

Genetically Engineered Foods: A Scathing Critique

Jane Sooby

Organic Farming Research Fdn.,

Santa Cruz, CA

Outline

#Issues

- **Agronomic**
- **Health**
- **Environmental/ecological**
- **Social**

#Implications for growers

ISSUES

Agronomic

- **Contamination of non-GM crops**
 - Organic canola is impossible to grow in northern plains because of contamination
 - Seedstocks of most commonly grown GM crops are contaminated with GM sequences: soy, corn, canola
 - **Decreased yields**
 - RR soy in Nebraska and canola in Canada had suppressed yields: 11% and 7.5% less, respectively
 - Bt cotton in India has lower yields, though mixed reports
 - Bt corn yields slightly more but not enough to offset cost
-

ISSUES

Agronomic (continued)

- **Resistance: by transfer of GM traits to weedy relatives, and by overuse of herbicides creating resistant varieties**
 - **Alberta canola grower found crop resistant to 3 herbicides due to contamination from the 3 herbicide tolerant varieties he grew**
 - **Complete contamination of world's seed supply is absolutely possible and well under way**
-

ISSUES

Health

- **Allergenicity**
 - Papaya ringspot virus coat protein contains string of amino acids identical to known allergen
 - **Gene transfer, resulting in antibiotic resistance and possibly cancer**
 - DNA from GMO soy was found in intestinal bacteria of people fed a meal containing the soy
 - Many GMOs contain antibiotic-resistant marker genes
 - **Entry of rogue genes into the food system**
 - Contamination by “pharmed” crops
-

Biochemistry of GMOs

It's all about DNA

- desired gene identified in animal or plant
 - lab techniques used to isolate and replicate
 - gene and marker gene inserted into plant cell
 - cell is cultured in lab, then grown to maturity
 - transgene exists in every cell of plant
 - “Promoter” from a virus often used to boost transgene expression
-

Biochemistry of GMOs

Methods of gene insertion:

- **gene gun: gold particles coated with DNA and blasted into plant cell; or**
- **bacterial DNA fragment (plasmid) is used to carry sequence into plant cell**

Imprecise technology:

- **no control over where engineered fragment enters DNA molecule**
 - **bacterial promoters make insertion unstable**
-

ISSUES

Environmental/ecological

- Gene spread to wild relatives
 - Toxic effect on non-target organisms such as insects and their predators
 - Loss of centers of diversity that provide raw material for plant breeding: Quist and Chapela 2001 report: Transgenic DNA introgressed into traditional maize landraces in Oaxaca, Mexico
 - Accumulations of toxins
 - Bt toxins can persist in some soils and jeopardize soil ecosystems
-

Unexpected results

- # **GM apple increases disease resistance but reduces vigor and yield (Cornell)**
 - # **Bt corn has higher lignin content than non-Bt corn (New York Univ.)**
 - # **Hogs, cattle, rats dislike GM grain/hay**
 - # **Bt corn caused reproductive problems in Iowa hogs; higher fusarium levels found**
-

ISSUES

Marketing

- **International markets reject purchase of GM contaminated shipments: EU and Japan**
 - **U.S. govt has paid \$10 billion in loan deficiency payments and market loss asst. because of low prices due to lost trade**
 - **Loss of GM crop sales are ~ \$1-2 billion**
 - **USDA spent \$13 million buying back Starlink corn**
 - **Organic farmers have lost sales already because of GM contamination**
-

ISSUES

Social

- **Proprietary technology allows corporations unprecedented control over seed re-planting, resulting in lawsuits against farmers**
 - **Secrecy agreements keep farmers from knowing extent of Monsanto's prosecutions**
 - **Internationally, traditional plants are being stolen from people who have grown them for centuries (biopiracy)**
 - **Farmers become dependent on input suppliers**
 - **Food aid can inadvertently (?) contaminate crops**
-

Implications for growers

- # **Potential lower yields**
 - # **No protection from contamination**
 - # **Back to back RR cotton-soy provides refuge for boll weevil (South Carolina)**
 - # **More herbicides/pesticides necessary**
 - # **Reduced access to markets**
 - # **GM wheat on the horizon**
-

What can I do?

- # **Inform yourself about food you eat**
 - # **Communicate with your neighbors**
 - # **Join campaigns to label GM food**
 - # **Encourage your local legislators to ban GM technology until it can be controlled**
 - # **Continue to educate yourself**
-