

Gene-Splice Approvals on Two Fronts

The first deliberate release of genetically engineered organisms is once again on the calendar. Two field tests involving products of gene-splicing techniques were approved by federal agencies last week. The Environmental Protection Agency (EPA), for its debut in the genetic engineering arena, announced issuance of an experimental use permit for a field test of antifrost bacteria on a plot of strawberry plants. Social critic Jeremy Rifkin immediately filed a suit to prevent that experiment.

In addition, the National Institutes of Health, the veteran player in the evaluation of gene-splice experiments, gave final approval to a field test of tobacco plants genetically engineered to resist a type of tumor. Meanwhile, a U.S. Senate hearing raised concerns once again about the adequacy of genetic engineering regulation.

The EPA approval was granted to Advanced Genetic Sciences of Oakland, Calif. The proposed test involves two strains of bacteria that have been genetically altered to prevent frost damage to plants (SN: 8/27/83, p. 132). The company plans to conduct its test in December or January on 2,400 strawberry plants in an 0.2-acre plot of the California Central Coast. A similar experiment approved by the National Institutes of Health in 1983 was later prohibited by a court injunction.

"The agency has reviewed substantial amounts of information relative to the potential impacts of these field tests and has concluded that they will not result in any foreseeable adverse effects to human health or the environment," says Jack Moore of EPA. He says the agency applied the same guidelines it uses in approving microbial pesticides that have not been genetically engineered. But in this instance, he says, "the amount of intense rigor and breadth of review were out of the ordinary."

Rifkin says, "It is naive for the EPA to posture that there are enormous benefits with no costs." He and his Washington, D.C.-based organization, the Foundation on Economic Trends, have charged that the EPA's issuance of the experimental use permit is "arbitrary, capricious, an abuse of discretion, and otherwise not in accordance with law."

Rifkin raises two types of objections. First, he complains about the specific assessment. For example, he says, EPA did not require experiments to determine how the bacteria might spread up into the atmosphere, which is a special concern because the microbes are thought to play a role in rainfall (SN: 5/4/85, p. 282).

Also, Rifkin says, the permit is "likely to jeopardize an endangered species." An endangered strawberry species lives in the vicinity of the proposed test plot, but there have been no tests to determine whether it would be adversely affected.

A second set of objections applies to the release of any genetically engineered organisms. Rifkin says federal agencies should not consider such a release "until such time as the appropriate scientific studies to judge risks have been completed." EPA, he charges, is currently funding studies in "predictive ecology." Rifkin says, "Why not wait until the EPA finishes its own in-house tests?" He adds, "The question is not science, the question is political pressure. It's business first, environment second."

Moore of EPA disagrees. "The agency has concluded," he says, "that the available information is sufficient to show that this small-scale use of [antifrost bacteria] is very unlikely to pose unreasonable hazards to man or the environment."

While EPA was making its decision, the National Institutes of Health (NIH) announced final approval of a proposal by Agracetus of Middleton, Wis., to field-test tobacco plants genetically engineered to resist tumors caused by crown gall disease. The proposal was originally submitted to NIH in May 1983. The NIH Recombinant DNA Advisory Committee unanimously recommended approval of the experiment in June 1984. But in May 1984, a federal court had issued a preliminary injunction against NIH's approval of deliberate release experiments. Although the court specifically exempted approval of company proposals (such as Agracetus's) voluntarily submitted, NIH director James B. Wyngaarden requested that an environmental assessment for the Agracetus proposal be prepared. This assessment was signed last August, and the approval was announced Nov. 13.

Agracetus will wait until next spring to decide whether to carry out its proposal. The test may be judged irrelevant, because in greenhouse experiments over the last two years the scientists have greatly refined their techniques.

Winston Brill of Agracetus says the proposal describes a model system only; crown gall disease is not normally a problem with tobacco. The company eventually plans to do genetic engineering on cotton, soy and corn, introducing such traits as increased yield, decreased fertilizer requirements and resistance to other diseases, Brill says.

The intent of the proposed field test was simply to demonstrate that genetically engineered plants do not have un-

expected properties, Brill says. In greenhouse experiments the scientists have found no measurable distinction between genetically engineered and natural plants. "But proper agricultural practice is to put things out in the field," Brill says.

Whether the approved field test will be challenged in court is not clear. "We don't know what NIH's approval means," Rifkin says. "I think the company will have to go to the USDA [Department of Agriculture]."

Also last week Sen. Albert Gore Jr. (D-Tenn.) chaired a hearing to consider the state of biotechnology regulation. "I am very concerned that the administration does not yet have a workable oversight mechanism in place," Gore said. "EPA's recent announcement underscores the urgency of the matter." Gore called the recently proposed interagency biotechnology coordinating council (SN: 9/28/85, p. 198) "a toothless discussion group."
— J.A. Miller

Single-photon interference seen

Duality is commonplace in modern physics. We are taught that things have a double nature, particlelike and wavelike. Things that people tend to think of as particles, such as electrons, also exhibit wavelike behavior; things that people tend to think of as waves, such as light, also exhibit particulate behavior.

The wave-particle duality was first enunciated by Louis de Broglie in 1923. Now Alain Aspect, a physicist from the University of Paris at Orsay, reports what he says is the first experiment that demonstrates the dual behavior of light, particularly the wavelike behavior of single photons, or particles of light. His presentation at last week's Symposium Commemorating the Centennial of Niels Bohr, held at the American Academy of Arts and Sciences in Cambridge, Mass., left an appreciative audience silent.

Over the decades many experiments have shown or claimed to show either the wavelike or particlelike behavior of light, electrons, neutrons, etc., and we are now to the point where technological artifacts, such as electron microscopes, make use of one or another aspect of the duality. However, it has always been a commonplace that an experiment (or a technological application) designed to see one side of the duality saw that side but not the other and vice versa. This elusive quality of the duality is one of the things that has fueled the longstanding