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Recent developments in intellectual property and power in the private sector related to food and agriculture ☆

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ABSTRACT

The legal protection of intellectual property (IP) has allowed private persons and enterprises to assert exclusive rights in relation to certain agricultural innovations. Whether through the protection of breeding innovations under plant variety rights protection laws or through the patenting of genes and gene fragments, the increasing involvement of IPRs in agriculture has effected a shift of agricultural research from public to private institutions. This article examines the changes in the international IP landscape which has facilitated these developments and looks at the impacts of modern IP developments upon agricultural research and farmers. It concludes with a consideration of IP liability issues arising from the development of GM agriculture.

Introduction

Intellectual property rights (IPRs) are rights of exclusive exploitation which are conferred by the state in relation to innovations which are considered worthy of incentivising. Thus for example commercially useful inventions are protected by patent laws and new plant varieties are protected by plant variety rights (PVR) laws. Since the late nineteenth century international consensus on the form which national IP laws should take has been effected through international conventions and agreements. The most recent of these is the World Trade Organization (WTO) Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS) which obliges WTO members to introduce, for example patent and PVP laws which adhere to prescribed norms. As a consequence agricultural innovators are assured of protection of their innovations in all WTO member states. At the same time the development of recombinant DNA technology has facilitated the capture of agri-biotechnological innovations as private patents. This in turn has led to the spectre of the commodification or the privatisation of food by those life-sciences companies which have the financial capacity to engage in agricultural research which had previously been the province of public research institutes.

This article looks at a number of recent developments in the commodification of agricultural innovation and considers some of the suggestions which have been made to respond to the prospect of the privatisation of food.

PVRs and patents

Classical plant breeding innovations have been protected by PVP laws. Legislation based upon the 1991 version of the International Convention for the Protection of Plant Varieties (UPOV) has conferred exclusive rights upon the developers of registered plant varieties, subject to allowing farmers to collect protected seed from harvested crops for replanting on their own properties and allowing researchers to use a protected variety to breed a distinct new variety. The seed saving exception does not appear in patent laws and those laws have a much more limited research exception. A 2000 decision of a US Appeal Court permitted the patenting of plant varieties, thereby eliminating the PVP exceptions in cases asserting patent rights.[1] An illustration of the practical effect of this decision was that of the US Federal Circuit Court in *Monsanto Co. V. McFarling*.[2] A Mississippi farmer had purchased Monsanto's Roundup Ready soybean seed in 1997 and again in 1998 and had signed a "Technology Agreement" in which he agreed that the seeds were to be used "for planting a commercial crop only in a single season" that the purchaser would not "save any crop produced from this seed for replanting." He saved 1500 bushels of the patented soybeans from his harvests. Mr. McFarling did not dispute that he violated the terms of the Technology Agreement but claimed that the contractual prohibition against using the patented seed to produce new seed for planting violated the seed saving provision of the US PVP law, which permitted farmers to save seeds of varieties registered under the law. The declined to limit the patent law by

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[1] Pioneer Hi-Bred International Inc., v. J.E.M. Ag Supply Inc. 200 F.3d 1374 (Fed. Cir. 2000), cert. granted, 148 L. Ed. 2d 954 (2001).

[2] 302 F.3d 1291 (Fed. Cir. 2002).

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reference to the PVP law and found an infringement of Monsanto's patent.

European patent law has historically excluded plant varieties from patent protection,[3] but patenting is permitted where a patent claim is not confined to a particular plant variety.[4] The Enlarged Board of Appeal (EBoA) of the European Patent Office is currently evaluating patent applications concerning the breeding of broccoli and tomatoes.[5] The tomato patent has been granted by the US Patent Office,[6] claiming, inter alia, "a method of producing tomato fruit capable of natural dehydration". The broccoli patent relates to methods for producing new *Brassica* plants, "in particular broccoli, with elevated levels of anticarcinogenic glucosinolates.[7] The determination by the EBoA will have considerable significance for the future of plant breeding and has been identified as such by NGOs opposed to plant patents. A report (Then and Tippe, 2009) published by the coalition: "No Patents on Seeds" describes "the potential takeover of plants' genetic resources by international companies, which would then be able to control access to the most important resources for conventional breeding and the whole food chain."

Patented genetic use restriction technologies (GURTS)

GURTs are inventions which use specific genetic switch mechanisms to limit the use of genetic material for agricultural purposes. The first GURT was patented in 1998 by Delta & Pine Land Company in cooperation with the United States Department of Agriculture.[8] By 2001 more than 50 GURT patents had been issued around the world (CGRFA, 2001). Genetic use restriction technologies are made by inserting additional genetic material into the germplasm of plants. Before sale, genetically modified seeds are treated with special chemicals which renders the seeds of the second generation infertile. As a result farmers cannot re-use seeds and breeders cannot utilise them in breeding programmes. Muscati (2005) suggested that the primary purpose of GURTs is for seed companies to prevent seed saving. Also, it overcomes the cost, expenditure of time and unpredictability of patent litigation (Yelpaala, 2000 at 72). As a corollary to this argument, where an intellectual property regime might be ineffective, GURTs could provide an alternative safeguard to investment in the development of new plant varieties by life-sciences firms.

In farming systems which are dependent upon saved seed, genetically engineered sterility will have a direct impact upon the livelihoods of such farmers. Where GURTs displace local varieties of crops, not only would genetic erosion occur, as was a feature of the Green Revolution but the loss of the ability for such farmers to save seed will confer market power upon seed companies, who can then raise seed prices, which will undermine the profits of farmers.

Eaton and van Tongeren (2001) have suggested that GURTs might tend to concentrate breeding efforts in the private sector and result in fewer options for smallholder farmers and indigenous and local communities, rather than widening breeding efforts to broaden the genetic base of crops through the stimulation of participatory crop breeding. An underlying concern about terminator technology is its impact upon market concentration. Because of the expense of this research, the sector is becoming one in which few companies are able to participate. Swanson and Goeschl (2002) have identified the technology as a development which may accelerate market concentration in the field of agricultural research by reducing access to plant genetic resources through the imposition of license fees which might be beyond the research budgets of public-sector institutions.

Blakeney (2004, 2009) has also pointed out that GURTs are a means to extend the term of the patent, since even after the patent over a GURT seed or method has expired, seed companies can still enjoy a monopoly over the seed, since farmers are obliged to continue buying the seed, particularly in the absence of saved viable seed.

In response to the 1998 Delta and Pine patent, the Consultative Group of International Agricultural Research (CGIAR) accepted the recommendation of the 8th meeting of its Genetic Resources Policy Committee (GRPC) that it adopt a statement concerning the "terminator gene technology". The recommendation was based on the "recognition of concerns over potential risks of its inadvertent or unintended spread through pollen; the possibilities of the sale or exchange of non-viable seed for planting; the importance of farm saved seed, particularly to resource poor farmers; potential negative impacts on genetic diversity; and the importance of farmer selection and breeding for sustainable agriculture". Noting that the CGIARs science exists to serve the poor, it decided that its centres "would not incorporate into their breeding material any genetic systems designed to prevent seed germination."

Patenting and market concentration

The propertisation of agricultural innovations through patenting and PBR protection has resulted in the concentration of proprietary biotechnologies in a few corporations (see Wells, 1994; Lesser, 1998). The history of pharmaceutical patenting was characterised by the cartelised use of patenting as a tool of competition and market protection.[9] Since, the modern 'life sciences' companies were largely spun off from the pharmaceutical patenting industry, they share in this tradition. In its 1998 report on *EC Regulation of Genetic Modification in Agriculture* the Select Committee of the British House of Lords warned of the problem of cartels and monopolies in the agrochemical/seed sector, pointing out that the degree of consolidation was already much greater than in the pharmaceutical sector. The Nuffield Council in its 1999 report on bioethics and genetically modified crops (Nuffield Council on Bioethics, 1999) observed that there were "six major industrial groups who between them control most of the technology which gives the freedom to undertake commercial R&D in the area of GM crops.[10] In 2000 it was reported that five companies controlled 60% of the pesticide industry, 25% of the world's seed market and almost 100% of genetically modified crops (GMOs).[11] In 2002 Monsanto alone was said by James (2002) to control in excess of 90% of the global market for genetically modified seed. Thus in South Africa, ActionAid, 2003 reported that

[3] Article 53(b) of the European Patent Convention (EPC).

[4] Eg in Novartis/Transgenic Plant, [2000] O.J. EPO 511 which concerned a patent containing claims to transgenic plants comprising in their genomes specific foreign genes, the expression of which resulted in the production of antipathologically active substances, and to methods of preparing such plants, the Enlarged Board of Appeal of the European Patent Office (EPO) noted that in the case of PVR an applicant had to develop a plant group, fulfilling in particular the requirements of homogeneity and stability, whereas in the case of a typical genetic engineering invention, a tool was provided whereby a desired property could be bestowed on plants by inserting a gene into the genome of a specific plant. It observed that the development of specific varieties was not necessarily the objective of inventors involved in genetic engineering.

[5] Cases: G2/07 ("Broccoli") and G1/08 ("Tomatoes").

[6] US 20070022504, January 25, 2007.

[7] US Patent Application 20070033675, February 8, 2007.

[8] US Patent Application No. 5723765 'Control of Plant Gene Expression' (granted March 3, 1998).

[9] See P. Drahos, Information Feudalism, London, Earthscan, 2002, 149ff; G.M. Dutfield, Intellectual Property Rights and the Life Science Industries: A 20th century history, Ashgate, Aldershot and Brookfield Vt, 2002.

[10] These are: "Agrevo/Plant Genetic Systems, ELM/DNAP/Asgrow/Seminis, Du Pont/Pioneer, Monsanto/Calgene/Delkalb/Agracetus/PBI/Hybritech/Delta and Pine Lane Co., Novartis, Zeneca/Mogen/Avanta", Nuffield Council on Bioethics, Genetically Modified Crops: The Ethical and Social Issues, 1999, para 3.36.

[11] J. Meek, 'Beginners guide to gene patents', Guardian, November 15, 2000, 11 quoted in Downes (2004).