across Europe between research laboratories, research equipment producers, and eventually pharmaceutical and chemical manufacturers. Italian, Swiss, and German companies are said to have already expressed interest, besides those in France and the United Kingdom.

Given the two slightly different approaches, each with its supporters, the need now, as some see it, is to generate a political consensus behind a common strategy for stimulating closer cooperation. Such a common strategy, it is argued, might also be used to dampen the public disquiet that has surfaced in several European countries (in particular West Germany) over the ethical implications of modern biological research—particularly genetics research affecting humans.

On 11 April, the research ministers of the 12 member states of the EEC gave their informal backing during a lunchtime discussion in Luxembourg to Riesenhuber's proposals to explore ways of generating such a consensus. In particular, they agreed that German and European Commission officials should jointly oversee plans for four separate meetings over the next 2 months, each aimed at addressing separate issues.

The first was the meeting held in Brussels on 2 May. Planned as a detailed discussion of both the proposed contents of the Japanese human frontiers program and of the possibilities for greater research cooperation in Europe, it was attended by 50 to 60 top European scientists as well as representatives from the commission's various scientific and industrial advisory boards. "The idea is to have a broad discussion among scientists about what should be done, just as we did before we set up EMBL in the early 1970s," CODEST member François Gros, former director of the Institut Pasteur in Paris told *Science* before the meeting. "After one or two meetings of this type, the EEC Commission will be in a better position to decide on the appropriate form of European activity."

If all goes according to plan, the 2 May meeting will, at the discretion of the German government and the Commission, be followed by an informal meeting of research ministers to discuss what type of European program might be endorsed on 29 June. And two parallel meetings will discuss the ethical and legal dimensions of biological research, particularly that concerning recombinant DNA techniques and genome sequencing.

As for Japan's Human Frontiers Science Program, the European ministers have already agreed on a common approach, which they will present if, as currently anticipated, the program is discussed at the Toronto summit in June. They have agreed that the type of research envisaged under the Japanese program is appropriate for international collaboration, and that Europe should play a significant role in it; for the time being, however, their contribution to the program will be more in kind than in new research money.

There are some differences of opinion, however. Riesenhuber, for example, has expressed both support for and caution about the Japanese initiative. Referring recently to the danger that it could become a new brain drain of European expertise in molecular biology and neurosciences to Japan, he has emphasized the need to ensure a "real partnership" with Japanese scientists, suggesting that Europe should aim to make the same overall level of financial contribution as the Japanese. British officials, in contrast, say they are waiting to see how the program develops before deciding to commit any funds to it.

Agreement on the appropriate form of a purely European initiative to stimulate advanced biological research is still proving elusive. But, according to German officials at least, the positive interest expressed informally by the research ministers indicates that substantial developments may take place over the next few months. "There is a lot going on," says a top BMFT official in Bonn, "and it looks as things are really beginning to move." ■ **DAVID DICKSON**

Field Test Data Inadequate, OTA Says

More research must be conducted to support risk assessment evaluations of outdoor tests of genetically engineered organisms, says the Office of Technology Assessment (OTA). "To dispel speculation, increasing the general knowledge base about organisms intended for environmental applications is paramount," says OTA. Not only will this bolster public confidence, the agency says in its latest report on biotechnology,* but additional data also should lead to some relaxation of federal regulations.

The findings are part of an overview prepared at the request of Congress on the use of engineered organisms in agriculture and for tackling environmental pollution. OTA's report examines historical introductions of new and modified organisms and plants as well as recent field trials.

The study should serve as a useful reference for members of Congress and the general public trying to make sense of the conflicting statements of social activists and industry. The report concludes that:

- With adequate review, the small-scale field tests that occur in the next several years are not likely to pose an environmental problem that cannot be controlled.
- Small field experiments are likely to be the only way potential risks from some proposed commercial uses of genetically engineered organisms can be evaluated.
- There are reasons to be cautious because significant areas of uncertainty exist, especially in the realms of microbial ecology and population dynamics.

In addition, OTA recommends that the National Science Foundation, the Department of Agriculture, and other federal research agencies consider targeted research initiatives covering interactions between competing organisms, gene regulation, and related issues affecting microorganisms. Along with this effort there also is a need for greater interdisciplinary research among microbiologists, geneticists, plant pathologists, agronomists, ecologists, and evolutionary biologists, says OTA.

"Specific data and basic, broad-based information. . .to develop capabilities for generic risk assessment and management strategies are lacking," observes OTA, which suggests that federal regulation of the biotechnology industry could benefit from better data. "With many commercial applications of biotechnology reaching the field test stage," the agency comments, "regulators need clear risk assessment and risk management guidelines."

As more data are gathered regarding various classes of organisms, regulation of some field tests can be relaxed, if not abandoned. "It should be possible now, or become possible in the near future to sort planned introductions into broad categories for which low, medium, or high levels of review are appropriate," says OTA.

The current regulatory mechanism set up by the Biotechnology Science Coordinating Committee (BSCC) in June 1986 is inadequate, OTA says. The BSCC, which is part of the Office of Science and Technology Policy, "lacks the power to impose its decisions" upon regulatory agencies such as the Environmental Protection Agency or the Department of Agriculture, the agency notes. As a result, OTA adds, there are inconsistencies in the regulatory approaches used by executive branch agencies. ■

MARK CRAWFORD

**Field Testing Engineered Organisms: Genetic and Ecological Issues* is the third of a series titled "New Developments in Biotechnology." Copies of the report (OTA-BA-350) are available from the U.S. Government Printing Office.