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Comment on Kleter and Kuiper: Environmental fate and impact considerations related to the use of transgenic crops

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Proponents of pest resistant (pt) and herbicide tolerant (ht) transgenic crops argue that a key benefit to deployment is the potential to reduce the burden of pesticides on human health and the environment. However, evidence available to validate this argument is often mixed, which has led to heated debate.

A key problem with determining the impact of pt and ht crops on pesticide use, human health and the environment is that these crops do not eliminate pesticides. They result in a substitution from one pesticide to another. This poses a problem because kilogram for kilogram not all pesticides are equally hazardous. Most studies exploring the issue report how pt and ht crops have changed the kilograms of pesticide active ingredient released into the environment, which ignores the fact that all pesticides are not equally hazardous. To the extent that pt or ht crops result in the use of more active ingredient of a less hazardous pesticide, the results of this type of analysis can be misleading. Kleter and Kuiper rectify this shortcoming by using the Environmental Impact Quotient (EIQ, Kovach et al. 1992) to weight the kilograms of a pesticide used by measures of its hazard to human health and the environment. While their methodology represents an improvement over previous efforts, their analysis can still be criticized as biased in favour of transgenic crops. The bias comes from their treatment of *Bt* crops. Implicitly, their analysis assumes the EIQ for *Bt* crops is 0, which indicates no risk to human health or the environment. Kovach et al. (1992) does not report an EIQ for the toxins expressed by *Bt* crops. However, it does report an EIQ for Dipel, which is a spray formulation of toxins similar to those in *Bt* crops. While the *Bt* toxins are generally rated as less hazardous than most alternatives, they are not hazard-free. To avoid claims of bias, Kleter and Kuiper should explicitly include toxins present in *Bt* crops in accounting the effect of *Bt* crops on pesticide use and hazard.

Another issue not addressed by Kleter and Kuiper is the long term effect of pt and ht crops on the pest complex as a whole. Most pt and ht crops offer superior control of the targeted pests when compared to alternatives. This can result in less frequent and severe infestations over time, reducing the need for pesticides altogether. Alternatively, the use of pt and ht crops could result in a new pest complex that is more difficult to control without significant increases in pesticide use and hazard. How pt and ht crops ultimately affect the burden of pesticides on human health and the environment can only be known by examining changes in the pest complex and how these changes influence pesticide use over time. Still, Kleter and Kuiper add another useful piece to our incomplete knowledge of the benefits and costs of transgenic crops.

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References

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