

Patenting of plants and seeds endangers world food security

A process of concentration has taken place during the last ten years in the field of genetic engineering – parallel to the extension of patent protection laws on seeds. Those who have profited from this development are a few agricultural corporations: DuPont, Monsanto, Syngenta and Bayer. All of these companies have their origin in the chemical business and now top of the list of seed multi-nationals. Big players in the million dollar game have focussed on the fight for patents, a game which can only be won by those who buy up their competitors and secure additional exclusive rights.

These corporations generally control access to seeds on a large scale, independently of whether genetic engineering was involved or not, or of whether the seeds are new varieties or were simply collected years ago. What these companies have collected in their gene banks or propagate in their nurseries is withdrawn from the public and only launched on the market once patented genes have been introduced and the cultivation, propagation and harvesting of the seeds can be controlled via exclusive rights.

By the end of 2004, about 400 patents on plants and seeds had been granted by the European Patent Office (EPO) alone. Several thousand applications for patents on seeds are awaiting authorisation at the office. Worldwide, there are already much more than a thousand valid patents on seeds.

Patents on genes and living organisms create an unacceptable accumulation of patents on living organisms and block access to genetic resources. Patent

protection may cover all living organisms which have been technically altered, where patented genes have been introduced, or whose “normal” molecular structure has merely been analysed. Patent protection covers these living organisms if they can be commercially exploited in the described way, and all subsequent generations of these organisms if they contain the patented features. This proliferation of patent protection is hugely disproportionate: inventive step and the patent protection granted are no longer in a reasonable balance. No longer are technical processes being rewarded by patents; living organisms themselves are declared to be mere inventions.

Through the biological ability of living organisms to reproduce and be crossed, and the extension of gene patents to all biological material in which protected properties exist, the effect of patents may accumulate in individual forms of life (such as seeds, for example), like toxins in the food chain. In one case it has turned out that just one grain of rice is already covered by up to 70 patents. For medium-sized breeders and farmers, this represents an impenetrable minefield of monopoly rights and royalty claims.

Non-manipulated plants become “inventions” too

Companies have long since started to declare plants that have not been genetically engineered as their inventions too. In the case of the patent EP 744 888, granted to DuPont, the company did no more than analyse the oil content in maize grains. This was sufficient to gain a monopoly on all maize plants with a particular oil content. The government of

Mexico, amongst others, appealed against the patent - farmers in Latin America have grown and cultivated maize containing the described oil content for centuries. There are many further examples. Monsanto also analysed the genes of a particular species of soybean from China and in 2000 applied for a patent covering all plants that contain this gene naturally (WO 0018963).

Greenpeace found out that the company even holds a patent on traditionally-bred wheat from India (EP 445 929). After raising this case, even the Supreme Court of India raised concerns about this patent.

Exclusive rights can block access on a large scale

Until recently, free access to genetic resources was a prerequisite for breeding plants, and a special intellectual property system was developed in Europe and elsewhere. This system protecting plant variety rights presumes that access to genetic resources must remain free from exclusive claims so as not to inhibit research and development. Although owners of the protected variety have the exclusive right to sell the seed they have bred, this reservation of ownership, as it is called, facilitates a permanent innovation process. Every breeder who wants to grow a new plant variety has free access to the protected seeds. If the new breeder's variety really shows new properties, the right of the previous grower lapses, and the new variety can be marketed by the new breeder. Unlike plant variety protection, patent law replaces free access with the possibility of imposing wide-ranging blockades on the activities of plant breeders with the patented plants. Moreover, the patents cover all levels of added value, from field to food.

Patent protection extends to all living organisms that are technically modified or into which the patented genes are inserted, or even when only their "normal" molecular properties are analysed. The patent applies to living organisms in as much as these can be put to economic use in the described manner, as well as to all

subsequent generations that have the patented properties.

For agriculture, the patenting of seeds represents a change of system in several ways. It fundamentally alters the economic framing conditions for plant growers and farmers. Varieties so far freely accessible via other growers are greatly restricted. Farmers may be directly subject to access by the patent proprietors, i.e. the latter can directly influence agricultural practice via licensing agreements.

The possible consequences also depend on the individual case. In the USA seed patents are not only used for licensing agreements to be signed with growers, the farmers are also told which pesticides they should use. In the case of the Flavr Savr tomato, the patent proprietors even controlled crop sales.

Food security endangered

The Rockefeller Foundation and the UNEP are among those who warn against the consequences of patenting, especially for the poorer countries. A publication in the February 2003 issue of Nature¹ also viewed the situation as dramatic. Parallel to the extension of private copyrights, the funds for public research have been drastically cut. At the same time, patenting has made access to genetic resources more difficult. Seeds are becoming too expensive, especially for developing countries: "If this trend isn't halted, some experts claim, tomorrow's supercrops may end up like many of today's medicines: priced out of the reach of much of the developing world's growing population. 'We are headed down the same path that public-sector vaccine and drug research went down a couple of decades ago,' says Gary Toenniessen, director of food security at the Rockefeller Foundation in New York."

In its study "Integrating Intellectual Property Rights and Development Policy", the UK Commission on Intellectual

¹ "Crop improvement: A dying breed" Knight, J., Nature 421:568-570, Feb 6, 2003

Property Rights recognizes the key role played by patents.

"Apart from the problem of incentives for research relevant to poor farmers," it says, "there is evidence that patents, and to some extent PVP, have played a part in the major consolidation of the global seed and agricultural input industries. The consolidation appears to be driven by technological change, with an objective of vertical and horizontal integration so that the appropriability of investment in research can be maximized through better control of distribution channels, including those of complementary agricultural inputs (such as herbicides).

Companies acquire patent rights to protect their own investment in research, and to prevent the encroachment of others. But by the same token, other companies' patent rights can impede one's own research. And the major multinational agrochemical companies, with their growing control over essential proprietary technologies, also represent a formidable barrier to the entry of innovative start-ups. In the 1980s, the university and public sector accounted for 50% of the total of granted US patents relating to Bt. By 1994, independent biotechnology companies and individuals held 77%, but by 1999 the big six companies (which became five with the merger of the agricultural arms of AstraZeneca and Novartis to form Syngenta) held 67%. Moreover, the growing control of these companies was demonstrated by the fact that 75% of their Bt patents in 1999 had been obtained by the acquisition of smaller biotechnology and seed companies."

The study says this trend can also be observed in developing countries. Monsanto, for instance, meanwhile holds a market share of 60 per cent of the trade in (ordinary) maize seed in Brazil. Only a share of five per cent is left over for Brazilian companies.

The authors come to the following conclusion: "Thus, the speed of concentration in the sector raises serious competition issues. There are considerable

dangers to food security if the technologies are overpriced to the exclusion of small farmers, or there is no alternative source of new technologies, particularly from the public sector. Further, the increase in concentration, and the conflicting patent claims when both the public and private sectors have patented plant technologies, may have had an inhibiting effect on research."²

The UK Commission on Intellectual Property Rights therefore explicitly advises developing countries to completely ban patents on plants and seeds.

Consequences for food production

The consequences of seed patenting for food production have met with little notice so far. By contrast, it is striking how consciously agrochemical companies are expanding their claims via patent law to the downstream areas of food production. Apart from the Dupont patent (EP 744 888) mentioned above, which covers not just corn grain but also "the use of the oil ... in food, animal feed, cooking or industrial applications", a Monsanto patent for (ordinary) soft wheat is particularly interesting:

Patent EP 445 929 patented wheat in which certain genes are naturally absent or inactive. Besides claiming these, it explicitly makes claims to:

- "flour prepared from wheat...
- dough or batter prepared from flour...
- an edible product made by cooking dough or batter...
- biscuits or the like prepared from flour ..."

In view of these patents and the existing concentration of just a few agrochemical companies in the seed market, the

² Integrating Intellectual Property Rights and Development Policy", UK Commission on Intellectual Property Rights, <http://www.iprcommission.org>

influence of agrochemistry on the food production market may be expected to grow in coming years. The agrochemical sector will be able to manoeuvre itself into a new key position because EU patent law was specifically tailored to this branch of industry. Patents are granted on the basis of relatively slight inventive activity (such as the isolation of genes), but with a wide scope. The life industry's aim to cover the complete range from field to consumer can thus be supported and realized by means of patents. Like the plant breeding and agriculture sector, the food industry is one of the branches that may become directly dependent by this way.

The 1992 OECD report "Biotechnology, Agriculture and Food" already describes a corresponding strategy on the part of companies. Under the heading "Industrial Strategies and Constraints", it states: "The main focus of attention in this sector has been the reorganization of the seed market, leading to a greater integration with the agrochemicals sector." It continues: "Among the marketing strategies for new products, the traditional gene technology supplier option has become vulnerable and is giving way to the strategy of controlling seed markets, or, more importantly, to strategy of moving further downstream into crop output markets, in order to capture the industrial value added."³

Against this backdrop, the advent of genetic engineering to agriculture must be seen more as an economic strategy than a solution-oriented technology.

Greenpeace demands:

- No Patents on plants, animals, human beings and their genes

³OECD, „Biotechnology, Agriculture and Food“, Paris 1992, quote retranslated from German edition "Biotechnologie, Landwirtschaft und Ernährung", printed 1994 by Landwirtschaftsverlag GmbH, 48165 Münster-Hiltrup, ISSN 0173-1416, page 23