

and the rest by the private sector and international partners. Furthermore, the commission assumed that the U.S. gross national product would grow an average of 2.4% per year, and that NASA's budget would grow proportionately. In the early decades of the 21st century, the agency would thus be spending roughly \$20 billion to \$30 billion per year.

It remains to be seen what the White House and Congress will make of all this. In constant 1986 dollars, NASA's budget has been static at roughly \$7.3 billion since 1976. And while the agency may get new money to replace the Challenger, its baseline budget is unlikely to rise until the federal deficit crisis is resolved. ■

M. MITCHELL WALDROP

## Field Test of Altered Microbe Still in Limbo . . .

"It's really very perplexing," says Steven Lindow, a scientist at the University of California at Berkeley who wants to field test microbes altered to curtail frost formation on plants. Three weeks ago, Lindow, after waiting nearly 2 years, won federal approval to conduct the experiment on potato plants, but he still cannot proceed because local opposition is mounting.

As a result of local public sentiment, the university has temporarily withdrawn its permission to proceed with the experiment. And, on 2 June, the board of supervisors of Modoc County where one of the test sites is located, passed a resolution requesting that the test be delayed.

Lindow is frustrated and surprised that the test has generated so much anxiety among residents of Tulelake, California, a rural town located a mile from the Oregon border. The experiment has been judged to be virtually harmless by expert advisers to the the National Institutes of Health and the Environmental Protection Agency, and agency scientists themselves. While the test proposal was under federal review, Lindow and the university met with local officials and growers to explain the experiment and found little resistance. They redoubled their efforts after protests erupted in Monterey County last January over a similar experiment planned by a biotechnology company, Advanced Genetic Sciences of Oakland.

Protests among Tulelake citizens were sparked after a Monterey County resident recently spoke against the test at a Tulelake Grange meeting. His appearance was unknown to Lindow, so "there was no chance for rebuttal," Lindow said in a telephone interview. He and the university are now

trying to repair the damage. In preparation for the meeting of the Modoc County board of supervisors, the university put together information packets about the test to educate residents. But commercial potato growers in Tulelake, who generally have supported the experiment, are now getting nervous that adverse publicity about the test will prompt a boycott of their crops. "It's a very emotional situation," he said. "It's basically a fear of the unknown."

Lindow said that the university on 20 May "unexpectedly" withdrew his authorization to conduct the test at the school's Tulelake experiment station, even though he was still waiting to proceed with test. A university spokeswoman said that it hopes to announce a date "in the next week" when the test can go forward.

The experiment is only a small part of Lindow's total research. Asked if the test has been worth pursuing, he said, "It's the stupidest thing I've ever done. I wouldn't do it again. I wouldn't recommend it to anyone else—not until people are better educated in science." ■ MARJORIE SUN

## . . . While First Outdoor Test of Engineered Plant Begins

The first outdoor test of plants altered by recombinant DNA methods began on 30 May when Agracetus, a Wisconsin biotechnology company, planted 200 tobacco seedlings that have been modified to resist crown gall disease. The test represents a small but significant step for agricultural biotechnology.

The purpose of the experiment is to analyze whether the genetic modification changes the plants' yield in an outdoor environment. Agracetus, which is jointly owned by Cetus Corporation and W.R. Grace & Company, used a special vector, a Ti plasmid, to transfer the disease-resistance genes. The vector system potentially could be used to make food crops resistant to specific diseases.

Agracetus is testing the tobacco plants only as a model system and has no interest in commercializing them, said Robert Fildes, president of Agracetus and chief executive officer of Cetus in Emeryville, California. The experiment is being conducted in Midletown, near Madison, on a 2000 square foot plot.

The test proposal was approved by the federal government last November after the National Institutes of Health and the U.S. Department of Agriculture reviewed

the proposal. The Wisconsin Department of Natural Resources also approved the test.

The company has been waiting nearly 2 years to conduct the test and it conferred with local officials prior to going ahead. "We worked real hard to make sure everybody was aware of what we were up to," said Fildes. But as a precaution, the company is not disclosing the exact location of the test site to prevent vandalism. ■

MARJORIE SUN

## Ariane Failure Hits Europe's Space Efforts

Europe's space ambitions received a major setback last week when an Ariane rocket which was to have launched a telecommunications satellite for the international consortium Intelsat had to be destroyed a few minutes after lift-off, following an ignition failure in the rocket's third stage.

All further Ariane launches have been suspended until a report on the accident has been prepared by a special commission which was immediately set up by the chairman of Arianespace, Frederic d'Allest. Arianespace is the company that has been set up to take commercial responsibility for all Ariane launches.

The rocket's failure puts a temporary hold on Arianespace's efforts to capitalize on the delays to the U.S. launcher program caused by the shuttle disaster in January. In recent weeks, Arianespace had announced several new contracts with customers who had previously been considering using the shuttle.

It was the fourth failure in 18 launches for Ariane, and the second in less than 9 months. Two factors are particularly disturbing to European space engineers. The first is that it was the first launch of a new, more powerful version of the rocket, known as Ariane 2.

The second factor was that three out of the four failures have occurred as a result of malfunctioning in the ignition system for the rocket's third stage.

Arianespace officials in Paris have predicted that the launch failure will lead to a delay of at least 1 month in the current schedule for future flights. The delay could be considerably longer if it is felt that a major redesign of the fuel injection system for the third stage is required.

Last week's launch failures also means that, following closely on the failures of the U.S. space shuttles and the Titan and Delta launchers, the West currently has no commercial launchers available for placing large payloads into earth orbit. ■

DAVID DICKSON