



THE CENTER FOR
FOOD SAFETY

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Corporate Seed Control

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Center for Food Safety

Center for Food Safety (CFS) works to protect human health and the environment by curbing the proliferation of harmful food technologies and by promoting organic and other forms of sustainable agriculture.



Seeds: Before

- For 10,000 years, farmers had a right to save seed and replant
- Small family-owned
- Public varieties, in commercial and in research
- Until 1924: Farmers received seed from government free program, millions annually



Seeds: Now

- Seeds Can be Patented
- Farmers losing right to save seed
- Companies limiting choice of seed
- Seed industry dominated by handful of transnational agro-chemical companies
 - Monsanto= world' s largest seed company (90% of the world' s GE seed)
- Independent research dramatically inhibited



What is a Patent

A government grant of a temporary monopoly over a particular invention, usually for a period of 20 years.

- During that time, the patent holder may exclude all others from making, using, or selling the invention
- In US, patent law requires that an invention be new, useful and not obvious to people working in the field of the invention; that the invention be fully described in writing, so it can be reproduced.
 - - 35 USC 101-103, 112
- In return for the temporary monopoly is the incentive for the inventor to disclose that knowledge



Plants and Patents

- Plant Patent Act, 35 USC 161 (for plants reproducing asexually, e.g. through grafting)
 - No exclusive right to produce plants sexually, i.e. through seeds
- Plant Variety Protection Act, 7 USC 2321 (for plants sexually reproducing like corn and soybeans)
 - Exemptions for farmer seed saving and for research uses
- Patenting Life Forms, Including Seeds



Can Seeds Be Patented?

- *Diamond v. Chakrabarty*, 447 U.S. 303 (1980).
 - Held: Utility patent could be issued for a genetically engineered microorganism.
 - Implications: Utility patents could be issued for life forms of nature (“products of nature”) that are altered by man.
- *Ex Parte Hibberd*, 227 U.S.P.Q. 443 (Bd. Pat. App. & Interferences 1985): Applying *Chakrabarty*, holding that plant breeders can patent under Section 101 of Patent Act. – 1,800 granted before *JEM Supply*
- *J.E.M. Ag Supply v. Pioneer-Hi Bred*, 534 U.S. 124 (2001)
 - Applying *Chakrabarty* to seeds
 - Patent Act, 35 USC 101 (utility patents)



What Is Genetic Engineering (GE)?

Genetic Engineering (GE) or Genetic Modification (GM)

- Artificial Insertion of Foreign DNA into Crops
- Crossing Species Barrier
- *Myth*: Just Like Traditional Breeding
- *Truth*: Use of Genes from Different Species to Make otherwise impossible Changes to DNA



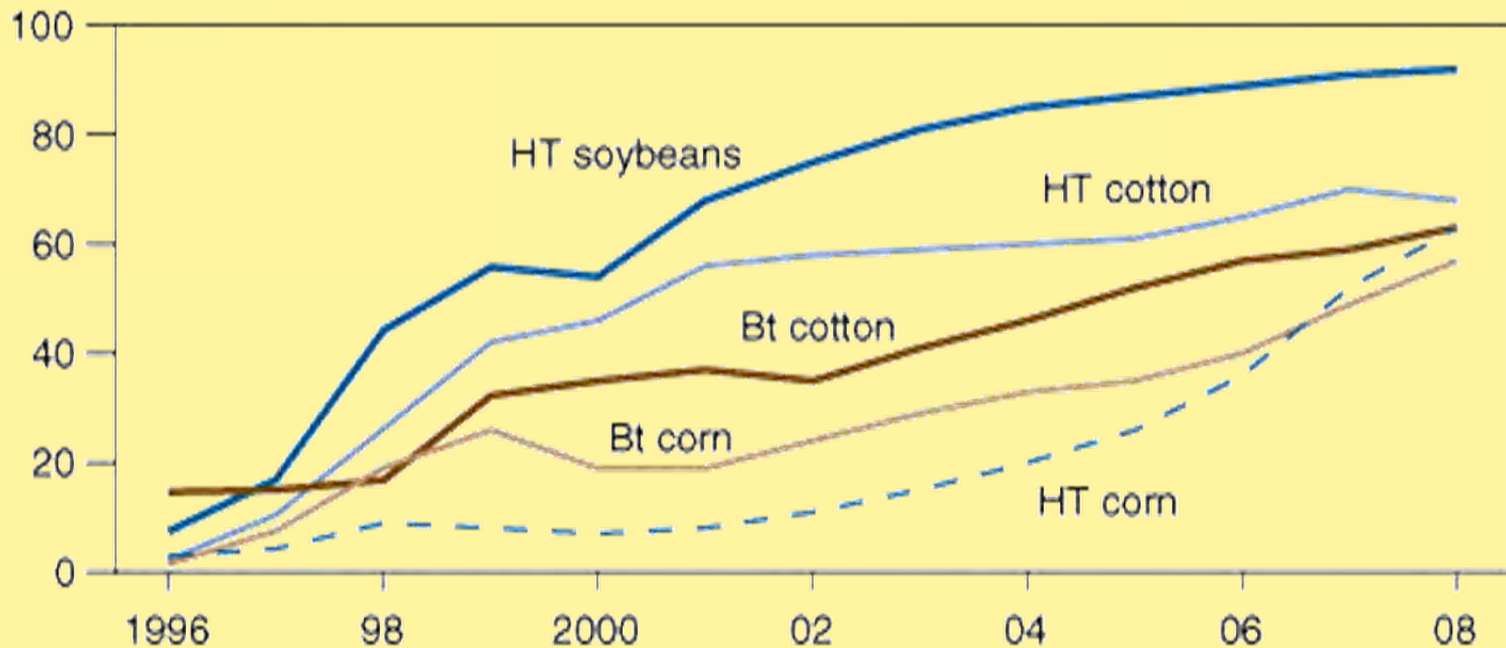
Kinds of GE Crops

- **Pesticide Promoting:** 75+ % of GE Crops are herbicide tolerant (HT) plants designed to withstand greater amounts of the herbicides
- **Pesticide Producing:** Produce a pesticidal toxin derived from the soil bacterium *bt*.

GE Crops Still On the Rise

Use of genetically engineered crops continues to grow in the U.S.

Percent of acres



HT= herbicide tolerant. Bt = Insect resistant. Data for each crop category include varieties with both HT and Bt (stacked) traits.

Source: USDA, Economic Research Service.



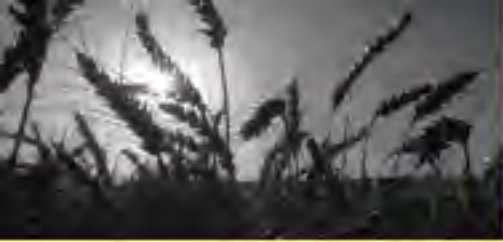
Risks: Contamination

- Cross-Pollination
 - Seed Mixing
 - Volunteers
- Human Error
- Weather Events

“Human error, random events, sub-standard stewardship practices, and the forces of nature make it impossible to guarantee that a ‘zero tolerance’ threshold for transgenic seeds or plants can be achieved after the release of GE Crops.”

- Allison Snow, PhD,

Plant Ecologist, Gene flow expert Ohio State University



Risks: Pesticides and Weeds

- Increase in pesticide use
- Proliferation of herbicide-resistant superweeds
- Bt-resistant pests
- Decrease in biodiversity
 - Harm to non-target species

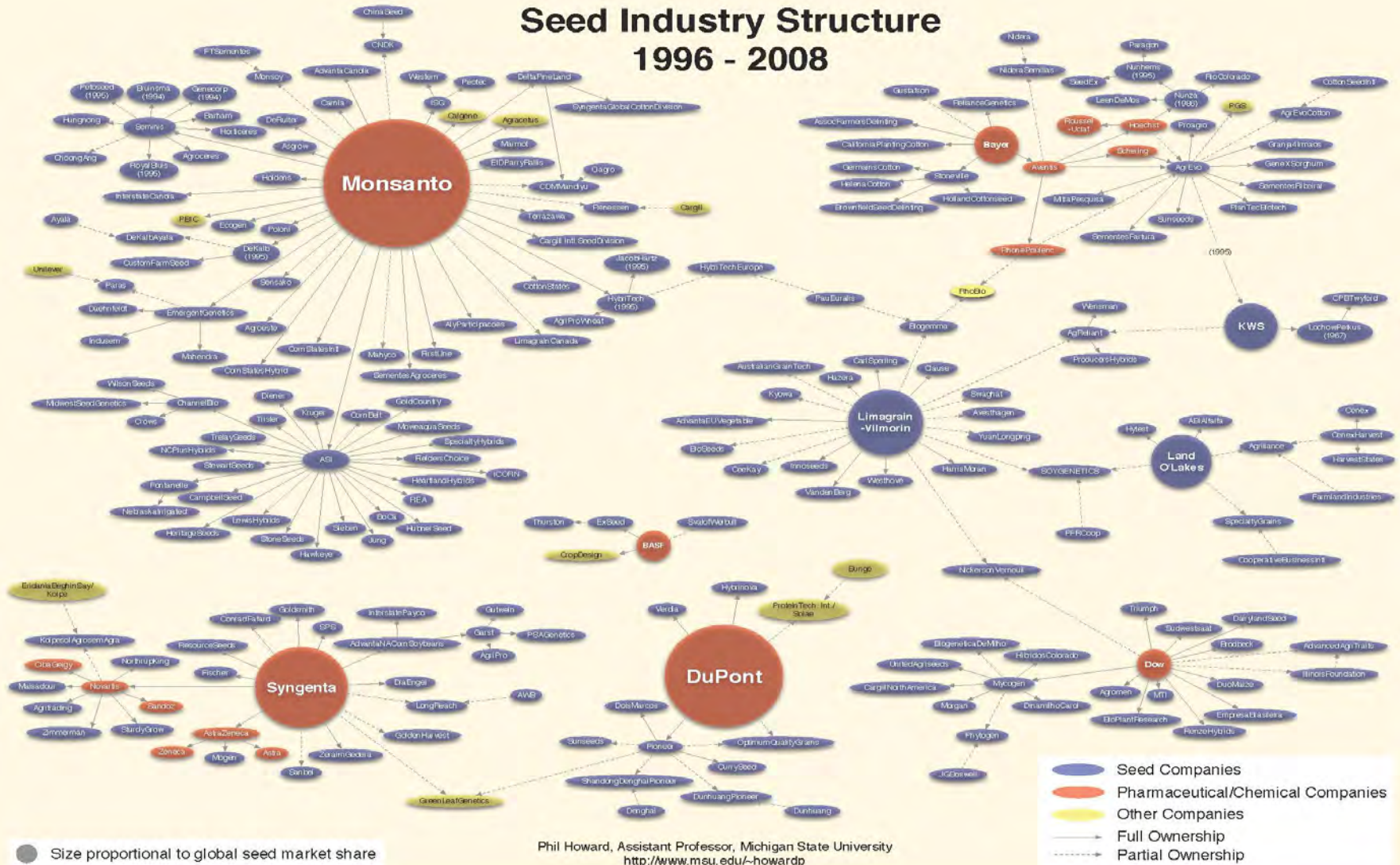



Seed Market Consolidation

- An aggressive strategy of buying up seed companies.
 - Between 1996 and 1998, Monsanto developed a strategy of buying out or establishing relationships with most of the major U.S. and international seed companies
- Now, 4 Chemical/Pesticide Companies own 50% of the worlds seeds
 - Monsanto 90% of GE seed; over 22% of global seed; Dupont-Pioneer (14%), Syngenta (8%), Bayer (5%)= 50% globally; pesticides (same corporations are dominant)
- Monsanto has obtained patents on all its genetic engineering techniques and genetically engineered seed varieties. Throughout the 1980's and early 1990's, Monsanto actively built its genetic engineering capacity and patented all newly discovered technologies and products along the way.
 - The cauliflower mosaic virus (35S promoter), which activates transgenes.
 - In 2003, Monsanto held 647 biotech patents, more than any other biotech company.
- Result: U.S. farmers now struggle to find conventional, non-herbicide tolerant GE seed.



Seed Industry Structure 1996 - 2008





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