Larger Public Sector Role Sought on Biotech

Controversy stirred up by initial field test plans worries industry, triggers demand for broader government action

PUBLIC outcries over proposals to conduct outdoor tests of genetically modified organisms have shaken the biotechnology industry. Companies are concerned that product introductions could be delayed by a regulatory crisis. This uncertainty also is prompting industry leaders to step up pressure for federal and state governments to fashion a regulatory apparatus to ensure that agricultural biotechnology experiments can go forward.

"The real question is whether there will be overreaction," says Richard D. Godown, executive director of the Industrial Biotechnology Association, who fears biotechnology's critics will demand "wholesale regulation." To lay the ground for rational regulation, industry and government officials have begun suggesting that the federal government take a more active role to assure that basic research is conducted to identify biotechnology's risks and regulatory needs. There also is a push for the government to provide giant facilities for testing modified organisms as an intermediate step between greenhouse experiments and open-air trials.

Relatively few products for agriculture are expected to come forth in the next couple of years. But within 5 years the number of bacterial, viral, and plant products engineered for agriculture is expected to soar. In addition to the need to allay public concern about safety, industry executives want a comprehensive regulatory structure up and running before regulators are inundated with field test applications. For both small and large companies, which are sinking millions into research, a regulatory bottleneck that unnecessarily delays product introduction could be financially disastrous.

The debate over federal regulation has intensified in part because of the controversy created by Advanced Genetic Sciences' outdoor testing of genetically altered bacteria—*Pseudomonas syringae* and *P. fluorescens*. When stripped of part of their genetic code, the bacteria cease to produce proteins that aid the formation of damaging frost on crops such as strawberries. In a test of the product, the company injected the bacteria into the bark of trees located on the roof of its Oakland, California, laboratory, thinking it was in compliance with Environmental Protection Agency regulations (*Science*, 14 March, p. 1242).

EPA officials, however, have taken exception to the company's procedure, stating that the experiment should have been conducted within the confines of a greenhouse. AGS's efforts to field test this product also have been stalled by the company's failure to plainly explain the experiment to Monterey County residents. In January, the company was forced to delay plans for its field test in the wake of local concerns.

The depth of the industry's worry was made clear 11 March in New York at a *Business Week* conference on biotechnology attended by 200 industry executives. Ralph W. F. Hardy, deputy chairman of BioTechnica International, Inc., of Cambridge, Massachussets, noted that "after the events in the press over the last few weeks, regulation is a key issue at this stage."

The concept of federally supported test facilities to fill the gap between greenhouse research and field tests has been kicked around by Executive Branch agencies for some time. But Hardy says that federal regulators have acted too slowly. "The public sector has to move forward," he says, "and play a major role in field research as far as evaluation of the benefits and the risks attendant in biotechnology products."

David Kingsbury, assistant director for biological sciences at the National Science Foundation, says "There is no question that [regulation] is getting to be a very critical issue." No consensus, however, has been reached within the Administration on the type of intermediate facilities, or the classes of agricultural products that should be routed through them. Similarly, the industry has yet to formally make its own determination about the nature of standards and facilities that are needed.

There are signs, however, that substantive action will be forthcoming. The industry's

EPA Suspends Biotech Permit

The Environmental Protection Agency has suspended a permit issued to a California biotechnology company to conduct a field test of genetically engineered bacteria. The microorganisms are designed to stop frost from forming on crops.

On 24 March, EPA announced that Advanced Genetic Sciences of Oakland, California, had violated agency's rules, asserting that the company had conducted an outdoor test of the modified microbes without permission and falsified part of the scientific data submitted to the agency. EPA fined the company $20,000, the maximum penalty possible.

The federal action is the latest development in a regulatory saga involving the company. Advanced Genetic Sciences won EPA approval to conduct the test last year, but encountered stiff local opposition (*Science*, 14 February, p. 667). Then it was disclosed that a year ago the company, without EPA's knowledge, had injected the altered bacteria into trees located on the rooftop of the company building to analyze plant pathogenicity.

The outdoor test violated agency rules, EPA said in a letter to the company. EPA also said that the company had "falsified" data by claiming in its permit application that the tree test had been done at specific ranges of humidity and temperature. An agency investigation this month concluded that the company did not record these conditions during the experiment. Agency officials told *Science*, however, that the trees did not develop any disease linked with the altered bacteria in these tests.

EPA says that the company may repeat the tests in the greenhouse and apply again for a permit, which the firm says it will do. The company has also invited a scientist of EPA's choosing to monitor the experiment.

Although the altered bacteria are widely regarded by scientists and regulators as harmless, EPA's action against Advanced Genetic Sciences signals that the agency will enforce its regulatory policy regarding biotechnology experiments. Agency official John Moore said, "EPA is not going to tolerate any infraction of its regulations" governing biotech. ■ MARJORIE SUN

trade organizations—the Industrial Biotechnology Association and the Association of Biotechnology Companies—are developing positions. Also, John McTague, acting director of the Office of Science and Technology Policy, is slated to receive a staff report on the R&D needs of agriculture, including construction of test facilities.

Meanwhile, the Reagan Administration is expected to unveil on 15 April its regulatory matrix for the EPA and Department of Agriculture screenings of genetically engineered biotechnology products. Representative Don Fuqua (D–FL), chairman of the House Science and Technology Committee, introduced comprehensive legislation covering this area on 17 March. Besides installing the Biotechnology Science Coordinating Committee as a permanent fixture in OSTP, it sets up a research program to create and maintain a database for regulating biotechnology.

Neither the Administration's regulatory matrix nor Fuqua's bill lay out a specific scheme for intermediate facilities to test genetically altered microbes and plants at a level just below full field trials. And there is still a divergence of opinion among industry, academic, and environmental interests as to what test facilities actually are needed.

Harvey S. Price, a Gaithersburg, Maryland, consultant, notes that "A lot of industry people are afraid an intermediate facility will become a funnel for everything." But Jack Doyle, an analyst with the Environmental Policy Institute, says the industry is overly paranoid. "I don't think the environmental community will be that unreasonable."

The need for containing classes of microbial and plant products in secure test facilities must have strong scientific review, says Warren C. Hyer, Jr., managing director of the Association of Biotechnology Companies. The track record of traditional plant breeding and chemotechnology must be considered. "We are not starting from ground zero," observes Hyer.

Nevertheless, there appears to be growing recognition within industry that regulatory inaction also could be paralyzing. "Lots of people can do marvelous dreaming in terms of 'what-if' risks might occur—and this can delay the advance of this technology," says BioTechnica's Hardy. The way to avoid this trap, he contends, "is to bring the public sector into this situation . . . to provide comfort in terms of a broad, knowledgeable evaluation of what is going to be tested in field tests." ■ MARK CRAWFORD

Antagonists Agree on Pesticide Law Reform

Chemical companies agree to regulatory reforms; public interest groups will not block patent extensions for pesticides

AFTER a 14-year stalemate, the agricultural chemical industry and a coalition of public interest organizations have hammered out an agreement that could dramatically reform the nation's pesticide law. On 10 March, the two groups unveiled the details of a plan that would strengthen the government's regulatory authority over pesticides and tighten the safety requirements for these chemicals.

Legislation based on the plan was immediately introduced in the House and Senate, and hearings were held on 19 and 20 March by a House agriculture subcommittee. Berkley Bedell (D–IA), chairman of the subcommittee, says, "I'm well aware that this bill doesn't satisfy everyone. But [industry and the coalition] have come a long, long way."

The agreement has broad implications. Of the thousands of pesticides in use, only a small fraction actually have been fully tested for safety under the federal pesticide law. For the Environmental Protection Agency, the statute has often been regarded as more of a hindrance than a help. Commenting on the agency's ability to cancel use of a pesticide, John Moore, EPA's assistant administrator for pesticides and toxic substances, told a House subcommittee last year, "The current system needs to be looked at. . . . You can only go so far to make a silk purse out of a sow's ear."

The impasse over pesticide reform was broken because pesticide manufacturers badly want Congress to extend the patent life on their products to compensate for time spent gaining regulatory approval. Two years ago, Congress extended the patent life of pharmaceuticals on these grounds. But the consumer groups said they would block these attempts unless the industry agreed to some significant changes in pesticide law.

The agreement to change the pesticide law "required a tremendous amount of give and take on both sides," says Jack Early, president of the National Agricultural Chemical Association. One of the most significant provisions in the proposal would speed up the safety review of old pesticides. "The fundamental deficiency in the current regulation of pesticides is the absence of valid scientific data addressing health hazards," says Albert Meyerhoff, a senior attorney at the Natural Resources Defense Council, one of the 41 consumer groups that pushed as a coalition for reform.

The debate centers partly on 600 active ingredients that are used to create the thousands of pesticide formulations on the market. Although most of these key chemicals have been on the market for decades, only six have been fully tested according to federal law. Moore says that, without additional resources, the agency can only review an average of 25 per year to evaluate a chemical's risk to health and the environment. The completion of the review entails the evaluation of tens of thousands of toxicity studies.

Under the proposal, companies would pay up to $150,000 to reregister a chemical with EPA. The fee would serve a twofold purpose. The size of the fee would discourage companies from reregistering chemicals that are unlikely to gain approval, and it would also generate needed revenue to beef up EPA resources for evaluation. Meyerhoff estimates that the fees could raise $70 million for EPA.

The agreement would also give EPA the authority to regulate inert ingredients in pesticides for the first time. According to Moore and others, some chemicals classified as inert by companies may be as harmful as active ingredients. The proposal would require manufacturers to test some inerts and to list the specific compounds on the product label, neither of which is now required.

The agreement would also tighten the standards for approval of many pesticides. Specifically, it would close what critics claim is a significant loophole resulting in the sale of chemicals that have not been fully tested. At present a new chemical must pass very stringent criteria to win EPA approval, but