Scientists Clash Swords Over Future Of GM Food Crops in India

HYDERABAD, INDIA—One of the most contentious issues roiling India these days is whether the country should permit commercial planting of genetically modified (GM) food crops. A defining moment in the debate came in February 2010, when Jairam Ramesh, then–minister of environment and forests, called for a moratorium on the cultivation of brinjal, or eggplant, engineered with a gene from the bacterium *Bacillus thuringiensis* (Bt) that codes for an insect-killing toxin (*Science*, 12 February 2010, p. 767). The previous year, India’s top biotechnology regulatory body had concluded that Bt brinjal is safe for environmental release. Public hearings held across India to discuss that recommendation tapped deep unease over GM foods. In response, Ramesh announced the ban on Bt brinjal, which he said would be perfectly justified, because people did not want it. Jairam Ramesh had about seven or eight public meetings spread all over the country, and the overwhelming opinion was that it will not be in the interests of people in India to have the cheapest vegetable which is available all round the year, that is brinjal, to be genetically engineered, and that genetically engineered brinjal be available without labeling, for consumption by people. And they felt they had the right to decide what they were going to eat and what they will not eat.

G.P.: I believe this moratorium was very unfortunate. Actually, Bt brinjal was thought in terms of demonstrating a proof of principle so far as a food crop is concerned. I personally believe India would need Bt rice at some point of time. So this moratorium has sent a very wrong signal, in my opinion. That decision was more populist than based on science as such. And it has depressed most of the scientists in the area. This is something which the country should worry about. People in this field have lost enthusiasm. Even students are not willing to get into this, which I think is very, very unfortunate.

B.A.: In an article in the December 2012 issue of *Frontiers in Genetics*, M. S. Swaminathan, distinguished leader of the green revolution in India, begins with the following statement: “I believe that the current concerns of biosafety and the impact of GMOs [genetically modified organisms] on biodiversity will soon give way to an appreciation of the potential benefits that the new genetics can confer on humankind.” Do you agree or disagree with that statement?

G.P.: I personally believe this biodiversity card is overplayed. After all, you will see genes have been transferred vertically, hori-
horizontal, all through evolution. For example, if you look at the rice genome, how many fungal genes are there, how many viral genes are there, how many bacterial genes are there? There is nothing like a pure rice genome. So to think a couple of genes would alter the biodiversity, I really do not buy that argument because in nature every plant has been modified. The only concern in my perception is whether the gene we are introducing is safe enough.

Of course, safety is a prime concern. I have no argument on that and safety is needed. Take Bt as an example. Millions of people have been consuming Bt corn for over 15 years—Americans, Canadians, Chinese, South Africans, Argentineans, Brazilians—and I have not seen any authenticated report of any environmental risk or health risk so far as this is concerned. Bt brinjal was 8 years in trials. It was not as if overnight somebody decided that Bt brinjal should come in. Many scientists were involved in this process.

B.A.: Swaminathan was saying here that the current concerns will disappear soon, and you certainly agree with that.
G.P.: Yeah, I definitely agree with that. Current concerns, I hope, will disappear but there is I feel a deliberate attempt in India to keep raising these concerns.

B.A.: Dr. Bhargava?
P.B.: Well, as far as Swaminathan’s statement is concerned, I think it is a very neutral statement that when these concerns will cease to exist, that may take 50 years, that may take 100 years, that may take 5 years.

As regards the other issues that my friend Padmanaban has raised: There is a great deal of evidence that there have been health problems amongst Americans, especially related to allergy, since the large-scale consumption of Bt corn or GM corn and GM soya started in the U.S. In fact, if you plot qualitatively the increase in incidence of gastrointestinal disorders amongst Americans over the last 12 to 13 years and the increase in the consumption of GM food, the two curves seem to overlap very substantially. And there is evidence in Latin America and Brazil where there has been increased consumption of GM crops, that there is an increase in incidence of childhood cancer and several other problems. So to say that there is no evidence of any deleterious effect on human health, on animal health, on plant health, and on biodiversity … I think is ignoring a tremendous amount of evidence that these effects are very real.