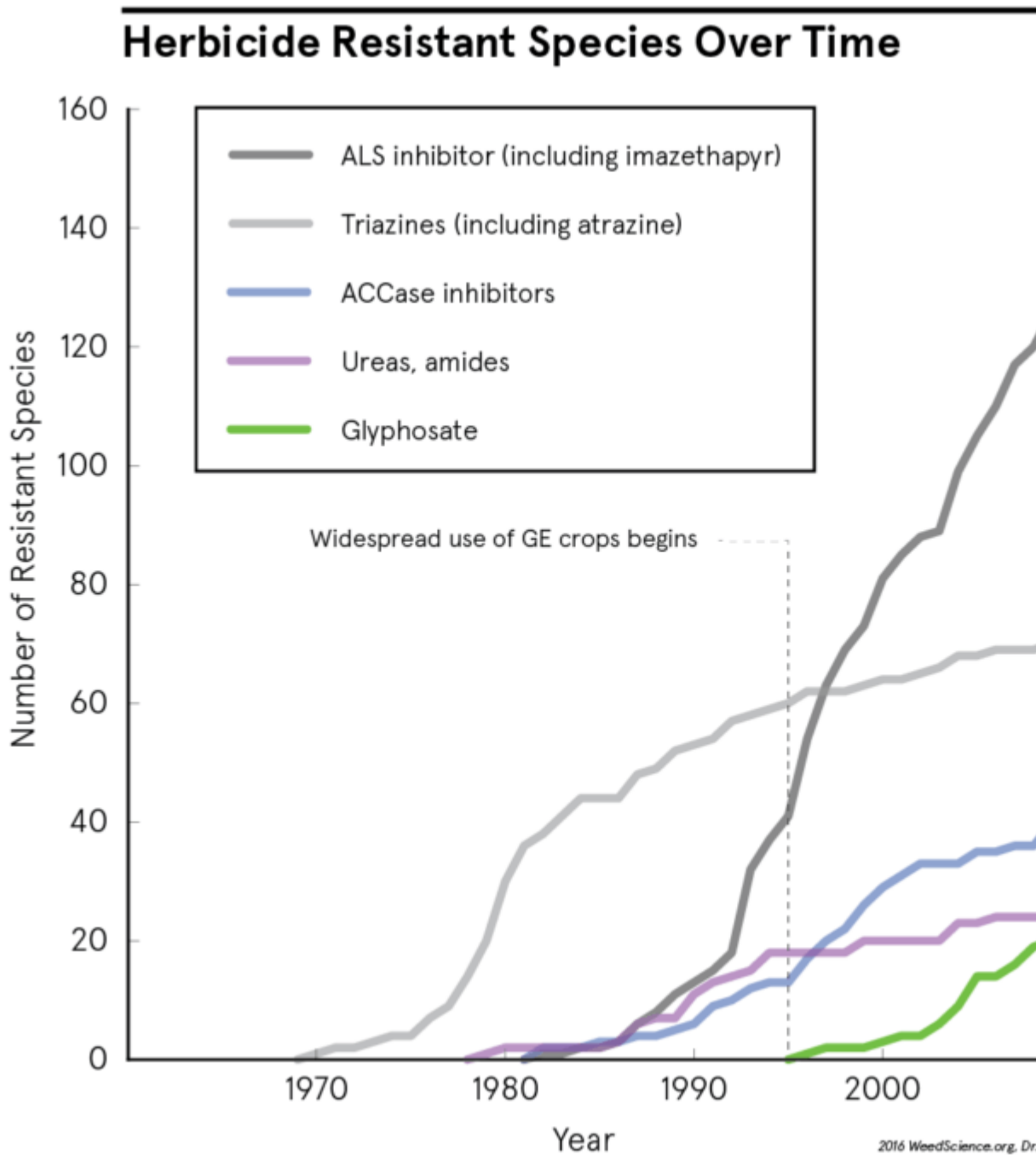
What are “Superweeds”?

Scientists generally scorn the term superweeds, arguing that it suggests a weed is exceptionally strong or even invulnerable. Rather, these weeds have developed a resistance to a particular herbicide. According to Andrew Kniss, Associate Professor of Weed Biology and Ecology at the University of Wyoming, and known for his independent views:

> the superweeds in most recent news articles aren’t really any different than the herbicide-resistant weeds we’ve been battling for 50 years. That doesn’t mean herbicide-resistant weeds aren’t a problem, quite the contrary. But it isn’t **because** they are resistant that they are problematic; weeds are problematic because they grow tall, they are aggressive, they damage harvest equipment, they produce a lot of seeds, etc. Weeds, in general, are pretty super. And they possess these traits whether they are herbicide-resistant or not.

The first herbicide resistant weeds identified in the United States were a variety of the spreading dayflower, found in Hawaii in 1957, with resistance to the herbicide 2,4-D. But while hardy weeds predate the 1974 introduction of glyphosate, they have spread rapidly and steadily in the decades that followed. The popular herbicide glyphosate was first paired with some GMO crops in 1996, but as the chart illustrates, it’s just one of many herbicidal products to which plants, naturally, developed resistance. The chart demonstrates that hundreds of weed species have developed tolerance to several classes of herbicide over the past four decades.



Before herbicide-tolerant GMO crops were introduced in the 1990s, farmers fought weeds by adding herbicides to the soil before planting or before weeds emerged. They'd spray again to fight weeds that survived the initial applications. And again if necessary during the growing season. It was a costly strategy that damaged some crops and was not ecologically sustainable.

The new era of genetically modified crops allowed farmers to spray their fields before and after planting with a herbicide (at first only glyphosate), that didn't harm crops. And since it doesn't need to be

incorporated into the ground, it opened the door to conservation tillage, which cut back on greenhouse gas emissions. More than 80 percent of farmers who use GMO soybeans, for example, use no-till or low-till conservation practices more than double the rate of non-conventional soybean farmers. Glyphosate is also less persistent in the soil and water than most herbicides.

One problem that emerged was tied to Monsanto's early belief that weeds were unlikely to develop resistance to Roundup. Some farmers relied too heavily on the herbicide, and took less care in instituting other pest management practices that might have delayed the rise in glyphosate-resistant weeds.

Today, the general consensus of weed scientists is that herbicide resistance is inevitable when farmers rely too heavily on one chemical for weed management. "Sole reliance on glyphosate by many producers is believed to be the primary factor in the evolution of weed resistance to glyphosate," according to a report by the U.S. Department of Agriculture's Economic Research Service. There have been suggestions that farmers could greatly reduce the problem by alternating crops and herbicides each year. But even that may not be enough. Studies have shown that mixing herbicides is better than rotating them to prevent herbicide resistance.

To fight glyphosate weed resistance, crop scientists have developed newer genetically engineered seeds that "stack" two or three of traits resistant to different herbicides, including glyphosate, 2,4-D, dicamba or glufosinate. Many scientists, including Kniss, believe those new stacked herbicides, sold as Enlist Duo by Dow AgroSciences and Roundup Extend by Monsanto, may be one of the more effective options available in the fight against herbicide resistant weeds:

> The only way to assuredly prevent herbicide resistance from evolving is never to apply the herbicide; but if we are going to use a herbicide, the best way to minimize herbicide resistant weed evolution may be to increase herbicide use. Since herbicide rotations are ineffective on their own, the most practical way to maintain the value of current herbicides is to mix them with other effective herbicides.

It's an approach that has its critics. The Pesticide Action Network, among other advocacy groups and some scientists, warns that adding more herbicides to the mix products puts farmers on a pesticide treadmill.

> Also referred to as the "pesticide trap," farmers get caught on the treadmill as they are forced to use more and more and increasingly toxic chemicals to control insects and weeds that develop resistance to pesticides. As "superbugs" and "superweeds" develop in response to widespread and continuous use of chemicals, a farmer will spend more on pesticides each year just to keep crop losses at a standard rate.
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> The recent introduction of crops genetically engineered for use with the herbicide 2,4-D provides a clear example of the pesticide treadmill. Widespread planting of RoundUp Ready crops and the associated application of RoundUp prompted weeds to develop resistance to the product. Farmers are forced to return to use of 2,4-D an antiquated, drift-prone chemical clearly linked to cancer and reproductive harms.

Some mainstream scientists are skeptical as well. “What is more troubling is that 2,4-D and dicamba are older and less environmentally friendly,” said David Mortensen, Professor of Weed Ecology at Penn State University.