

Glyphosate: A timeline of a pesticide's rise and legal cases

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One of agriculture's chief inputs is not only a mainstay in the field, it's had its fair share of trips to the courtroom as well.

Glyphosate, a chemical that was first used to clean out mineral deposits in pipes and boilers, is commonly used as a herbicide to protect a farmer's crops from being overtaken by noxious weeds. Glyphosate comes in many forms but is most commonly

applied as an acid or a salt. It is a nonselective herbicide, meaning it will kill most plants that it comes in contact with unless that plant has been genetically modified for resistance.

"Roundup was the first herbicide to control weeds above and below the ground which made it possible, for the first time, to control tough yield-robbing perennial weeds like Johnsongrass, Quackgrass, Canada Thistle, Field Bindweed and many other tough to control weed species," explained Glenn Stith, a former Monsanto crop protection executive who is president of Top Hand Consulting and also works as a consultant for The Context Network.

"Because of the broad spectrum of weeds controlled and the fact that it was virtually inactive in the soil, Roundup was used as a replacement for pre-plant tillage in many annual cropping systems around the world."

The herbicide became popular among producers for its ability to manage noxious weeds on a large agricultural scale, saving time and money. Before, Monsanto commercialized Roundup, of which glyphosate is a key ingredient, farmers would manage weeds by tilling up the ground, making multiple passes across a field with large machinery and exposing the topsoil — which could lead to soil erosion and compaction. Or, a producer would use a variety of selective herbicides, which each targets a specific weed, resulting in multiple trips across a field and greater use of resources like fuel, labor, and time. In other situations, producers would have to physically walk a field and hand remove weeds.

"The advent of Roundup Ready Soy, Cotton, Corn and Canola revolutionized in-crop weed management by simplifying operations, lowering overall chemical costs and reducing the number of trips across the field, triggering a major expansion in zero till and other forms of conservation tillage agriculture in these major broad acre crops," noted Stith. "Roundup has also been widely used to control weeds in perennial specialty crops such as tree nuts, tree fruits, citrus and grapes as well as landscape, ornamental nursery, forestry, roadside and turf management."

Since the advent of glyphosate-tolerant crops such as corn, cotton, and soybeans in the mid-1990s, agricultural use has increased steadily. By 2016, glyphosate accounted for nearly 44% of the total herbicide use on crops, according to the U.S. Geological Survey.

But the discourse around glyphosate took a different turn after concerns over the safety of the product and its cancer risks. According to a [2017 determination from the Environmental Protection Agency, glyphosate is not likely to be carcinogenic to humans](#). But in a different study completed in [March 2015 by the International Agency for Research on Cancer, a group of 17 scientists classified glyphosate as "probably carcinogenic to humans."](#) EPA said it "considered a significantly more extensive and relevant data set than the International Agency for Research on Cancer," including studies submitted to support registration of glyphosate and studies EPA identified in the open literature.

Glyphosate's safety has also been challenged in the U.S. court system. In 2016, Dewayne "Lee" Johnson, a groundskeeper for Benicia Unified School District in the San Francisco Bay area, claimed exposure to Roundup — the trade name for Monsanto's glyphosate-based herbicide — caused his non-Hodgkin Lymphoma.

During the first set of Roundup court cases, [Monsanto was in the process of being acquired by German pharmaceutical company Bayer](#). Once the acquisition was complete, Bayer also acquired the Roundup lawsuits filed against Monsanto.

Today, Bayer is under pressure to address what it estimates as about 30,000 currently unsettled claims — [and any future claims](#) — that the company's Roundup products caused Non-Hodgkin lymphoma. In addition to [announcing it will withdraw glyphosate-based products from the residential market](#), it has said it is working to find alternatives to glyphosate while continuing to insist the chemical is safe to use as directed. (Bayer says about 107,000 cases have been settled.)

[The company also was hoping the Supreme Court would review a federal appeals court decision](#) that concluded the Federal Insecticide, Fungicide, and Rodenticide Act does not preempt state law tort claims, as were brought in three widely publicized cases that resulted in massive jury verdicts for plaintiffs. The court, however, [rejected that petition \(the *Hardeman* case\)](#) and followed that up by [denying a second petition from Monsanto](#) that made similar arguments about a California Court of Appeal decision (the *Pilliod* case).

How did we get here? The timeline below includes some of the more significant events, starting with Monsanto's founding.

Roundup History Timeline

1901: The Monsanto Chemical Works company was founded.

1933: Name changed to the Monsanto Chemical Co. During World War II, Monsanto produced styrene, a component of synthetic rubber, which was vital in supporting the war.

1961: Glyphosate was patented in the U.S. by the Stauffer Chemical Co. and was used as a descaling agent to clean out calcium and other mineral deposits in pipes and boilers of residential and commercial hot water systems.

1970: Monsanto scientist John Franz discovered glyphosate could be used as an herbicide and patented the discovery.

1974: Monsanto brought glyphosate to market under the trade name Roundup.

1985: The Environmental Protection Agency classified glyphosate as a Group C Carcinogen, meaning it has “suggestive evidence of carcinogenic potential.”

1991: EPA changed carcinogenic classification to Group E, meaning "evidence of non-carcinogenicity for humans."

1996: Asgrow introduced Roundup Ready soybeans to the market, which have been genetically modified to resist the effects of Roundup.

1997: Monsanto bought Asgrow from Mexican firm Empresas La Moderna SA. Monsanto also bought Calgene, a biotechnology company based in Davis, California, that was the first company in the United States to commercialize a genetically modified organism.

1997: Roundup Ready cotton commercialized.

1997: Roundup Ready canola first commercialized in Canada.

1998: Monsanto acquires DEKALB Genetics Corporation for \$2.3 billion and also buys out Cargill’s international seed business, making Monsanto the world’s third-largest seed company and fourth-largest pesticide company.

1998: Through the acquisition of biotechnology research companies, including Ecogen, Agracetus, and the Plant Breeding Institute, Monsanto also acquired the rights to recently developed seed technologies.

1998: Roundup Ready corn introduced to the market.

2000: Monsanto's glyphosate went off patent in 2000. Several product variants entered the market.

2004: Monsanto established American Seeds, Inc. (ASI), a holding company established to support regional seed businesses with capital, genetics and technology investments. Its first venture involved acquiring Channel Bio Corp., a leading U.S. seed company based in Kentland, Indiana.

2005: Roundup Ready alfalfa commercialized.

2005: Roundup Ready sugarbeets commercialized.

Jan. 28, 2016: San Francisco groundskeeper Dewayne “Lee” Johnson filed a lawsuit in California state court against Monsanto alleging his exposure to Monsanto’s Roundup weed killer and its active ingredient, glyphosate, caused him to develop Non-Hodgkin lymphoma, with which Johnson was first diagnosed in August 2014.

Sept. 14, 2016: [Bayer and Monsanto announce a definitive merger agreement under which Bayer will acquire Monsanto.](#)

June 7, 2018: [Bayer completed the acquisition of Monsanto for \\$63 billion.](#)

Johnson v. Monsanto

July 9, 2018: Johnson v. Monsanto trial begins.

Aug. 10, 2018: [Jury determines that Monsanto failed to adequately warn Johnson of the dangers of Roundup and awards him about \\$289 million](#) (\$39.2 million in compensatory damages and \$250 million in punitive damages). Monsanto appeals the verdict.

Related Articles

[Judge rules glyphosate cancer cases can move forward](#)[Bayer: Glyphosate cases have more than doubled](#)

Oct. 26, 2018: [Judge upholds the jury's verdict but reduced the punitive damages award, bringing the total award to \\$78.5 million.](#)

April 23, 2019: [Monsanto filed its second appeal.](#)

May 24, 2019: Johnson cross-appeals.

June 2, 2020: [The California Court of Appeal First Appellate District begins hearing for Johnson v. Monsanto.](#)

July 20, 2020: [Monsanto/Bayer AG loses appeal in Johnson v. Monsanto.](#) Award is reduced to \$20.5 million.

Edwin Hardeman v. Monsanto

February 2015: Edwin Hardeman, Sonoma County, California resident, diagnosed with non-Hodgkin's Lymphoma.

Feb. 12, 2016: Hardeman files lawsuit against Monsanto.

Feb. 25, 2019: Edwin Hardeman v. Monsanto jury trial begins.

March 19, 2019: [Jury finds Hardeman's exposure to Roundup was a "substantial factor"](#) in causing his Non-Hodgkin lymphoma

March 27, 2019: [The jury returned a verdict of approximately \\$80 million](#), including punitive damages of \$75 million. [U.S. District Judge Vince Chhabria reduced the punitive damages awarded to Hardeman to \\$20 million.](#)

May 14, 2021: In a major victory for plaintiff Hardeman, [the 9th U.S. Circuit Court of Appeals upheld the lower court verdict that found Roundup was a “substantial factor” in causing his NHL](#) and the Federal Insecticide, Fungicide, and Rodenticide Act does not preempt state law claims.

Aug. 16, 2021: [Monsanto files petition with Supreme Court seeking review of 9th Circuit decision](#) that upheld a \$25 million award to Hardeman. In the petition, [Bayer said federal pesticide law preempts state-law claims such as those brought by Edwin Hardeman](#), who alleged Monsanto failed to warn him and other consumers of the risk of contracting cancer from exposure to Roundup. [The Ninth Circuit ruled in Hardeman’s favor in May.](#)

Dec. 13, 2021: Supreme Court seeks views of Solicitor General of U.S. before deciding whether to grant petition.

May 10, 2022: [Solicitor General Elizabeth Prelogar concludes FIFRA does not preempt state law claims](#), suggests Supreme Court does not need to hear arguments in the case.

May 23, 2022: [Ag groups ask Biden administration to withdraw Prelogar's brief](#), calling it a "stunning" and "dangerous" shift in U.S. policy toward pesticide labeling.

June 21, 2022: [Supreme Court denies petition.](#)

Pilliod v. Monsanto

June 2, 2017: Alva and Alberta Pilliod sue Monsanto over Roundup in Alameda County Superior Court stating it caused both of their non-Hodgkin lymphomas. Alberta Pilliod was diagnosed with Non-Hodgkin lymphoma brain cancer in 2015 and Alva Pilliod was diagnosed in 2011.

March 28, 2019: Pilliod v. Monsanto state court trial begins.

April 4, 2019: Chhabria asks Monsanto and its new owner Bayer AG to begin mediation with lawyers for cancer victims who have sued Monsanto alleging Roundup and other glyphosate-based herbicides cause Non-Hodgkin lymphoma.

April 12, 2019: Chhabria issues a formal order of mediation to seek a settlement between Bayer AG and lawyers representing thousands of cancer victims

May 13, 2019: [Jury sides with Pilliods and orders Monsanto to pay slightly over \\$2 billion](#) (\$1 billion to each) in punitive and a combined \$55 million in compensatory damages.

July 26, 2019: [Alameda County Superior Court Judge Winifred Smith reduced the punitive damages](#) to \$70 million and also reduced the compensatory award to \$17 million.

Aug. 9, 2021: California appellate court rejects Monsanto appeal of decision.

Nov. 17, 2021: California Supreme Court decides not to review appellate court decision.

March 21, 2022: [Monsanto files petition in Supreme Court.](#)

June 27, 2022: [Supreme Court denies petition.](#)

Stevick v. Monsanto

December 2014: Elaine Stevick of Petaluma, California, diagnosed at the age of 63 with multiple brain tumors due to a type of Non-Hodgkin lymphoma called central nervous system lymphoma.

April 2016: Stevick sues Monsanto.

May 2019: Stevick was supposed to be the next trial in line to take on Monsanto. But with Chhabria's order of mediation to Bayer, he also vacated Stevick's May 20 trial date.

June 24, 2020: Bayer announced a settlement between \$8.8 billion and \$9.6 billion to address close to 100,000 existing claims that exposure to Roundup caused their Non-Hodgkin lymphoma. Another \$1.25 billion was set aside to address claims by potential future plaintiffs, which would have included a maximum of \$150 million in attorney fees.

May 26, 2021: [Chhabria rejects Monsanto/Bayer's proposal to deal with future cases.](#)

July 29, 2021: [Bayer announces it will remove glyphosate from the U.S. residential lawn and garden marketplace, effective January 2023.](#)

Oct. 8, 2021: [Monsanto wins case](#) after jury concludes the herbicide was not a "substantial factor" in the cancer of 10-year-old Ezra Clark.

Dec. 9, 2021: California jury rules for Monsanto in case brought by Donetta Stephens claiming exposure to Roundup caused her NHL.

June 9, 2022: Jury in state court in Missouri finds for Monsanto in a complaint brought by Allan Shelton, who claimed exposure to Roundup caused his NHL.

June 17, 2022: [Bayer wins case in state court in Oregon \(Johnson v. Monsanto\).](#)