Seed Wars
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Controversies and Cases on Plant Genetic Resources and Intellectual Property

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To Mona

for her patience

and unstinting support and love
Contents

Acknowledgments xi
Introduction xiii

Chapter One  Malthus, Mendel, and Monsanto: Ownership of Plant Genetic Resources and Intellectual Property 3
A. Prelude to the “Seed Wars” 3
B. Who Should "Own" PGRs? 5
C. Particular Types of Inventive Human Agency 8

Chapter Two  From Hunter-Gatherers to Industrial Farmers: A Brief History of Seed Cultivation 9
A. Colonialism, Germplasm Flow, and Selective Breeding: 16th–18th Centuries 10
B. Government Subsidy: 19th through Early 20th Centuries 12
C. Hybrid Vigor: 1900–1930s 16
D. The Shifting Emphasis between Public and Private Seed Research 20
E. The “Green Revolution” and Genetic Erosion 22
F. Summary 25

A. General Overview of U.S. Patent Law 27
C. The Plant Variety Protection Act of 1970 (PVPA) 34
D. Opposition to Expanded Intellectual Property Protection for Plants 38
E. Recent Skirmishes in the “Seed Wars” 41
   a. 1980: Diamond v. Chakrabarty 41
   b. 1985: Ex Parte Hibberd 42
   c. 1995: Asgrow Seed Co. v. Winterboer 44
   d. 2001: J.E.M. Ag Supply, Inc. et al., v. Pioneer Hi-Bred Int’l. 46
   e. 2004: Monsanto Canada, Inc. v. Percy Schmeiser 49
   f. Other Cases 57
F. Summary 58

Chapter Four  Overlapping International Legal Regimes for Plant Genetic Resources: From “Common Heritage” to “Sovereign Property” 61
B. The CGIAR System 66
C. The 1983 International Undertaking on Plant Genetic Resources (IUPGR) 69
D. The Keystone Dialogues and “Farmers’ Rights” 74
E. The 1992 Convention on Biological Diversity (CBD) and the 1994 Agreement on Trade-Related Aspects of Intellectual Property (TRIPS) 77
F. The 2001 International Treaty on Plant Genetic Resources (ITPGR) 85
F. Comparison and Comments: Two Decades of International Treaties and Agreements 90
H. Summary 96

Chapter Five Intellectual Property and Beyond? 99
A. Governing the (Limited) Commons? 99
B. Alternate (Intellectual) Property Regimes 103
C. “Farmers’ Rights,” the Open Source Software Movement and Open Access to PGRs 109
   a. Open Source Software Principles 109
   b. An Intellectual Property Anticommons for PGRs and Related Technology? 111
   c. Applicability of the Open Source Model to PGRs 114
   d. Plusses and Minuses of an Open Source PGR Model 117
   e. Institutional Challenges in Applying an Open Source Model to PGRs 122

Conclusion 123

Appendix 129
I. International Agreements 129
   Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) 129
   Convention on Biological Diversity (CBD) 129
   International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR) 133
   Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of their Utilization 138
II. National Legislation 143
   United States 143
   Plant Variety Protection Act 143
   Canada 149
   Plant Breeders’ Rights Act 149
III. Cases 154
   United States 154
   Sidney A. DIAMOND, Commissioner of Patents and Trademarks, Petitioner, v. Ananda M. CHAKRABARTY et al. 154
   Ex parte Kenneth A. Hibberd, Paul C. Anderson and Melanie Barker 162
   ASGROW SEED COMPANY, Petitioner v. Denny WINTERBOER and Becky Winterboer, dba Deebees 167
   J.E.M. AG SUPPLY, INC., et al., Petitioners, v. PIONEER HI-BRED INTERNATIONAL, INC. 174
   Canada 187
## CONTENTS

| Harvard College v. Canada (Commissioner of Patents) | 214 |
| Bibliography | 239 |
| Index | 259 |
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Introduction

Contemporary debate over the legal treatment of plant genetic resources (PGRs) has been described as the “Seed Wars.” The phrase “Seed Wars” as it is used here comes from a Wall Street Journal report that refers to the conflict implicating “access to, control over, and preservation of [PGRs].” This book seeks to provide an abbreviated history of events that precede and surround the “Seed Wars” of the past two and a half decades.

Chapter One gives an overview of the major tensions in this area: loss of crop genetic diversity in the 20th century; the rise of industrial agriculture; globalization with the so-called “Green Revolution;” and the intersection of these trends with intellectual property law in the 20th and early 21st centuries. This chapter also raises questions about the relation between technological advances in plant breeding, traditional crop development, and the effect of commodification of plant germplasm (or genotype).

Chapter Two gives a brief overview of plant and seed cultivation, focusing on the treatment of germplasm. The first period is from the 16th through the early 19th centuries, when European colonial powers eagerly sought out exotic plants and seeds to underwrite plantation economies in the equatorial regions of the globe. The key point here is that plants and seeds were not considered the private ‘property’ of individuals, but were instead “owned” (or at least “possessed”) by sovereign nations.

The second period is from the early 19th through the early 20th centuries, when U.S. state and federal governments heavily subsidized the crop plant cultivation and seed distribution. In the last third of the 19th century, through institutions like land grant colleges (LGCs) and state agricultural experimental stations (SAESs), state and federal governments funded research that focused on plant improvement and dissemination of research results to farmers. The USDA used Congressional free franking privileges to send millions of seed samples to constituent farmers annually.

The third period is from the early 1900s to the 1930s, when the primacy of publicly funded breeding and research in this area came under pressure with the re-discovery of Gregor Mendel’s work on plant genetics and the development of crop hybridization to induce higher yields. Private seed companies such as Pioneer Hi-Bred took center stage, as LGC-housed public plant breeding programs were eclipsed and relegated to a complementary role, thus leaving the private seed industry without competition.

this chapter discusses the so-called “Green Revolution” brought about by higher-yielding crops and the rise of industrial agriculture as well as the costs in terms of genetic erosion that such high-input agriculture entails.

Chapter Three shifts from developments in the seed cultivation area to developments in intellectual property law. First, this chapter briefly describes the structure of U.S. patent law. To receive a utility patent, an inventor must show that her invention falls within the realm of “patentable subject matter.” The inventor must also show that the invention is “non-obvious,” “useful,” and “novel”—that is, not part of “prior art” in the area. Before 1930, plants (either their genotype or phenotype) were not considered “patentable subject matter” because they were considered “products of nature.” This changed in 1930, when the Plant Patent Act (PPA) passed into law. The PPA made asexually reproduced plants (i.e., reproduced by grafting or cloning) into legally protectable intellectual property matter. Just as importantly, the PPA specifically excluded sexually reproduced crop plants from its scope. The chapter goes on to describe the Plant Variety Protection Act of 1970 (PVPA) that did grant intellectual property protection to sexually reproduced plants that were “novel,” “uniform,” and “stable.” The 1970 PVPA included important exceptions that allowed farmers to save seeds for planting and resale as well as for research.

Both the PPA and the PVPA limited intellectual property rights. In terms of exclusivity of ownership, a utility patent is much stronger—giving (at the time) the patent holder an exclusive right to “make, use or sell” the patented invention for 17 years from the date of issue. Unlike the PVPA, a utility patent does not have exemptions. The issues that the courts would decide next pertained to the scope of patentable subject matter and the eligibility of selectively bred (or genetically engineered) plants for utility patents.

Against this backdrop, the third chapter then describes the development of a series of cases that changed the juridical scope in North America of intellectual property protection for plants. Beginning in 1980, the U.S. Supreme Court held that living organisms could receive utility patents if they met prerequisite requirements. In 1985, the U.S. Patent and Trademark Office Board of Appeals held that genetically modified maize could receive a utility patent and that the enactment of the PVPA did not foreclose this legal option. In 2001, the U.S. Supreme Court once again revisited this area, holding that selectively bred plants could receive utility patents. These cases represent a sea change in the legal treatment of plants. At the beginning of the 20th century, plants (including selectively bred plants produced by farmers and breeders) were legally “products of nature” and part of the public domain. Legally speaking, the genetic information contained in plants was openly accessible. By the turn of the 21st century, however, if a plant breeder met the criteria, she could receive a utility patent in her selectively bred plant variety, which could include particular genomic characteristics of the plant. In other words, intellectual property rights (IPR) could extend not only to the plant phenotype, but to the genotype as well.

Chapter Four describes the emergence from the 1980s of several overlapping legal regimes that attempted to address the status of PGRs. There was a striking shift in the legal treatment of PGRs from the early 1980s to the 1990s. In 1980, with the exception of asexually reproduced varieties protected by the PPA or sexually reproduced varieties protected by PVP certificates, PGRs were considered to be part of the “common heritage of mankind,” and as such were freely appropriable. However, “worked” germplasm was treated as the intellectual property of an individual or a firm. By the mid-1990s, legal treatment of germplasm as “common heritage” had been largely rejected, due in significant part to critics in the developing world that decried PGR appropriation from their
countries, and PGRs were treated as “sovereign national property”—an ironic return to the de facto treatment of such resources during European colonialism.

This fourth chapter also describes and explores the several international fora that affect the legal status of PGRs. These include the UN Food and Agriculture Organization’s (FAO) attempt from 1983 to secure a multilateral agreement regarding PGRs, culminating in the 2001 International Treaty on Plant Genetic Resources (ITPGR) that became effective in 2004. These also include the International Union for the Protection of New Varieties of Plants (UPOV), as outlined in its four major iterations in 1961, 1972, 1978 and 1991, the Convention on Biological Diversity (CBD) in 1992, and the Trade Related Aspects of Intellectual Property (TRIPS) of 1994. The CBD and TRIPS have a particularly complex and contentious relationship, which is explored in this chapter. Finally, the chapter also discusses the relationship between changes in U.S. intellectual property law and these overlapping, international regimes.

The fifth and concluding chapter reviews competing theories of property and intellectual property in order to explore which, if any, may help us find acceptable ways to treat PGRs in terms of promoting in situ genetic conservation and encouraging more open PGR exchange between seed banks, farmers, and plant breeders. This chapter suggests that the rejection of “common heritage” protection may have been both premature and overbroad. Such treatment in the 21st century may be beneficial, rather than detrimental to the countries of the developing world. Furthermore, this chapter contends that use of “open source” licensing for PGRs, influenced by its success in the software arena, may be an ironic yet highly beneficial way for seed banks to use “private” contract mechanisms to keep open access to PGRs by treating them as a form of “limited” commons.