

The new fundamentalism

Dick Taverne

The past few decades have witnessed a growing influence of 'green' activists who approach environmental issues with a semi-religious zeal and seemingly little regard for evidence. The increasing prominence of these viewpoints in the media and in political circles is a significant cause for concern; it imperils not only the future of the biotech enterprise but also the health of society as a whole.

Poles apart

Alternative medicine and organic farming are fashionable. Many claims made for them lack scientific veracity and are largely unchallenged by the media. In contrast, scare stories abound about the health threats of the triple mumps, measles and rubella (MMR) vaccine, genetically modified (GM) crops and pesticide residues in food. Frivolous campaigns against MMR vaccines represent a clear and present danger to public health; they discourage parents from immunizing their children against potentially life-threatening illnesses. But perhaps a more nebulous concern for society as a whole is that scaremongering by activists potentially alienates the public and politicians from biotechnologies as a whole. And it is these technologies on which our future health and wealth depends. If we allow new technology to be summarily dismissed on the basis of unsubstantiated claims, we may equally well succumb to the racists, chauvinists, religious fundamentalists and other peddlers of unreason who endanger the future of a tolerant society.

In Europe, the issue on which green activists have focused most intensely is the genetic modification of crops. As an outsider approaching

the matter without preconceptions or any academic or financial interests, I was surprised first, how arguments about the merits of a technology are so one-sided, with the leading scientific academies and a mass of publications in respected scientific journals on one side and a dearth of peer-reviewed research or any attempt to respect evidence on the other. The scientists are cautious, emphasize the need to judge each issue case by case and avoid generalization; the opponents make wild generalizations that do not stand up to critical analysis.

My second surprise was the stridency and dogmatism of the opposition. Evidence in favor of transgenic crops is either ignored or dismissed cavalierly on the flimsiest grounds. Discredited claims of damage to human health or biodiversity are continually repeated. Depressingly, a number of aid agencies, nongovernmental organizations dedicated to reducing hunger and disease in the world, join forces with green lobby groups and uncritically support their denunciations of the technology¹. Together, they act like members of an esoteric club who talk only

to each other and because they are convinced of their noble purposes—saving the planet in the case of the green lobbies—feel no need to consult experts. Furthermore, they have wide support in the media, whose own knowledge or respect for expertise is often well disguised. Consequently, scientists in the field have been driven on to the defensive.

Disclosing benefits

Because many significant benefits have already been achieved and a long list of potential benefits are in an advanced stage of development, we have a moral duty to promote the technology. It is amazing how rapidly the use of the technology has spread: transgenic crops now cover over 80 million hectares in 18 different countries. In 2004, for the first time the largest increase in the area cultivated was in the developing world². Over 6 million small farmers now benefit from *Bt* cotton modified to resist the bollweevil. China, the main beneficiary, has developed several different varieties, and their cultivation has resulted in the use of 60–80% less pesticide. The



Protesters on the march of unreason? Activists dressed as George W. Bush clones demonstrate through the streets of San Diego against biotechnology.

Dick Taverne is chair of the charity Sense About Science, founded to promote the evidence-based approach to scientific issues. He is a member of the UK House of Lords and has developed a special interest in science and the environment. He recently published "The March of Unreason—Science, Democracy and the New Fundamentalism."

e-mail: dicktaverne@hotmail.com

crop has brought savings of as much as \$500 per hectare and an improvement in farmers' health from the lessened need to spray³.

In KwaZulu, South Africa, 92% of cotton growers, mainly women, adopted *Bt* cotton over the 5-year period to 2003, and the number is still rising. Their income had increased by 77% by the second season, although transgenic seed is twice as expensive as nonmodified cotton³. Similar success stories can be told about India, Brazil and Mexico.

There is every reason to suppose that the developing world will benefit even more in the foreseeable future. China has taken the lead in the technology with 141 types of transgenic crops and 65 already in field trials. Its motto appears to be: 'Let a thousand GM crops bloom'⁴.

There are also products currently under development that have the potential to improve the health, wealth and welfare of large portions of the world's population. Examples include Golden Rice⁵, a transgenic strain that accumulates β -carotene (which is converted into vitamin A in the body) and transgenic rice engineered to be enriched in iron⁶; today, according to the World Health Organization (Geneva), there are more than 100 million vitamin A-deficient children worldwide, and ~400 million women around the globe who suffer from iron deficiency. Work is also underway to engineer plants, such as tomatoes and bananas, for use as oral vaccines⁷⁻⁹ in developing countries, where a lack of adequate refrigeration facilities and personnel with the necessary training to safely administer injections hinder existing vaccination programs. For small-holder farmers cultivating crops in regions susceptible to environmental stress, researchers are developing transgenic tomatoes that thrive on salty water¹⁰ or rice that can resist cold, drought or high salinity¹¹.

Mudslinger's mantras

Why do green lobbies oppose a technology that can improve the welfare of individuals and lead to better use of land and resources and more food for the undernourished? The benefits of *Bt* cotton are dismissed by the unsupported statement that it "is killing the natural parasitic enemies of the cotton bollworm and increasing the number of other pests" and that its success will be short-lived as the bollworm will become resistant to the insecticide¹. In fact, after eight years, there is as yet no evidence of pesticide resistance; strategies such as cultivating refuges alongside transgenic crops seem to have proved more effective than expected¹². In addition, no mention is made that the bacterium that produces *Bt* toxin has been sprayed on crops for decades by organic farmers as an alternative to chemical pesticides.

In the case of Golden Rice, Greenpeace alleges that the project is worthless on the grounds that "a child would have to eat about seven kilograms a day of cooked Golden Rice to benefit"¹. According to Potrykus and colleagues¹⁰ who originally developed it, this overestimates the amount a child would have to eat by more than 15 times. Other opponents argue that nobody wants it because it tastes awful and that people who eat it will lose their hair and their sexual potency⁵.

Opponents repeatedly allege that consumption of transgenic plants harms our health. The fact that Americans have safely been doing so for over eight years (with not a single law case) and that all the scientific academies have found no evidence of harm is simply ignored. Again, it is still claimed that *Bt* corn kills Monarch butterflies. One study did show that larvae survived less well when fed on milkweed leaves covered with an unspecified amount of pollen from *Bt* corn¹³, but this finding was observed under artificial laboratory conditions rather than the field; it was later described as a worst case scenario, "just as an airline crash is the worst case scenario for flying"¹⁴. In contrast, when the impact of the pollen was tested in field studies, it was not found to be substantially different from that of conventional corn¹⁵.

Fundamental differences

In fact, the real objections of the most vociferous green lobbies are not based on scientific evidence but are more fundamental, indeed fundamentalist. They are based on the belief that humans are interfering with nature and that modern science has gone too far in seeking to control nature. It is a kind of new religion, which as Michael Crichton observed has recreated its own version of traditional Judaeo-Christian beliefs and myths: it has its own Eden, when mankind lived in a state of unity with nature; the Enlightenment was responsible for the Fall, after we had eaten of the tree of knowledge, science; pollution of nature is original sin, and salvation will be found through 'sustainability'¹⁶.

Indeed, Greenpeace exemplifies this fundamentalist approach. During the hearing of a committee of the House of Lords on the regulation of transgenic crops¹⁷, its director was asked: "Your opposition to the release of GMOs [genetically modified organisms], that is an absolute and definite opposition... not one that is dependent on further scientific research?" He replied "It is a permanent and definite and complete opposition"¹⁷.

The spread of this new religion, particularly in Europe where its influence is growing strongly, is dangerous for two reasons. First, it could turn Europe into an intellectual

and technological backwater, at least where research into biotech is concerned: already agribusinesses are virtually forced to emigrate and much research into plant science is being moved elsewhere. Pharmaceutical companies too are threatened by a small sect of fundamentalists, the animal rights activists, who campaign forcefully, often violently, against the use of any animals in scientific procedures. These extremists take the view that human rights must be subordinated to the rights of animals and if animal rights are threatened, humans must be made to suffer. Pharmaceutical companies could well follow agricultural companies and abandon research in Europe. Indeed, European politicians would be wise to remember the history of Islam in the Middle Ages, which ceased to be the center of contemporary learning in medicine and science because the quest for knowledge was suppressed by the forces of religious dogmatism.

Second, if the march of unreason is not halted, the consequences will not be limited to biotech and industries based on it. The Enlightenment was one of the most hopeful and wonderful episodes in the history of mankind because it gave birth both to modern science and to liberal democracy. If we turn our back on the evidence-based approach and science, we turn our backs on the Enlightenment and undermine one of the foundations on which a civilized society is built.

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