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# Herbicide usage increases with herbicide tolerant genetically engineered plants

## After eight years of cultivation in the United States, a new evaluation on the impact of genetically engineered (GE) plants in agriculture shows dramatically increasing amounts of herbicides being used with herbicide tolerant GE crops.

GE herbicide resistant plants[1] were created to simplify the management of weeds within crop systems. The biotechnology companies developing the GE plants claimed that their GE varieties substantially reduce the use of herbicides[2]. However, a recent evaluation by Dr. Charles Benbrook[3] of pesticide usage in the United States over the first eight years (1996-2003) of commercial cultivation of GE crops, shows very different results.

Using US Department of Agriculture (USDA) statistics, the study showed that the use of GE herbicide tolerant crops (corn, soya and cotton) have **increased herbicide use in the US by over 30 million kilograms** (kg) over the past eight years. In the first three years of their growth (1996 to 1998), GE herbicide tolerant crops reduced the consumption of herbicides, compared with conventional crops, by an estimated 8.3 million kilogrammes (kg). However, in the last three years (2001-2003), the amount of these herbicides applied to the same GE varieties increased by 36.3 million kg, compared with conventional crops.[4]

The supposed environmental advantages of GE herbicide tolerant crops claimed by the biotechnology industry have not stood the test of time. After eight years of cultivation it has clearly been shown that the arguments used by independent scientists, environmental groups and associations for the defence of the consumer and environment were correct. Much more herbicide is being applied in the US now than before the introduction of GE herbicide tolerant crops.

**Monsanto's GE soya to blame for herbicide increases**

The largest contribution, by a long way, to this increase in herbicide application is the cultivation of GE herbicide resistant soybeans. Only one type of GE herbicide tolerant soya is commercially available: Monsanto's Roundup Ready soya, which is resistant to glyphosate (marketed by Monsanto as Roundup).

Some 300 million acres of Roundup Ready soybeans have been grown in the US since 1996. In fact, out of the entire area cultivated with GE crops in the US, 54% Monsanto's Roundup Ready soya. USDA data show an incredible 22 % increase in the amount of glyphosate applied acre to GE soya between 2001 and 2002. Hence, the large increase in the amount of glyphosate applied per acre of GE soya combined with the large acreage make Monsanto's GE Roundup Ready soya the main reason for escalating use of herbicides in the US.

The dramatic increase in herbicide use during the cultivation of GE glyphosate-resistant soya is primarily caused by a decreasing efficacy of glyphosate. This is caused by several factors including, changes in the composition of weed communities towards species either resistant[5] or tolerant[6] to glyphosate as the constant use of glyphosate selects those plants with least sensitivity or with a certain degree of protection against the herbicide. The reduction in the price of glyphosate associated with lower efficacy has caused farmers to use increasing quantities of herbicides in the

cultivation of GE crops.

The increased use of herbicides comes as no surprise. Scientists warned years ago[7] that cultivating GE plants resistant to herbicides would give rise to alterations in the composition of weed communities and increasing resistance to herbicides, leading to an increased quantity of herbicide in order to keep them under control. The adaptations of weeds to glyphosate are now so well documented that even the biotechnology companies themselves warn of the problem[8].

**In summary, claims made by the GE industry have proven false: there has been NO overall reduction in US herbicide usage over the last eight years since the introduction of GE herbicide tolerant crops. Herbicide usage is now increasing dramatically in the US, primarily because of the cultivation of Monsanto's Roundup Ready soya. This is yet another example of the false promises of GE crops.**

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[1] GE crops resistant to herbicides include Monsanto's Roundup Ready varieties for resistance to glyphosate, DowAgroScience's LibertyLink varieties for resistance to glufosinate-ammonium. Herbicide tolerant crops can also be insect resistant (i.e. stacked varieties).
[2] See, e.g. "Environmental Benefits Of Crops Developed Through Biotechnology" from the "Topics Library/Effects On The Environment" at http://www.biotechknowledge.monsanto.com/.
[3] Benbrook, C.M. (2003) Impacts of Genetically Engineered Crops on Pesticide Use in the United States: the First Eight Years. AgBioTech InfoNet Technical Paper Number 6 http://www.biotech-info.net/technicalpaper6.html
[4] Recalculated from Benbrook (2003) Table 15 for herbicides only. Includes acres planted to stacked varieties (e.g. herbicide tolerant and insect resistant).
[5] Resistance is when a weed is susceptible to the herbicide but a population evolves to acquire resistance to the herbicide.
[6] Tolerance is the natural capacity of a species to resist a herbicide. With the frequent application of the herbicide, the most susceptible plants die and the population of plants that are tolerant to ever-increasing doses of herbicide, increases.
[7] Robert S & Baumann U (1998) Resistance to the herbicide glyphosate. *Nature*, **395**, 25-26 and Heap, I.M. (1997) The occurrence of herbicide-resistant weeds worldwide. *Pesticide Science*, **51**, 235-243.
[8] http://www.syngentacropprotection-us.com/Resources/Prod/Touchdown/Land_Values.pdf; http://www.syngentacropprotection-us.com/media/article.asp?article_id=466.