

Genetically-engineered soya yields less



Studies demonstrate that Monsanto's 'Roundup Ready' (glyphosate-tolerant) soya has a 5-10% lower harvest compared to modern conventional soya lines. These lower-yielding GE (genetically-engineered) soya varieties cost farmers billions of dollars every year.

Evidence of lower yields, called 'yield drag', is an example of the unpredictability and unintended consequences of GE. Yield drag losses were and remain avoidable through the use of modern conventional varieties.

Yield drag documented

Yield drag surfaced quickly as GE soya was adopted in the US in the late 1990s. Early studies by Charles Benbrook, a former US government science advisor, and Roger Elmore at the University of Nebraska documented the problem.

Analysing multiple US field trials in 1999 Benbrook found an average yield drag of 5.3% for Roundup Ready soya and that, in some locations, the best conventional varieties beat Roundup Ready yields by more than 10% (Benbrook 1999).

In 2001, Elmore and colleagues directly compared sister Roundup Ready and conventional soya lines in field trials. They demonstrated that yield drag was due to GE and not to other factors (Elmore 2001a). Elmore also estimated the yield drag of Roundup Ready soya at 5% - 10%, depending upon exact variety and conditions (Elmore 2001b)

The cost of yield drag

In the US, where 95% of soya is Roundup Ready, farmers planted 30.6 million hectares of the crop in 2008, harvesting 80.54 million metric tonnes (USDA 2009). Yield drag thus chopped between 4 and 8 million metric tonnes (Mt) off the 2008 US soybean harvest. That loss is greater than annual US soya exports to the EU (3.7 Mt) or Mexico (3.6 Mt), and may be greater than the two combined.

Cumulatively, the loss is staggering. By opting for the deceptive weed control simplicity of Roundup Ready soya rather than using the best conventional varieties, it is estimated that from 2006 through 2009, US farmers produced 31 million metric tonnes less soya than they should have. In the last four years, the cumulative cost of that loss is over \$11 billion US dollars (at a farm price of \$9.65/bushel).

Similar losses occur in other Roundup Ready soya producing countries, such as Brazil, which is expected to overtake the US as the world's largest soya producer within a few years, and Argentina.

Industry belatedly admits the problem

It was only recently that Monsanto admitted that Roundup Ready soya yields less. The tacit admission has come in the form of marketing for 'Roundup Ready 2', a newer type of glyphosate-resistant plant. Monsanto claims that Roundup Ready 2, which was introduced on limited acreage in the US in 2009, has 7-11% 'higher' yield than its predecessor (Monsanto 2009).

But Roundup Ready 2 does not yield more than appropriate conventional soya lines, rather it is claimed to yield more than Roundup Ready 2's 'dragged' predecessors. After all, the Roundup Ready genes confer chemical herbicide resistance and not productivity traits. According to Monsanto, Roundup Ready 2 was made by inserting the herbicide resistance gene in a different place on the soya genome (Meyer 2006), allegedly reducing yield drag.

"Two years ago, I went to a meeting about a new soybean technology. The trait company claimed there was now no yield drag with the new technology. When the original technology was released, it was touted as having no yield drag. What are we to believe about new soybean technologies?"

Chris Jeffries in The Seed Consultant (newsletter), May 2009

Like the first generation of Monsanto's glyphosate-resistant soya, however, there are indications that Roundup Ready 2 genetic engineering also has unintended consequences. Roundup Ready 2 plants are 5% shorter than conventional plants of the same type (Meyer 2006). Nobody knows why this is the case.

Sources

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image Harvested soya beans. Studies have shown that conventional varieties of soya yield between 5 and 10% more than GE varieties.