Risks and Benefits of Genetically Engineered Plants

Spring 2003

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Here is a list of topics that appear to me to be current for Spring 2003.

Read the papers in your topic or the abstracts, at least, and make a selection of 2 primary papers that you will review in detail and perhaps some others as support. The 2 primary papers will be sent out to the other students to read.

I think all or nearly all of these papers are available as pdf files on the web, through the UW library, or by the links I have provided. Any papers that you can only get in hard copy, bring to me and I will scan them for pdf distribution.

   a. Allergens
      i. Brazil-nut allergen in transgenic soybeans [1]
   b. Allergen free GM plants
      i. Peanut [2]
      ii. Soybean (no peer-reviewed literature, just a press release)
   c. How to test [3-8]

2. Roundup ready plants
   a. Effects on field ecology [9, 10]
   b. Comparison to conventional agricultural weed control [11-13]
   c. Toxicity and persistence of glyphosate (Roundup) [14]
   d. Chemical use and economics [15]
      The following USDA report is the primary source of original data on economics and productivity of GM plants in use in agriculture in the US.
      http://www.ers.usda.gov/publications/aer810

3. Assessments of the risk of gene transfer between plants, between plants and bacteria.
   a. Sexual hybridization with wild and domestic non-GMOs
      i. Oilseed rape
      ii. Corn [16-18]
      iii. Beets [19]
      iv. Examples of food crop gene escape (introgression) [20-22]
   b. Horizontal gene transfer between plants and bacteria [23-26]

4. Environmental benefits of agricultural insect resistance, i.e., BT toxin incorporation.
   a. Comparisons of chemical use and productivities
      The following USDA report is the primary source of original data on economics and productivity of GM plants in use in agriculture in the US.
      http://www.ers.usda.gov/publications/aer810
      i. Cotton [27-32]
ii. Corn (Maize)
   1. European corn borer[33-38]
   2. Root worm (new) [39]

5. Environmental risks of BT toxin in plants: non-target organism susceptibility.
   a. Monarch butterfly toxicity[40, 41]
   b. Effects on soil insects[42-46]
   c. Persistence of BT toxin[47-50]
   d. Complications[51]

6. Antibiotic resistance markers – I don’t have a lot on this topic. No one has yet chosen it.
   a. What markers are used?
   b. What is their medical use?
   c. Prevalence in environment[52]

7. What are the comparative productivities and land area requirements of different types of agriculture: plant biotech, conventional herbicide/insecticide, organic?
   a. Comparative productivities, conventional vs organic[53, 54]
   b. Effects of BT cotton[27, 29, 55]

8. Pharmaceuticals production in plants -- This topic is an ophan at this time.
   a. Food plant risks and benefits
   b. Why not non-food plants

9. Recent genetic modifications of trees and their beneficial applications.
   a. Low lignin trees for pulp[56-59], also

10. GM plants for phytoremediation
    a. Mercury[60-62]
    b. Arsenic[63]
    c. Munitions[64-67]
    d. Chlorinated hydrocarbons[68-71]

11. Modification of plants to increase productivity – here is an important topic I forgot last Friday.
    a. Season shortening – I could find nothing very convincing
    b. Drought resistance
       i. reviews[72, 73]
       ii. experimental studies[72, 73]
    c. Salinity tolerance
       i. reviews[74, 75]
       ii. experimental studies[76-80]
    d. Why no progress on nitrogen fixation?
       i. Reviews[81, 82]
       ii. Experimental studies[83-88]

12. Increasing nutrition level of plants[89] – And another one
    a. Protein profiles
    b. Increasing vitamin A in plants

13. Apomixis: Asexual reproduction in plants – And yet another one.
    a. Transgenic plants that breed true: bringing the green revolution to farmers that save seed
If any group wants to choose another topic please contact me right away and I will get some reference together for you.

References

Most of these references are available online through the UW library, electronic journals, http://www.lib.washington.edu/types/ejournals/

Let me know if you have trouble finding them


42. Saxena, D. and G. Stotzky, *Bt toxin is not taken up from soil or hydroponic culture by corn, carrot, radish, or turnip.* Plant and Soil, 2002. 239(2): p. 165-172.


47. Herman, R.A., P.N. Scherer, and J.D. Wolt, *Rapid degradation of a binary, PS149B1, delta-endotoxin of Bacillus thuringiensis in soil, and a novel


