you can now eat deep-fried chocolate bars? They owe their origin to government officials trying to get the best plants to farmers everywhere.

The U.S. population gradually changed from an agrarian to an industrial, consumer-based economy, and the need for more consistent, large-scale agriculture grew stronger. The focus shifted to improving seed varieties.

F1 hybrid

The F1 (first generation) hybrid is a product of Mendelian genetics. You start with two parents that are homozygous for a trait you like, such as color or taste (let's say, AA and aa, BB and bb). Breed the homozygous parents (aka, F0), and all the offspring have the trait you want (Aa or Bb). The traits you want are in that first generation (F1) plant. The main difference here between "open pollination" and this method is that you start with inbred homozygous parent plants, and carefully control how pollen gets to

the offspring.

Trying this with a generation bred from F1 plants leads to worse results. The first generation from F1 (aka, the second generation) will have half of the traits you want. Keep breeding like this, and you stand greater chances of losing the traits you want, and growing traits you don't.

This is why farmers don't save seeds. Using saved seeds are less reliable. Many times the traits you must value are just lost, or the risk of less than high quality crops is high. Farmers are hard nosed business people; they can't afford to risk weak harvests; they are willing to pay a premium for seeds that grow true.

Researchers have documented a distinct advantage to using hybrid seeds over "bin-fed" or saved standard seeds. A Wisconsin agronomist looked at data collected by North Carolina State University researchers, and "found a 1.9 bushel per acre advantage to certified seed over bin-run seed. In some cases, they were higher. Conley notes Wisconsin data showed a 2.2 bushel per acre advantage for certified over bin-run seed."

The USDA helped pioneer the development hybrids decades before and independently of genetic engineering, contrary to the propaganda espoused by anti-GMO foods organizations. Researchers found that better F1s arose from controlling pollination of parent plants, usually by physical means including tenting parent plants, removing pollen-containing organs, and isolating hybrid plants from other varieties in a crop.

This process doesn't happen overnight (hence the case for genetic engineering, which can cut development time down from decades to less than a year in some cases). Hybrids have to be pollinated by hand, and not every hybrid is a winner. Similar to pharmaceutical production, a successful F1 hybrid may take more than 10 years to develop. The justification for patenting new drugs and hybrid or GMO seeds is identical. Agricultural hybrids can cost about $150 million to produce. While that figure pales in comparison to the $1 billion it takes to develop a new drug, it still underscores the need for intellectual property protections of new products. And these protections are available to any hybrid, not just those that were produced through genetic engineering.

Now that the patent for "Roundup soybeans" has expired, does that mean we will have a flood of farmers saving the off patent seeds for the next harvest? That's already happening of course. But with each succeeding generation, the quality will erode. Then it's back to the higher quality patented seeds.

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