

Roundup Ready soybean

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GTS 40-3-2 (OECD UI: **MON-04032-6**, also known as **Roundup Ready Soybean**) is a genetically engineered variety of glyphosate-resistant soybeans produced by Monsanto.

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Genetic modification

Glyphosate kills plants by interfering with the synthesis of the essential amino acids phenylalanine, tyrosine and tryptophan. These amino acids are called "essential" because animals cannot make them; only plants and microorganisms can make them and animals obtain them by eating plants.^[1]

Plants and microorganisms make these amino acids with an enzyme that only plants and lower organisms have, called 5-enolpyruvylshikimate-3-phosphate synthase (EPSPS).^[2] EPSPS is not present in animals, which instead obtain aromatic amino acids from their diet.^[3]

Roundup Ready Soybeans express a version of EPSPS from the CP4 strain of the bacteria, *Agrobacterium tumefaciens*, expression of which is regulated by an enhanced 35S promoter (E35S) from cauliflower mosaic virus (CaMV), a chloroplast transit peptide (CTP4) coding sequence from *Petunia hybrida*, and a nopaline synthase (nos 3') transcriptional termination element from *Agrobacterium tumefaciens*.^[4] The plasmid with EPSPS and the other genetic elements mentioned above was inserted into soybean germplasm with a gene gun by scientists at Monsanto and Asgrow.^{[5][6]}

History

First approved commercially in the United States during 1994, GTS 40-3-2 was subsequently introduced to Canada in 1995, Japan and Argentina in 1996, Uruguay in 1997, Mexico and Brazil in 1998, and South Africa in 2001.^[7]

Detection

GTS 40-3-2 can be detected using both nucleic acid and protein analysis methods.^{[8][9]}

Derivatives

At least one of Monsanto's Vistive varieties has been crossbred with GTS 40-3-2.^[7]

Regulation

Main article: Regulation of the release of genetic modified organisms

The regulation of genetically modified crops such as Roundup Ready soybeans concerns the approaches taken by governments to assess and manage the risks associated with the development and release of genetically modified crops. There are differences in the regulation of GM crops between countries, with some of the most marked differences occurring between the USA and Europe. Regulation varies in a given country depending on the intended use of the products of the genetic engineering. For example, a crop not intended for food use is generally not reviewed by authorities responsible for food safety.

Controversy

Main article: Genetically modified food controversies

Critics have objected to use of GM crops such as Roundup Ready soybeans on several grounds, including ethical concerns, ecological concerns, and economic concerns raised by the fact GM techniques and GM organisms are subject to intellectual property law. GMOs also are involved in controversies over GM food with respect to whether food produced from GM crops is safe, whether it should be labeled, and whether GM crops are needed to address the world's food needs. These controversies have led to litigation, international trade disputes, and protests, and to restrictive regulation of commercial products in most countries.

References

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External links

- GTS 40-3-2 (http://cera-gmc.org/index.php?action=gmc_crop_database&mode=ShowProd&data=GTS%2040-3-2&format=LONG) at the *Center for Environmental Risk Assessment*
- GTS 40-3-2 (<http://gmdd.shgmo.org/event/view/41>) at *Shanghai Jiao Tong University's GMO Detection Laboratory*

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Categories: Genetically modified organisms in agriculture | Soy products | Monsanto

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