To be revised. International group seeks disease-resistant banana genes.

has already raised the banana's public profile, but some plant scientists say the project won't bear much scientific fruit.

The Global *Musa* (Banana) Genomics Consortium says it expects the project to take anywhere between 5 and 10 years, depending on the degree of accuracy desired, and cost up to $7 million a year. Members of the consortium have promised $2 million a year for the duration of the project, says geneticist Emile Frison, chair of the nonprofit International Network for the Improvement of Banana and Plantain and coordinator of the sequencing effort. The chief sponsor to date is the French agricultural institute CIRAD, which has pledged $1.5 million over the next 5 years.

The consortium has already begun work but is still looking for funding. To help with fund raising, it engaged a public relations firm and announced the project's launch last week, noting that better bananas would help reduce hunger and poverty in the developing world. Frison explains that it would have been "a handicap in raising resources" not to have sought publicity.

Two dozen research centers expect to participate in the project, including The Institute for Genomic Research, a large-scale sequencing facility in Rockville, Maryland. Sequencing pros and banana experts met in Alexandria, Virginia, from 17 to 19 July to draw up a protocol and select a banana type for sequencing. Only specialists are likely to be familiar with their choice—*Musa acuminata calcutta 4*, a wild, nonedible variety native to southern India. According to Frison, *calcutta 4* was chosen in part because of its resistance to black sigatoka, a devastating fungus that reduces worldwide banana yields by as much as 50%. Network researchers, who plan to make sequence data freely available as they are produced, say they hope the variety's resistance traits can be used to improve commercial bananas.

The banana would be the third major plant genome sequenced, after the wild mustard *Arabidopsis*, completed by a public consortium in 2000, and rice, undertaken by a private company and a public consortium. With 500 million to 600 million base pairs, the banana would be the biggest plant genome cracked yet.

But some members of the plant genomics community are skeptical of the project. They say bananas are intractable in the laboratory, which will make it hard to take advantage of the genomic data. "You can count the number of people working on banana on one hand," says Chris Somerville, a pioneer in *Arabidopsis* research who works at Stanford University. "The sequence is of limited utility if no one is working on the plant."

Backers of the project acknowledge that the ranks of banana geneticists are thin but point to recent accomplishments such as the identification of black sigatoka resistance genes. They argue that the banana is a very important crop even though it is not ideal for genetic research. "Just because something you sequence isn't a perfect model organism doesn't mean that its genome isn't useful," says University of Chicago plant geneticist Daphne Preuss. –JOSH GEWOLB

NEW FACILITIES

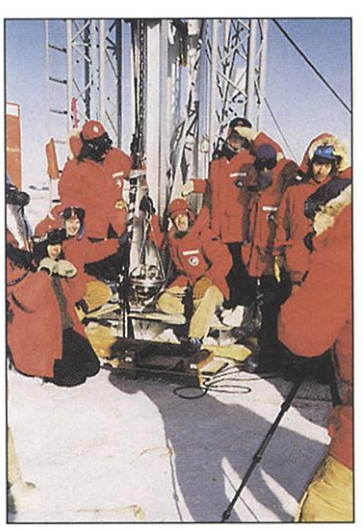
Funding Backlog at NSF Sets Off Free-for-All

Elbowing your way to the head of a line that has been forming for years isn't polite. This year, however, it could be a winning strategy for several groups seeking major new research facilities from the National Science Foundation (NSF). The latest evidence came earlier this month in separate votes by both House and Senate spending panels on increasing NSF's $4.4 billion budget.

The panels approved overall increases for NSF in 2002 of 9.4% and 5.5%, respectively—more than the 1.5% the Bush Administration requested but less than the 15% sought by research advocates. Those middle-of-the-road numbers hide some controversial decisions on individual projects, however. The Senate panel included funds for an underground laboratory in South Dakota, whereas the House panel approved money for an expanded search for neutrinos at the South Pole and a high-altitude research plane. None of these projects were included in NSF's budget request to Congress. Although Congress must still reconcile those bills this fall, the trend is clear: Pushiness pays off.

NSF's budget has traditionally been nearly free of congressional earmarks—projects not requested by the agency and often advanced by politicians on the urgings of their constituents. But a decision in February by the Bush Administration to eliminate any so-called "new starts" from the foundation's capital budget, combined with congressional rejection of two projects contained in last year's budget request, has created a backlog of pent-up demand. That delay has prompted some researchers whose projects are stuck in NSF's pipeline to plead their cases to Congress.

The result is undermining the orderly process for setting priorities on big projects. The process begins with scientific reviews, runs through approval by the National Science Board (NSB), NSF's governing body, and culminates with a decision to include an item in the agency's budget request to Congress. Any major deviation, say most scientists, invites chaos and a misallocation of limited resources. "NSF [decision-makers] can see the big picture, and they set their funding priorities based on what's best for the entire community," says Anne Meltzer, a seismologist at Lehigh University in Bethlehem, Pennsylvania. She's involved with one of the delayed initiatives, a 10-year, $350 million geosciences project called EarthScope that includes a network of seismic monitoring stations and a 4-kilometer hole drilled into the San Andreas fault. Although "it's all good research," says Meltzer about the projects Congress has favored, "it's very disappointing when people don't respect the process."



Cold cash. Congressional funding may help scientists working on a neutrino detector at the South Pole greatly expand their experiment.

CREDITS: (TOP TO BOTTOM) CGIAR; AMANDA

The science board hasn't even been briefed on one of the major projects that Congress wants the agency to take on: building a national underground laboratory in an old gold-mine shaft in South Dakota (*Science*, 15 June, p. 1979). Last week, the Senate panel that funds NSF included $10 million to examine the feasibility of the $280 million project, which was submitted to NSF for scientific review only last month. Propo-

nents, who have the ears of Senate Majority Leader Tom Daschle (D–SD) and panel member Senator Tim Johnson (D–SD), say that impending plans to flood the former Homestake mine forced them to act quickly.

In contrast, the antarctic astrophysics project, dubbed Ice Cube because of its 1-kilometer–per-side dimensions, has worked its way through NSF's review process. The proposed $243 million muon and neutrino detector would vastly expand an existing array beneath the South Pole. The expansion was approved last year by the NSB and made it into NSF's draft budget last fall. But it was booted out by the president's diktat.

Project leader Francis Halzen and others at the University of Wisconsin, Madison, which would run the facility, didn't give up, though; they won over Representative David Obey (D–WI), the ranking member of the House Appropriations Committee. At his urging, the committee approved a $15 million down payment on the project. "There's a long backlog of projects, and I've been told that we were top ranked," says Halzen, explaining his decision to seek help from a powerful friend. "There's also a European project coming along, and we want to push forward and retain our advantage."

This year's final spending bill is also likely to include money for a research plane that was endorsed by the NSB in 1998 but never included in NSF's budget request. The $80 million project, called High-Performance Instrumented Airborne Platform for Environmental Research (HIAPER), would be operated by the National Center for Atmospheric Research in Boulder, Colorado, which persuaded Congress to put in $20 million over the last 2 years. In keeping with the panel's philosophy of finishing what it starts, the House this year added the remaining $35 million needed to start bending metal. Last week, NSF announced that it had begun negotiating with Gulfstream to build the plane.

Left behind in this free-for-all are supporters of EarthScope and the $100 million National Ecological Observatories Network, a collection of 10 instrumental field stations. These two projects were part of NSF's 2001 budget request, at $17 million and $12 million, respectively, that legislators declined to fund. And they were bumped from NSF's draft 2002 budget.

Unlike the teams involved in Ice Cube, HIAPER, and the underground lab, the earth scientists who hope to carry out EarthScope have agreed to bide their time until NSF is able to reinsert them next year into its major research equipment and facilities account, at a proposed $32 million. However, so far that strategy has netted them nothing but a pat on the back. "They agreed to play by the rules, and so far they have lost out," notes one NSF official. **–JEFFREY MERVIS**

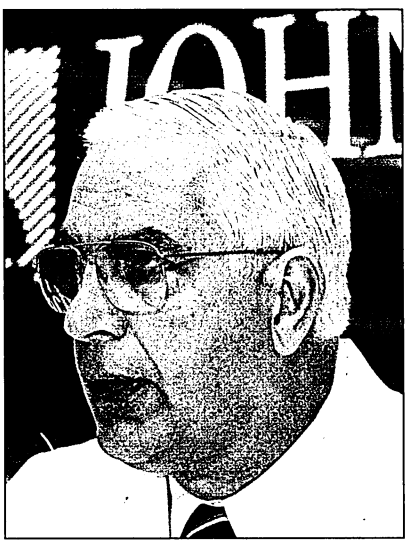
CREDIT: MARTY KATZ

CLINICAL RESEARCH

Shutdown at Hopkins Sparks a Debate

The federal government abruptly suspended all U.S.-funded human studies at Johns Hopkins University in Baltimore last week. Then, in a turnabout 3 days later, it allowed about 700 of the more than 2400 that were affected to resume, although with restrictions. The crisis sent a shock through the clinical research world, mainly because Hopkins is regarded as one of the country's most conscientious overseers of research. And it seemed likely to raise questions anew about how best to protect research subjects.

These events grew out of an inquiry into the death on 2 June of a healthy volunteer in a Hopkins asthma study. Hopkins completed its own investigation of the tragedy on 16 July, finding relatively minor flaws in the study (*Science*, 20 July, p. 406). Then on 16 to 18 July, investigators from the U.S. Department of Health and Human Services (HHS), who had been checking other issues at Hopkins since fall, conducted an urgent site visit. One day later, they found Hopkins deficient on 31 points and issued the shutdown order.* Among the alleged infractions: failure to approve every study in a "convened meeting" of the Institutional Review Board (IRB), lack of proper informed consent, exposure of subjects to a drug not approved for human use, and failure to report an adverse reaction.



"Outraged." Hopkins Medicine CEO Edward Miller protested a federal shutdown order.

Unlike a half-dozen other institutions that have been punished in this way, Hopkins didn't meekly swallow HHS's medicine. Instead, university officials contested some of the allegations and lashed out at the regulators. The same day Hopkins received the notice of deficiency from HHS's Office for Human Research Protections (OHRP), Edward Miller, CEO of Johns Hopkins Medicine, appeared before cameras on Hopkins's front steps to protest what was happening. And in a public statement,† the university called the research shutdown "unwarranted, unnecessary, paralyzing," "draconian," and "outrageous." University officials also contacted members of Congress. Both of Maryland's senators, Democrats Barbara Mikulski and Paul Sarbanes, responded with faxed protests to HHS Secretary Tommy Thompson.

Over the next few days, Hopkins and HHS reached an understanding. The university submitted a plan to correct the claimed deficiencies by specific deadlines. And HHS agreed that people could continue to be treated in Hopkins clinical studies if the investigators could verify that this would be "in the best interests" of the subjects. Most studies, however, have been placed in limbo and must be reapproved.

This compromise, reached over a weekend of hectic activity at Hopkins and in government offices, seemed to cool the rhetoric. But it was clear early this week that Hopkins and OHRP still disagree sharply on important points and that a wider debate may be brewing. Observers differ markedly: Some are exasperated with the detailed reporting imposed by the regulators—which they dismiss as mere paperwork that doesn't necessarily improve the protection of research subjects—whereas others think the oversight system needs even more support and authority.

After reading the documents, Norman Fost, a pediatrician and ethicist who chairs an IRB at the University of Wisconsin, Madison, says he agrees with Hopkins that some government sanctions were "outrageous," probably "unfair," and perhaps even "wrong." For example, OHRP reprimanded Hopkins for ignoring U.S. rules on the use of drugs in basic clinical research, but Fost says the record shows that the government has never clearly articulated them. In contrast, Mary Faith Marshall, a professor of medicine and bioethics at the University of Kansas Medical Center in Kansas City and chair of OHRP's advisory committee, thinks government inspectors were probably justified in taking strong action. "In my experience," she says, "they bend over backward to be fair and do an excellent job." She notes that an HHS inspector general's report in 1998 warned that IRB review panels were overworked and underfunded—putting human subjects at risk.

The university, meanwhile, is trying to

* ohrp.osophs.dhhs.gov/detrm_letrs/jul2001.htm
† www.hopkinsmedicine.org/press/2001/JULY/010719.htm