

Biotechnology

Field-test ups and downs

The path to governmental permission for field tests of genetically engineered microbes has been far rougher than the scientific development of the organisms. But a long-awaited report of the President's Office of Science and Technology Policy (OSTP), now awaiting the President's approval, is expected to smooth out some of the rough areas for the biotechnology industry. Meanwhile, critics of genetic engineering continue to erect blockades.

A proposal to field-test microbes genetically engineered to protect corn against root cutworms has taken a major detour. The Environmental Protection Agency (EPA) deferred action on the request by the Monsanto Co. of St. Louis for an experimental use permit. EPA asked Monsanto for "better data" to indicate that the release of the two genetically altered strains of bacteria will present "minimal risk" to the environment. Because the bacteria were to be applied to seeds during the spring planting season, the EPA action rules out a field test of these organisms this year, the company says.

This EPA decision counters the recommendation last month of its scientific advisory panel. The panel said that although there were deficiencies in some of the studies Monsanto submitted, the available data were sufficient to show that the risks presented by a field test are minimal.

While Monsanto has had a major setback, the University of California at Berkeley has received permission to field-test a genetically engineered microbe, a bacterium altered to prevent it from triggering frost damage in crops. But opposition to the field test has been raised in the neighborhood of the proposed test sites. The university says it will delay the testing to address local concerns.

The university proposes to test the same organism that was about to be field-tested by Advanced Genetic Sciences of Oakland, Calif. That company recently had its testing permit revoked by EPA when the agency reported violations of rules regulating greenhouse tests (SN:3/8/86,p.148). Before approving the University of California proposal, EPA undertook extra investigation steps, inspecting the test sites and examining the university scientists' laboratory records.

As a new tactic in his continuing opposition to biotechnology field tests, Jeremy Rifkin of the Washington, D.C.-based Foundation on Economic Trends recently petitioned EPA to withhold experimental use permits for such experiments until the agency addresses the issue of insurance liability. He says companies and universities are being denied field-test coverage by insurance companies. "No research institution or corporation in the United States," Rifkin says, "has the financial reserves to cover the liability claims for one genetic engineering accident of the scale of a spreading chestnut blight or dutch elm disease."

Specifics of how the various federal agencies should divide up the task of regulating the fruits of biotechnology now are described in an OSTP report. The delegation of authority recommended follows the general scheme currently in place: EPA would handle microbial products; the Department of Agriculture would regulate animal vaccines and genetically engineered plants; and the Food and Drug Administration would deal with pharmaceuticals and human vaccines. But the report provides "considerable details" that will make the pattern of authority "much more visible to the biotechnology community," says one government official.

A category of genetically engineered products, those from which a gene has been deleted, would not be required to face as rigorous a review as those to which genes have been added, according to other government officials. But a spokesperson for OSTP refused to confirm that report. Scientists disagree on whether the deletion of a gene is necessarily less risky.

Earth Sciences

Stefi Weisburd reports from Baltimore at the spring meeting of the American Geophysical Union

Tune in to noise out

Just before the silence of space begins in the outer reaches of the earth's atmosphere is a region that shimmers with sound. The symphony of signals found in the magnetosphere—where the geomagnetic field has trapped a plasma of charged particles—include whistle-like noises triggered by lightning and the chirping sound of the "chorus" created when an incoherent set of radio waves passes through.

Radio scientist Robert Helliwell at Stanford University and his colleagues have also shown that a radio signal at one frequency sent into the magnetosphere will grow and trigger a noisy rainbow of signals at slightly different frequencies. Now the researchers find that the magnetosphere will produce a series of signals at discrete frequencies when radio waves of two or more frequencies are transmitted from their research station in Antarctica.

For example, a transmitted signal oscillating at 2,000 hertz (hz) and another at 2,030 hz results in a "subharmonic" signal at 2,015 hz, as well as other signals at 2,060 hz and 2,090 hz. These signals are often just as strong as the waves received at the injected frequencies. "The mechanism for their generation is not yet understood," says Helliwell, "but their presence indicates an interesting process at work . . . that may play a role in creating the kind of observed noise we see in the magnetosphere." It's possible, adds one co-worker, that the zoo of odd noises may arise from rather simple combinations of waves.

Peeping TOMS sees volcanic plumes

About four years ago, atmospheric physicist Arlin J. Krueger and his colleagues at NASA Goddard Space Flight Center in Greenbelt, Md., were puzzled by a large blob in the map made from data recorded by the Total Ozone Mapping Spectrometer (TOMS) aboard the Nimbus-7 satellite as it passed over Mexico. According to the computer, the blob was not due to ozone. Then the researchers realized they were looking at a plume of sulfur dioxide from the El Chichón volcano. And TOMS became not only a way to map atmospheric ozone but also a powerful tool for observing eruptions from space.

Krueger's group has now used TOMS to follow eruptions from 16 volcanoes. Since sulfur dioxide plumes are unique to volcanoes, scientists have a much easier time spotting eruptions with TOMS than by looking at cloud shapes with conventional imaging from weather satellites, says Krueger. Unfortunately, he adds, the eight-year-old TOMS "is beginning to act a little sick," and there are no formal plans to replace it.

The courts ignored the currents

When the International Court of Justice at The Hague determined in October 1984 where the northeastern maritime boundary between Canada and the United States should fall, they may have thought they were finally putting to rest a two-century dispute over some of the world's richest fishing grounds. Unfortunately, says oceanographer David A. Brooks, the court made its decision by geometrically dividing the waters in the Gulf of Maine and the Georges Bank, with little regard for attorneys' arguments about currents or other oceanographic, geological and ecological factors critical to fisheries. As a result, he says, "the fisheries issue that created the controversy in the first place was not resolved."

According to Brooks, of Texas A & M University in College Station, this was the first time two nations had agreed in advance to abide by the court's decision, but neither is happy with the outcome. Even before the line was declared, the competition over resources had led to overfishing of several species, Brooks says. He thinks one solution would be for a commission to address the problem of fisheries management on a scientific basis.