How to Be Prophetic

I shut down my laboratory in 1990, convinced that our practices in agricultural genetic engineering would damage the common good–even though it took another five years for genetically engineered crops to become a commercial reality.

Now, after observing widespread consequences of genetically engineered crops, my early decision to cease and desist research is vindicated. We see an accelerated concentration of seeds in a few multinational corporations, threatening world food security. Ecolog-ical problems are surfacing, such as toxic pollen and disturbed soil ecosystems, and we see genetic pollution as pollen from engineered crops fertilizes non-engineered varieties and related wild species. The safety of genetically engineered foods has not been adequately demonstrated and labels are not required, making future epidemiological studies more difficult. Alternatives to further industrialization of agriculture are not being seriously pursued at universities and other research institutions as scientists put all of their eggs in the biotech basket.

Looking back, what appears to have been a keen prophetic power on my part was actually a willingness to pay attention to the present. First, I saw that the methods and ways of thinking required for genetic engineering research on plants and life cycles were degrading to larger sets of relationships. From there, I simply extrapolated from the details of our day-to-day research to see the ultimate applications of that knowledge.

For example, the basic research on the molecular biology of seeds–which leads to the Terminator Technology–demonstrates the ways in which research conduct presages application. There is a formula followed by almost all scientists who wish to get grants for studying how seeds grow and develop. In nature, the life of an organism is best described as a continuous cycle from one generation to the next, but we break those cycles in our labs in order to study it. The seed cycle is represented as a series of steps, with one leading to the next: fertilization leads to the formation of a small spherical embryo, which then forms a heart-shaped structure, and so on, until the mature seed results. In turn, each step is represented as controlled by particular genes. Thus, the goal of seed research is to describe the kinds of genes needed for each step, then control and alter the seed cycle by manipulating those genes.

Most researchers break the cycle by either creating mutant seeds that stop developing at particular steps, or by using toxins that cause specific blocks in the process. Seeds are thus routinely soaked in carcinogens, mutagens, solvents, and inhibitors, or are subjected to X rays. We--my students and colleagues–made hundreds of mutant plants, with embryos and seeds that were grotesquely disfigured and incapable of continuing the cycle of regeneration characteristic of life. If we were clever, the genes from these mutants could be identified, cloned, studied, and altered. The genes could also be patented, bought, and sold.

Is it mere coincidence that the knowledge gained by breaking the seed cycle is now being used to construct seeds that cannot continue past a particular stage in their development, and used to keep patented varieties of plants from use by others? Several agricultural biotechnology companies have been awarded patents to genetically engineer crops which grow normally until they make seeds, but then produce toxins in those seeds to prevent them from being planted. This Terminator Technology is a kind of built-in patent protection system. Thus, basic research which treats organisms as machines with interchangeable parts and the life cycle as a series of steps controlled by genes that can be owned has led to an application with the same characteristics.

If the means predict the ends, then the smart thing to do is change the methods of gaining knowledge. I would like an agriculture that is whole and healthy and fully capable of regenerating from one cycle to the next, far into the future. That is why I decided to quit doing molecular research altogether and to learn about agriculture by participating in it rather than by studying it as an object. Any method that results in weakened, poisoned plants is unlikely to yield information of use in creating vibrant food.

It doesn't take a rocket scientist to figure that out.

–Marti Crouch
Associate Professor of Biology
Bloomington, Indiana

For a more detailed explanation of the patent, see "How the Terminator terminates: An Explanation for the Non-Scientist of a Remarkable Patent for Killing Second Generation Seeds of Crop Plants," published as an occasional paper of the Edmonds Institute, 20319-92nd Avenue West, Edmonds, Washington 98020 USA. It is also on the web at: http://www.bio.indiana.edu/people/terminator/html

Originally published in *Wild Duck Review* Vol. III No.3 on "Special Issue: Paul Shepard".

A complete index of pdf downloads is available at: InstituteforInquiry.org.

Text