



## From Genetically Engineered Corn to Cows: GE Livestock, Cloning, and Concentration in Agriculture

The spread of genetic engineering (GE) technology exacerbates the corporate consolidation occurring in the seed industry. This trend will continue, if not worsen, in livestock once the genetically engineering and cloning of animals is commercialized and becomes more prevalent. We must put a stop to this technology before it spreads to protect the livelihood of family farmers and the future of our food supply.

Between 1996, when the first biotech crop became available commercially, and 2007, Monsanto, the largest supplier of genetically modified seed traits, purchased more than a dozen seed companies, and now controls 60% of corn and 62.5% of soybean seeds and seed traits licensed in the United States.<sup>i</sup> As of 2009, Monsanto's patented genetically engineered genes were found in 93% of all soybeans and 80% of all corn grown in the U.S.<sup>ii</sup> Globally, four seed companies (Monsanto, DuPont [Pioneer], Syngenta, and Limagrain) control almost 30% of the world seed market.<sup>iii</sup>



This level of market domination has allowed the seed companies to charge exorbitant amounts for their seeds and technology at the expense of farmers. The amount farmers paid for seeds over the past twenty years has nearly doubled,<sup>iv</sup> and GE soybean seeds can be twice as expensive as non-GE seeds<sup>v</sup>--\$35 a bag versus \$17 a bag.<sup>vi</sup> Monsanto planned to charge 42% more for its GE seeds in 2010 than it did in 2009.<sup>vii</sup> Dupont/Pioneer Hi-Breed announced a 20% and 35% price increase in corn and soy seed, respectively, in 2009 and is projecting "double-digit seed price increases" between 2009 and 2013.<sup>viii</sup> Many farmers must pay these prices since traditional seed breeders have been forced out of business and only GE varieties exist in some markets.

Agribusiness is pushing family farmers out of business – a trend that will only accelerate when animals are genetically engineered, cloned, and their genes are patented. As has happened with GE seeds, fewer and fewer corporations will own the expensive technology (and therefore, the actual product) while controlling a larger and larger share of the market.

The U.S. Patent and Trademark Office (USPTO) has been issuing patents to inventors of "any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof" for over 200 years. Living organisms had been excluded from patent law since they were considered a "product of nature" and not an invention. However, a 1980 Supreme Court decision, *Diamond v. Chakrabarty*, said that a genetically engineered strain of bacteria could be patented. It only took eight years after this case for the USPTO to grant a patent to the first animal, the "Harvard Oncomouse," which was genetically engineered for increased susceptibility to cancer. Since then, over 660 patents on animals have been granted.<sup>ix</sup>

This expansion of patent law to cover living animals has serious consequences for agriculture. If a farmer or rancher raises a patented genetically engineered animal, he or she may not own that animal or its products. One company, Pharming, owns patents on transgenic cows, the milk from the transgenic cow, and the milk from any mammal that has its engineered genes.<sup>x</sup>

Genetic engineering is a relatively crude technology that involves inserting the genes from one organism into another – typically either through a virus or a gene “gun.” Engineering an organism with the desired traits that can survive is difficult. Once it is accomplished, one would want to copy that organism over and over again through cloning techniques. Patents have already been granted on cloning processes. The University of Missouri, for example, has been granted a patent on cloning techniques for “mammals,” which would technically include human cloning under the patent.<sup>xi</sup>

Genetic engineering technology has been advancing in the realms of animal genetic engineering and these traits will spread on a large scale through the use of cloning. The effect the consolidated corporate ownership of these technologies will have on markets for farmers and consumers will, at best mirror what we’ve seen with GE crops and, at worst, will lead to the complete corporate control of our food supply.



The traits that are being engineered into animals are almost entirely a way to force animals into fitting an already-broken industrial food model. Proponents believe GE animals will grow faster off of less feed, be resistant to certain diseases such as Mad Cow disease, produce less toxic waste,<sup>xii</sup> and even to feel less pain.<sup>xiii</sup> For example, AquaBounty has created the AquaAdvantage<sup>®</sup> Salmon, a fish that contains genes from two other fish species, one from another salmon and one from the eel-like Arctic pout that the

company claims was designed to grow twice as fast as a normal salmon.<sup>xiv</sup> The University of Guelph in Canada has developed the Enviropig<sup>™</sup>, a genetically engineered pig with a mouse gene that allows it to produce less phosphorous in its waste.<sup>xv</sup> Instead of changing the broken system from which a few powerful interests profit, corporations would rather change and own the genetic code of not just animals, but entire species. While these technologies have not yet been commercialized, some are just awaiting final approval from the Food and Drug Administration before they enter our food supply.

Farmers wanting to plant GE seeds typically have to enter a contract with the biotechnology company that owns the patent and pay a licensing fee to plant a crop for a single season.<sup>xvi</sup> Will farmers and ranchers have to pay an annual licensing fee to raise GE dairy cows? Who will own and profit from the milk? The contract for seeds usually prohibits the farmer from saving his or her seeds to plant the following season. Will farmers be able to breed their animals or will they have to turn to the biotech company to purchase cloned bull semen every year?

Farmers whose non-GE crops were contaminated by their neighbors’ GE seeds through cross-pollination can be sued for copyright infringement,<sup>xvii</sup> a practice biotech companies have repeatedly used to threaten farming communities. AquaBounty claims that its fish will be sterile, but if a GE fish escapes from a factory fish farm and breeds with a naturally occurring fish, would one be violating a patent and be brought to court by AquaBounty for catching one of the offspring while fishing? What type of damage would that fish do to the ecosystem?

If we learn from the recent history of GE seeds, we can guess what the answers to the above questions will be. We must continue the moratorium on cloned animals and their progeny in our food supply and put a stop to the genetic engineering and patenting of all animals. GE and cloned animals are bad for farmers, bad for the environment, and bad for communities' right to control their food supply.

### *Images courtesy of Wikimedia*

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- <sup>i</sup> *Consolidation and Intellectual Property Rights in the Seed Industry*. Washington, DC: Food & Water Watch, 2010.
- <sup>ii</sup> Whorsikey, Peter. "Monsanto's dominance draws antitrust inquiry." *Washington Post*. November 29, 2009.
- <sup>iii</sup> *Tracing the Trend Towards Market Concentration*. UN Conference on Trade and Development. 2006.
- <sup>iv</sup> *Ibid*.
- <sup>v</sup> Clapp, Stephen. "Opponents challenge ISAAA biotech crop forecast." *Food Chemical News*. February 16, 2009.
- <sup>vi</sup> "Non-biotech soybean acreage increasing in the United States." *Food Chemical News*. August 17, 2009.
- <sup>vii</sup> Clapp, Stephen. "Monsanto to charge up to 42% more for next generation seeds." *Food Chemical News*. August 24, 2009.
- <sup>viii</sup> "Pioneer seed sales up." *Feedstuffs*. June 29, 2009; Kaskey, Jack. "Dupont Raises Corn, Soybean Seed Prices Most Ever." *Bloomberg*. June 12, 2009.
- <sup>ix</sup> "History of Animal Patents." *Stop Animal Patents!- Animals Are NOT Inventions*. American Anti-Vivisection Society. Web. <<http://www.stopanimalpatents.org/history.html>>.
- <sup>x</sup> Transgenic Bovines and Milk from Transgenic Bovines. Pharming B.V, assignee. Patent 6013857. 11 Jan. 2000; Transgenic Non Human Mammal Milk. Pharming B.V, assignee. Patent 5750172. 12 May 1998.
- <sup>xi</sup> Complete Oocyte Activation Using an Oocyte-modifying Agent and a Reducing Agent. The Curators of the University of Missouri, assignee. Patent 6211429. 3 Apr. 2001.
- <sup>xii</sup> Reinberg, Steven. "FDA Issues Final Regulations for Genetically Engineered Animals." *U.S. News & World Report*. 15 Jan. 2009. Web. <<http://www.usnews.com/health/managing-your-healthcare/policy/articles/2009/01/15/fda-issues-final-regulations-for-genetically.html>>.
- <sup>xiii</sup> Shriver, Adam. "Not Grass-Fed, but at Least Pain-Free." *New York Times*. 18 Feb. 2010. Web. <<http://www.nytimes.com/2010/02/19/opinion/19shriver.html>>.
- <sup>xiv</sup> "AquaAdvantage® Fish." *AquaBounty*. Web. 26 Mar. 2010. <<http://www.aquabounty.com/products/products-295.aspx>>.
- <sup>xv</sup> "Enviropig - Technology." *University of Guelph*. <<http://www.uoguelph.ca/enviropig/technology.shtml>>.
- <sup>xvi</sup> *Monsanto Transgenic Trait Dominance in U.S. Market, 1996-2007*. Rep. Organization for Competitive Markets, 2008.
- <sup>xvii</sup> *Consolidation and Intellectual Property Rights in the Seed Industry*, 2010.