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AGBIOTECH DEBATE

ABATING OR ABETTING ENVIRONMENTAL STRESS?

STANFORD, Calif.—Biotechnology is certain to play an integral role in shaping the world's environmental fate. Whether that influence will prove positive or negative, however, was debated here at Stanford University's sixth annual "You Can Make a Difference" conference, which this time focused on "Deciding Our Environmental Future."

Stephen Rogers, a plant molecular biologist from Monsanto (St. Louis, MO), stressed that agbiotech represents an important extension of conventional breeding. Specifically, he said, genetic engineering allows the rapid, selective transfer of new traits. What's more, companies can wrap this state-of-the-art technology in a very convenient and conventional package: the seed. Biotech's potential environmental benefits, Rogers added, include allowing the biological clean-up of hazardous wastes, and prompting farmers to shift away from dangerous chemical agents.

The other speakers, however, focused more on the risks—or *possible* risks—that genetic technology could bring.

Noting that most corn and rice grown today in the U.S. is of just a few genetic lineages, Virginia Walbot warned against becoming too dependent on a limited number of strains. A biology professor at Stanford, Walbot emphasized the need to balance financial and yield advantages against a longer-term view toward maintaining genetic diversity.

As an example, she pointed to the commercialization of genetically engineered, herbicide-tolerant crops. If one such strain is introduced into the marketplace and achieves widespread planting, farmers will run the risk of a particularly virulent pathogen specifically targeting such plants and wiping out an entire year's crop. But introducing *multiple* herbicide-tolerant strains simultaneously would minimize such risks, Walbot suggested. "Single genes can be really important," the researcher concluded, "but they carry a risk that we have to be aware of."

Donald Dahlsten, a professor of entomology at the University of California (Berkeley), recommended that, instead of zooming immediately down to the genetic level, applied scientists should pay more attention to harnessing whole organisms for pest control. Pointing out that pest

losses have actually increased along with crop yields, he maintained that "high technology doesn't have a very good reputation." To Dahlsten, the key is to take a broader, more ecological viewpoint, rather than being seduced by whichever technology is popular at the moment. "I don't see genetic engineering [solving] our problems," he concluded.

Jane Rissler, biotechnology specialist for the National Wildlife Foundation, was the most cautionary when it comes to biotech. Displaying a 40-year-old *Time* magazine advertisement proclaiming that "DDT is good for me-e-e," Rissler warned against biotechnology's becoming the equivalent of the synthetic chemical industry. She also raised several potential dangers of combining genes from disparate organisms: Will the new creations displace existing species? Will ecosystems be disrupted? Will the approach serve to decrease biological diversity?

In addition, Rissler criticized the development of herbicide-tolerant plants, which could promote increased use of potentially dangerous chemicals. "Why are herbicide-tolerant plants being produced?" she asked rhetorically. "It's simple: to sell more herbicide." And even seemingly safe herbicides should not be targeted in this manner, Rissler stressed, because their long-term effects on humans are not fully understood, and the ultimate impact of the formulations' inert ingredients has not been tested adequately.

The correct approach, according to Rissler, is to adopt a policy of "sustainable agriculture" in which input requirements are low and emphasis is placed on maintaining environmental equilibrium. "Sustainable agriculture, with a bit of biotechnology, is the best bet," she said. In fact, she suggested that the amount of R&D funding now devoted to agricultural biotech should be switched to sustainable agriculture, and vice versa.

Rissler, who worked at the U.S. Environmental Protection Agency (EPA) until last year, also took some shots at the current regulation of biotechnology. She believes that the application of existing laws to genetically engineered products provides insufficient protection to the public, and that "the holey federal framework is getting holeyer."

—Arthur Klausner