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Superweed Outbreak Triggers Arms Race

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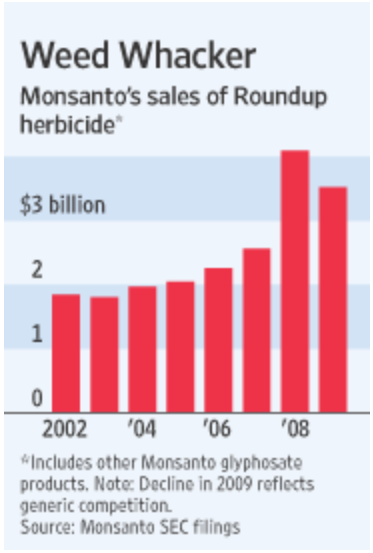
Associated Press

Hardy superweeds immune to the Farm Belt's most effective weedkiller are invading fields, prompting a counterattack from agribusiness that could leave farmers using greater amounts of harsh old-line herbicides.

The flagging weedkiller is Roundup. Its developer, Monsanto Co., also sells seeds for corn, soybean and cotton plants unaffected by the chemical, enabling farmers to spray it on freely without fear of harming their crops. Farmers now do so en masse, using "Roundup Ready" crop varieties for 90% of the soybeans and 80% of the corn grown across the U.S.

The rise of Roundup, more than a decade ago, sent older herbicides that damage both weeds and crops into deep eclipse. But now, as nasty invaders with names like pigweed, horseweed and Johnsongrass develop immunity to the mighty Roundup, chemical companies are dusting off the potent herbicides of old for an attack on the new superweeds.



And big chemical companies—taking a page from Monsanto's book—are engineering crop varieties that will enable farmers to spray on the tough old weedkillers freely, instead of having to apply them surgically in order to spare crops.

Dow Chemical Co., DuPont Co., Bayer AG, BASF SE and Syngenta AG are together spending hundreds of millions of dollars to develop genetically modified soybean, corn and cotton seeds that can survive a dousing by their herbicides, many decades old.

"It will be a very significant opportunity" for chemical companies, says John Jachetta, a scientist at Dow Chemical's Dow AgroSciences and president of the Weed Science Society of America. "It is a new era."

The bioengineering push is causing controversy, though. Some of the old pesticides—in particular, those called 2,4-D and dicamba—have a history of posing more risks for the environment than the chemical in Roundup. That's partly because they have more of a tendency to drift on the wind onto neighboring farms or wild vegetation. Roundup tends to adhere better to the ground.

The chemical companies are betting their biotech investments will pay off in two ways: Farmers will buy more of their herbicides, and will pay big premiums for the new seeds.

Some 40% of U.S. land planted to corn and soybeans is likely to harbor at least some Roundup-resistant superweeds by the middle of this decade, executives at DuPont estimate. That could create big demand for the herbicides that can kill the evolved weeds—and for the seeds of crops that permit free use of those herbicides.

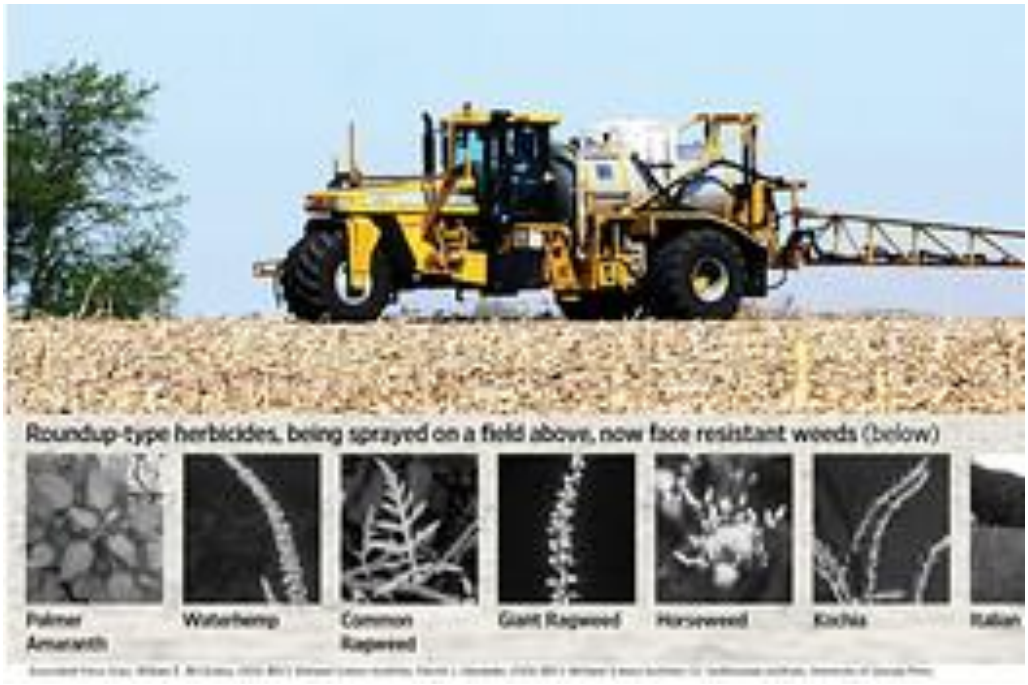
The new herbicide-tolerant seeds "would make controlling weeds very easy for farmers," says David Mortensen, a weed scientist at Pennsylvania State University. As a result, he says, the amount of herbicide sprayed on just one major crop, soybeans, could climb roughly 70%.

The burst of efforts by rivals isn't necessarily bad for Monsanto's crop-biotech business, at least in the short term. The chemical in Roundup remains able to kill hundreds of kinds of weeds and will remain a central part of the farmer's arsenal. Most companies developing crops tolerant of other herbicides want to build them on a Roundup Ready platform, so to speak—putting their new herbicide-tolerant genes into crops that already carry tolerance for Roundup.

Yet the developments portend further turmoil in the $12 billion U.S. pesticide industry. Monsanto already is cutting prices for Roundup to compete with a flood of cheap Chinese-made generics. The patent for Roundup expired years ago. The St. Louis company has cut its earnings outlook recently to reflect both generic competition and a backlash by farmers against the steep prices it charges for genetically modified seeds. Its stock has dropped 39% this year.

Monsanto also is facing the 2014 expiration of the patent on the key gene in seeds for soybeans tolerant of the weedkiller.

Round-type herbicides, being sprayed on a field above, now face resistant weeds.

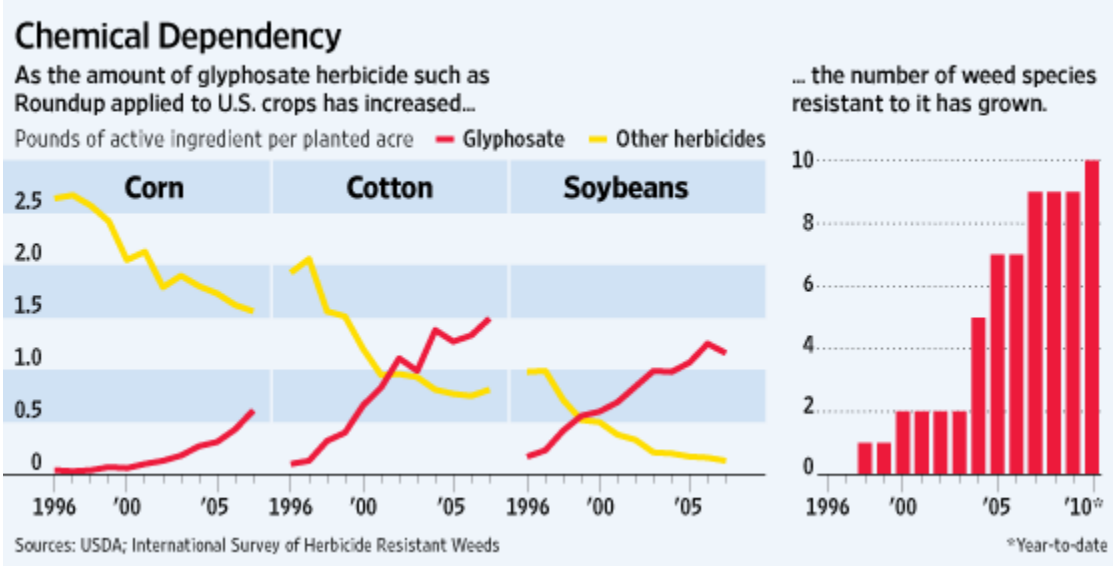


It was back in the 1990s that Monsanto upended the herbicide industry and farming practices by offering its first genetically modified product—soybean seeds into which scientists had transplanted genetic material from microorganisms and petunias. The seeds sprouted soybean plants that could survive exposure to Roundup. Chemically known as glyphosate, Roundup was known for its ability to kill almost anything green yet leave a relatively small environmental footprint, being less toxic to wildlife and people than most weedkillers. "If glyphosate isn't the safest herbicide, it is damn close," says Charles Benbrook, chief scientist of the Organic Center, a nonprofit organic advocacy group.

The new seeds meant farmers could leave behind the risk and guesswork of choosing the right herbicides to spray, at exactly the right time, on the right weeds. Weed control became so easy that many farmers sold off their weed-tilling implements and stopped buying other pesticides.

The chemical weed control even had some environmental pluses because it left the soil undisturbed, reducing erosion. Farmers burned less fuel, no longer needing to crisscross fields with implements that root out weeds. The Roundup revolution, as some called it, freed up time for growers to plant more land, helping spur bigger farms.

Monsanto's sales and profits soared while other herbicide makers suffered. DuPont's leading herbicide for soybean farmers, called Classic, lost about 90% of its business. Some industry players were swept into mergers, and research spending wilted. Today, Roundup and its generic competitors are used on nearly four times as many U.S. acres as any other herbicide.



But weeds are adapting. At least nine species have developed immunity to it. They've spread to millions of acres in more than 20 states in the Midwest and South.

Ron Holthouse, a farmer who grows cotton and soybeans on 8,600 acres near Osceola, Ark., says he spends hundreds of thousands of dollars annually on the herbicide. But after 10 years of use on his land, Roundup no longer controls pigweed, which ran rampant in his fields last year.

The weed, which can grow six feet high on a stalk like a baseball bat, is tough enough to damage delicate parts of his cotton-picking equipment. Mr. Holthouse had to hire a crew of 20 laborers to attack the weeds with hoes, resorting to a practice from his father's generation. For the first time in years, Mr. Holthouse used some of an older, highly poisonous weedkiller called paraquat.

Many Southern farmers are spending twice as much on killing weeds as it typically cost them just a few years ago. "It is getting a lot harder and expensive to run a big farm," says Mr. Holthouse. "This is nerve-racking."

Farmers have no wish to return to labor-intensive methods. The success of expensive seeds that are Roundup-tolerant shows growers will pay a steep premium to control weeds chemically.

Chemical companies are tight-lipped about their development of crops that can tolerate the spraying of herbicides other than Roundup. BASF and Bayer filed petitions last year with biotech regulators at the U.S. Department of Agriculture, seeking permission to market new herbicide-tolerant seeds. The USDA hasn't yet released its environmental assessments. Several of the genetically modified plants are still in field trials or in the laboratory.

Dow AgroSciences manufactures 2,4-D, a powerful herbicide introduced nearly 65 years ago. The company hopes by 2013 to be selling seeds for corn crops that will be unaffected if farmers splash 2,4-D on their fields. The company hopes to have seeds for soybeans tolerant of the herbicide a year later, and is also working on a herbicide-tolerant cotton variety.

It won't predict how the new seeds might help its sales of 2,4-D, but it's optimistic enough that it's developing a new form of the herbicide.

Some winery owners are concerned that such efforts will renew farmer demand for 2,4-D, to which grapes are highly sensitive if the herbicide drifts from a farm sprayer onto vines. "I couldn't survive in this business if 2,4-D resistant seed catches on in cotton country," says Neal Newsom, whose 100-acre vineyard in Plains, Texas, is surrounded by cotton fields. "A neighbor could take me out in one night."

The Natural Resources Defense Council petitioned the Environmental Protection Agency in 2008 to ban 2,4-D, citing research that suggests it disrupts hormones in trout, rodents and sheep. Dow says it is providing rebuttal data to the agency. A spokesman for the EPA said it anticipates responding to the petition this fall.

Both 2,4-D and dicamba, another older herbicide, are common ingredients in weedkillers at lawn-and-garden stores, which homeowners are careful to keep away from flowers and vegetables. Chemical companies say both are safe in larger amounts if farmers follow usage instructions cleared years ago by the EPA.

Allthough dicamba could kill superweeds such as Mr. Holthouse's pigweed, soybean farmers haven't sprayed it because it kills soybeans, too. A dicamba-tolerant soybean variety would change that. Monsanto itself is developing one.

Bayer is developing soybeans that can survive exposure to a herbicide that disables weeds' defense to ultraviolet rays, setting them up for a fatal sunburn. Bayer hopes to have those soybean seeds on the market in 2015 and later give corn and cotton plants immunity to the same herbicide, called isoxaflutole.

As for Monsanto, its chairman and chief executive, Hugh Grant, hinted in a call with analysts last week that the company is considering whether to begin selling farmers cheap, off-patent weedkillers that can kill Roundup-tolerant weeds. On Thursday a Monsanto spokeswoman, Kelli Powers, said, "We remain committed to working with farmers to manage weed resistance,"

adding, "We have a shared interest with farmers in continuing to deliver environmental and production benefits on the farm with glyphosate."

Monsanto, in fact, is launching a second generation of Roundup Ready seeds. Competitors continue to try to develop their own plant varieties tolerant of the chemical in Roundup. DuPont's big Pioneer Hi-Bred seed business, for example, plans to begin selling seed for soybean and corn plants that can tolerate exposure to both the Roundup chemical and other herbicides.

Swiss-based Syngenta, meanwhile, is field-testing soybeans genetically engineered to tolerate exposure to a relatively new herbicide Syngenta makes called Callisto.

"The herbicide business used to be good before Roundup nearly wiped it out," says Dan Dyer, head of soybean research and development at Syngenta. "Now it is getting fun again."

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