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Pollen in the Wind: Economic and Legal Consequences When Nature Responds to Man

Kristen M. Zahnow*

I. INTRODUCTION

For hundreds of years, farmers have engaged in conventional breeding techniques by crossing the traits of individual plants with favorable physiological traits of others.1 Within the past few decades, however, developments in the field of molecular biology have revolutionized the agricultural industry.2 Today, scientists can easily introduce a foreign gene into a plant genome in order to confer advantages, such as drought or weed resistance.3 The resulting plants are known as "transgenic" plants, which simply means that a gene from one organism has been transferred to another organism.4 Scientists create transgenic plants to study plant physiology and to confer physiological and economic advantages specific to agriculture, particularly large-scale crop production.5

As the reader can imagine, there is inherent tension between biotechnology companies, the primary creators of transgenic plants, who seek a return on their costly investment, and farmers, who seek to grow their crops in the most cost-effective manner. This Comment will address this tension and explain the issues that arise with two aspects of plant reproduction, namely, self-pollination and cross-pollination. This Comment will also explain the way in which courts have overlooked fundamental aspects of plant biology, misunderstood the complexities of genetic engineering, and failed to appreciate the significant ecological risks that transgenic plants pose to the environment.

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2. Id.


4. Id.

II. SELF-POLLINATION

A. Transgenic Plants

Monsanto is the largest manufacturer of transgenic crop seed. Monsanto is particularly known for its Roundup weed management solutions and the Roundup Ready soybean. Roundup Ready technology provides a tremendous advantage to farmers, as weeds can compete with and kill crops. Monsanto’s Roundup Ready seed contains a transgene that gives each plant resistance to glyphosate, the active chemical in Monsanto’s Roundup herbicide that inhibits protein synthesis. When the farmer plants the Roundup Ready seed, the farmer can then spray the entire field with the Roundup herbicide containing glyphosate, resulting in the death of the weeds while not harming the crop.

Monsanto licenses its transgenic seed directly to farmers and permits third-party seed companies to insert the transgene into their own seeds, provided that the seed companies pay a royalty to Monsanto. Monsanto also requires each farmer to sign a standard-form, limited-use license known as the “Technology Agreement.” The terms of the Technology Agreement require that the farmer:

1. Use the seed containing Monsanto gene technologies for planting a commercial crop only in a single season;
2. Not supply any of this seed to any other person or entity for planting;
3. Not save any crop produced from this seed for replanting, or supply saved seed to anyone for replanting; and
4. Not use this seed or provide it to anyone for crop breeding, research, generation of herbicide registration data, or seed production.

A frequently litigated phrase of Monsanto’s Technology Agreement relates to the “use” of the seed. Absent from the agreement, however, is an express prohibition against “making” transgenic seed. This is presumably due in part to the fact that “making” seed is simply inherent to the commercial production and subsequent sale of the crop. At least in the case of soy-

7. See *[Monsanto Co.](http://www.soybeans.com)* (last visited Nov. 13, 2015) (Monsanto owns and uses the domain name soybeans.com to educate consumers and farmers about its products and patented technologies).
9. *Id.* at 1344.
10. *Id.* at 1344–45.
11. *Id.* (emphasis added).
bean seed, the farmer harvests and cultivates mature soybean plants. In other words, when the farmer sells the crop, the farmer sells the first-generation soybean plants along with the second-generation soybean seeds.

There is one exception to Monsanto’s restriction on the “use” of the seed for a single commercial crop: the farmer can sell the second-generation seed to a grain elevator. Monsanto allows grain elevators, under a separate license, to sell second-generation seeds as commodity seeds for the sole purpose of consumption. Because farmers routinely sell their second-generation transgenic seeds to the grain elevators, “commodity” seeds contain a mix of transgenic and non-transgenic seeds. As a result, some farmers purchase and re-plant commodity seeds for use in their commercial crops. Monsanto subsequently sues these farmers, alleging that they infringe the patent directed to the Roundup Ready transgene.

B. Protection for Transgenic Plants

Those who create novel plant species may protect their plants (including the underlying genetically modified plant genes) with a plant or utility patent, issued by the Patent and Trademark Office, or a certificate of plant variety protection, issued by the Plant Variety Protection Office, a subset of the Department of Agriculture. Courts have held that these forms of protection are not mutually exclusive—that is, a biotechnology company could, for example, protect a plant species by a plant patent and a plant variety protection certificate. Biotechnology companies may also enforce their rights under contract law through the use of contracts and licenses. Monsanto is arguably the most well-known example of a company that has utilized both the patent and contract laws to protect their transgenic plants. Monsanto has also aggressively enforced its patent rights against farmers.


14. Id.

15. Id. at 1343.

16. See id. at 1341.


19. See Organic Seed Growers and Trade Ass’n v. Monsanto Co., 718 F.3d 1350, 1353 (Fed. Cir. 2013) (noting that Monsanto has brought approximately 144 infringement suits and settled 700 other disputes between 1997 and 2010).

20. Id.
i. Plant Patent Act

Prior to the enactment of the Plant Patent Act, plants were not believed to be patentable subject matter for two reasons: (1) plants constituted “products of nature,” a well-known exception to patentability;21 and (2) inventors would be unable to satisfy the “written description” requirement as some physical traits, such as scent and color, were difficult to quantify.22 Congress, however, recognized that biotechnology companies needed an incentive to invest in plant biotechnology and sought to make the United States agricultural industry more competitive.23

In 1930, Congress enacted the Plant Patent Act,24 and in doing so, the United States was the first country to grant patent rights for plant varieties.25 To address the dual concerns about patentability, Congress developed a less stringent “written description” requirement for plant patents and stipulated that a plant was not a “product of nature.” Rather, breeding novel plant varieties was an act “in aid of nature.”26

The Plant Patent Act has three limitations, among others, that are relevant and important to this Comment. First, Congress sought to provide an incentive to plant breeders to develop new plants27 while at the same time ensuring that wild, uncultivated plants would remain unpatentable. This exclusion was based on the theory that an individual who merely discovers a novel plant by happenstance does not deserve a patent monopoly.28 The legislative history expressly states that new plants are patentable when “man [has] ‘controll[ed] and direct[ed] the natural processes [to] produce[ ] a desired result.’”29 Courts have similarly required “human creative effort.”30 If this were the only limitation, biotechnology companies would surely satisfy

23. Id.
24. Plant Patent Act, 35 U.S.C. § 161 (2012) (“Whoever invents or discovers and asexually reproduces any distinct and new variety of plant, including cultivated sports, mutants, hybrids, and newly found seedlings, other than a tuber propagated plant or a plant found in an uncultivated state, may obtain a patent therefore, subject to the conditions and requirements of this title.”).
25. Imazio Nursery, 69 F.3d at 1563.
26. Id.
27. Id. (The purpose of the Plant Patent Act is to “afford agriculture, so far as practicable, the same opportunity to participate in the benefits of the patent system as had been given to industry, and thus assist in placing agriculture on a basis of economic equality with industry.”) (citing S. Rep. No. 71-315, at 3 (1930)).
29. Id. at 1352 (citing H.R. Rep. No. 71-1129, at 7 (1930)).
30. Id. at 1351.
this requirement, as the introduction of a transgene to the plant genome is a laborious process requiring expensive lab equipment and expertise in plant molecular biology.31

Second, Congress limited protection to novel plant varieties developed by asexual reproduction.32 The House Committee Report explains that the purpose of the plant patent statute is to give to the inventor "an exclusive right to propagate that plant by asexual reproduction; that is, by grafting, budding, cuttings, layering, division, and the like, but not by seeds."33 It is unlikely, then, that a biotechnology company like Monsanto would seek plant patent protection, because the majority of crops reproduce sexually by seed. In other words, should Monsanto seek to protect a plant variety by a plant patent, Monsanto would only be able to protect the single parent plant and its asexually reproduced progeny and would therefore be unable to enforce its rights against farmers who primarily propagate their crop by planting seed.

Third, the plant patent allows the patentee only one claim to the individual plant variety.34 Because biotechnology companies benefit most from protection of both the transgene itself and plants containing the transgene, it follows that Monsanto would not invest in a plant patent that offered virtually no protection to the underlying technology. Based on the foregoing limitations, it should be no surprise that biotechnology companies—or at least those heavily invested in the agricultural industry—rarely protect their plants under the Plant Patent Act.35

ii. Plant Variety Protection Act

With the enactment of the Plant Variety Protection Act in 1970, Congress broaden the scope of protection for plants and sought to provide sup-

31. See generally Monsanto Co. v. Bowman (Bowman I), 657 F.3d 1341, 1343–44 (Fed. Cir. 2011) (describing, in technical language, the patents Monsanto has developed).

32. See Asexual Reproduction, BERKELEY UNIV., http://www.ucmp.berkeley.edu/glossary/gloss6/asexual.html (last visited Nov. 13, 2015) (Asexual reproduction is a method of production in which the progeny arises from a single parent rather than two parents—meaning that the progeny has the same genetic makeup as its parent. Rather than producing seed, plants that reproduce asexually produce rhizomes, stolons, tubers, and bulbs. Plants that are capable of asexual reproduction can also be propagated through human manipulation, i.e., through grafting, cuttings, and the like.).


plementary patent-like protection for sexually reproduced plants. To receive a certificate of plant variety protection, the "breeder" must satisfy criteria similar to that of the patent laws; that is, the plant must be new, distinct, uniform, and stable. Unique to the Plant Variety Protection Act are the research exemption, which gives scientists the right to use transgenic plants in their research, and the farmer's exemption, which gives farmers the right to save seed with certain limitations. Moreover, the Department of Agriculture, rather than the Patent and Trademark Office, administers the certificate of plant variety protection.

To comply with the International Union for the Protection of New Plant Varieties (an international treaty), Congress amended the Plant Variety Protection Act in 1994. The 1994 amendments had three significant implications for the agricultural biotechnology industry. First, Congress removed the prohibition against first-generation hybrid protection, thereby allowing companies to protect the first generation of plants from which subsequent generations will derive. Second, Congress broadened the scope of infringement to include an "essentially derived" variety. Finally, the farmer's exemption no longer allows farmers to save seed for "reproductive purposes," increasing the likelihood that farmers will be found liable for patent infringement. The research and farmer's exemptions are the most important distinctions between a certificate of plant variety protection and a patent.

Although a Plant Variety Protection Act certificate protects sexually reproduced plants and crop seed, it has its disadvantages. More than 70 countries contracted for the International Union's Protection of New Plant

36. See 7 U.S.C. § 2402(a) (2012) (emphasis added) ("The breeder of any sexually reproduced or tuber propagated plant variety who has so reproduced the variety, or the successor in interest of the breeder, shall be entitled to plant variety protection for the variety, subject to the conditions and requirements of this chapter"); see also H.R. REP. No. 91-1605, §144, at 5095–96 (1970) (noting the purpose of the Plant Variety Protection Act was "[t]o encourage the development of novel varieties of sexually reproduced plants and to make them available to the public, providing protection available to those who breed, develop, or discover them, and thereby promoting progress in agriculture in the public interest.").

37. 7 U.S.C. § 2402(a).

38. Id. § 2544.

39. Id. § 2543.

40. Id. § 2321.


43. Id. sec. 9, § 111(4)(c), 108 Stat. 3136, 3142.

44. Id. sec. 10, § 113, 108 Stat. 3136, 3142.
Varieties. However, the International Union does not have the established and widespread recognition that the patent system has, and as a result, it may be more difficult for American inventors to obtain reciprocity rights in foreign countries. Moreover, like the plant patent, the certificate of plant variety protection protects only a single plant variety, whereas a utility patent allows the inventor to claim both the individual variety and other varieties containing the transgene. It appears that the certificate provides more protection to biotechnology companies through the protection of sexually reproducing plants, but it still fails to provide the kind of protection afforded by the traditional utility patent (discussed below).

iii. Patent Act

Because Congress created a discrete system of plant patent protection through the Plant Patent Act in 1930 for asexually reproduced plants and later the Plant Variety Protection Act in 1970 for sexually reproduced plants, it was unclear whether, in addition to already established avenues of protection, an inventor could also obtain a utility patent for a novel plant. In 1980, the Supreme Court in *Diamond v. Chakrabarty* upheld a utility patent directed toward a living, synthetic microorganism. The Court reasoned that the microorganism was created in the laboratory through extensive genetic manipulation and, therefore, constituted either a "manufacture" or "composition of matter." Following this decision, the Patent Office began issuing utility patents towards plants and plant material.

It was not until 2001 that the Supreme Court held that an individual can obtain a utility patent for a plant. In *J.E.M. Ag Supply, Inc. v. Pioneer Hi-Bred Intern, Inc.*, the Supreme Court held that sexually reproducing plants were patentable subject matter under Section 101 of the Patent Statute. The Court also found that plant patents and certificates of plant variety protection

46. Id.
49. Id. at 309–10.
51. Id. at 145.
52. Id.; see also § 35 U.S.C. §101 (2012) ("Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.")
are not the exclusive means of protection. That is, an inventor can obtain both a patent and a certificate of plant variety protection for the same plant variety.

The Supreme Court also discussed at length the backdrop against which the Plant Patent Act was enacted. In 1930, the drafters of the Act had not contemplated the kind of genetic engineering that is now commonplace. Even though Congress had originally believed that plants developed through rudimentary breeding techniques were not patentable under Section 101, the Court did not preclude protection, especially considering the kind of plant genetic manipulation that occurs today. Also, in contrast to today, there were no large or developed markets for seed. As such, Congress did not intend the Plant Patent Act to incentivize seed companies by granting protection to their sexually reproduced plants but rather to protect asexually reproduced plants—the kind of plants that were commonly and widely developed at that time.

The holding in *J.E.M. Ag Supply* was an important decision for biotechnology companies. As previously mentioned, it allowed biotechnology companies to secure broader protection for their transgenic plants through utility patents. The Patent Act does not differentiate between asexually and sexually reproduced plants; it relates broadly to the subject matter. In contrast to the plant patent, the utility patent allows the patentee to include multiple claims covering the transgene, plant, seed, and virtually any other plant matter containing the transgene. The utility patent does not provide a farmer’s or research exemption, and as a result, the patentee’s rights are much more extensive. The only apparent drawback is that the patentee must satisfy heightened non-obviousness and enablement requirements under the Patent Act. The utility patent generally gives broader protection than the plant patent, and therefore, the utility patent is the preferred and most popular type of plant protection used in the biotechnology industry.

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54. *Id.* at 132–33.
55. *Id.* at 135–38.
56. *See id.* at 134–135.
57. *Id.*
58. *Id.*
60. *Id.* at 145.
61. *See id.* at 135–37.
62. *Id.* at 140.
63. *See id.* at 131.
C. Enforcement of Patent Rights

The Patent Office’s right to issue patents originates in Section 8, Clause 8 of the United States Constitution. A patent does not afford the patent holder an affirmative right to make the patented invention. Instead, the Patent Act allows the patent holder to prevent others from practicing the patented invention: “whoever without authority makes, uses, offers to sell, or sells any patented invention . . . during the term of the patent therefor, infringes the patent.” The Plant Patent Act makes an additional distinction, granting to the patentee the right to prevent others from “asexually reproducing the plant.” This patent monopoly does have limitations, including the doctrines of patent misuse and patent exhaustion. This Comment will address the doctrine of patent exhaustion, as it has been a frequently litigated doctrine with respect to plant biotechnology.

Patent exhaustion, alternatively known as “the first sale doctrine,” is a common law doctrine providing an essential check on patent monopoly and promoting the alienability of property. After the first authorized and unconditional purchase of a patented invention, the patent is exhausted and the patent owner’s rights terminate; consequently, the authorized purchaser can sell, destroy, or use the patented invention without the consent or authority of the patent owner. The underlying premise of this first sale doctrine is that “once the purpose is realized the patent law affords no basis for restraining the use and enjoyment of the thing sold.” In other words, once the patentee

66. Id.
69. See B. Braun Med., Inc. v. Abbott Labs., 124 F.3d 1419, 1426 (1997) (Patent misuse is a common law equitable doctrine by which courts prevent the enforcement of a patent that has been misused by the patentee. Examples of patent misuse may include a patentee’s attempt to extend the patent beyond the patent term or restricting a licensee’s use of the patent in a way that hinders competition).
70. Bowman v. Monsanto Co. (Bowman II), 133 S. Ct. 1761, 1764 (2013).
71. Id. at 1764.
72. Quanta Computer, Inc. v. LG Elecs., Inc., 553 U.S. 617, 625 (2008); see also James R. Cartiglia & Nina Maja Bergmar, Beans & Books: Court Says Exhaus tion Doctrine Applies to Imported Textbooks, but Not Genetically Modified Seeds, 49 TENN. B.J. 14, 15 (2013) (noting that patent exhaustion was first discussed by the Supreme Court in Bloomer v. McQuewan); Bloomer v. McQuewan, 55 U.S. 539, 549 (1852) (“[W]hen the machine passes to the hands of the purchaser, it is no longer within the limits of the monopoly.”).
receives the benefit of the bargain, the patentee cannot exercise control over the subsequent use of the patented invention.

A purchaser’s use of the patented invention, however, is limited to that which is contemplated by the patent itself and can be restricted by the terms of a license. Courts have held that a sale of a patented article transfers to a purchaser the right to “use” a patented invention, but not the right to “make” a new article. Moreover, the sale must be authorized. Where a patentee licenses the right to manufacture the patented article, the license typically contains use restrictions. Thus, if the manufacturer creates and sells a patented article outside the scope of the license, that sale is not authorized, and the patent has not been exhausted. Although the Federal Circuit has found that patent exhaustion does not apply to conditional licenses, the Supreme Court held that a patent may be exhausted where the licensed article “substantially embodies” the patented invention and where the license contemplates a use disclosed in the patent.

i. Making versus using

Many flowering plants are self-pollinating, and as such, courts identify them as “self-replicating technology.” Scientists often allow plants to self-pollinate, rather than introduce pollen from another plant, in order to maintain stable transgenic plant lines. The ability to self-pollinate is possible...

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74. Monsanto Co. v. McFarling, 302 F.3d 1291, 1298 (Fed. Cir. 2002) (“[W]hen a patented product has been sold the purchaser acquires ‘the right to use and sell it, and . . . the authorized sale of an article which is capable of use only in practicing the patent is a relinquishment of the patent monopoly with respect to the article sold.’”) (citing United States v. Univis Lens Co., 316 U.S. 241, 249 (1942)).

75. Jazz Photo Corp. v. Int’l Trade Comm’n, 264 F.3d 1094, 1102 (Fed. Cir. 2001).

76. Quanta Computer, 553 U.S. at 619.


78. Quanta Computer, 553 U.S. at 633, 638.

79. See Plant Systematics: Gymnosperms, IND. UNIV. Sw., https://www.ius.edu/herbarium/gymnosperms.php (last visited Nov. 13, 2015) (As the reader is surely aware, not all plants produce flowers. For example, gymnosperms are non-flowering plants that produce cones rather than flowers.).

80. Monsanto Co. v. Bowman (Bowman I), 657 F.3d 1341, 1348 (Fed. Cir. 2011), aff’d in Bowman v. Monsanto Co. (Bowman II), 133 S. Ct. 1766 (2013).

81. See Priyanka Das & Naveen Chandra Joshi, Minor modifications in obtaining Arabidopsis floral dip method enhances transformation efficiency and production of homozygous transgenic lines harboring a single copy of transgene, ADVANCES IN BIOSCIENCE & BIOTECHNOLOGY, 59–60 (Feb. 2011), http://www.scirp.org/journal/PaperInformation.aspx?paperID=4334 (Establishing stable transgenic plant lines is necessary for scientists to study transgenes in succes-
because flowering plants contain both male and female organs. When the plant reaches maturity, pollen from the male stamen will come into contact with the female stigma, and the plant will then produce seed. At this point, the plant contains both the first generation (plant) and second generation (seed). Although the distinction between the first and second generations is trivial, the Federal Circuit appears to have overlooked this fundamental aspect of plant reproduction.

ii. Federal Circuit’s approach

In Monsanto v. McFarling, the Federal Circuit held that patent exhaustion does not apply to the sale of transgenic seed from a biotechnology company, Monsanto, to a farmer, McFarling. In this case, McFarling purchased Roundup Ready soybean seeds through one of Monsanto’s authorized distributors for the purpose of planting a commercial crop. Despite McFarling’s signing the Technology Agreement, he saved and re-planted seeds from his first commercial crop. The fact that McFarling was in direct violation of the terms of the Technology Agreement was not disputed; rather, the issue was whether the sale from Monsanto to McFarling exhausted the patent. The court held the patent was not exhausted because the new second-generation seeds had not been the subject of a sale and because the Technology Agreement “did not confer a license to construct new seeds.” As such, patent exhaustion did not apply to those particular seeds.

Only a few years later, in Monsanto v. Scruggs, the Federal Circuit again found in favor of Monsanto. In that case, Scruggs purchased, planted, and re-planted saved Roundup Ready soybean and cotton seeds that he obtained from a seed company. However, unlike the farmer in McFarling, 

sive experiments over long periods of time. It would be too difficult, for example, if the scientist had to create a new transgenic plant line each time he or she wanted to study the transgene. Using a single transgenic plant line also promotes consistent, uniform, and repeatable results.).

82. CAMPBELL ET AL., supra note 5, at 802.
83. Id.
84. See Bowman I, 657 F.3d at 1348.
85. McFarling, 302 F.3d at 1299.
86. Id. at 1293.
87. Id.
88. Id. at 1298–99.
89. Id.
90. Id.
91. Monsanto Co. v. Scruggs, 459 F.3d 1328, 1341 (Fed. Cir. 2006).
92. Id. at 1333.
Scruggs did not sign the Technology Agreement.93 The court, in relying on McFarling, held that there was no sale between the seed company and Scruggs because agreeing to the terms of the Technology Agreement was a pre-condition to Scruggs's use of the transgenic seed.94

The court also found that Scruggs did not have an implied license to plant the seed because Monsanto expressly required each and every purchaser to enter into the Technology Agreement, and, therefore, a reasonable person would not believe that he or she had an implied license.95 Scruggs is also routinely cited for the policy of not applying patent exhaustion to self-replicating technologies, as “applying the first sale doctrine to subsequent generations of self-replicating technology would eviscerate the rights of the patent holder.”96

In the more recent decision of Monsanto v. Bowman (Bowman I), the Federal Circuit held that a bona fide purchaser has only the right to “use” a plant and does not have the right to “make” new seeds.97 Bowman was a farmer who purchased commodity soybean seed from a grain elevator.98 Because commodity seed typically contains a mixture of transgenic and non-transgenic seeds, Bowman planted and treated the seeds with Roundup to determine which plants were resistant to herbicide.99 Bowman then allowed the transgenic plants to reach maturity and sold the crop while saving some of the transgenic seeds.100 Although Bowman’s saving of his seed purchased from the grain elevator was in direct violation of the terms of the Technology Agreement, the issue in the case was whether the patent was exhausted when the farmers sold the seed to the grain elevator.101

In Bowman I, the Federal Circuit relied upon B. Braun Medical v. Abbott Labs. and Jazz Photo v. Int’l Trade Comm’n, in addition to the foregoing cases, as support for distinguishing between “making” and “using.”102 In B. Braun Medical, the court held that a sale of a patented medical reflux valve

93. Id.
94. Id. at 1336.
95. Id.
96. Id.
97. Monsanto Co. v. Bowman (Bowman I), 657 F.3d 1341, 1348 (Fed. Cir. 2011) (quoting Jazz Photo Corp. v. Int’l Trade Comm’n, 264 F.3d 1094, 1102 (Fed. Cir. 2001)).
98. Id. at 1345.
99. Id. at 1345–46.
100. Id. at 1346.
101. Id.
102. See id. at 1341.
with a post-sale use restriction did not exhaust the patent.\textsuperscript{103} The court reasoned that in a conditional sale “the parties [have] negotiated a price that reflects only the value of the ‘use’ rights conferred by the patentee.”\textsuperscript{104} This reasoning in \textit{B. Braun Medical} was nothing more than dicta and was not the central issue of the case. The court actually remanded the case based upon an improper jury instruction.\textsuperscript{105} Even so, the Federal Circuit in \textit{Bowman I} relied upon the dicta in \textit{B. Braun Medical} to hold that Bowman received only a narrow right to “use” the patented transgene from the Technology Agreement.

The Federal Circuit also relied on \textit{Jazz Photo}. In \textit{Jazz Photo}, the patent in question was directed not to a self-replicating organism but to camera film.\textsuperscript{106} The court in \textit{Jazz Photo} held that a licensee’s right to “use” camera film did “not include the right to construct an essentially new article on the template of the original.”\textsuperscript{107} In \textit{Bowman I}, the Federal Circuit interpreted this statement quite broadly and concluded that Bowman’s right to “use” did not include the right to “construct” second-generation transgenic seeds.\textsuperscript{108} The license contemplated the right to plant the first-generation transgenic seeds, but not the right to make second-generation transgenic seeds.\textsuperscript{109}

This reasoning, applied to the first limitation in Monsanto’s Technology Agreement, is nonsensical. It restricts the farmer’s “use [of] the seed containing Monsanto gene technologies for planting a commercial crop only in a single season”\textsuperscript{110} Once the farmer has planted the seed, the seed will germinate, and the plant will mature and produce new seed because plants are self-pollinating and self-reproducing.\textsuperscript{111} Moreover, at least in the case of soybeans, the farmer harvests and cultivates mature plants—meaning the commercial crop will necessarily contain the new seed.\textsuperscript{112} It follows that, in order to “use” the transgenic seed, the farmer will necessarily have to plant and “make” new seeds.

\begin{itemize}
\item \textsuperscript{103} See \textit{B. Braun Medical, Inc. v. Abbott Laboratories}, 124 F.3d 1419, 1426–27 (1997).
\item \textsuperscript{104} \textit{Id.} at 1426.
\item \textsuperscript{105} See \textit{id.} at 1426–27.
\item \textsuperscript{106} See \textit{Jazz Photo Corp. v. Int’l Trade Comm’n}, 264 F.3d 1094, 1098 (2001).
\item \textsuperscript{107} \textit{Id.} at 1102.
\item \textsuperscript{108} \textit{Monsanto Co. v. Bowman} (\textit{Bowman I}), 657 F.3d 1341, 1348 (Fed. Cir. 2011).
\item \textsuperscript{109} \textit{Id.} at 1344–45.
\item \textsuperscript{110} \textit{Id.} at 1344.
\item \textsuperscript{111} See \textit{CAMPBELL ET AL., supra} note 5, at 802.
\item \textsuperscript{112} See \textit{Growing Soybeans, supra} note 12.
\end{itemize}
iii. Supreme Court’s approach

On appeal from the Federal Circuit’s decision in Bowman I, a unanimous Supreme Court affirmed the Federal Circuit’s ruling. The Supreme Court held that patent exhaustion did not apply to the sale of Monsanto’s transgenic plants. However, the Supreme Court applied different reasoning than the Federal Circuit did in Bowman I. The Supreme Court reasoned that patent exhaustion only applied to the sale of a “particular article” and not to the sale of a subsequent article, whether created from the original particular article or by some other means. If a patentee were not compensated for the sale of the subsequent article, then the purpose of the patent exhaustion doctrine—to ensure the patentee receives the benefit of the bargain—would be frustrated.

Rather than distinguishing between the right to “use” and the right to “make” within the context of a conditional license, the Supreme Court avoided this issue by focusing primarily on Bowman’s purchase of the commodity seed from the grain elevator rather than directly from Monsanto. The Court also addressed the creation of the new infringing article itself. First, Bowman purchased the commodity seeds directly from the grain elevator so the only proper use was for consumption rather than planting. As a result, it was not necessary for the Court to determine whether the right to “use” included the right to “make,” because, under these circumstances, Bowman was not authorized to plant the seed under the terms of the Agreement. Second, in the context of a sexually reproducing plant, the only way to create a new infringing article is to plant the seed. The Court suggested then that infringement could have occurred upon the planting rather than the subsequent “making” of the seeds.

The Supreme Court also addressed its reasoning in J.E.M. Ag Supply. There, the Court addressed the scope of protection under patents and certificates of plant variety protection. The Court reasoned that, because certificates of plant variety protection were traditionally believed to offer narrower rights, yet still give breeders the right to prevent buyers from selling seed,

114. See Bowman II, 133 S. Ct. at 1766.
115. Id.
116. See id. at 1767.
117. Id. at 1766.
118. Id. at 1765.
119. See id. at 1768.
120. Bowman II, 133 S. Ct. at 1768.
121. See id. at 1766–67.
then patentees, who have broader rights, should be able to prevent buyers from making seed.122

The Supreme Court in Bowman II also noted that its holding was limited to the particular facts of the case—particularly that “Bowman planted Monsanto’s patented soybeans solely to make and market replicas of them . . . [p]atent exhaustion provides no haven for that conduct.”123 With this statement, it stands to reason that perhaps the inverse is true—patent exhaustion or some other kind of equitable doctrine could prevent the patentee from asserting its rights where the creation of the seeds is inadvertent and not willful. This reasoning is also reflected in the terms of the Technology Agreement itself. The terms do not expressly prevent farmers from making new seed. Rather, the language impliedly requires an intent-to-create or intent-to-make transgenic seeds because the Agreement prevents farmers from “saying any crop produced from this seed for replanting” and “using the seed or providing it to anyone for . . . seed production.”124 Some scholars have also suggested that Congress should add an “intent-to-acquire” element to plant patent infringement.125

III. CROSS-POLLINATION

The organic food movement started in the 1960s in response to growing consumer concerns about the safety of genetically modified plants and the effects of widespread pesticide use on the ecosystem.126 Food companies were quick—as they typically are—to seize an opportunity to market their products as being free of genetically modified organisms.127 As a result, consumers are now bombarded with food claims, such as claims that certain foods are “vitamin enriched” or “all natural.”128 Well-known food writer Michael Pollan reports that the organic food industry is an $11 billion industry and claims that the industry is “the fastest growing sector of the food

122. See id. at 1767–68.
123. See id. at 1769.
124. Monsanto Co. v. Bowman (Bowman I), 657 F.3d 1341, 1345 (Fed. Cir. 2011).
125. See Hilary Preston, Note, Drift of Patented Genetically Engineered Crops: Rethinking Liability Theories, 81 Tex. L. Rev. 1153, 1168–69 (2003) (arguing that “[t]he innocent possessor derives no benefit from the patented goods and may even suffer harm by the invasion. This difference justifies adding the requirement of intent to infringe (or at least knowledge of infringement) in cases in which possession is a sufficient basis for infringement”).
127. Id.
128. Id.
Lawmakers in the 1960s, however, were concerned about consumer deception and the standards by which these foods were actually produced. For example, the term "natural" has not been defined by the Food and Drug Administration to this day, and as such, its meaning varies significantly. To establish national standards for the production and handling of organic foods, Congress passed the Organic Foods Production Act.

A. Requirements and Protection for Organic Plants

i. Organic Foods Production Act

The Organic Foods Production Act delegated authority to the U.S. Department of Agriculture (USDA) to promulgate and enforce regulations governing labeling requirements, organic production, and certification requirements. The USDA established the National Organic Program to govern certification, authentication, and labeling. States may also institute their own state organic certification programs, so long as they are consistent with and satisfy the minimum requirements of the National Organic Program.

To obtain organic certification under the National Organic Program, farmers must satisfy two requirements. First, farmers must produce their crops without using synthetic chemicals, including heavy metals, toxic residues, and any other unapproved synthetic substance that does not appear on the National List. This provision requires farmers to cease labeling and selling their products as organic when the levels of a synthetic chemical are


132. See Organic Foods Production Act, 7 U.S.C. § 6501 (2012) (“It is the purpose of this chapter: (1) to establish national standards governing the marketing of certain agricultural products as organically produced products; (2) to assure consumers that organically produced products meet a consistent standard; and (3) to facilitate interstate commerce in fresh and processed food that is organically produced.”).

133. See id. § 6503(a).


135. See Organic Foods Production Act § 6506(d).

136. See id. § 6517; see generally 7 C.F.R. § 205.601 (2001).
“greater than unavoidable residual environmental contamination.”137 The National Organic Program does, however, permit low levels of non-authorized substances that are 5 percent or below the Environmental Protection Agency’s tolerance.138 Second, farmers must submit an “organic plan” showing sustainable and environmentally-friendly production methods as well as a management history to ensure that the farmer has not applied unauthorized substances to the crops.139 Organic certification is also, of course, a precondition to selling food with the “organic” label.140

After receiving organic certification, the farmer must maintain detailed records describing the type and amount of substances applied to the crop for at least five years.141 Notably, organic farmers also have an affirmative obligation to ensure that prohibited, non-organic substances do not contaminate their crops.142 To prevent contamination, organic farmers must have sufficient boundaries surrounding their fields to reasonably separate organically grown crops from prohibited substances.143 Certifying agents conduct annual inspections of the farm and residue testing of the products.144

B. Plant Protection Act

Congress enacted the Plant Protection Act to govern the process that biotechnology companies use to introduce transgenic plants into the ecosystem.145 The Animal and Plant Health Inspection Service enforces the Plant Protection Act.146 The agency has discretion to seize or destroy any organism or substance that it determines is a “plant pest” or “noxious weed.”147

However, the Animal and Plant Health Inspection Service does not have exclusive authority to regulate plants.148 For instance, the Food and Drug

140. Id. § 6502(20).
141. Id. § 6519(b)(2), § 6513(a).
142. 7 C.F.R. § 205.202(c).
143. Id.
144. 7 U.S.C. § 6506(a)(5)–(6).
146. Id. § 7711.
147. 7 U.S.C. § 7714(a); see also Ctr. for Food Safety v. Vilsack, 718 F.3d 829, 934 (9th Cir. 2013) (explaining that the agency’s jurisdiction turns on whether “the organism is a ‘plant pest’ within the meaning of the statute”) (citing 7 U.S.C. § 7701(14); 7 C.F.R. § 340.2, n.4 (2013)).
148. See 7 U.S.C. § 7702(14) (“The term ‘plant pest’ means any living stage of any of the following that can directly or indirectly injure, cause damage to, or cause disease in any plant or plant product.”); see also Ctr. for Food Safety, 718 F.3d
Administration regulates plants to the extent that those plants, or their parts, are sold as food.\textsuperscript{149} However, the Animal and Plant Health Inspection Service has the authority to regulate transgenic plants that were created using an organism or substance with a deleterious effect on other plants.\textsuperscript{150} In other words, when a harmful organism or substance is incorporated within a transgenic plant, the entire transgenic plant becomes a "plant pest," giving the agency jurisdiction to regulate the entire plant.\textsuperscript{151}

Before introducing a "regulated article," companies have a duty either to notify or to obtain permission from the Animal and Plant Health Inspection Service.\textsuperscript{152} For example, a company that intends to introduce a transgenic plant through "environmental release" must notify the Animal and Plant Health Inspection Service thirty days before the introduction.\textsuperscript{153} Further, the company has six months from the introduction to submit a required "field test report" containing "all deleterious effects on plants, nontarget organisms, or the environment."\textsuperscript{154} Finally, the company must follow various performance standards,\textsuperscript{155} such as growing transgenic plants in a manner that prevents cross-pollination with unintended, organic plants and adequately storing transgenic seeds to prevent inadvertent germination.\textsuperscript{156}

Interpreting the Plant Protection Act, the Ninth Circuit held that transgenic alfalfa seed is not a "plant pest."\textsuperscript{157} In \textit{Center for Food Safety v. Vilsack}, the Animal and Plant Health Inspection Service had deregulated Monsanto’s transgenic alfalfa seed.\textsuperscript{158} A group of environmentalists and farmers subsequently sued the agency, challenging the deregulation.\textsuperscript{159} The Ninth Circuit addressed whether the incorporation of a known plant pest within the transgenic alfalfa seed made the seed itself a plant pest.\textsuperscript{160} Monsanto's use of Agrobacterium, a gram-negative bacteria and plant pest, intro-

\textsuperscript{149} See \textit{Ctr. for Food Safety}, 718 F.3d at 833.
\textsuperscript{150} \textit{Id.} at 836–37.
\textsuperscript{151} \textit{Id.}
\textsuperscript{152} 7 C.F.R. § 340.0(a)(1) (2012).
\textsuperscript{153} \textit{Id.} § 340.3(d)(3)(iii).
\textsuperscript{154} \textit{Id.} § 340.3(d)(4).
\textsuperscript{155} See \textit{id.} § 340.3(c) (setting forth mandatory performance standards “for any introductions under the notification procedure”).
\textsuperscript{156} \textit{Id.} § 340.3(c)(1)–(2).
\textsuperscript{157} \textit{Ctr. for Food Safety v. Vilsack}, 718 F.3d 829, 832 (9th Cir. 2013).
\textsuperscript{158} \textit{Id.} at 831–32.
\textsuperscript{159} \textit{Id.} at 832.
\textsuperscript{160} \textit{Id.} at 836.
duced the transgene to the alfalfa seed, and the resulting transgenic plant’s genome contained Agrobacterium DNA. After conducting additional studies, the Animal and Plant Health Inspection Service determined that the presence of Agrobacterium DNA did not pose a risk of harm to other plants. Therefore, the agency decided that the transgenic alfalfa seed was not a plant pest, and the Ninth Circuit upheld this decision. As a result, the agency lacked the jurisdiction needed to regulate the transgenic alfalfa seed. Unfortunately, no other conventional farmer is likely to prevail under this theory because the majority of transgenic flowering plants are created through the Agrobacterium method.

In 2008, the Animal and Plant Health Inspection Service proposed a regulation to amend the transgenic plant rules by broadening the definition of “plant pest.” This expanded definition would have included non-living plant material and, in turn, would have allowed the agency to regulate the movement of pollen grains. Additionally, the proposed regulation might have significantly impacted a farmer’s ability to recover damages from a biotechnology company based on cross-pollination contamination. In the spring of 2015, however, the Animal and Plant Health Inspection Service withdrew its proposed regulation. The agency has recently began soliciting comments regarding the regulation of transgenic plants and, in particular, whether a complete overhaul of the law is necessary.

C. Trace Amount Contamination

As illustrated above, there are a number of regulatory hurdles an organic farmer must overcome in order to obtain and maintain the highly coveted

161. Id.
162. Id. at 837.
163. Ctr. For Food Safety, 718 F.3d at 836.
164. Id. at 842.
167. Id.
168. Id.
169. Id.
170. Id.
organic certification status. Because regulatory compliance requires significant time and investment, organic trade organizations, unsurprisingly, are very concerned about the threat of genetic drift, i.e., contamination of their organic crops by transgenic crops. So far, courts have only addressed the issue of standing—that is, whether the threat of cross-pollination between organic and non-organic crops constitutes a justiciable injury. The Federal Circuit and Supreme Court have, once again, analyzed the issue differently.

Biotechnology companies like Monsanto have argued that they will not assert their patents against farmers whose crops merely have a “trace amount” of the patented transgene. However, courts have failed to acknowledge that “trace amounts” of genes will likely cause the majority of a farmer’s crop to suffer from long-term contamination. Moreover, this risk is heightened by the fact that organic farmers may not know or have a reason to know that their crops are contaminated. Unless the plant exhibits some other physiological effect from the insertion of the transgene, organic farmers would be unable to detect the transgene’s presence because they do not apply herbicides to their crops, even those with glyphosate (i.e., synthetic chemicals). One possibility is that, by the time the farmer learns of the contamination, a high percentage of the crop will already be contaminated, resulting in increased costs and decreased profits. Although scientists can easily detect the presence of a transgene through laboratory experiments, this testing is costly and places an undue burden on the farmer.

In Organic Seed Growers & Trade Ass’n v. Monsanto Co., the Federal Circuit found that the mere possibility of cross-pollination was not an immediate threat and, thus, did not warrant a non-infringement declaration. Over seventy organic agricultural organizations sought a declaratory judgment of non-infringement against Monsanto, arguing that cross-pollination was im-

171. See supra Part III.A.i.
172. See, e.g., Ctr. for Food Safety v. Vilsack, 718 F.3d 829, 830–32 (9th Cir. 2013).
173. See, e.g., Organic Seed Growers & Trade Ass’n v. Monsanto Co., 718 F.3d 1350, 1354 (Fed. Cir. 2013).
174. See id. at 1360.
175. See supra Part III.A.i.
177. See supra note 81 and accompanying text; see also Kellyn S. Betts, Growing Evidence of Widespread GMO Contamination, Inst. For Agric. & Trade Pol’y (Dec. 14, 1999), http://www.iatp.org/news/growing-evidence-of-widespread-gmo-contamination (providing a detailed explanation of the process and costs of testing for crop contamination); Repp, supra note 176, at 591–93 (noting various examples of when scientific testing revealed crop contamination).
178. Organic Seed Growers, 718 F.3d at 1360.
Pollen in the Wind

minent and inevitable.\textsuperscript{179} Although the Federal Circuit acknowledged that cross-pollination was inevitable, the court found that this likelihood of harm was speculative.\textsuperscript{180} Further, the court held that the standard for a justiciable case or controversy was not satisfied because cross-pollination did not present a "substantial risk" of harm.\textsuperscript{181} Therefore, the organic agricultural organizations lacked standing to sue.\textsuperscript{182}

The Federal Circuit also found that the organic trade organizations lacked standing "[b]ecause Monsanto ha[d] made binding assurances that it will not 'take legal action.'\textsuperscript{183} Specifically, Monsanto makes the following commitment on its website: "It has never been, nor will it be Monsanto policy to exercise its patent rights where trace amounts of our patented seeds or traits are present in farmer's fields as a result of inadvertent means."\textsuperscript{184} Notably, the commitment does not define "trace amounts" or "inadvertent means"\textsuperscript{185} and appears to govern Monsanto's relationship with its customers.\textsuperscript{186} The court found that these statements and Monsanto's representations in court constituted "binding assurances" that Monsanto would not sue farmers.\textsuperscript{187} Despite these "binding assurances," Monsanto refused to agree to a covenant not to sue throughout the course of the litigation.\textsuperscript{188} Monsanto argued that it lacked incentive to sue based on the inability to recover sufficient damages.\textsuperscript{189} While this may be true, consumers may perceive Monsanto's blanket assurances as merely a public relations attempt to handle the backlash it had received.

The Federal Circuit addressed, but did not resolve, whether a farmer would be liable for patent infringement if the transgenic seed \textit{inadvertently}
contaminated the farmer's crop. The Federal Circuit noted that the Supreme Court has suggested that patent exhaustion would not apply to unintentional infringement cases. Despite the Supreme Court's suggestion, the Federal Circuit rejected this equitable argument and noted that *de minimis* infringement is still infringement, whether intentional or unintentional.

In refusing to find non-infringement based on equitable principles, the Federal Circuit cited its own precedent from *SmithKline Beecham Corp. v. Apotex Corp.* as authority. In *SmithKline Beecham*, the Federal Circuit reversed the district court's limitation of a claim directed to a chemical compound. The appellate court held that claim construction of a patent is not influenced by policy considerations. Thus, the Federal Circuit suggested that it will not follow the Supreme Court's suggestion in *Bowman II* and, instead, will decide the issue in favor of the patentee without considering equity.

*Organic Seed Growers* appears to be one of the only cases addressing the issue of contamination by transgenic crops and, more specifically, whether contamination constitutes patent infringement. In concluding that the possibility of cross-pollination is too speculative, the Federal Circuit underestimated the unpredictable nature of plant biology and failed to properly weigh the district court's finding that such contamination was "inevitable." Traditionally, non-living products are evaluated through the standards of harm, but, unlike these products, plants are self-reproducing organisms. Moreover, as previously mentioned, patent infringement does not require an

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190. *Id.* at 1356.
191. *Id.* at 1356, 1361 n.4 ("Bowman was not a passive observer of his soybeans’ multiplication. . . . In another case, the [seed]'s self-replication might occur outside the [farmer's] control.") (quoting *Bowman v. Monsanto Co.* (*Bowman II*), 133 S. Ct. 1761, 1769 (2013)).
192. *Organic Seed Growers*, 718 F.3d at 1356.
193. *Id.*
195. *Id.* at 1339–40.
196. *Organic Seed Growers*, 718 F.3d at 1356.
197. *Id.* at 1357 (citing *Organic Seed Growers & Trade Ass’n v. Monsanto Co.*, 851 F.Supp. 2d 544, 548 (S.D.N.Y. 2012)).
Although the Supreme Court suggested that equity considerations should govern an unintentional infringement case, the Federal Circuit disagreed with this policy argument. Further, the Federal Circuit apparently decided the case entirely on Monsanto’s commitment not to sue based on “trace amount” contamination. However, the standard to evaluate whether a farmer forfeits organic certification status is not “trace amount” contamination, but “unavoidable residual environmental contamination.”

**D. Significant Risk of Contamination**

The Supreme Court briefly discussed the significant risk of contamination in *Monsanto Co. v. Geertson Seed Farms.* After finding that the transgenic seed did not pose a significant risk to the environment, the Animal and Plant Health Inspection Service approved the deregulation of Monsanto’s Roundup Ready alfalfa seed. Conventional farmers and environmental groups challenged the agency’s deregulation on procedural grounds. The Supreme Court reversed the injunction against deregulation and, in effect, affirmed the agency’s deregulation. The Court found that the environmentalists had standing, because deregulation posed a “significant risk” of genetic drift and harm to conventional farmers.

Similar to their disagreement on applying patent exhaustion to transgenic plants, the Federal Circuit and Supreme Court also disagree on the standing requirements for conventional and organic farmers. The Federal Circuit held that “trace amounts” would not support a justiciable case or controversy. However, the Supreme Court found that the deregulation of a transgenic crop presented a “significant risk,” which was sufficiently concrete to establish an injury-in-fact.

Despite this apparent conflict of interpretations, the Supreme Court chose not to address the issue and denied certiorari in *Organic Seed Growers.*

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199. Preston, *supra* note 125, at 1157 (“[A] patent infringement claim does not have intent as an element of the infringement.”).

200. *Organic Seed Growers,* 718 F.3d at 1356.

201. *Id.* at 1358.


204. *Id.* at 144, 146.

205. *Id.* at 146.

206. *Id.* at 155.

207. *Id.*

208. See *id.* at 141; *Organic Seed Growers & Trade Ass’n v. Monsanto Co.,* 718 F.3d 1350, 1360–61 (Fed. Cir. 2013).


The Supreme Court may have believed *Organic Seed Growers* was not the appropriate case to decide the issue because the farmers had not yet suffered an injury. On the other hand, it is arguable that the Court agreed with the Federal Circuit that the threat of cross-pollination does not satisfy standing requirements. As a result of this uncertainty, the threat of inadvertent infringement will loom large until the Supreme Court definitively addresses this issue.

E. Tort Liability

With the exception of a few cases, including *Organic Seed Growers* and *Geertson Seed Farms*, courts have yet to address the issue of transgenic crops cross-pollinating with organic crops. However, the related issue of pesticide drift has been litigated before the highest courts of some states under traditional tort theories, including strict liability, trespass, negligence, nuisance, and conversion of chattels. Contamination by pesticides and contamination by transgenic crops both occur in a similar way, *i.e.*, through wind, water, and other environmental means. Thus, courts may apply similar logic to organic crop contamination.

i. Strict liability

In *Langan v. Valicopters, Inc.*, the Supreme Court of Washington held that trace amounts of pesticides and a subsequent decertification of organic status constituted an economic loss. In *Langan*, Valicopters inadvertently sprayed a portion of the Langans' crop with pesticide. The Langans were members and founders of the Northwest Organic Food Producers’ Association (NOFPA), an organization that had the power to certify its members "as organic food growers." NOFPA requires certified growers to comply with its bylaws, which provide, in part, that farmers may not use any quantity of

211. Organic Seed Growers & Trade Ass’n v. Monsanto Co., 134 S. Ct. 901 (2014) (mem.).

212. *See generally Geertson Seed Farms*, 561 U.S. 139; *see also Organic Seed Growers*, 718 F.3d at 1350.


214. *See Organic Seed Growers*, 718 F.3d at 1357 (explaining that both the district court and Monsanto recognized that "windblown pollen or seeds" can cause crop contamination); Johnson, 817 N.W.2d at 700 (noting that the farmers' complaint centered on the fact that the wind carried the pesticide onto their land); *see also* Repp, *supra* note 176, at 591–93 (explaining various ways in which cross-pollination can occur).


216. *Id.* at 219.

217. *Id.* at 219–20.
pesticides "on food or in the soil in which products are grown."\(^{218}\) Despite the inadvertent means by which their crop was contaminated, NOFPA decertified the Langans’ as organic farmers because their crop contained trace amounts of pesticide.\(^{219}\) As a result, the Langans were unable to sell their crop.\(^{220}\)

The court held that Valicopters could be strictly liable for damages to the farmers’ crops.\(^{221}\) The court found that aerial spraying of pesticides was an abnormally dangerous activity that posed an unavoidable risk, despite the exercise of reasonable care.\(^{222}\) Therefore, finding for the Langans, the court balanced equitable interests and required Valicopters to reimburse the Langans.\(^{223}\)

The Organic Foods Production Act of 1990 was enacted thirteen years after Langan, making it unclear whether the case would have been decided the same way today.\(^{224}\) The Act’s regulations contain a narrow exception for low levels of inadvertent contamination.\(^{225}\) Therefore, if the pesticide levels exceed those in the Act, Langan is more likely to support the argument that genetic drift—like pesticide drift—causes substantial economic loss due to the loss of organic certification.\(^{226}\)

ii. Trespass

In Johnson v. Paynesville Farmers Union Cooperative Oil Co., the Supreme Court of Minnesota addressed whether pesticide drift contamination gave rise to causes of action for trespass, nuisance, and negligence per se.\(^{227}\) Like Valicopters, the Paynesville Cooperative sprayed the field next to an organic farm with pesticide on multiple occasions.\(^{228}\) The organic farmer’s testing revealed the presence of chemicals in his crop, and the farmer reported his findings to state and federal certifying agents.\(^{229}\) Later, the farmer

\(^{218}\) Id.

\(^{219}\) Id.

\(^{220}\) Id. at 220.

\(^{221}\) Langan, 567 P.2d at 221–23.

\(^{222}\) Id. at 223.

\(^{223}\) Id.


\(^{226}\) See 7 C.F.R. § 205.671; Langan, 567 P.2d at 219–20, 222.

\(^{227}\) Johnson v. Paynesville Farmers Union Coop. Oil Co., 817 N.W.2d 693, 696 (Minn. 2012).

\(^{228}\) Id. at 697–98; Langan, 567 P.2d at 222 (explaining that Valicopters inadvertently sprayed a portion of the Langans’ crop with pesticide).

\(^{229}\) Johnson, 817 N.W.2d at 698.
received letters regarding violations of the Organic Foods Production Act’s certification requirements, and although the farmer did not have evidence that the levels of the chemicals exceeded the minimum amounts, he ceased production entirely.

First, the court held that pesticide drift would not support a trespass claim because the pesticide contamination concerned an “intangible agency” or “particulate matter.” Therefore, the pesticide contamination did not interfere with the farmer’s right of possession. Second, the court found that the farmer’s removal of the crop from production was premature, because the inadvertent application of the pesticide did not constitute a regulatory violation. According to the court’s interpretation of the regulation, “the phrase ‘applied to it’” refers solely to the farmer’s application of pesticide. Thus, a third party’s application of pesticide would be permissible.

Although the court relied on cases that dismissed trespass claims based on a mere invasion of odors, it did not define these terms or explain how pesticide molecules are intangible property. This court erroneously concluded that pesticides are intangible property. However, the result in Johnson would likely be different if contamination by transgenic crops were involved. Although transgenes are intangible property, they cannot be physically separated from the tangible seed or plant. Moreover, many patents claim

230. Id.
231. Id.
232. Id. at 700–02.
233. Id.
234. See id. at 707–08 (finding that a violation of the regulation at issue under the Organic Foods Production Act requires the farmer himself to apply the prohibited substance to his crops (citing 7 C.F.R. § 205.202(b) (2001))).
235. Johnson, 817 N.W.2d at 708.
236. See id.; see also 7 C.F.R. § 205.202(b) (requiring that an “organic,” agricultural product “[h]ave no prohibited substances . . . applied to it for a period of 3 years immediately preceding harvest of the crop”).
237. See Johnson, 817 N.W.2d at 702–03; but see Intangible, DICTIONARY.COM, http://dictionary.reference.com/browse/intangible (last visited Sept. 18, 2015) (defining “intangible” as “incapable of being perceived by the sense of touch, as incorporeal or immaterial things”).
238. See Organic Seed Growers & Trade Ass’n v. Monsanto Co., 718 F.3d 1350, 1357 (Fed. Cir. 2013) (conceding that “genetically modified seeds cannot easily be separated from conventional seeds; thus, a grower who harvests and uses or sells contaminated crops risks incurring infringement liability”); see also Stephen M. Scanlon, Should Missouri Farmers of Genetically Modified Crops Be Held Liable for Genetic Drift and Cross-Pollination?, 10 Mo. ENVT'L. L. & POL’Y REV. 1, 7–8 (2003) (explaining that, in the context of trespass, “an organic farmer would be barred from recovering damages for the intrusion of GMO pollen onto his land if GMO pollen is considered an intangible object”);
both the transgene itself, as well as the seed and plant containing the transgene.\textsuperscript{239}

In addition, the court's interpretation of Organic Foods Production Act usurps legislative intent. The Act was intended to increase consumer confidence by providing uniform standards for the production and control of organic crops.\textsuperscript{240} The Supreme Court of Minnesota's interpretation of the Act allows indirect application of pesticides to a farmer's crop, which frustrates the Act's purpose by permitting farmers to solicit third party application of pesticides. In his dissent, Justice Page quoted the Supreme Court's standpoint on statutory construction: "use of passive voice in statutory phrase . . . reflects agnosticism . . . about who does the using."\textsuperscript{241} Because the Supreme Court of Minnesota ignored this traditional rule of statutory construction, its interpretation of the regulation implementing the statute was incorrect.

Furthermore, no other state has relied on the court's reasoning in \textit{Johnson} to hold that contamination of organic crops does not constitute an actionable tort. Therefore, \textit{Johnson} is unlikely to influence transgenic crop contamination jurisprudence. In any event, the suit provides an interesting case study on how a court may approach the issue of contamination.

iii. Negligence

In June of 2013, Ernest Barnes, a farmer in Kansas, alleged that Monsanto breached its duty of care by introducing transgenic wheat to his non-transgenic wheat fields.\textsuperscript{242} Among his various assertions, Barnes argued that

\textit{but see Johnson,} 817 N.W.2d at 700, 702 (finding that pesticide is "particulate matter" and "an intangible agency").


240. \textit{Organic Foods Production Act,} 7 U.S.C. § 6501 (2012) ("It is the purpose of this chapter: (1) to establish national standards governing the marketing of certain agricultural products as organically produced products; (2) to assure consumers that organically produced products meet a consistent standard; and (3) to facilitate interstate commerce in fresh and processed food that is organically produced.").

241. \textit{Johnson,} 817 N.W.2d at 716 (Page, J., dissenting) (quoting Dean v. United States, 556 U.S. 568, 572 (2009)).

242. \textit{Complaint at 1, 5, 36, Barnes v. Monsanto Co.,} No. 6:13CV01218 (D. Kan. Dismissed Feb. 10, 2014, 2013 WL 2401640); \textit{see also} Roxana Hegeman, \textit{Monsanto Sued over Genetically Modified Wheat,} USA TODAY, June 4, 2013,
Monsanto failed to prevent cross-pollination by birds and wind. A court never addressed this issue, as Monsanto swiftly settled with the farmer for an undisclosed amount.

The ultimate issue in Barnes was whether Monsanto’s duty of care to the farmer included the duty to prevent contamination of transgenic wheat. Although one could reasonably argue that the patent-holder should bear the responsibility and suffer the consequences when cross-pollination occurs, the Organic Foods Production Act takes a different approach. Under the Organic Foods Production Act, the farmer has the responsibility to prevent cross-pollination through the use of "buffer zones."

However, neither the farmer nor the patent-holder should bear the entire burden of seed testing to determine the amount and extent of crop contamination resulting from transgenic seed. As a practical matter, enforcement is difficult and burdensome for the farmer and the biotechnology company, even if the company is better suited to absorb and reallocate costs. Because cross-pollination is inevitable, the question is not whether the plants will be contaminated, but rather when the plants will be contaminated by transgenic seeds drifting onto neighboring lands through wind, water, or other means.

That said, the principles of equity require Monsanto and other biotechnology companies to proportionately compensate farmers for the harm caused. Alternatively, farmers could insure their crops against cross-pollination from transgenic crops. Cross-pollination is incidental to biotechnology companies introducing transgenic crops into the environment.
nators of this patented technology, they should bear some of the responsibility for the harm this technology has caused downstream, especially considering the foreseeable risks to the environment and organic farming in the future.

iv. Conversion

While the drift of transgenic seed could support an additional cause of action for conversion of chattels, this novel argument is unlikely to prevail. In a traditional conversion claim, the defendant’s intentional exercise of such substantial dominion over the chattel interferes with the owner’s right of control and justifies reimbursing the owner for the chattel’s full value. A court may impute intent when the defendant exercised such substantial control that it actually interfered with the owner’s right to exercise control.

The contamination of organic crops could constitute a conversion of chattel. To establish the intentional tort of conversion, however, the farmer would have to overcome the difficult burden of proving the element of intent, which may be imputed to a patent-holder. For example, the introduction of a transgene to an organically grown population could result in substantial control and actual interference because the farmer would no longer be able to sell the crop. It is more likely, though, that the cross-pollination would not result in the entire crop being contaminated. Moreover, the farmer may be able to sell the crop at a reduced price. While losing organic certification is a substantial harm, it probably does not rise to the level of conversion. Therefore, a farmer is unlikely to succeed on a claim for conversion of chattels.

that “(d)ue to self-replication, [ ] genetically modified DNA will [ ] pass to future plant generations”).


250. Id. § 222A(2)(b), (d).

251. See supra notes 136–137 and accompanying text; see also Langan v. Valicopters, Inc., 567 P.2d 218, 219–20 (Wash. 1977) (explaining that the Langan owners were unable to sell their crop due to an inadvertent, pesticide contamination); Repp, supra note 176, at 591–93 (noting various instances where cross-contamination caused economic damage).

252. See Johnson v. Paynesville Farmers Union Coop. Oil Co., 817 N.W.2d 693, 706–12 (Minn. 2012) (holding that “[t]he Cooperative’s pesticide drift [ ] could not proximately cause the Johnsons’ [entire] soybean field to be taken out of organic production for 3 years” because “a third party’s pesticide drift cannot cause a field to lose organic certification.”); but see Repp, supra note 176, at 591–93 (discussing various situations in which cross-contamination caused extensive economic damage).

253. See RESTATEMENT (SECOND) TORTS § 222A(2) (1965) (listing factors to determine whether the actor’s control was substantial enough to justify full reimbursement to the owner).
In the aggregate, very few farmers have brought tort claims against the biotechnology industry, but this may be an area of future litigation. However, the cases relating to pesticide drift do not appear promising for conventional farmers. Strict liability requires an abnormally dangerous activity, yet transgenic crops are likely not “unsafe” even though the chemicals and pesticides used in conjunction with them may be carcinogenic.

The most persuasive causes of action are trespass and negligence, but proving intent and breach of care on the part of the biotechnology company, both of which are necessary for reimbursement, will be challenging. Considering how forcefully Monsanto asserts its patent portfolio, its settlement with Barnes was not only surprising, but also supports the notion that a farmer’s greatest chance of recovery is under a negligence theory.

IV. Conclusion

As this Comment illustrates, there are a number of unresolved issues related to patent exhaustion, inadvertent infringement, and trace amount contamination. The Supreme Court has suggested that inadvertent infringement may result in patent exhaustion or, alternatively, that courts should balance equitable and patent principles. Despite the Supreme Court’s guidance, the Federal Circuit has continued to assert that de minimis or “trace amount” infringement is still infringement.

Additionally, a split of authority exists regarding standing: the Federal Circuit has a much higher standard of foreseeability than the Supreme Court. Until the Supreme Court directly addresses this issue, farmers must


255. See Organic Seed Growers & Trade Ass’n v. Monsanto Co., 718 F.3d 1350, 1357, 1360 (Fed. Cir. 2013).

256. See Johnson, 817 N.W.2d at 706; see also Wilson, supra note 239, at 184 (clarifying that cross-contamination may support a trespass claim “if the defendant intentionally enters or causes something to enter the land of another”).

257. See Organic Seed Growers, 718 F.3d at 1356, 1361 n.4 (noting that the Supreme Court suggested that patent exhaustion would not apply if the infringement is unintentional (citing Bowman v. Monsanto Co. (Bowman II), 133 S. Ct. 1761, 1769 (2013))).

258. See supra notes 191–196 and accompanying text.

259. See Organic Seed Growers, 718 F.3d at 1356 (rejecting the Supreme Court’s equitable argument that inadvertent infringement may “not be an infringing use” (citing Bowman II, 133 S. Ct. at 1769)).

260. Compare Organic Seed Growers, 718 F.3d at 1360–61 (holding that “trace amounts” of contamination would not support a justiciable case or controversy), with Monsanto Co. v. Geertson Seed Farms, 561 U.S. 139, 141 (2010) (finding that the deregulation of a transgenic crop was sufficiently concrete to establish an injury-in-fact).
suffer an injury, such as crop contamination or losing their organic certification, before recovering damages in the Federal Circuit. Even if the farmer suffers an injury, however, the Federal Circuit may continue to be unsympathetic to the plight of the farmer.

All of these issues have a common origin: they have all arisen from the anatomical and physiological characteristics of plants. While *Bowman* shed some light on the applicability of patent exhaustion to transgenic plants, the Supreme Court must weigh in on inadvertent infringement. Who should bear the costs of genetic drift? Can farmers recover under tort liability theories? Until the Supreme Court answers these questions, lower courts will continue to find in favor of biotechnology companies, such as Monsanto.