The agriculture industry has changed significantly over the last thirty years. Surprisingly, however, farming in the United States remains a family business. In 2007, ninety-eight percent of farms were classified as family organizations. Nevertheless, these farming operations have evolved to the point that fewer, larger operations produce the majority of agricultural commodities. In addition, production per farm has increased over time, allowing greater yields from less acreage.

One of the most dramatic changes for the agriculture industry was the development of genetically engineered (GE) crops, which were introduced commercially in 1996. GE crops have helped the agriculture industry and other industries through reduced costs for food or drug production, reduced pesticide use, enhanced nutrient composition and food quality, resistance to

2. Id. at 22.
3. Id.
4. Id. at 44. According to the Commodity Exchange Act, agricultural commodity means: (1) The following commodities specifically enumerated in the definition of a “commodity” found in section 1a of the Act: Wheat, cotton, rice, corn, oats, barley, rye, flaxseed, grain sorghums, mill feeds, butter, eggs, Solanum tuberosum (Irish potatoes), wool, wool tops, fats and oils (including lard, tallow, cottonseed oil, peanut oil, soybean oil and all other fats and oils), cottonseed meal, cottonseed, peanuts, soybeans, soybean meal, livestock, livestock products, and frozen concentrated orange juice, but not onions; (2) All other commodities that are, or once were, or are derived from, living organisms, including plant, animal and aquatic life, which are generally fungible, within their respective classes, and are used primarily for human food, shelter, animal feed or natural fiber; (3) Tobacco, products of horticulture, and such other commodities used or consumed by animals or humans as the Commission may by rule, regulation or order designate after notice and opportunity for hearing; and (4) Commodity-based indexes based wholly or principally on underlying agricultural commodities.
17 C.F.R. § 1.3zz (2013).
5. ERS Bulletin EIB-88, supra note 1, at 44–45.
pests and disease, greater food security, and various medical benefits. In 2004, the global farm income benefit from GE crops, including second season soybeans in Argentina, was $6.5 billion. The largest income benefit during that same year was from herbicide-tolerant soybeans, which added $4.14 billion in additional income. Furthermore, from 1996 to 2004, the farm income benefit from herbicide-tolerant soybeans in the United States alone was approximately $6.4 billion. While companies that hold utility patents on GE plants are often blamed for restricting farmers’ rights, the farmers have obviously benefited from the availability of GE crops. On average, studies have shown that patent holders retain only one-third of the benefits of first-generation GE crops, whereas two-thirds of the benefits were shared “downstream” with consumers or purchasers of the GE crops.

In addition to income, GE crops have created other benefits for agriculture, including decreased pesticide usage, utilization of less toxic herbicides, reduced inputs such as machinery, fuel, and labor, and environmental benefits. From 1982 to 2007, farmers in the United States used thirty percent less hired labor while increasing farm output by thirty-five percent. During this same time period, the total number of acres used for agricultural purposes decreased five percent.

8. Brookes & Barfoot, supra note 6, at 191.
9. Id.
10. Id. at 192 tbl.5.
12. See Henry I. Miller & Graham Brookes, Debunking ‘The Big Lie’ About Genetically Engineered Crops, FORBES (May 23, 2013, 6:00 AM), http://www.forbes.com/sites/henrymiller/2013/05/23/debunking-the-big-lie-about-genetically-engineered-crops/ ("Farmers certainly don’t believe that genetic engineering is unwanted, unneeded or unsuccessful. The net economic benefit at the farm level in 2011 was $19.8 billion, equal to an average income premium of $329/acre. For the 16 year period 1996–2011, the global farm income gain was $98.2 billion. Of the total farm income benefit, 49% ($48 billion) was due to yield gains resulting from lower pest and weed pressure and improved genetics, with the balance arising from reductions in the cost of production.").
15. ERS Bulletin EIB-88, supra note 1, at 6–7.
16. Id. at 12.
Many of the same agricultural benefits can be observed, with some minor differences, in both developed and developing nations.\(^{17}\) As the world’s population continues to grow,\(^ {18}\) farmers need advancements in technology in order to increase production levels from the same amount of tillable acres.\(^ {19}\) Productivity growth in agriculture has been achieved largely with technological advancements, including management, equipment, and GE plants.\(^ {20}\) Without the availability of GE crops, maintaining global crop production levels at 2011 levels would have required planting an additional nine percent of the arable land in the United States, including 13.3 million acres of soybeans alone.\(^ {21}\) While herbicide-tolerant crops have been particularly important for increased efficiency and production, development is currently underway for the next generation of GE technology.\(^ {22}\) These crop developments include virus and fungus resistance, cold tolerance, drought resistance, and improved seed quality through protein, oil, or vitamin content.\(^ {23}\)

In order to promote innovation in genetics and biotechnology,\(^ {24}\) developers of GE plants may obtain utility patents for plant tissue, seeds, or whole plants.\(^ {25}\) Seed companies who own the patent rights for GE plants use utility patents in conjunction with license agreements to restrict a farmer’s use of patented GE plants.\(^ {26}\) These restrictions, inter alia, prevent farmers from saving

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17. Qaim, supra note 14.
19. ERS Bulletin EIB-88, supra note 1, at 65 & tbl.4.3. The agriculture industry relies on improvements in technology for growth more than almost any other section of the U.S. economy. Id. From 1960 to 2004, the growth in total factor productivity (TFP), which is a statistical series used to isolate the effect of changes in technology and related factors on output, accounted for 13% of growth in industrial output; however, during this period, TFP accounted for 117% of the growth in agricultural output. Id.
20. Id. at 51.
22. ERS Bulletin EIB-88, supra note 1, at 51.
23. Id.
24. See Diamond v. Chakrabarty, 447 U.S. 303, 307 (1980). Patent laws promote progress by offering incentives to investors for a limited time, and this “authority of Congress is exercised in the hope that ‘[t]he productive effort thereby fostered will have a positive effect on society through the introduction of new products and processes of manufacture into the economy, and the emanations by way of increased employment and better lives for our citizens.’” Id. (quoting Kewanee Oil Co. v. Bicron Corp., 416 U.S. 470, 480–81 (1974)).
26. J.E.M. Ag Supply, 534 U.S. at 128; see also Monsanto Co. v. Scruggs, 459 F.3d 1328, 1333 (Fed. Cir. 2006).
for replanting any seed produced from patented product.\textsuperscript{27} In \textit{Bowman v. Monsanto Co.},\textsuperscript{28} the United States Supreme Court concluded that patent rights apply when a farmer plants commodity soybean seed\textsuperscript{29} and saves and replants seeds harvested from that commodity seed.\textsuperscript{30} Moreover, the Court concluded that the doctrine of patent exhaustion did not apply because the doctrine does not restrict a patentee from preventing the buyer from making copies of the patented product.\textsuperscript{31} In the subsequent sections, this Note discusses patent rights and the patent exhaustion doctrine as applied by the Supreme Court in \textit{Bowman v. Monsanto Co.} and argues that the Court correctly concluded that the patent exhaustion doctrine does not apply to self-replicating technologies in this context.\textsuperscript{32}

In support of this argument, Part I of this Note outlines the development of patent law and the application of the doctrine of patent exhaustion as a defense in patent infringement lawsuits. In addition, Part I discusses the broadening of the scope of utility patents to include GE plants as patentable subject matter under 35 U.S.C. § 101 (2006). Lastly, Part I addresses the use of license agreements in conjunction with patented GE plants and the application of patent exhaustion in the context of GE plants.

Part II of this Note summarizes the Supreme Court’s decision in the Bowman case, as well as provides necessary background from the district court and Federal Circuit decisions. Part III argues that the Court’s holding that the doctrine of patent exhaustion was inapplicable to the factual situation of this case was correct. Moreover, while the Court’s decision effectively removes the farmer’s option to plant and save commodity seed, it consequently promotes the purpose of patents to encourage and protect innovation. Lastly, Part III endorses the Court’s narrow holding and discusses generally the application of the patent exhaustion doctrine to self-replicating technologies.

\textsuperscript{27} See Scruggs, 459 F.3d at 1333 (noting that Monsanto required growers to sign a license agreement or “Technology Agreement” that (1) required growers to only use Monsanto’s biotechnology seed for a single crop, (2) prohibited transfer or re-use of seed containing biotechnology for replanting, (3) prohibited research or experimentation, and (4) required payment of a technology fee); see also Monsanto Co. v. McFarling, 302 F.3d 1291, 1293 (Fed. Cir. 2002).

\textsuperscript{28} Bowman v. Monsanto Co., 133 S. Ct. 1761 (2013).

\textsuperscript{29} “Commodity seeds are a mixture of undifferentiated seeds harvested from various sources, including from farms that grow Roundup Ready® soybeans and those that do not, although nearly ninety-four percent of Indiana’s acres of soybeans planted in 2007 were planted using herbicide resistant varieties.” Monsanto Co. v. Bowman, 657 F.3d 1341, 1345 (Fed. Cir. 2011).

\textsuperscript{30} Bowman, 133 S. Ct. at 1769 (explaining commodity seed was purchased from a grain elevator that purchases grain from farmers and resells that grain for human and animal consumption).

\textsuperscript{31} Id. at 1766.

\textsuperscript{32} Id. at 1769.
I. HISTORICAL ANALYSIS

A. Development of Plant Utility Patents

The United States Constitution grants Congress the power to provide authors and inventors with “the exclusive [r]ight to their respective [w]ritings and [d]iscoveries” for a limited time, for the purpose of promoting science and the arts.33 Under this constitutional power, Congress enacted the first patent statute in 1790.34 According to the iteration of this statutory authority applicable at the time of Bowman, a patent grants the patentee “the right to exclude others from making, using, offering for sale, or selling” the patented product.35 Patent protection, however, only applies to established categories of patentable subject matter, including “any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof.”36

1. Scope of Utility Patents

Congress intended that patentable subject matter under 35 U.S.C. § 101 be interpreted broadly to “include anything under the sun that is made by man.”37 In addition, the Supreme Court concluded that the terms “manufacture” and “composition of matter” under § 101, as modified by “any,” “plainly contemplated that the patent laws would be given wide scope.”38 A distinction exists between those “manifestations of . . . nature, free to all men and reserved exclusively to none”39 and the “nonnaturally occurring manufacture or composition of matter—a product of human ingenuity ‘having a distinctive name, character [and] use.’”40 Therefore, the relevant inquiry for patentable

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33. U.S. CONST. art. I, § 8, cl. 8. This clause provides a constitutional basis for rights granted under patent and copyright law.
34. 1 DONALD S. CHISUM, CHISUM ON PATENTS § OV-2 (2014).
36. Id. § 101.
37. Diamond v. Chakrabarty, 447 U.S. 303, 309 (1980) (determining that a genetically engineered bacterium capable of breaking down multiple components of crude oil was a non-naturally occurring manufacture or composition of matter and thus patentable subject matter).
38. Id. at 308. In concluding that the legislature’s statutory language in defining patentable subject matter was unambiguous, the Court noted that “[t]he subject-matter provision of the patent law have been cast in broad terms to fulfill the constitutional and statutory goal of promoting ‘the Progress of Science and the useful Arts’ with all that means for the social and economic benefits envisioned by Jefferson.” Id. at 315.
39. Id. at 309 (internal quotation marks omitted) (quoting Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127, 130 (1948)).
40. Id. at 309–10 (quoting Hartranft v. Wiegmann, 121 U.S. 609, 615 (1887)).
subject matter is whether the invention is a product of nature or man-made, not whether the product is living or inanimate.41

2. Utility Patents, Plant Patents, and the Plant Variety Protection Act

In 1930, Congress enacted the Plant Patent Act (PPA)42 providing patent protection for a person who “invents or discovers and asexually reproduces any distinct and new variety of plant.”43 A new variety of plant is patentable under the PPA if it meets the requirements under § 101, except for the description requirement as outlined in § 162.44 In addition, in 1970 Congress passed the Plant Variety Protection Act (PVPA),45 which provided that a “breeder of any sexually reproduced or tuber propagated plant variety . . . shall be entitled to plant variety protection for the variety.”46 Under this Act, Congress authorized patent-like protection for sexually reproduced varieties, but the PVPA provides a narrower scope of protection than a utility patent.47

In 1986, the United States Patent and Trademark Office’s Board of Patent Appeals and Interferences, relying heavily on the Supreme Court’s ruling in Diamond v. Chakrabarty, found that plants are patentable subject matter under § 101, and the PPA and PVPA are not the exclusive forms of protection for plants.48 Later, the Supreme Court also concluded the PPA and PVPA are not the exclusive means to obtain a right to exclude others from using, selling, or reproducing plants.49 Therefore, utility patents may be issued for plants, provided the requirements under § 101 are met.50

B. The Doctrine of Patent Exhaustion

1. Initial Sale Terminates Patent Rights

A patentee has exclusive rights and may prevent a person from making, selling, or using the patented product.51 A person who, “without authority

41. Id. at 313.
42. 35 U.S.C. §§ 161–64 (2006); see J.E.M. Ag Supply v. Pioneer Hi-Bred Int’l, 534 U.S. 124, 133 (2001) (stating that plant patents provide exclusive protection to the asexual reproduction of the plant and also include a relaxation of the description requirement).
44. J.E.M. Ag Supply, 534 U.S. at 133 & n.6. See also 35 U.S.C. § 162 (“No plant patent shall be declared invalid for noncompliance with section 112 if the description is as complete as is reasonably possible.”).
46. Id. § 2402(a).
47. J.E.M. Ag Supply, 534 U.S. at 138.
49. J.E.M. Ag Supply, 534 U.S. at 145.
50. Id.
makes, uses, offers to sell, or sells any patented invention, within the United States or import into the United States any patented invention during the term of the patent therefor, infringes the patent.\textsuperscript{52} Under the doctrine of patent exhaustion or “first sale” doctrine, the patent owner’s statutory right to exclude is exhausted once a product that fully embodies the patented invention is sold without limitation.\textsuperscript{53}

The policy behind the doctrine is that in an unconditional sale, the patent holder has negotiated a sale equivalent to the full value of the patented product.\textsuperscript{54} As a result, the doctrine of patent exhaustion only applies as a result of an authorized sale of the patented product by the patent holder.\textsuperscript{55} As the Supreme Court stated in \textit{Motion Picture Patents Co. v. Universal Film Manufacturing Co.}, “[T]he right to vend is exhausted by a single, unconditional sale, the article sold being thereby carried outside the monopoly of the patent law and rendered free of every restriction which the vendor may attempt to put upon it.”\textsuperscript{56} Therefore, the unconditional sale of a patented product exhausts the patent owner’s right to control the use of the patented product.\textsuperscript{57} The purchaser may use and resell the product free of patent infringement but may not reproduce or copy the product.\textsuperscript{58}

2. Implication of Restrictive Licenses

Parties to a transaction involving a patented product retain the freedom to contract regarding conditions placed on the patented article.\textsuperscript{59} Therefore, a patent owner may utilize restrictive licenses or “grant a license ‘upon any condition the performance of which is reasonably within the reward which the patentee by the grant of the patent is entitled to secure.'”\textsuperscript{60} The Supreme Court has held that price-fixing and tying restrictions affixed to patented products are per se illegal.\textsuperscript{61} However, as long as a condition does not violate a principle of law or policy, such as patent, contract, anti-trust, or patent misuse law, parties


\textsuperscript{54} B. Braun Med., Inc. v. Abbott Labs., 124 F.3d 1419, 1426 (Fed. Cir. 1997).

\textsuperscript{55} United States v. Univis Lens Co., 316 U.S. 241, 249 (1942).

\textsuperscript{56} Motion Picture Patents Co. v. Universal Film Mfg. Co., 243 U.S. 502, 516 (1917).

\textsuperscript{57} See Univis, 316 U.S. at 252; Mallinckrodt, Inc. v. Medipart, Inc., 976 F.2d 700, 706 (Fed. Cir. 1992).

\textsuperscript{58} Univis, 316 U.S. at 250.

\textsuperscript{59} Mallinckrodt, 976 F.2d at 708. \textit{See also} Gen. Talking Pictures Corp. v. W. Elec. Co., 305 U.S. 124, 127 (1938) (“That a restrictive license is legal seems clear.”).


\textsuperscript{61} See \textit{Motion Picture Patents Co.}, 243 U.S. at 516–17; Bauer & Cie v. O’Donnell, 229 U.S. 1, 17–18 (1913).
retain the freedom to contract and can agree to specific conditions. 62 For a patent misuse defense, the license must have the overall effect of restraining competition unlawfully. 63 Therefore, parties may contract as they choose, and “any conditions which are not in their very nature illegal with regard to this kind of property, imposed by the patentee and agreed to by the licensee for the right to manufacture or use or sell the [patented] article, will be upheld by the courts.” 64

In addition, the doctrine of patent exhaustion does not apply when a license or sale is expressly conditional since, by inference, “the parties negotiated a price that reflects only the value of the ‘use’ rights conferred” by the patent holder. 65 The relevant inquiry for the appropriateness of a restrictive license is whether the restriction is reasonably within the patent grant, or within the scope of the subject matter of the patent, or, if not, whether the patent holder’s restriction has an anticompetitive effect “not justifiable under the rule of reason.” 66

C. Genetically Engineered Plants and Utility Patents

1. Development of Genetically Engineered Plants

Under the regulations of the United States Department of Agriculture, genetic engineering is defined as “genetic modification of organisms by recombinant DNA techniques.” 67 Generally, recombinant DNA techniques involve the isolation of DNA fragments, recombination of these fragments, and insertion into a living organism. 68 The genotype, or genetic makeup, of plants can be altered by transferring genes for specific traits into a particular plant species. 69 The desired genotype must still be selected by traditional techniques, yet recombinant DNA techniques allow for an increased probability of success in developing the desired plant trait. 70 In addition, these techniques introduce

62. Mallinckrodt, 976 F.2d at 703, 708.
63. Id. at 706.
64. Id. at 703 (quoting E. Bement & Sons v. Nat’l Harrow Co., 186 U.S. 70, 91 (1902)). See also Gen. Talking Pictures Corp., 305 U.S. at 126 (stating that where a patented product is subject to different uses, a patent owner may legally restrict the purchase to a particular use).
65. B. Braun Med., Inc. v. Abbott Labs., 124 F.3d 1419, 1426 (Fed. Cir. 1997) (“[E]xpress conditions accompanying the sale or license of a patented product are generally upheld.”).
66. Mallinckrodt, 976 F.2d at 708 (“Anticompetitive effects that are not per se violations of law are reviewed in accordance with the rule of reason. Patent owners should be in a worse position, by virtue of the patent right to exclude, than owners of other property used in trade.”).
69. Id. at 6, 434.
70. Id. at 420.
genetic variation in plants that would not be possible with traditional plant breeding.71

In 1996, the first GE agriculture plants, including herbicide-tolerant varieties, became commercially available.72 These herbicide-tolerant varieties, which allow for a single herbicide application, have increased yields and lowered farmers’ costs through decreased labor and machinery operation.73 As of 2007, over ninety percent of all soybean acres were planted with herbicide-tolerant soybeans.74 Plant varieties tolerant to glyphosate (N-phosphonomethylglycine)75 herbicides, like Monsanto Company’s (Monsanto) Roundup® product, have allowed for decreased reliance on other more toxic herbicides; however, the heavy reliance on glyphosate herbicides has resulted in the development of glyphosate-resistant weeds.76

2. Utility Patents for Genetically Engineered Plants

As decided in J.E.M. Ag Supply v. Pioneer Hi-Bred International, whole plants, plant tissue, seeds, or cells, including GE plants, are patentable subject matter under 35 U.S.C. § 101.77 In order to obtain a utility patent, the plant must meet the requirements under §§ 101–103 as new, useful, and nonobvious.78 In addition, the patentable GE plant must meet the specification requirement under § 112 requiring a written description to enable someone skilled in the trade to “make and use” the invention.79

Advances in biological and genetic knowledge have enhanced a plant breeder’s ability to meet the requirements for a utility patent.80 While the requirements to obtain a general utility patent are more stringent than those under the PVPA, the protections provide a greater right of exclusion.81 For example, unlike the PVPA, the protections for plants under utility patents do not provide exemptions for research or saving seed.82 Therefore, the practice of saving seeds for planting the next season, once a common practice for

72. ERS Bulletin EIB-88, supra note 1, at 51.
73. Id.
74. Id.
75. Monsanto Co. v. Bowman, 657 F.3d 1341, 1343 (Fed. Cir. 2011).
76. ERS Bulletin EIB-88, supra note 1, at 52.
78. Id. at 142.
79. Id.
80. Id. at 134.
81. Id. at 143.
82. J.E.M. Ag Supply, 534 U.S. at 143.
farmers,\(^{83}\) is not a right provided to purchasers of seed protected by utility patents.\(^{84}\)

Monsanto’s lineup of GE plants, including corn, soybeans, cotton, and other specialty crops, are protected by a number of patents.\(^{85}\) Monsanto’s Roundup Ready\(^{6}\) technology was developed so that soybeans, among other plants, would be resistant to applications of glyphosate herbicides like Monsanto’s Roundup product.\(^{86}\) Roundup Ready soybeans are protected by two patents, U.S. Patent Nos. 5,352,605 (‘605 Patent) and RE39,247 E (‘247 Patent).\(^{87}\) On October 4, 1994, the United States Patent and Trademark Office (USPTO) granted Monsanto the ‘605 Patent for “chimeric genes which are capable of being expressed in plant cells, which utilize promoter regions derived from viruses which are capable of infecting plant cells.”\(^{88}\) The ‘247 Patent, a reissue of U.S Patent No. 5,633,435, was issued on August 22, 2006, for glyphosate-tolerant 5-enolpyruvylshikimate-3-phosphate synthases (EPSPS) including “[g]enes encoding Class II EPSPS enzymes . . . [that] are useful in producing transformed bacteria and plants which are tolerant to glyphosate herbicide.”\(^{89}\) These patents form the basis for Monsanto’s patent infringement litigation involving Roundup Ready soybeans.\(^{90}\)

3. Implication of the Doctrine of Patent Exhaustion

Self-replicating technologies, like soybeans, complicate the determination of a patent holder’s rights under the utility patent.\(^{91}\) In addition, the application of the doctrine of patent exhaustion is not clear due to the technology’s ability to self-replicate.\(^{92}\) Since these technologies can self-replicate, thus creating new copies of the patented product, purchasers could continue to replicate the patented product, theoretically in perpetuity, putting the patent holder’s rights at risk.\(^{93}\)

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84. *Monsanto Co. v. McFarling*, 302 F.3d 1291, 1299 (Fed. Cir. 2002).
87. *Id*.
90. See *Bowman*, 657 F.3d at 1343; *Monsanto Co. v. Scruggs*, 459 F.3d 1328, 1332 (Fed. Cir. 2006); *Monsanto Co. v. McFarling*, 302 F.3d 1291, 1293 (Fed. Cir. 2002).
92. *Id*.
93. *Id*.
In *Monsanto Co. v. McFarling*, the United States Court of Appeals for the Federal Circuit determined that the doctrine of patent exhaustion was inapplicable to patented soybeans because the new seeds, or the copies of the original product, were never sold. Since the soybeans that were harvested from the original patented product, the "copies," were never purchased from Monsanto, the doctrine of patent exhaustion did not apply. Moreover, the price paid for the original patented soybean seeds "reflected only the value of the ‘use’ rights conferred by the patentee." As a result, the original sale of the patented soybeans did not confer a right to make copies. In addition, it is within the scope of the patent for Monsanto to restrict others, through the Technology Agreement, from making copies of the patented soybeans for the purposes of planting.

The same principles applied when a farmer purchased patented Roundup Ready soybeans without signing a License Agreement and saved seed for planting in subsequent growing seasons. The original purchase was conditioned on the farmer obtaining a license; therefore, whether a License Agreement was signed or not, the conditions still applied. Consequently, since the progeny soybean seeds, or copies of the originally purchased seed, were never sold, the doctrine of patent exhaustion did not apply. Self-replicating technology "does not give a purchaser the right to use replicated copies of the technology" without restriction. Application of the doctrine of patent exhaustion in these situations would “eviscerate the rights of the patent holder.”

94. *McFarling*, 302 F.3d at 1299. McFarling purchased Monsanto patented Roundup Ready soybeans and signed the Technology Agreement. *Id.* at 1293. He then saved 1500 bushels of the patented soybeans for planting the next season, in violation of the License Agreement. *Id.* McFarling repeated this practice the next season until Monsanto filed suit for patent infringement and breach of contract. *Id.*

95. *Id.* at 1299.

96. *Id.* (quoting B. Braun Med., Inc. v. Abbott Labs, 124 F.3d 1419, 1426 (Fed. Cir. 1997)).

97. *Id.*

98. *Id.* at 1298.

99. *Monsanto Co. v. Scruggs*, 459 F.3d 1328, 1333 (Fed. Cir. 2006). Scruggs argued that it purchased the Monsanto soybean seeds in an unrestricted sale, so the doctrine of patent exhaustion provided that Scruggs could use the soybean seeds as it saw fit. *Id.* at 1335.

100. *Id.* at 1336.

101. *Id.* (quoting *McFarling*, 302 F.3d at 1299).

102. *Id.*

103. *Id.*
II. MONSANTO CO. v. BOWMAN

A. Factual Background

Defendant Vernon Bowman regularly purchased soybean seeds containing Roundup Ready technology from Pioneer Hi-Bred (Pioneer), a Monsanto-licensed seed producer. In conjunction with these purchases, Bowman executed the Pioneer Hi-Bred Technology Agreement, which is similar in language and scope to Monsanto’s Technology Agreement. Beginning in 1999, Bowman planted Pioneer soybean seed containing Roundup Ready technology, and, pursuant to the Technology Agreement, did not save any seed from any of these plantings.

In addition to the licensed product, Bowman purchased commodity seed from a local grain elevator for a second-season planting, or “double-crop soybeans.” After planting, Bowman applied a glyphosate-based herbicide to the commodity seeds, killing weeds and any plants not glyphosate resistant, or more specifically not exhibiting the Roundup Ready trait. Following the harvest of the soybean crop produced from the commodity seed, Bowman saved some seed for planting the next season. Bowman also supplemented the saved seed with additional purchases of commodity seed from the grain elevator and continued this practice from the initial planting in 1999 to 2007, when Monsanto sued Bowman for patent infringement.

B. Monsanto’s Claim

Monsanto argued that Bowman infringed on its patent by the unauthorized planting of commodity seed. In addition, Bowman saved seed harvested from the commodity seed and then planted successive generations of saved seed, along with additionally purchased commodity seed. All of these products included soybean seed containing the Roundup Ready trait.

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105. Id.
106. Id.
107. Id. Grain elevators purchase seed from farmers and sell this commodity seed for consumption purposes. See Bowman v. Monsanto Co., 133 S. Ct. 1761, 1765 (2013). A grain elevator is generally prohibited from packaging the commodity seed and selling it as agricultural seed. See 7 U.S.C. § 1571 (2006).
108. See Bowman, 133 S. Ct. at 1765; Bowman, 657 F.3d at 1345–46.
109. Bowman, 657 F.3d at 1346.
112. Id.
113. Id.
Monsanto’s Technology Agreement authorizes farmers to sell seed to grain elevators as a commodity. However, Monsanto maintained that it owns and licenses the glyphosate resistant trait, and, therefore, the technology contained in all progeny seed belongs to Monsanto. While the seeds belong to the farmer, the technology belongs to Monsanto and may not be duplicated through planting without authorization from Monsanto. Since the Roundup Ready trait continues with each successive crop, Monsanto argued that without this restriction, farmers could purchase commodity soybeans and receive the benefit of the Roundup Ready trait without properly compensating Monsanto for the technology, thus circumventing the patent.

C. Bowman’s Defense

Bowman contended that based on the doctrine of patent exhaustion, commodity seeds involve an authorized, unconditional sale from the farmer to the grain elevator, so Monsanto could no longer control the use of the soybean seeds. According to Bowman’s argument, when licensed soybeans containing the Roundup Ready trait are harvested and sold by the farmer to the grain elevator, the seeds are sold without restriction. Therefore, when this seed is mixed with seed from other farmers and sold as commodity seed, the doctrine of patent exhaustion applies to remove the commodity seed from patent protection.

Moreover, Bowman argued that Monsanto’s claim for patent protection for all seeds with Roundup Ready technology effectively eliminates the low-cost commodity seed option. The self-replicating nature of soybeans, which reproduces the Roundup Ready trait with each successive generation, further complicated the issue of farmers utilizing commodity seed. In addition, considering the domination of Roundup Ready soybeans in the market and the lack of separation at the grain elevator between seeds containing Roundup Ready technology and those without, the grain elevator’s commodity seed necessarily contains the Roundup Ready trait. Therefore, commodity seed purchased from most grain elevators would contain some proportion of patented product and could not be used for planting. Bowman argued that

116. Id.
117. Id.
120. Id. See also Monsanto Co. v. Bowman, 657 F.3d 1341, 1346 (Fed. Cir. 2011).
122. Id. at 836–37.
123. Id.
124. See id. at 836–37. See also Bowman v. Monsanto Co., 133 S. Ct. 1761, 1768 (2013).
providing Monsanto patent protection in the case of commodity seeds would “create an impermissible exception to the exhaustion doctrine” for patented seeds and other “self-replicating technologies.”

D. The Supreme Court’s Analysis

1. Patent Exhaustion

In addressing Bowman’s defense of patent exhaustion, the Court emphasized that the doctrine restricts a patentee’s rights related to the particular article sold but does not restrict the right to prevent copying of the patented product. A copy of the patented product brings about the patentee’s rights for a second time because the patentee only received the reward associated with the patent for the original product sold. Therefore, the Court reasoned that Bowman could resell the commodity seeds purchased from the elevator, consume the seeds, or feed the seeds to his animals, and Monsanto, based on the doctrine of patent exhaustion, would have no right to restrict these uses.

However, the doctrine does not confer the right to Bowman to make copies of the patented product without Monsanto’s authorization, express or implied. Consequently, when Bowman purchased and planted the commodity seed, sprayed the soybeans with glyphosate herbicide, and harvested the plants, he made new copies of the patented product, so the doctrine of patent exhaustion did not apply.

The Court explained that the above conclusion was necessary to balance the invention and reward. If patent exhaustion applied, Monsanto would receive the reward for the first sale of seed, but nothing would stop farmers or other companies from making consecutive copies of the original product without Monsanto receiving any reward. Therefore, the purchaser would receive the benefit of the invention or the Roundup Ready technology, but Monsanto would not be compensated for the repeated use of the copies of its invention.

125. Bowman, 133 S. Ct. at 1768 (quoting Brief for Petitioner at 16, Bowman, 133 S. Ct. 1761 (2013) (No. 11-796)).
126. Id. at 1766 (citing United States v. Univis Lens Co., 316 U.S. 241, 251 (1942)).
128. Id.
129. Id.
130. Bowman, 133 S. Ct. at 1767.
131. Id.
132. Id.
133. See id.
While Bowman contended he was merely “using” the patented product as it was intended, the Court refused to allow an exception to the rule that the doctrine of patent exhaustion does not permit the purchaser of a patented product to reproduce the product. The undiminished right of the patent holder to prohibit others from copying the patented product is consistent with the purpose of patent protection to create incentives for innovation, otherwise the patent would not last for twenty years but for only one sale of the product.

Moreover, the Court’s ruling did not limit farmers’ ability to utilize the product purchased. Under Monsanto’s Technology Agreement or another licensee’s technology agreement, a farmer can purchase seeds with Roundup Ready technology and produce copies of those seeds, through planting and harvesting, which may be sold as a commodity or consumed. As for the commodity seed utilized by Bowman, this seed may be consumed according to the intended and authorized use of the commodity seed purchased from grain elevators. In this context, Monsanto receives the reward for the soybean seed containing the Roundup Ready trait, and the farmer is also allowed to utilize and benefit from the technology or innovation.

2. Self-Replicating Products

Bowman argued that the soybeans, as naturally self-replicating, created copies of Monsanto’s patented product without any influence or control by Bowman. The Court discredited this “blame-the-bean” defense. Bowman did not passively observe eight consecutive seasons of Roundup Ready soybean seed planting and harvesting. Rather, Bowman executed a unique plan by purchasing a grain elevator’s commodity seed, with knowledge that the seed would contain a majority of Roundup Ready seed. Bowman then selected the Roundup Ready plants by applying glyphosate-based herbicide. Thus, Bowman actively participated in a planned process to produce successive crops of Roundup Ready soybeans without paying Monsanto for the patented product.

134. Id. at 1768.
135. Bowman, 133 S. Ct. at 1768.
136. Id.
137. See id.
138. See id.
139. See id.
140. Bowman, 133 S. Ct. at 1768–69.
141. Id. at 1769.
142. See id.
143. See id.
144. See id.
145. See Bowman, 133 S. Ct. at 1769.
While the Court conceded that the self-replicating nature of soybeans played a role in the process, it emphasized Bowman’s control over the process of copying Monsanto’s patented product. However, the Court limited the holding to the particular factual circumstances of this case and failed to decide whether patent exhaustion would be applicable in other situations involving self-replicating technologies. Although the Court did not specifically address the instances which might exempt a purchaser of self-replicating technologies from patent infringement, or circumstances in which the doctrine of patent exhaustion would apply, the Court did indicate a couple of examples that are different from Bowman’s situation and would possibly result in a different conclusion. Specifically, the Court noted that self-replication may occur outside the purchaser’s control or may be a “necessary but incidental step in using the item for another purpose.”

III. ANALYSIS

A. Patent Exhaustion

1. The Doctrine of Patent Exhaustion Is Inapplicable When a PurchaserCopies a Patented Product

The Supreme Court’s analysis of the doctrine of patent exhaustion in Bowman is consistent with other federal cases involving Roundup Ready technology and clearly indicates a distinction between “using” versus “copying” or “making” the patented product. While Bowman claimed the defense of patent exhaustion, the doctrine of patent exhaustion only applies to exhaust the patentee’s rights in the original patented article sold but does not confer a right to make additional copies of the product. The distinction regarding patented GE crops lies in what the farmer sees as “using” the

146. Id.
147. See id.
148. See id.
149. Id.
150. Monsanto Co. v. Scruggs, 459 F.3d 1328, 1334–36 (Fed. Cir. 2006); Monsanto Co. v. McFarling, 302 F.3d 1291, 1299–1301 (Fed. Cir. 2002).
151. See Bowman, 133 S. Ct. at 1769; see also Jeremy N. Sheff, Self-Replicating Technologies, 16 STAN. TECH. L. REV. 229, 238 (2013) (“The application of the use/make distinction in the Roundup-Ready cases ignores the elephant in the room: the only and intended ‘use’ of seeds or any other self-replicating technology necessarily ‘makes’ a newly infringing article—this is the defining characteristic of self-replicating technologies.”).
152. See Mallinckrodt, Inc. v. Medipart, Inc., 976 F.2d 700, 706 (Fed. Cir. 1992) (“[U]nconditional sale of a patented device exhausts the patentee’s right to control the purchaser’s use of the device.”). See also B. Braun Med., Inc. v. Abbott Labs., 124 F.3d 1419, 1426 (Fed. Cir. 1997).
Bowman recognized the seed containing Roundup Ready technology that he purchased from Pioneer was restricted according to the Technology Agreement, so he was not allowed to, and did not, save seed from the soybeans purchased under this agreement. When Bowman purchased this seed, his price reflected only the use rights conferred, and the new seeds, which had not been sold by the patentee, would not implicate the doctrine of patent exhaustion. Accordingly, mutual benefit arises between Monsanto, as the patent holder, and the farmer when the farmer is permitted to plant the Roundup Ready soybeans purchased under the license agreement and grow additional seed, which the farmer can then sell for profit as a commodity.

While the inapplicability of the doctrine of patent exhaustion is straightforward in the situation above where the farmer purchases patented seed under a license agreement, the analysis in this case was complicated by Bowman’s purchase of commodity seed from a grain elevator. When a farmer sells seed produced from a patented product, he cannot convey to the grain elevator the right to plant that seed, namely the commodity seed, because the farmer did not possess the right himself. Therefore, as a purchaser of commodity seed from a grain elevator, Bowman was not conferred the right to plant any commodity seed that contained patented product because the grain elevator did not have the right itself.

The patent holder, Monsanto, retained the right to restrict the making of additional patented product, and Monsanto did not confer to the purchaser of patented soybeans the right to produce seed beyond one generation. In addition, the doctrine of patent exhaustion does not provide any exemption for a purchaser to “copy” or “make” the patented product. Consequently, Bowman had no right to plant the commodity seed, select for soybeans containing the Roundup Ready trait by applying glyphosate-based herbicide.

153. See Bowman, 133 S. Ct. at 1766–67 (“[M]ake’ means ‘cause to exist, occur, or appear,’ or more specifically, ‘plant and raise (a crop).’”).
155. See McFarling, 302 F.3d at 1298–99.
156. See Bowman, 133 S. Ct. at 1768 (“No sane farmer, after all, would buy the product without some ability to grow soybeans from it. And so Monsanto, predictably enough, sells Roundup Ready seed to farmers with a license to use it to make a crop.”).
157. See id. at 1766. Bowman acknowledged the ‘well settled’ principle ‘that the exhaustion doctrine does not extend to the right to ‘make’ a new product.’’ Id. (quoting Brief for Petitioner, supra note 125, at 37).
158. See id. at 1765.
160. See id.
162. Id. at 1766.
and harvest the progeny seeds, which were essentially additional copies of the patented product.163

2. Could Bowman Have Altered His Procedure to Avoid Patent Infringement?

Technically, Bowman was allowed to plant any non-patented product contained in the commodity seed he purchased, but Bowman intentionally removed these plants by applying glyphosate-based herbicide.164 Nevertheless, isolating the non-patented seed from the patented seed would be unrealistic, especially since nearly ninety-four percent of soybeans grown in Indiana at the time were herbicide resistant varieties and consequently likely protected by patent law.165

Even if Bowman had not used a glyphosate-based herbicide to select for the plants containing Roundup Ready technology, he would have been prohibited from using the defense of patent exhaustion.166 Bowman was conscious of the prevalence of herbicide-resistant soybeans planted within the state and, in fact, regularly purchased patented soybeans himself.167 Therefore, he purchased the commodity seed with knowledge that a majority of the seed would contain the Roundup Ready trait.168 Moreover, Bowman would not have applied a glyphosate-based fertilizer that could potentially kill the entire crop unless he anticipated the majority of the commodity seed was resistant to glyphosate herbicide.169

Given Bowman’s previous purchases of Roundup Ready soybeans and subsequent execution of a license agreement for each purchase, he was aware that the patented product sold to the grain elevator as a commodity could not be saved by the farmer for replanting.170 Therefore regardless of the herbicide chemistry Bowman used, by planting the commodity seed, Bowman was

163. See id. at 1766–67 (indicating that Bowman could resell the patented soybeans, consume the beans himself, or feed the seed to animals without restriction by Monsanto).
164. See id.
165. See Monsanto Co. v. Bowman, 657 F.3d 1341, 1345 (Fed. Cir. 2011).
166. See Bowman, 133 S. Ct. at 1766 (noting that the doctrine of patent exhaustion does not confer the right to Bowman to make additional patented soybeans without Monsanto’s permission).
167. Bowman, 657 F.3d at 1345.
168. See id.
169. See Bowman, 133 S. Ct. at 1769 (“[Bowman] purchased beans from a grain elevator anticipating that many would be Roundup Ready; applied a glyphosate-based herbicide in a way that culled any plants without the patented trait . . . .”).
170. Bowman, 657 F.3d at 1344–45.
 knowingly and intentionally making copies of patented product and infringing on Monsanto’s patent for Roundup Ready technology.171

Even if Bowman had not “selected” for the patented product and instead used an alternative chemistry, Bowman was still aware that the majority of the commodity seed contained patented product that, per the License Agreement, could not be replanted.172 Realistically, Bowman used a glyphosate-based herbicide because of its convenience and efficiency and would be unwilling to switch chemistries,173 especially considering the remainder of his first-crop soybeans were glyphosate resistant and could be sprayed with glyphosate-based herbicide.174

3. Planting Commodity Seed: A Practice of the Past

Bowman raised a policy argument that Monsanto should require its patented product to be kept separate, even at the grain elevator, or otherwise Monsanto retains a monopoly to control not only its patented product but other non-patented products incorporated with the undifferentiated commodity seed.175 Bowman used this policy argument as justification for the application of the doctrine of patent exhaustion to the situation where farmers purchase and plant commodity seed.176 Nevertheless, purchasing and planting commodity seed as a low-cost alternative to purchasing from a seed dealer has become a relic of the past.177 In 2013, considering that ninety-three percent of all soybeans planted in the United States were herbicide-resistant or herbicide-tolerant varieties, it would be virtually impossible for a farmer to purchase commodity seed from a grain elevator that did not contain patented product.178

171. See id. at 1348 (“Even if Monsanto’s patent rights in the commodity seeds are exhausted, such a conclusion would be of no consequence because once a grower, like Bowman, plants the commodity seeds containing Monsanto’s Roundup Ready® technology and the next generation of seed develops, the grower has created a newly infringing article.”).
172. See Bowman, 133 S. Ct. at 1769.
173. ERS Bulletin EIB-11, supra note 71, at 9–14. Herbicide-tolerant soybeans make weed control simpler and less time consuming, so farmers can control more weeds effectively. Id. In addition, herbicide-tolerant soybeans allow for reduced pesticide applications. Id.
174. See Bowman, 657 F.3d at 1345–46.
175. See Bowman, 133 S. Ct. at 1768; Monsanto Co. v. Bowman, 686 F. Supp. 2d 834, 837 (S.D. Ind. 2009).
176. See Bowman, 686 F. Supp. 2d at 837.
177. See Bowman, 133 S. Ct. at 1768 (stating the commodity seed purchased by Bowman was intended for consumption, and the normal practice is for farmers to purchase commodity seed for this purpose).
Farmers may see hope on the horizon since the patent for Roundup Ready soybeans expired in 2014.\(^{179}\) In addition, Monsanto has stated that farmers can start saving seed from Roundup Ready varieties purchased following the expiration of the patent.\(^{180}\) However, farmers are permitted to save seed only for varieties developed by Monsanto breeders, whereas other varieties, or even Monsanto varieties licensed from a third party, may have variety patents that restrict the farmers’ ability to save seed.\(^{181}\)

Additionally, Monsanto’s Genuity® Roundup Ready 2 Yield® trait technology (Roundup Ready 2) is the second-generation Roundup technology that entered the market in 2009.\(^{182}\) In fact, a search of Monsanto’s lineup of soybean products only includes the Roundup Ready 2 soybean varieties.\(^{183}\) The patents for Roundup Ready 2 soybeans\(^{184}\) do not expire for a decade or more.\(^{185}\) Consequently, the continued purchase and planting of patented product will ensure the presence of patented product sold to grain elevators, and thus, commodity seed, as undifferentiated seed, will continue to include patented product.\(^{186}\) As long as commodity seed includes patented seed, which by law cannot be copied, a farmer’s ability to plant commodity seed is eliminated.\(^{187}\)

Perhaps this result is ultimately not bad for farmers. As technology becomes more advanced, new varieties are produced with better insertion events that optimize yield.\(^{188}\) In addition, herbicide-resistant crops have

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\(^{181}\) Id.

\(^{182}\) Id.


\(^{184}\) Product Patents: Soybeans, MONSANTO, http://www.monsanto.com/products/Pages/product-patents.aspx (last visited June 6, 2014) (indicating that Monsanto’s Genuity Roundup Ready 2 Yield Soybean varieties are protected by one or more of the following U.S. Patents Nos.: 5,717,084; 5,728,925; 6,051,753; 6,660,911; 6,949,696; 7,141,722; 7,608,761; 7,632,985; 8,053,184; RE39247).

\(^{185}\) Roundup Ready Soybean Patent Expiration, supra note 180.

\(^{186}\) See Monsanto Co. v. Bowman, 657 F.3d 1341, 1345 (Fed. Cir. 2011) (noting that Monsanto’s Technology Agreement permits the grower to sell seed to grain elevators as a commodity or to use the grain for feed).

\(^{187}\) See Bowman v. Monsanto Co., 133 S. Ct. 1761, 1766 & n.3 (2013) (finding that when Bowman reproduced Monsanto’s patented product, whether purchased from a grain elevator or a Monsanto authorized company, the doctrine of patent exhaustion did not protect him from patent infringement).

\(^{188}\) ERS Bulletin EIB-11, supra note 71, at 9 n.4 (stating the decreased yield that occurred in early varieties of herbicide-tolerant crops was eliminated by introducing the genes into higher yielding cultivars).
reduced herbicide use and allowed for application of herbicides that are more effective, less toxic, and cheaper than other herbicides.\textsuperscript{189} Thus, herbicide-resistant crops have also impacted farmers’ bottom-lines through reduced costs and increased income. Moreover, GE crops have reduced input costs associated with machinery, fuel, and chemical usage.\textsuperscript{190} The environment has also benefited through reduced pesticide applications resulting in less chemical runoff and lower pesticide residues.\textsuperscript{191}

Additionally, better weed control has allowed greater implementation of reduced-tillage and no-till systems\textsuperscript{192} that improve soil quality and reduce soil loss.\textsuperscript{193} Therefore, while a farmer may be paying more for patented seed, that seed provides many benefits, and, considering that ninety-four percent of all soybeans planted are herbicide-resistant varieties, farmers obviously believe this benefit is worth the price.\textsuperscript{194}

Even if Bowman could have purchased lower-cost commodity seed free of any patented product, he would likely benefit instead from planting the higher priced, herbicide-resistant patented seed for his second-crop or “double-crop” soybeans.\textsuperscript{195} The second-crop soybeans typically have a lower production potential and profitability.\textsuperscript{196} Moreover, second-crop soybeans benefit from the flexibility and efficiency of herbicide-resistant seed.\textsuperscript{197} For example, farmers’ ability to use reduced tillage or no-till systems “allows additional time for planting, growing, and harvesting a second crop.”\textsuperscript{198} Therefore, when planting patented product, farmers can plant the double-crop soybeans sooner, optimizing growing conditions and increasing yield potential.\textsuperscript{199}

\begin{itemize}
\item \textsuperscript{189} Qaim, \textit{supra} note 14.
\item \textsuperscript{190} \textit{Id.}
\item \textsuperscript{191} \textit{Id.}
\item \textsuperscript{192} \textit{Tillage Type Definitions, CONSERVATION TECH. INFO. CTR., http://www.ctic.purdue.edu/resourcedisplay/322/ (last visited June 6, 2014). No-till means “[t]he soil is left undisturbed from harvest to planting except for strips up to [one-third] of the row width (strips may involve only residue disturbance or may include soil disturbance).” \textit{Id.} Reduced tillage means “[f]ull-width tillage . . . involving one or more tillage trips which disturbs all of the soil surface and is performed prior to and/or during planting. There is 15–30 percent residue cover after planting . . . .” \textit{Id.}
\item \textsuperscript{193} Qaim, \textit{supra} note 14.
\item \textsuperscript{194} See ERS Bulletin EIB-11, \textit{supra} note 71, at 8 (“Farmers are more likely to adopt new practices and technologies if they expect to benefit from them.”).
\item \textsuperscript{195} See Brookes & Barfoot, \textit{supra} note 6, at 190 (noting that second-crop soybeans are “facilitated substantially by the ease of management” of the herbicide-tolerant patented soybeans).
\item \textsuperscript{196} See Bowman v. Monsanto Co., 133 S. Ct. 1761, 1765 (2013) (stating that Bowman considered the second-crop soybeans as “risky”).
\item \textsuperscript{197} Brookes & Barfoot, \textit{supra} note 6, at 190.
\item \textsuperscript{198} \textit{Id.}
\item \textsuperscript{199} See \textit{id.}
\end{itemize}
Nevertheless, Bowman claimed he would be negatively impacted if his ability to plant the lower-cost commodity seed was eliminated. Bowman’s policy argument on the surface appears justified. Monsanto, as the patent holder, seems to be granted a monopoly over not only its patented product, but also a majority of the soybean crop. Yet, Bowman’s policy argument falls apart when considering the benefits Bowman received from planting the commodity seed, which was essentially comprised of patented Roundup Ready soybeans. Bowman received all the benefits of the patented product without paying the cost associated with those benefits. Furthermore, Bowman received these benefits at a price much less than the price other farmers paid for the same patented product.

Moreover, Bowman obviously desired the benefits of the patented product because he applied glyphosate-based herbicide to his second-season crop to specifically select for the patented plants. Basically, Bowman wanted authority to purchase patented product at a low cost, plant the patented soybeans, repeatedly copy the patented seed, save the copies for successive plantings, and sell a portion of his harvest without compensating the patent holder, Monsanto. No policy is served by allowing Bowman to entirely circumvent the principles of patent law.

200. See Monsanto Co. v. Bowman, 686 F. Supp. 2d 834, 836–37 (S.D. Ind. 2009) (“As Bowman points out, Monsanto’s domination of the soybean seed market, combined with the regeneration of the Roundup Ready® trait and the lack of any restriction against the mixing of soybeans harvested from a Roundup Ready® crop from those that are harvested from a crop that was not grown from Roundup Ready® seed, has resulted in the commodity soybeans sold by grain dealers necessarily carrying the patented trait, thereby eliminating commodity soybeans as a low cost (but higher risk) source for planting.”).

201. Id. at 837.

202. Id.


204. See id. at 1767 (observing Monsanto received no reward from Bowman’s annual production and sale of his second-season crop of Roundup Ready soybeans).

205. For example, Monsanto’s 2014 price list for Roundup Ready 2 Soybeans includes prices from $51.00 to $67.00 per unit for Roundup Ready 2 soybeans and from $41.00 to $45.00 for conventional soybeans. MONSANTO CO., ASGROW® SOYBEAN SUGGESTED RETAIL PRICE (2014). According to the commodity trading market, March 2014 soybean futures were priced at $13.38. Soybean Futures Quotes, CME GROUP, http://www.cmegroup.com/trading/agricultural/grain-and-oilseed/soybean.html (last visited Feb. 15, 2014).

206. Bowman, 133 S. Ct. at 1765 (“[Bowman] . . . sprayed his fields with glyphosate to kill weeds (and any non-resistant plants), and produced a new crop of glyphosate-resistant—i.e., Roundup Ready—soybeans.”).

207. See id. at 1767. Following Bowman’s argument, Monsanto would receive its reward for the first sale of any patented invention. Id. Subsequently, any farmer or seed company could then proceed to make copies of the invention without compensating Monsanto. Id.

208. See id. (observing that if the doctrine of patent exhaustion protected Bowman’s activities, “Monsanto’s patent would provide scant benefit”).
B. Holding Necessary to Incentivize Innovation

The purpose of patent protection is to promote innovation, research, and scientific discovery, which ultimately benefits society economically and socially.\(^{209}\) In light of these goals, the scope and applicability of patent laws have been interpreted broadly to accommodate changing technology and new and unforeseen inventions.\(^{210}\) These goals provide the foundation for the application of the patent exhaustion doctrine only to the particular item sold.\(^{211}\) When a purchaser copies the patented article, the doctrine of patent exhaustion becomes inapplicable to protect the rights of the patent holder.\(^{212}\)

If the doctrine of patent exhaustion did apply, the patent holder would be compensated for its patent only when the first patented seeds were sold.\(^{213}\) Subsequently, farmers would not need to purchase additional patented seeds but could “make” additional product without compensating the patent holder.\(^{214}\) Perhaps a farmer would occasionally want to supplement his seed with new patented product.\(^{215}\) However, these periodic purchases would not incentivize the patent holder, like Monsanto, to continue funding research to develop cutting-edge technology.\(^{216}\) Additionally, if Monsanto were forced to price the first sale of patented product at a level to recoup its research and development costs, no farmer would be able to afford to purchase the product.\(^{217}\)

Bowman’s actions are even worse because he never compensated the patent holder.\(^{218}\) Monsanto was compensated by the first sale of Roundup

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210. Id. at 131, 135 (“A rule that unanticipated inventions are without protection would conflict with the core concept of the patent law that anticipation undermines patentability.” (internal quotation marks omitted) (quoting Diamond v. Chakrabarty, 447 U.S. 303, 316 (1980))).
211. Bowman, 133 S. Ct. at 1766.
212. Id. (“’[A] second creation’ of the patented item ‘call[s] the monopoly, conferred by the patent grant, into play for a second time.’” (quoting Aro Mfg. Co. v. Convertible Top Replacement Co., 365 U.S. 336, 346 (1961))).
213. Id. at 1767.
214. Id.
215. See id. at 1765 (stating sometimes Bowman supplemented his saved seed with additional commodity seed purchased from the grain elevator).
216. See Corporate Profile, MONSANTO, http://www.monsanto.com/investors/Pages/corporate-profile.aspx (last visited June 6, 2014) (noting that Monsanto invested more than $1.5 billion last fiscal year on research and development).
217. See Sheff, supra note 151, at 243. If the doctrine of patent exhaustion did not apply, “Monsanto might only be able recoup [sic] its investments in Roundup-Ready technology by selling its first generation of seeds to individual farmers for thousands (millions?) of dollars per bag.” Id.
218. See Bowman, 133 S. Ct. at 1765.
Ready soybeans, which were then sold to the grain elevator. Yet, Monsanto was not compensated when Bowman purchased from the grain elevator the commodity seed containing copies of Monsanto’s patented traits. In fact, Bowman purchased this seed specifically because it was cheaper than purchasing patented product from an authorized dealer. Bowman sprayed his plants grown from the commodity seed with glyphosate-based herbicide to select for the patented product, saved some of this seed for the next season, and supplemented with additional commodity seed purchases when necessary. In addition, Bowman continued this process for eight seasons. Therefore, Bowman received the benefit of the patented product for eight years of second season or “double-crop” soybeans without any compensation to the patent holder.

In this scenario, Monsanto spends valuable time, money, and other resources on developing desirable patented soybean seed without receiving any reward from Bowman. If Monsanto is not compensated for its invention, what would incentivize Monsanto to continue developing new patented product? How can the goal of promoting innovation be achieved when Monsanto has no incentive to invent and especially share its invention with society? While Monsanto’s product may be more expensive than other available products or previously produced non-patented seed, Monsanto is free to charge the price that the market can sustain. Moreover, purchasers are free to purchase other soybean seed, patented or non-patented, from Monsanto or other seed dealers. However, a farmer who desires a superior product should expect to pay a price proportional to the benefits received.

219. See Monsanto Co. v. Bowman, 657 F.3d 1341, 1345 (Fed. Cir. 2011) (noting that Monsanto’s License Agreement authorizes farmers to sell the progeny of the original patented product to grain elevators as a commodity).
220. See Bowman, 133 S. Ct. at 1765.
221. See id.
222. Id.
223. Id.
224. See id.
226. See Bowman, 133 S. Ct. at 1767 (“The exhaustion doctrine is limited to the ‘particular item’ sold to avoid just such a mismatch between invention and reward.”).
227. See U.S. CONST. art. I, § 8, cl. 8 (“To promote the Progress of Science and the useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.”).
228. Monsanto Co. v. McFarling, 302 F.3d 1291, 1299 (Fed. Cir. 2002).
229. Id. at 1298.
230. See id.
C. Monsanto’s Technology Agreement—Mutual Benefits

Monsanto, or an authorized company, sells patented seed conditioned upon the Technology Agreement, which restricts farmers to growing a crop for a single season.\(^\text{231}\) Restrictive licenses are legal as long as the condition is reasonably within the reward the patentee expects to receive.\(^\text{232}\) Monsanto’s Technology Agreement has been found to be a valid and legal restriction of the sale of patented seed.\(^\text{233}\)

While Monsanto conditioned the purchase of patented seed on the farmers planting only a single crop season without saving seed, the farmer was not restricted from purchasing different seed in subsequent seasons.\(^\text{234}\) “Monsanto has a right to exclude others from making, using, or selling its patented plant technology, and its no replant policy simply prevents purchasers of the seeds from using the patented biotechnology when that biotechnology makes a copy of itself.”\(^\text{235}\) Therefore, “[t]his restriction . . . is a valid exercise of its rights under the patent laws.”\(^\text{236}\)

Monsanto realized that its patented seed was most useful when a farmer could plant the patented product and harvest the progeny seeds to sell as a commodity.\(^\text{237}\) Therefore, Monsanto provides a license to farmers to “make” additional patented product, so long as the farmer only sells the seed as a commodity and does not save any seed for planting.\(^\text{238}\) The license agreement provides a means for both the farmer and the patent holder to benefit from the patented product.\(^\text{239}\)

While Bowman did not sign a license agreement when purchasing commodity seed, Monsanto’s Technology Agreement still limits Bowman’s use of the seed.\(^\text{240}\) When farmers sell seed to the grain elevator, no unconditional sale of the patented technology occurs.\(^\text{241}\) The farmer cannot convey to the grain elevator a right that he does not possess himself.\(^\text{242}\)

\(^{231}\) Monsanto Co. v. Scruggs, 459 F.3d 1328, 1333 (Fed. Cir. 2006); see also Bowman, 133 S. Ct. at 1764.


\(^{233}\) See McFarling, 302 F.3d at 1298–99.

\(^{234}\) Id. at 1298.

\(^{235}\) Scruggs, 459 F.3d at 1340 (citation omitted).

\(^{236}\) Id.

\(^{237}\) See Bowman v. Monsanto Co., 133 S. Ct. 1761, 1768 (2013).

\(^{238}\) See id.

\(^{239}\) See id.

\(^{240}\) See Monsanto Co. v. Bowman, 686 F. Supp. 2d 834, 839 (S.D. Ind. 2009) (noting that Monsanto’s License Agreement specifically excludes planting progeny seed, so no right could be conferred to Bowman).

\(^{241}\) Id.

\(^{242}\) Id.
Therefore, the grain elevator did not have the right to plant seed containing the patented trait and could not convey that right to Bowman. Accordingly, both the Technology Agreement and patent law, through prohibiting a purchaser from making a patented product, restrict Bowman’s ability to plant commodity seed containing patented product. Bowman was free to purchase different seed from another seed dealer, perhaps seed that would have been cheaper, but was restricted from planting patented product without appropriately compensating the patent holder.

D. Self-Replicating Technology

Self-replicating technologies complicate the application of patent law and the overall purpose of promoting innovation. Formerly only a theory of science fiction, self-replicating technologies are common in certain industries and, as a result of scientific advancement and innovation, are becoming more complex and dynamic than ever before. The application of the doctrine of patent exhaustion for self-replicating technologies was questioned after the Supreme Court in Quanta Computer, Inc. v. LG Electronics, Inc. held that “the authorized sale of an article that substantially embodies a patent exhausts the patent holder’s rights and prevents the patent holder from invoking patent law to control postsale use of the article.”

Bowman tried to capitalize on this uncertainty following Quanta and argued the doctrine of patent exhaustion applies to patented soybeans. Bowman claimed that each seed sold “substantially embodied” subsequent generations of seed, and, therefore, a licensed farmer’s sale of progeny seed involves an authorized, unconditional sale of the patented soybeans. Consequently, that unrestricted sale exhausts the patent as to those patented

243. Id.
244. Monsanto Co. v. Bowman, 657 F.3d 1341, 1347 (Fed. Cir. 2011).
245. See Monsanto Co. v. McFarling, 302 F.3d 1291, 1298 (Fed. Cir. 2002) (recognizing the option of over two hundred commercial soybean products, including herbicide-tolerant varieties).
246. See Monsanto Co. v. Scruggs, 459 F.3d 1328, 1333 (Fed. Cir. 2006) (observing that according to Monsanto’s License Agreement, farmers are required to pay a technology fee when purchasing patented seed).
247. See Bowman, 657 F.3d at 1347–48.
248. Sheff, supra note 151, at 231.
249. Id. at 230.
252. Id. at 638. See also Kevin Rodkey, Exhaustion and Validity of Single-Use Licenses for Transgenic Seeds in the Wake of Quanta v. LG Electronics, 19 FED. CIR. B.J. 579, 596 (2010); Sheff, supra note 151, at 239.
soybeans. Bowman advocated, under *Quanta*, for a broad application of the doctrine of patent exhaustion that would generally apply to self-replicating technologies.

Nevertheless, Bowman’s broad interpretation of the holding in *Quanta* is of little consequence. A farmer’s sale of progeny seed is expressly restricted by Monsanto’s Technology Agreement. Therefore, the transaction is not an authorized unconditional sale that exhausts Monsanto’s patent but is only authorized when conditioned upon that seed not being planted. Without an unrestricted sale, the doctrine of patent exhaustion is not implicated, and, consequently, the interpretation of *Quanta* is irrelevant.

Moreover, previous patent infringement cases involving GE soybean seed support this conclusion. Purchasing patented seed from Monsanto involves a valid, restricted sale, and the newly grown and harvested seed, authorized by the license agreement, does not implicate the doctrine of patent exhaustion because those seeds were never purchased from the patent holder. Thus, whether the purchased seed “substantially embodies” the new seed or not, the doctrine of patent exhaustion does not apply for a restricted sale.

Even unrestricted sales do not confer the right to make copies simply because the technology is self-replicating. If Monsanto’s patent rights were exhausted, Bowman still does not have the right to copy the patented product, creating a newly infringing article. Ultimately, “[t]he fact that a patented technology can replicate itself does not give a purchaser the right to use replicated copies of the technology.” Patent holders whose product naturally

256. *Bowman*, 657 F.3d at 1346.
258. *See* *Bowman v. Monsanto Co.*, 133 S. Ct. 1761, 1764 (2013); *Monsanto Co. v. Scruggs*, 459 F.3d 1328, 1333 (Fed. Cir. 2006); *Monsanto Co. v. McFarling*, 302 F.3d 1291, 1293 (Fed. Cir. 2002).
259. *See* *Bowman*, 686 F. Supp. 2d at 839.
260. *See id.* Unlike *Quanta*, no unconditional sale occurred and the grain elevator “had no right to plant the soybeans and could not confer such a right on Bowman.” *Id.*
261. *See, e.g.*, *Scruggs*, 459 F.3d at 1336; *McFarling*, 302 F.3d at 1299.
262. *Scruggs*, 459 F.3d at 1336.
263. *McFarling*, 302 F.3d at 1299.
264. *Monsanto Co. v. Bowman*, 657 F.3d 1341, 1348 (Fed. Cir. 2011). The court disagreed with Bowman’s *Quanta* argument “because nothing in the record indicates that the ‘only reasonable and intended use’ of commodity seed is for replanting them to create new seed.” *Id.* (quoting *Quanta Computer, Inc. v. LG Elecs.*, Inc., 553 U.S. 617, 631 (2008)).
265. *Id.* (“The right to use ‘do[es] not include the right to construct an essentially new article on the template of the original, for the right to make the article remains with the patentee.’” (quoting *Jazz Photo Corp. v. Int’l Trade Comm’n*, 264 F.3d 1094, 1102 (Fed. Cir. 2001))).
266. *Id.*
267. *Id.*
self-replicates still deserve the same protections afforded other products under patent law. Otherwise, “[a]pplying the first sale doctrine to subsequent generations of self-replicating technology would eviscerate the rights of the patent holder.” Accordingly, the right to make the patented product remains with the patent holder.

The Supreme Court also did not find Bowman’s “seeds-are-special argument” convincing. Yet, the Court limited its holding to Bowman’s particular situation, refusing to apply the holding to all cases involving self-replicating technology. Nevertheless, the Court clearly indicated that in certain situations the doctrine of patent exhaustion does not protect individuals from liability for infringing on patents for self-replicating technologies.

The factor influencing the Court’s holding in Bowman was that Bowman exerted a level of control. Indeed, Bowman was systematically involved in selecting the patented Roundup-Ready seed. Through planting commodity seed, spraying the soybeans with glyphosate-based herbicide, and harvesting the progeny or copies of the self-replicating technology, Bowman actively participated in making Monsanto’s patented product.

Nevertheless, one can conceive of situations that would involve replication of the technology outside the purchaser’s control or incidental to the purchaser’s activities. Since the Court limited the holding in Bowman, determining the application of the doctrine of patent exhaustion to these situations and what level of “control” warrants infringement are unclear. However, this issue was recently discussed in Organic Seed Growers & Trade Ass’n v. Monsanto Co., a case that was dismissed for lack of a justiciable case or controversy. In that case, organic farmers and other associations were seeking a declaratory judgment and Monsanto’s express waiver of any claim for patent infringement against them. These entities, which grow, use, or sell only conventional seed, were concerned that incidental contamination from

269. Id.
270. Bowman, 657 F.3d at 1348 (quoting Jazz Photo Corp., 264 F.3d at 1102).
272. Id. at 1769.
273. See id.
274. Id. at 1768–69.
275. Id. at 1769.
276. Bowman, 133 S. Ct. at 1769.
277. Id.
278. Id.
279. See Organic Seed Growers & Trade Ass’n v. Monsanto Co., 718 F.3d 1350, 1352 (Fed. Cir. 2013).
280. Id. at 1352, 1354.
transgenic seed would subject them to patent infringement suits from Monsanto.\textsuperscript{281}

Monsanto explicitly contended that it would not take legal action against growers whose fields inadvertently contained trace amounts of patented product.\textsuperscript{282} However, the threshold requirement of “trace” or “minimal” quantities was not defined.\textsuperscript{283} Is the limit one percent, as suggested by the organic farming organizations?\textsuperscript{284} Monsanto did not contest this threshold, yet offered no firm, enforceable limit.\textsuperscript{285} Moreover, courts have determined that \textit{de minimus} or trace amounts, or even one molecule, of a patented product can be construed as infringement.\textsuperscript{286} While Monsanto may be judicially estopped from later adopting a contrary position in a case involving the same patents as those in \textit{Organic Seed Growers},\textsuperscript{287} that fact provides little guidance to individuals concerned about infringing the patents of the many other self-replicating technologies.

Though there is no clear guidance, the decision, as stated above, will likely be governed by the issue of control.\textsuperscript{288} Indeed, the Court in \textit{Bowman} emphasized that patent exhaustion provides no protection when an individual, like Bowman, intentionally makes copies of the patented product.\textsuperscript{289} Moreover, Monsanto, as the patent holder, was deprived of the reward provided under patent law.\textsuperscript{290} In contrast, organic farmers exert substantial effort to control the integrity of their system and avoid contamination by GE crops.\textsuperscript{291} In fact, organic farmers must take precautions to avoid contamination in order to maintain organic certification.\textsuperscript{292} Despite the efforts of organic farmers,
contamination still occurs.\textsuperscript{293} Indeed, the Supreme Court has recognized the risk of “gene flow” from GE crops into conventional crops.\textsuperscript{294}

While the organic farming organizations in \textit{Organic Seed Growers} had not sustained greater than trace contamination, an organic farmer who exercises the utmost control and precaution in limiting contamination by GE crops, yet still experiences greater than trace contamination, should not be liable for patent infringement.\textsuperscript{295} Although contamination at greater than trace amounts in this type of situation is currently not highly likely to occur,\textsuperscript{296} the risk increases as GE crops become more prolific.\textsuperscript{297} Nevertheless, an organic farmer has a responsibility to limit contamination\textsuperscript{298} but cannot reasonably be expected to eliminate all contamination, or even greater than trace amounts of contamination in certain situations.\textsuperscript{299} Moreover, an organic farmer would prefer to eliminate all contamination from GE crops but, due to the nature of contamination by wind-blown pollen and gene-flow, probably cannot.\textsuperscript{300}

In spite of this contamination, the patent holder is not deprived of the reward provided by patent law because the organic farmer did not purchase GE crops, did not apply Roundup herbicide, and was not intentionally trying to create copies of the patented product.\textsuperscript{301} Therefore, each situation of possible infringement involving self-replicating technologies should be determined on the basis of how much the individual controls the system as well as the inadvertent nature of any infringement.\textsuperscript{302}

\textbf{CONCLUSION}

In the agriculture industry, the self-replicating nature of GE seed complicates the application of the doctrine of patent exhaustion and the determination of a patent holder’s rights under patent law. The Supreme Court examined this issue in \textit{Bowman} and correctly concluded the doctrine of patent

\textsuperscript{293} Organic Seed Growers & Trade Ass’n v. Monsanto, 851 F. Supp. 2d 544, 548 (S.D.N.Y. 2012). Despite efforts to control contamination, “some unlicensed—and unintended—use of transgenic seeds is inevitable. Like any other seeds, transgenic seeds may contaminate non-transgenic crops through a variety of means, including seed drift or scatter, crosspollination, and commingling via tainted equipment during harvest or post-harvest activities, processing, transportation, and storage.” \textit{Id.}

\textsuperscript{294} Monsanto Co. v. Geertson Seed Farms, 130 S. Ct. 2743, 2754–55 (2010).

\textsuperscript{295} See \textit{Organic Seed Growers}, 718 F.3d at 1356 (citing \textit{Bowman}, 133 S. Ct. at 1769).

\textsuperscript{296} \textit{Id.} at 1359.

\textsuperscript{297} \textit{Id.} at 1357.

\textsuperscript{298} \textit{Id.} at 1360.


\textsuperscript{300} \textit{Id.}

\textsuperscript{301} See \textit{Organic Seed Growers}, 718 F.3d at 1359.

\textsuperscript{302} See \textit{Bowman} v. Monsanto Co., 133 S. Ct. 1761, 1769 (2013).
exhaustion did not apply. Regardless of where the product is purchased, the
document of patent exhaustion does not protect individuals who copy the
patented product. Moreover, the ability of a patented product to self-replicate
does not, as a result, confer the right to a purchaser to make or copy the
patented product.

Accordingly, seed companies that own the patent rights for GE plants may,
in conjunction with license agreements, restrict a farmer’s use of patented GE
plants. These restrictions also apply when a farmer plants commodity soybean
seed that contains patented product. While the Court’s decision effectively
removes the farmer’s option to plant and save commodity seed, or save any
patented seed, it consequently supports the purpose of patent law to promote
innovation and ensures the patent holder receives the reward provided for
under the patent. Furthermore, protection of self-replicating technologies from
patent infringement will incentivize technological development in many
industries, including genetics and biotechnology.

The Court limited its holding to Bowman’s particular situation, refusing to
apply the holding to all cases involving self-replicating technologies.
Nevertheless, the Court indicated that in certain situations the doctrine of
patent exhaustion may protect an individual from liability for patent
infringement. The Court’s holding in Bowman, and ultimately any other case
involving self-replicating technologies, was influenced by whether the self-
replication occurred outside the individual’s control or was unintentional.

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