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21st September 2012

## Legitimate fears over GM crops?

This week, we have seen two news items about genetically modified crops. First, we learn that Dow AgroScience has developed a new herbicide-tolerant crop. Second, French researchers claim (in a peer-reviewed research paper) that long-term feeding of rats with the current generation of Roundup Ready maize causes tumour development and higher mortality rates.

For those who have campaigned against the supposed evils of GM, this merely confirms their beliefs. In their view, GM food is dangerous, and American companies are set on pushing new products on to the market in the drive for more profits, whatever the consequences. On the other hand, there will many – and not just biotech company employees – who see this view as a grotesque distortion of a far more positive reality.

But in the middle there are many people who don't necessarily believe the scare stories entirely but nevertheless are made rather uneasy by them. Are they right to worry and avoid biotech crops 'just in case'? Or are journalists, as ever looking for a good story, guilty of stirring up unnecessary trouble, and simply acting as activists' useful idiots?

It's interesting to look at the way these stories have been reported. The work of a group led by Gilles-Eric S eralini of the University of Caen was published online on 19 September by the journal Food and Chemical Toxicology ([Long term toxicity of a Roundup herbicide and a Roundup-tolerant genetically modified maize](#)). Unusually, journalists were not allowed to preview it before its release. The main findings were that a particular strain of rats studied over their entire lifetimes developed more tumours and died earlier if they were fed on the GM maize variety. Others, fed on conventional maize but provided with water containing low levels of Roundup, also developed more tumours than the controls.

But here the plot thickens. Despite these superficially worrying findings, the design of the experiment appears to be incapable of demonstrating any effects with any statistical rigour. 25% of the (smaller) control group also died after developing tumours, but some of the test groups (it is unclear which) actually had fewer health problems. There was also no dose-response effect, which would normally occur only if a substance was toxic at extremely low levels, which is highly unlikely for a crop or compound which has been widely used for many years.

Some journalists have been wary of the results, particularly as Professor S eralini has form. He is president of the Scientific Council of [CRIIGEN](#) (the Committee for Research and Independent

Information on Genetic Engineering) which campaigns against GM crops, and has published similar studies previously. The New Scientist's report on the latest paper is distinctly sceptical ([Study linking GM crops and cancer questioned](#)).

But, inevitably, other journalists made much more of this. The Daily Mail, for example, in full campaigning, scaremongering mode ran with the headline [Cancer row over GM foods as study said it did THIS to rats...and can cause organ damage and early death in humans](#). THIS refers to images of rats with enormous and grotesque tumours. Unusually, these pictures were part of the published paper. The Mail article upped the ante with a sidebar headlined *Agent Orange to kill GM weed*, which provides a convenient link to the other story in the media this week, about the new Dow herbicide tolerance trait.

Roundup Ready crops have been an enormous success in both north and south America. Glyphosate, the active ingredient, is a broad-spectrum herbicide which has very low toxicity and is environmentally benign. However, it is inevitable that long-term use of a single herbicide will lead to resistance developing in some weed populations. This has led Monsanto's rival, Dow, to develop crops tolerant to both glyphosate and 2,4-D. Assuming this is approved by the American authorities, farmers will have the choice of using one of two herbicides, or both together if necessary. If weed populations are not subjected to the same chemical season after season, the development of resistance is less likely.

So far, so sensible, but the problem is that 2,4-D is a long-established weedkiller which was one ingredient of the infamous Agent Orange, widely used as a defoliant by US Forces in Vietnam. 2,4-D was not the cause of the extensive health problems suffered by people exposed to it; in fact it is still in common use by gardeners. But the association has been too tempting for some journalists to resist, hence the BBC story [Agent Orange chemical in GM war on resistant weeds](#). The tone of this is critical of modern agricultural technology, and the Agent Orange association in the headline makes the piece much more negative than it deserves to be.

The lesson from these two stories is that, despite much more balanced reporting about crop biotechnology in recent years and clear evidence of little public concern about the topic, there is often an inbuilt media bias and distrust of the usual suspects: science and big business. In journalism this might be only to be expected, but the publication of a deeply flawed study in a peer-reviewed journal should give us pause for thought.

The paper was submitted by a well-known campaigning activist scientist, which might put editorial staff on alert. Peer review is intended to stop poor quality studies being published, and the great majority of toxicologists or statisticians would surely have recommended rejection. The conclusion must be that the editor chose reviewers sympathetic to Sérlanini's views. Since publication in a peer-reviewed journal gives any paper an aura of credibility, this has clearly helped to give the story a head start.

The corrosive influence of anti-GM campaigners continues to be a cause of concern. How we move beyond this situation is a moot point, but a first step would be for scientists to do their work properly and for journal editors to be objective about their publication criteria.