

# OSTP Ponders Plant Research Initiatives

*Looking to the future, OSTP and federal agencies aim to fill voids in the U.S. agricultural research base*

**D**ESPITE the souring outlook for science budgets in the next 4 years, a handful of federal agencies are garnering support for funding up to \$50 million annually in new plant biology research at colleges and universities. The Office of Science and Technology Policy is reviewing about a dozen preliminary proposals ranging from training top-flight scientists to microbial research on the rhizosphere—top soil systems that interact with plant roots. The aim of this high-level effort is to ensure that American agriculture, which depends heavily on export income, realizes potential gains in plant productivity.

Thus far, the effort to fill critical gaps in basic plant research has been low-key, with no line-item requests contained in President Reagan's forthcoming fiscal year 1987 budget. But because these research proposals address some of the concerns of activists and environmentalists, as well as industry and the university communities, a push may emerge this year in House and Senate authorizing committees to turn these paper plans into actual research efforts.

"Science is critical to our plant production industry," says Robert Rabin, assistant director for life sciences at OSTP. "But its knowledge is not growing fast enough to sustain U.S. economic supremacy for the 21st century." This view is supported by the findings of the National Academy of Sciences, and other congressional, federal, and academic reviews.

"In plants we know some biochemistry, but we really don't have a very clear scientific understanding." As long as these conditions persist, says Nicholas M. Frey, director of research for Pioneer Hi-Bred International, Inc., of Des Moines, Iowa, "It's going to be difficult to make rapid advances."

Federal spending at colleges and universities for basic research in human health hit \$2.1 billion in 1985—or 55 percent of the total \$3.8-billion basic research budget. In contrast, about \$225 million was spent on agricultural research by the Department of Agriculture, the National Science Foundation, and other agencies. Approximately \$110 million of that was allocated to plant research, with \$57 million coming from

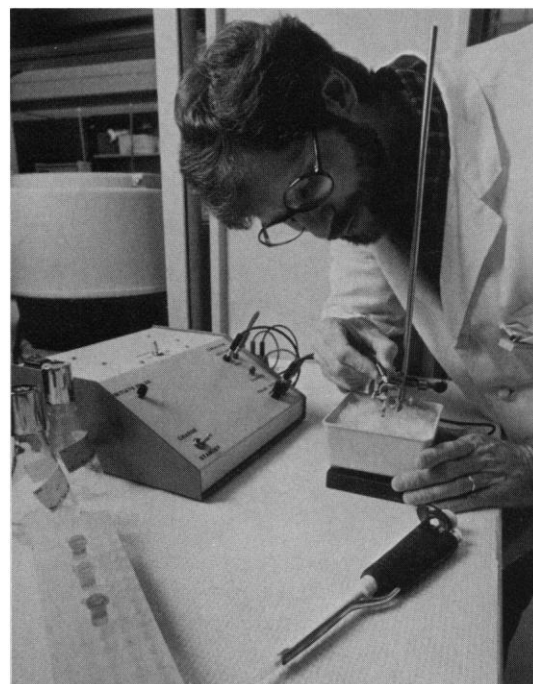
NSF and \$36.6 million from USDA.

The program proposals before OSTP would run for 5 years and add as much as \$250 million to the competitive grant pool for plant biology. Solicited from NSF, USDA, and the Department of Energy, the research tasks outlined by the agencies focus on microbial activity in the rhizosphere, plant biotechnology, ecological processes of forests and rangelands, biological control (pesticides and genetic engineering), plant diseases, water quality, complex carbohydrates, and plant sensing.

OSTP wants these research projects coordinated through interdisciplinary centers at universities. "New opportunities in science are more and more often occurring at the boundaries between traditional disciplines," says John P. McTague, acting director of OSTP. "Even in these tight times," he adds, the interdisciplinary approach is a cost-effective investment of federal dollars. Moreover, says Paul F. O'Connell, deputy administrator for USDA's office of grants and program systems, "you will get some focus on emerging plant technologies, and bring plant breeders and molecular biologists together."

NSF plans to foster the integration of biotechnology with the rest of the biological research in plant sciences. At a cost of \$7.5 million annually it would seek to train hundreds of postdoctorate investigators in interdisciplinary plant research. "We need to get better people involved," says David Kingsberry, assistant director for biological science at NSF, if the United States is to maintain its position in the agricultural export markets. In fiscal year 1985 exports totaled \$31.2 billion—\$27.1 billion of which was derived from plant products.

At OSTP's behest, NSF in October surveyed a dozen companies about the availability of talent. Companies engaged in plant research, NSF says, complained that there is a shortage of highly qualified Ph.D. and postdoctoral candidates—plant biochemists and molecular biologists, cell tissue-culture specialists and plant pathologists. Too many of the applicants, NSF reports, lack state-of-the-art training in biotechnology, or do not have specialized backgrounds in plant sciences.



## Electrical shock

*Arthur Weissinger, a molecular biologist at Pioneer Hi-Bred International, sets up for electroporation—a process that creates pores in cell membranes large enough to admit DNA molecules.*

Says Winston J. Brill, director of research for Agricetus of Middleton, Wisconsin, a joint venture of W. R. Grace & Co. and Cetus Corporation, "I think the U.S. has to now put money into basic plant sciences, young people, and teachers so that they will be there in the future so we can compete with other countries."

But the passage of the Gramm-Rudman-Hollings deficit reduction bill, OSTP and agency officials admit, means funding these projects will be an uphill battle. Still, the research proposals may attract wide support. Hard to ignore will be NSF's proposal to build one and possibly two test facilities to serve as an interim step between greenhouse and field experiments involving genetically altered plants and organisms. Under one concept, each facility would consist of tests plots contained in sunken swimming pool-like structures. They would be integrated with a closed drainage system that empties into lined ponds capped with domes.

Not all of plant research ideas are likely to survive, agency officials concede, since funding the new initiatives will likely require Congress to cut other federal programs. While science officials hope money can be drawn from nonscience programs, they recognize some hard choices may lie ahead. But in the case of American agriculture, there may be no choice. "If we want to stay competitive in the next decade in world agriculture, we had better keep up," says Brill. "In plant sciences, it is not clear that the U.S. is leading." ■ **MARK CRAWFORD**