

- Letters

## Bt Toxin: Assessing GM Strategies

The debate over possible deleterious effects on the Monarch butterfly of genetically engineered plants expressing a biological insecticide (Bt toxin) is described in the News Focus article “Risks and benefits: GM crops in the cross hairs” by Dan Ferber (26 Nov., p. [1662](#)). In response, some critical points should be raised.

The issue is broader than whether Bt toxin (from the bacterium *Bacillus thuringiensis*) produced by genetically modified (GM) crops imperils Monarch butterflies. The real issue is that a strategy to constitutively express an insecticidal compound in large-scale crop monocultures (15 million acres of Bt corn was planted in the United States in 1998, 20% of the total acreage of corn), and thus expose a homogeneous subecosystem continuously to the toxin, seems bound to create Bt-toxin-resistant pests because of heavy selection pressure. Sooner or later we will likely see Bt-toxin resistance in those insects that are continuously in contact with these monocultures and feed on them. If or when this occurs, we will have lost the use of a valuable bio-insecticide. For about 30 years Bt toxin has been applied on the spot (by spraying *B. thuringiensis* directly onto plants) and only when there are signs of infestation of the crops by insects. It is the most successful biological insecticide control system we have and would probably retain its potency against pests for many more years to come.

Bt toxin and Bt toxin-DNA have been found to leak through the root system of Bt-toxin GM maize into the soil, which could possibly affect a myriad of insects in the soil and give rise to horizontal gene transfer, for example, through soil bacteria ([1](#)). Perhaps we should consider going back to the drawing board and designing better GM strategies with less or none of such drawbacks.

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**References** D. Saxena, S. Flores, G. Stotzky *Nature* 402, 480 (1999).