Chemical Giants Push for Patents on Plants

Controversy has arisen in Europe over whether new plant varieties produced by genetic engineering methods can—or should—be patented

Paris. On 29 May, the council of the Paris-based Organization for Economic Cooperation and Development (OECD), after long and frequently acrimonious debate within some of its national delegations, approved the publication of a report recommending a substantial increase in the amount of patent protection for the results of biotechnology research.

The report, prepared by a panel of outside consultants, endorses the idea, for example, that there should be an internationally recognized "grace period" of 6 months after the publication of research results in which a patent can be applied for; at present, in Europe and several other Western nations—unlike the United States—any form of publication invalidates a subsequent patent application (*Science*, 22 February, p. 926).

The most controversial section of the report, however, has been that which argues the case for strengthening the protection offered by the patent system to plants produced by new breeding techniques that have been developed through the use of genetic engineering.

The topic is an important one for European countries where, unlike the situation in the United States, new plant varieties cannot at present be patented. The financial stakes are high, for some of the most commercially promising prospects for the applications of recombinant DNA research lie in the field of agriculture and food production.

Pressure for change is coming in particular from large European chemical companies, especially in Switzerland and West Germany, which are currently investing considerable sums of money in such research. The companies, often backed by government officials responsible for stimulating technological innovation, claim that their investment can only be justified if they are able to obtain patent rights to all plants that may eventually result from the use of the research results.

They are being challenged, however, by traditional plant breeders, who currently enjoy legal protection under a parallel system of "plant breeders' rights" giving them ownership of any new plant variety they are able to create—regardless of who holds the rights to the "parent" variety from which the new variety was bred. These breeders have, in countries such as Japan and Holland, also found government officials to support their case, this time mainly from agricultural ministries.

The current dilemma stems from a decision taken earlier this century in Europe that, except for a few examples, plants should not be patented. This was partly because, unlike with a machine, it was felt impossible to provide a precise description of how the plant variety had been produced. It was also partly the result of political concerns about the dangers of private companies obtaining monopolies over important foodstuffs.

> The dispute pits traditional plant breeders against chemical companies.

In contrast, the alternative system of plant breeders' rights was enshrined in a convention setting up the International Union for the Protection of New Varieties of Plants (UPOV) signed in Paris in 1961, currently subscribed to by 17 (mainly European) nations and administered through the Geneva-based World Intellectual Property Organisation.

Reflecting this separation, the European Patent Convention of 1973, which set out to harmonize patent law in the different European countries, states explicitly that patents will not be granted for "plant or animal varieties or essentially biological processes for the production of plants or animals." It adds, however, that this exclusion does not extend to "microbiological processes or the products thereof."

Since the convention was signed, genetic engineering has arrived on the scene to raise the commercial stakes—and highlight the ambiguities contained in language written for a time when plant (and animal) breeding was still a skilled art rather than an exact science.

Patent attorneys such as Günter Schumacher with the giant German chemical company Bayer, which is already investing heavily in long-term research on the applications of genetic engineering techniques to plant breeding, argue that these can be considered as "microbiological" rather than "essentially biological" techniques—and can therefore be patented as they are not exempt from patent protection.

A significant test of this interpretation will be the decision of the German Patent Office on an patent application covering a process for the introduction of expressible genes into plant cell genomes by using *Agrobacterium* strains carrying hybrid T-plasmid vectors developed by a team led by Josef Schell, of the Max-Planck Institute for Plant Breeding Research near Cologne.

The patent application was made in 1983 (a similar, potentially competitive, application has been made by the American company Monsanto) and the result is still being awaited.

Even if it is granted, the "process" patent itself is unlikely to cause conflict with traditional plant breeders. More controversial is whether the patent protection should extend to all subsequent varieties based on the new plants produced by this process, in defiance of current plant breeders' rights.

Schumacher of Bayer says that it should, arguing that if his company cannot gain patent rights to new plant varieties that incorporate innovations, such as a gene with special characteristics, arising from its research, "in the long run it would not be worth investing in the field" since "all breeders could use the results of our research."

Bayer's interest is reflected in the fact that, as well as conducting its own research, it currently contributes more than $300,000 a year to the Cologne institute—and is also one of the three companies that have already been given provisional rights to the *Agrobacterium* procedures by the Max-Planck Gesellschaft in Munich in anticipation of the patent being granted.

Many plant breeders, however, are worried that, if patent rights are allowed on new varieties produced by genetic engineering, it could be the thin end of the wedge leading to a virtual take-over of their profession by large chemical companies. They argue that it is often only these companies that can afford the substantial research and development costs needed to achieve significant breakthroughs in "scientific breeding."

"The artificial gene which science is today able to construct should be protectable by patents, but as soon as this

gene is incorporated into a plant and starts functioning, it should no longer be allowed patent protection," says one breeder in Holland, where the Ministry of Agriculture has recently written to the Ministries of Economic Affairs and Justice in support of the claim that plant breeders' rights should be given precedence over patents.

This argument receives enthusiastic support from UPOV's headquarters in Geneva. Heribert Mast, the agency's vice secretary-general, argues that "there is no need for better protection" than that provided by the existing system of plant breeders' rights, that "the seed firms are content" with the way things now work, and that the pressure for change is coming from industrial attorneys "who only understand the patent system."

Ironically, many of UPOV's criticisms of demands from chemical companies for greater patent protection for plants are shared by Third World groups who, in the past, have been the most vocal critics of plant breeders' rights, claiming that they have led to environmentally damaging agricultural practices and the monopoly control of crops by multinational seed companies.

"We still feel that plant breeders' rights are wrong, but the type of threat raised by companies being able to patent individual genes and the plants containing them is even worse," says Henk Hobbelink, Amsterdam-based coordinator of the "seeds campaign" of the International Coalition for Development Action.

The high emotions running on each side of the debate have been reflected in the controversy generated in several OECD countries by an early draft of the agency's experts' report, which claimed that breeders' rights were a "less appropriate" form of protection than patents for "plants produced by genetic engineering methods."

In the final report approved last week (and shortly to be published under the title "Biotechnology and Patent Protection") the language has been toned down. While arguing the need for "stronger protection than is possible at present," it suggests that innovators be allowed "the choice of the type of protection most appropriate to secure a proper return on his investment."

Schumacher at Bayer, and other industrial attorneys, suggest that it should be possible to operate with a "double" system of protection—provided that patent claims are not superseded by plant breeders' rights.

Several countries, reflecting a pragmatic acceptance of the new rules of the game among plant breeders, now appear to be moving in this direction, hoping that they can find a compromise formula that will not require time-consuming changes either in domestic law or international conventions.

Mast at UPOV claims that "double protection would lead to legal insecurity" since rights claimed under one system could be challenged under the other (indeed, it is currently disallowed under the UPOV convention, which requires countries to choose between the two systems). But some observers feel that the organization will eventually be forced to compromise and accept plant patents in some form, even where these compete with traditional forms of breeders' rights.—**DAVID DICKSON**

DOD Program Proves Attractive

A proposal to channel substantial sums of money from the Department of Defense into academic science through a new Universities Research Intitiative has been warmly received by the armed services committees on Capitol Hill. But the ink had scarcely dried on the proposal before efforts were begun to siphon some of the money off through pork-barrel politics.

The intitiative, for which the Pentagon has requested $25 million in fiscal year 1986, is intended to shore up university research in areas of potential interest to defense. The funds, which the Pentagon plans to increase to $100 million a year by 1988, would be spent on such items as fellowships, instrumentation, and projects linking academic, industrial, and defense scientists (*Science*, 19 April, p. 303).

The House Armed Services Committee was so enamored with the idea that last month it upped the Pentagon's request to $200 million for 1986 alone. The Senate Armed Services Committee was also highly supportive but approved the program at the level requested. A House-Senate conference committee will eventually come up with a compromise figure.

The proposal has yet to be acted upon by the House and Senate appropriations committees, which exert a more powerful hold on the Pentagon's purse strings, but the congressional action so far suggests that the program has attracted a good deal of political support.

It has also attracted the attention of Senator Alfonse d'Amato (R–N.Y.), who apparently decided it would provide an opportunity for him to do his alma mater, Syracuse University, a favor. At d'Amato's request, Senator John Warner (R–Va.) proposed an amendment to the defense authorization bill when it was being considered by the Senate Armed Services Committee, requiring that $1 million of the Universities Research Initiative be spent at Syracuse University for computer science and related activities. The amendment was accepted and is now written into the bill passed by the committee.

This raid on the program has incurred the wrath of the Association of American Universities (AAU), which consists of 50 of the nation's largest research universities and has been enthusiastically supporting the Universities Research Initiative. The association discussed the episode at its spring meeting last month, following which AAU president Robert Rosenzweig fired off a letter to the members of the House Appropriations subcommittee on defense asking them to reverse the Senate's action.

"The attempt to earmark these funds for a single research program, no matter how meritorious it is thought to be, preempts the commonly accepted practice of soliciting competing applications and having them reviewed by qualified professionals," Rosenzweig wrote. "The Universities Research Initiative was devised specifically to bolster institutions whose health is especially important to the research programs of the Department of Defense. To open it at the very beginning to decisions made on different grounds altogether would severely compromise a valuable new enterprise," he added.

An aide to d'Amato said that the senator recently toured the facilities at Syracuse and spoke with the chancellor. He came away impressed with the potential for rapid growth and simply "wants to support them in what they are trying to do . . . What more can I say?"—**COLIN NORMAN**