No. 11-796

In the Supreme Court of the United States

VERNON HUGH BOWMAN,
Petitioner,
v.
MONSANTO COMPANY, ET AL.,
Respondents.

On Writ of Certiorari to the United States Court of Appeals for the Federal Circuit

BRIEF OF AMERICAN SOYBEAN ASSOCIATION, ILLINOIS SOYBEAN ASSOCIATION, INDIANA SOYBEAN ALLIANCE, IOWA SOYBEAN ASSOCIATION, KANSAS SOYBEAN ASSOCIATION, KENTUCKY SOYBEAN ASSOCIATION, MICHIGAN SOYBEAN ASSOCIATION, MINNESOTA SOYBEAN GROWERS ASSOCIATION, MISSISSIPPI SOYBEAN ASSOCIATION, MISSOURI SOYBEAN ASSOCIATION, NEBRASKA SOYBEAN ASSOCIATION, NORTH DAKOTA SOYBEAN GROWERS ASSOCIATION, OHIO SOYBEAN ASSOCIATION, TENNESSEE SOYBEAN ASSOCIATION, VIRGINIA SOYBEAN ASSOCIATION, AND WISCONSIN SOYBEAN ASSOCIATION, NATIONAL CORN GROWERS ASSOCIATION, NATIONAL ASSOCIATION OF WHEAT GROWERS, AMERICAN SUGARBEET GROWERS ASSOCIATION, AND GROWERS FOR BIOTECHNOLOGY AS *AMICI CURIAE* IN SUPPORT OF RESPONDENTS

GARY H. BAISE*
STEWART D. FRIED
JOHN G. DILLARD
Olsson Frank Weeda Terman Matz PC
600 New Hampshire NW
Washington, DC 20037
*Counsel of Record (202) 789-1212
gbaise@ofwlaw.com
Counsel for Amici Curiae

Becker Gallagher · Cincinnati, OH · Washington, D.C. · 800.890.5001

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STATEMENTS OF INTEREST OF AMICUS CURIAE[1]

American Soybean Association (ASA) is the national trade association representing U.S. soybean farmers on domestic and international issues of importance to the soybean industry. ASA's advocacy and representational efforts are made possible through the voluntary membership of approximately 22,000 farmers in 31 states. ASA represents the interests of 280,000 American soybean farms. ASA strongly supports the development of new biotechnology-derived traits for soybeans that will enhance efficiency and profitability by controlling weeds and pests, providing more competitive cropping opportunities, and permitting soybean farmers to meet domestic and international food, feed, and fuel needs. Weeds are the most important pest complex facing soybean farmers and the introduction of glyphosate-resistant soybeans dramatically changed how soybean farmers addressed weed management.

Illinois Soybean Association, Indiana Soybean Alliance, Iowa Soybean Association, Kansas Soybean Association, Kentucky Soybean Association, Michigan Soybean Association, Minnesota Soybean Growers Association, Mississippi Soybean Association, Missouri Soybean Association, Nebraska Soybean Association,

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[1] Pursuant to Rule 37(a), counsel of record for both parties received timely notice of amici curiae's intention to file a brief. The parties have consented to the filing of this brief. No counsel for any party in this case authored this brief in whole or in part, and no person or entity other than amici curiae made a monetary contribution to its preparation or submission.

North Dakota Soybean Association, Ohio Soybean Association, Tennessee Soybean Association, Virginia Soybean Association, and Wisconsin Soybean Association (State Soybean Associations) represent soybean growers in their respective states and are affiliated with the American Soybean Association. The State Soybean Associations support the development of seed biotechnology and believe that farmers will suffer in the event that patent protection for second and subsequent generations of genetically modified soybeans is not preserved.

National Corn Growers Association (NCGA) is a non-profit trade association that represents 37,000 corn farmers nationwide, 48 affiliated state corn organizations and the interests of more than 300,000 growers who contribute through 23 state corn checkoff programs. NCGA represents its members' concerns before the federal executive, legislative and judicial branches on intellectual property and other issues and has historically advocated for fair access to technology. NCGA is a leader in ensuring that technology is introduced with minimal disruption to markets and submits that early season weed control is vital to improved corn yields and profitability.

National Association of Wheat Growers (NAWG) is a federation of 21 state wheat grower associations that represents wheat producers before Congress, the federal courts, USDA and other federal agencies. NAWG is a grower-governed and grower-funded entity that advocates on issues ranging from federal farm policy, trade, environmental regulation, and agricultural research to sustainability. NAWG supports the protection of intellectual property,

including education about the importance of complying with the Plant Variety Protection Act, seed contract and stewardship provisions, and enforcement of those provisions when necessary. NAWG members understand that constantly evolving threats to wheat production from diseases, pests, weeds and weather patterns can only be addressed through long-term investments in research and development of new varieties. While there are currently no commercialized varieties of genetically modified wheat, NAWG recognizes that strong intellectual property protections are critical to encouraging seed companies to make the investments necessary to bring biotech wheat to the marketplace.

American Sugarbeet Growers Association (ASGA) is an organization of approximately 10,000 sugar beet growers, primarily family farmers, in all eleven sugar beet-growing states. ASGA's members grow virtually all of the commercially planted and harvested sugar beets in the United States. Sugar produced from sugar beets accounts for more than half of the domestically grown sugar in the United States. Since 2009, more than 90% of the sugar beets planted and harvested by ASGA members have been improved with a biotech trait. Elimination of patent protection for seed biotechnology will have substantial negative impacts on the sugar beet industry.

Growers for Biotechnology (Growers) is a non-profit organization of farmer-producers who believe the use of biotechnology-enhanced seed is a critical tool in modern agriculture. The use of genetically-enhanced seed is vital to enabling American farmers to produce a high quality and bountiful harvest, while reducing

tillage, pesticide use, and topsoil erosion. Continued investment in research and the ongoing introduction of new varieties is critical to meeting the food, fiber, and fuel needs of a rapidly growing global population. Growers recognizes that seed developers are entitled to protection of their intellectual property and a fair return on their investments and believes that fee circumvention by farmers should not be countenanced.

ASA, State Soybean Associations, NCGA, NAWG, ASGA, and Growers (Amici) respectfully suggest that application of the patent exhaustion doctrine to second and subsequent generations of soybeans will result in profound, adverse impacts on soybean growers and other farmers. Amici offer this brief in support of the Respondents to help the Court understand the broad agronomic and weed control implications that plant biotechnology has on soybean and other commodity crop farmers, environmental sustainability, global nutrition and advances in plant genetics research. Amici submit that the patent exhaustion doctrine is inapplicable to a farmer's unlicensed growing of new crops that contain patented traits.

SOYBEANS

The greatest service which can be rendered to any country is to add a useful plant to its culture.
– Thomas Jefferson

Weeds are the most significant economic challenge to global food production. Weeds compete with soybeans and other commodity crops for light, water and nutrients that are essential to production. These unwanted plants have serious ramifications for

mankind, ranging from human nutrition and health to the environment to our pursuit of recreation.[2] Improvements in weed management are critical to increasing crop yields. This case presents a matter of great importance to America's farmers and the decision will have acute impacts on how agricultural producers will control weeds and sustainably meet the nutritional demands of a growing global population.

Amici respectfully submit that without adequate intellectual property protection, the seed industry will lack sufficient incentive to develop improved genetic traits for field crops. Patent protection for new seed technologies is vital for advancements in biotechnology. Although soybeans and other crops have been cultivated for centuries, advances in plant genetics were historically stifled by a lack of incentives to invest in new technologies and breeding techniques.

During the past few decades, enormous progress has been made in improving new seed varieties based upon the protections initially afforded by the Plant Variety Protection Act of 1970. Genetic innovation in soybeans grew exponentially, like Jack's magical beanstalk, after this Court's 1980 decision in *Diamond v. Chakrabarty*, 447 U.S. 303, which confirmed the applicability of utility patent protection to qualifying organisms.

No other country possesses the United States' prolific record in developing new crop varieties.

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[2] D.C. Bridges, *Impact of Weeds on Human Endeavors*, WEED TECHNOLOGY, Vol. 8, 392-95 (1994).

Without the protection of intellectual property afforded by the U.S. legal system, seed and biotechnology companies would not have undertaken the expensive and time-consuming research necessary to improve existing plant technology.

Innovation spurred by the *Chakrabarty* decision resulted in impressive gains in nutrition and environmental stewardship. Since 1980, total domestic soybean production has increased 96% and yields per acre have increased 55%.[3] Soybean production has also become more environmentally friendly. On a per-bushel basis, the land needed to produce a bushel of soybeans declined by 35%, soil erosion decreased 66%, irrigation water applied declined by 42%, fuel consumption decreased 42%, and greenhouse gas emissions declined by 41%.[4]

Amici urge this Court to uphold the Federal Circuit's decision in *Monsanto Co. v. Bowman*, Pet. App. 1a-18a. Upholding the decision below will ensure that technological innovation in crop breeding and genetic traits continues unhindered, thereby leading to the development of more productive, manageable, and environmentally-sustainable varieties. In contrast, permitting unrestricted replication of soybean biotechnology will have a wide variety of harmful effects on Amici, other farmers, and society as a whole.

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[3] Keystone Alliance for Sustainable Agriculture, *Environmental and Socioeconomic Indicators for Measuring Outcomes of On-Farm Agricultural Production in the United States*: Second Report (Version 2) at 83, (Dec. 2012), *available at* www.fieldtomarket.org.

[4] *Id.*

A loss of patent protection is likely to result in the loss of substantial research dollars currently devoted towards developing improved plant varieties and would foster an environment where farmers that use certified, high-quality seed will be required to compete with producers that adopt Petitioner's peculiar license fee circumvention scheme. It is also likely that farmers, seed sellers, and downstream grain buyers will encounter burdensome additional licensing and contractual requirements in the event that Mr. Bowman's unorthodox practice is given this Court's imprimatur.[5]

A. Soybeans Are One of The World's Principal Food Crops

Soybeans are grown on more than 280,000 farms in the United States. In 2012, 93% of domestic soybeans were grown using Monsanto's glyphosate-resistant technology, which manages weeds and enhances environmental stewardship. In 2012, soybeans were planted on approximately 77 million acres in 31 states, making the legume the second-most planted field crop in the United States.[6] United States soybean sales topped $37 billion in 2011, accounting for 18% of crop

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[5] Resp. Br. 53-54.

[6] USDA National Agricultural Statistics Service (USDA NASS) *Acreage* 15, http://usda01.library.cornell.edu/usda/current/Acre/Acre-06-29-2012.pdf (June 12, 2012).

sales and 10% of all agricultural commodities produced in the country.[7]

Soybeans are America's most valuable field crop export and a major contributor to agriculture's positive trade balance. In 2011, exports topped $21.5 billion, accounting for over 60% of soybean receipts and 18% of total agricultural exports.[8] Since 1996, when glyphosate-resistant technology was introduced, domestic soybean acreage has increased from 64 million acres to 75 million acres in 2011.[9] During that same timeframe, soybean exports increased from 882 million bushels to 1.3 billion bushels.[10]

The history of soybean cultivation originated in northern China over three thousand years ago.[11]

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[7] Ted Covey & Kevin Patrick, *Cash Receipts By Commodity Group*, USDA Economic Research Service (USDA ERS) http://www.ers.usda.gov/datafiles/Farm_Income/Historical and State Level DataUSFarm_Income_and_Wealth_Statistics/Cash_receipts/US_tables_include_details/cashreceipts1924tolatest.xls. (Aug. 28, 2012).

[8] American Soybean Association, *U.S. Soy Crop Statistics*, Soystats 2012, http://www.soystats.com/2012/Default-frames.htm (last viewed Jan. 21, 2013).

[9] USDA NASS Quick Stats, www.quickstats.nass.usda.gov (last viewed Jan. 21, 2013).

[10] American Soybean Association, *Exports & Ending Stocks*, Soystats 2012, http://www.soystats.com/2012/Default-frames.htm (last viewed Jan. 21, 2013).

[11] Lance Gibson & Garron Benson, *Origin, History, and Uses of Soybean (Glycine max)*, Iowa State University Department of

Soybean production in Europe began after 16th century visitors to China and Japan took notice of its varied uses for food and returned home with seeds.[12] Soybeans were introduced to North America when a Georgia farmer began cultivating the legume in 1765.[13]

Unlike corn, wheat, and oats, soybeans were not a major agricultural crop in the United States until the middle of the 20th century.[14] While useful in preserving soil quality when added to crop rotations

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Agronomy, (March 2005) http://www.agron.iastate.edu/courses/agron212/Readings/Soy_history.htm.

[12] T. Hymowitz, *On the Domestication of the Soybean*, ECONOMIC BOTANY, Vol. 24, Iss. 4 at 408–09 (Dec. 1970). Occasionally referred to as the "cow of China," soybeans were utilized to make soy paste, tofu, Miso, soy sauce, and soy milk. *Id*. at 409.

[13] William Shurtleff & Akiko Aoyagi, *History of Soy in the United States 1766-1900*, SoyInfo Center, http://www.soyinfocenter.com/HSS/usa.php (Last viewed Jan. 21, 2013). During the late 1760s, Samuel Bowen began exporting soy sauce and received an English patent. In 1770, while serving as an agent for Pennsylvania, Benjamin Franklin sent soybean seeds to a Philadelphia botanist for cultivation. *Id*.

[14] USDA NASS Quick Stats, www.quickstats.nass.usda.gov (last viewed Jan. 21, 2013). In 1924, 1.6 million acres of soybeans were planted in the United States. 77 million acres were planted domestically in 2012. The soybean was popular with plant scientists and agricultural visionaries. George Washington Carver is credited as the first scientist to recognize the soybean as a "complete protein" and an edible oil source for humans. Prior to Carver's research, soybeans were primarily used as animal feed. *See* Kurt Nolte, *Soybeans*, University of Arizona Cooperative Extension Service, http://cals.arizona.edu/fps/sites/cals.arizona.edu.fps/files/cotw/Soybeans.pdf (last viewed Jan. 21, 2013).

(typically with corn, wheat, or cotton), soybean production was limited prior to World War II. The war effort created a sizeable demand for domestically-sourced lubricants and edible oils, for which soybeans are well-suited. Between 1941 and 1942, the United States doubled its soybean production and became the world's largest producer of soybeans.[15]

B. The USDA Free Agricultural Seed Program Stunted Progress in Genetic Research

The federal government, in an effort to improve the agricultural productivity of a growing nation, played a major role in crop seed distribution during the 19th and early 20th centuries. Starting in 1819, William Crawford, President Monroe's Treasury Secretary, asked American consuls to send seeds from useful foreign plants to customs collectors at U.S. ports for free distribution to American farmers. In 1836, Henry Ellsworth, first Commissioner of the State Department's newly organized Patent Office, obtained the first congressional appropriation directed to agriculture -- for the free distribution of agricultural seed packets, including soybeans, to American farmers. For the next 26 years, the Patent Office was the center of governmental agricultural seed distribution activity.[16]

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[15] Shurtleff & Aoyagi, *History of World Soybean Production and Trade – Part 2*, SoyInfo Center, http://www.soyinfocenter.com/HSS/production_and_trade2.php (last viewed Jan. 21, 2013).

[16] *See* Debra L. Blair, *Intellectual Property Protection and its Impact on the U.S. Seed Industry*, 4 DRAKE J. AGRIC. L. 297, 299-302 (1999).

The free seed distribution program was placed under the jurisdiction of USDA upon its establishment in 1862 and quickly grew to an enormous size. By 1878, approximately one-third of USDA's budget was devoted to collecting and distributing free seeds. The federal government's largess was not perpetual and by 1893, USDA Secretary J. Sterling Morton was calling for the end of the "gratuitous" distribution of seed.[17] Nonetheless, Congress did not terminate the free seed program until 1924.[18]

Early seed breeders had little incentive to make costly investments in developing more productive plants because the free seed program crowded private breeders from the marketplace. Additionally, without intellectual property protection, seed breeders had little control over the fate of their genetic material; purchasers were not barred from saving seed or from selling the new seeds they grew to others for planting purposes without compensating the breeder. As a result, little progress was made in increasing seed productivity. For example, between 1866 and 1930, the average national yield for corn decreased from 24.3 to 20.5 bushels per acre.[19]

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[17] *Id.* at 301-03. Morton considered free seed distribution an expensive service fraught with problems that the developing private seed industry was better equipped to handle.

[18] *Id.* at 303.

[19] USDA NASS Quick Stats, www.quickstats.nass.usda.gov (last viewed Jan. 21, 2013).

The federal government's exit from the seed distribution business in 1924 created space for our nation's nascent seed industry to grow and innovate. In 1926, Henry A. Wallace, future Secretary of Agriculture and Vice-President, established Hi-Bred Corn Co. (Pioneer), which introduced hybrid corn on a commercial scale. Hybrid corn, which led to substantial increases in yields, was initially unprotected by federal intellectual property law.

Hybrid corn, by its nature, cannot be profitably replanted.[20] Thus, corn farmers purchase seed on an annual basis. Because of these annual purchases, seed companies were able to invest in research, reaping impressive results for America's farmers.[21] By 1950, 80% of corn grown in the United States utilized hybrid seeds and yields increased from 26 bushels per acre in

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[20] Open-pollinating crops, such as corn and alfalfa, reproduce by exposing the female organs of one plant to the pollen (male) of another plant. This combination results in heterozygous offspring, meaning that the offspring expresses genetic traits of both parent crops.

Commercial hybrid lines are produced by crossing two inbred parent lines. Hybrid varieties express "hybrid vigor" or "heterosis," which is the improved or increased function of any biological quality in a hybrid offspring. The offspring of hybrid varieties cannot be replanted profitably because the hybrid vigor is not uniformly expressed in second-generation hybrid crops, causing yields to suffer. *See* Martin J. Chrispeels and David E. Sadava, PLANTS, GENES, AND CROP BIOTECHNOLOGY 368–69 (Second Ed. 2003).

[21] Julian M. Alston, et al., PERSISTENCE PAYS: US AGRICULTURAL PRODUCTIVITY GROWTH AND THE BENEFITS OF PUBLIC R&D SPENDING 252 (2010).

1926 to 38 bushels per acre in 1950 to 147 bushels per acre in 2011.[22]

Unlike corn, "self-pollinating" crops, such as soybeans and wheat, are not grown commercially as hybrids.[23] Instead, the progeny of self-pollinating crops, which produce nearly genetically identical offspring, can be planted as seed in subsequent crops.[24] Thus, without intellectual property protection, soybean seeds can be replanted for multiple generations, providing little incentive for private companies to invest in seed research.

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[22] USDA NASS Quick Stats, www.quickstats.nass.usda.gov (last viewed Jan. 21, 2013).

[23] Soybeans are "self-pollinators." Self-pollinating crops have "perfect flowers," meaning that the male and female reproductive organs are located in the same flower. Pollen, the male component, fertilizes the ovules, the female component, in the same flower. This makes it very difficult to introduce "outside" genetics, resulting in an inbred plant that produces "homozygous" offspring, which are genetically identical, or nearly identical to the parent plant. Rice, wheat, barley, and peanuts are also self-pollinators. *See* Chrispeels & Sadava, *supra* note 20 at 368–69.

[24] Self-pollinating crops are not conducive to cross-pollination. Cross-contamination between conventional and glyphosate-resistant soybeans is minimal and does not occur if soybeans are planted more than 10.5 meters apart. Y. Yoshima, et al., *Gene Flow from GM Glyphosate-Tolerant to Conventional Soybeans Under Field Conditions in Japan*, ENVIRON. BIOSAFETY RES. Vol. 5, No. 3, 169–73 (2006). Any purported concerns about gene flow cross-contamination is largely, if not completely, academic in nature. *See* Center for Food Safety and Save Our Seeds ("CFS"), Br. 6–7.

C. Prior to 1970, Self-Pollinating Plant Varieties Lacked Clear Intellectual Property Protection

The United States Constitution provided Congress with the power "[t]o promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries."[25] Early patent laws did not contemplate germplasm[26] and intellectual property protection for plants was not recognized prior to 1930, when Congress enacted the Plant Patent Act (PPA).[27] However, the PPA expressly excluded sexually reproducing plants and tubers, thereby rendering soybeans, corn, wheat, potatoes, and sugar beets unpatentable. Although hybrid corn breeders have been able to protect inbred parent lines through state trade secret laws since the late 1930s, this patchwork of state laws proved difficult and expensive to enforce.[28]

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[25] U.S. CONST. art. I, § 8, cl. 8.

[26] "Germplasm" is a general reference to all of the genetic information, or genes, in a plant.

[27] *See* Blair, *supra* note 16, at 310; 35 U.S.C. §§ 161-164.

[28] *See* Blair, *supra* note 16, at 308-310. Trade secret laws require that the protected information be held confidentially and not disclosed to the public. Thus, trade secret laws could apply to inbred parent lines of hybrid crops because they are never sold to the public.

Due to their self-replicating nature, self-pollinating crops are not amenable to trade secret protection.[29]

Congress, recognizing a global effort to provide intellectual property protection for field crops, enacted the Plant Variety Protection Act (PVPA) in 1970.[30] The PVPA allows breeders of new or distinct sexually reproducing plant varieties to register them and receive twenty years' protection from unauthorized sale, reproduction, import or export.[31] While federal law prevented farmers from saving and selling PVPA-protected seed to a downstream buyer as seed, the PVPA expressly permitted farmers to save enough seed to replant a subsequent crop.[32] The saved seed exemption allowed farmers to avoid purchasing seed annually. Furthermore, the PVPA's "breeder's exemption" allowed seed to be saved for research.[33] Competing seed companies could save PVPA-protected seeds and use the progeny to develop and receive PVPA certificates for new varieties. Although the PVPA provided some protection for plant breeders, these exemptions limited incentives for investment in new plant technology. Absent clear utility patent

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[29] *Id.* The genetic makeup of the parent soybean is nearly identical to the offspring sold to the public.

[30] *Id.* at 311-12; 7 U.S.C. §§ 2321-2582.

[31] *Id.* at 312-13.

[32] 7 U.S.C. § 2543; *see also Asgrow Seed Co. v. Winterboer*, 513 U.S. 179, 192-93 (1995).

[33] *Id.* at § 2544.

protection, soybean breeders had little incentive to invest resources in developing new varieties.

D. *Chakrabarty* Clarified That Utility Patent Protection Could Be Applied to Seeds

The seed development landscape shifted dramatically following the *Chakrabarty* decision. After this Court confirmed that living things could be protected by utility patents, plant breeders began developing new varieties and traits with the confidence that their intellectual property would be protected. Two decades later, this Court extended *Chakrabarty*, clarifying that genetically modified crops, including the patented soybeans at issue in this case, were eligible for utility patent protection under 35 U.S.C. section 101. *J.E.M. Ag Supply v. Pioneer Hi-Bred Intern., Inc.*, 534 U.S. 124, 131-32 (2001).

Breeders responded vigorously to the new assurances of intellectual property protection. In 1979, the year before this Court decided *Chakrabarty*, private U.S. expenditures on seeds and genetic trait research totaled $146 million in inflation-adjusted terms.[34] By 1982, this figure more than doubled to $305 million. The introduction of genetically modified traits in the mid-1990s spurred an expansive increase in private seed research. In 1994, annual private U.S.

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[34] Paul W. Heisey & Keith O. Fuglie, *Research Investments and Market Structure in the Food Processing, Agricultural Input, and Biofuel Industries Worldwide* at 9, USDA Economic Research Service, ERR-130 (Dec. 2011).

expenditures rose to nearly $634 million.[35] By 2010, this figure more than tripled to nearly $2 billion.[36] These investments resulted in the discovery and implementation of genetic traits that improve weed management and promote environmental sustainability.

Seed and genetic trait development has surpassed all other agricultural inputs in terms of research intensity.[37] Intellectual property protection provided by the PVPA and utility patents provided incentives for private seed developers and genetic researchers to create innovative and highly productive crop varieties and genetic traits.

Meanwhile, public expenditures on plant genetics and breeding research, once the backbone of our nation's seed germplasm resources, leveled off in the 1970s and began to decrease by the mid-1990s.[38] Traditionally, much of the burden for funding crop genetics research fell on federal and state governments. Bolstered by clear utility patent protection, private seed and genetic trait researchers have filled in these funding gaps.

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[35] *Id.* at 9, 39. Inflation-adjusted to constant 2006 U.S. dollars.

[36] *Id.*

[37] *Id.* at 25.

[38] *Id. See also* Paul W. Heisey, et al., *Public Sector Plant Breeding in a Privatizing World*, USDA Economic Research Service, AIB-777, at 6 (Aug. 2001).

E. Farmers Rapidly Adopted Genetically Modified Soybeans to Improve Weed Management

In 1996, the soybean seed market experienced a sea change with the commercial introduction of Roundup Ready® soybeans. Although Roundup Ready® seed is more expensive than conventional seed, soybean farmers readily adopted glyphosate-resistant technology because it simplified weed management. By 1998, two years after its commercial debut, 38% of American soybean farmers were already using glyphosate-resistant soybeans.[39] By 2000, a majority (54%) of domestic soybeans contained biotechnology and by 2012, this figure rose to 93%.[40]

Soybean farmers' swift adoption of glyphosate-resistant technology attests to the value of biotechnology to growers. Although planting soybeans containing biotechnology requires annual purchases of seed and forbids the saving of seed, its nearly universal use lends strong support for the notion that American farmers are willing to pay for innovative technology if doing so results in improved efficiency, yields, and profits.

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[39] Janet Carpenter and Leonard Ganassi, *Herbicide Tolerant Soybeans: Why Growers Are Adopting Roundup Ready Varieties*, J. AGROBIOTECH. MGMT & ECON., Vol. 2, No. 2, *available at* http://agbioforum.org/v2n2/v2n2a02-carpenter.htm.

[40] Jorge Fernandez-Cornejo, *Adoption of Genetically Engineered Crops in the U.S.*, USDA ERS, www.ers.usda.gov/datafiles/Adoption_of_Genetically_Engineered_Crops_in_the_US/alltables.xls (July 3, 2012).

As the share of tax dollars devoted to public research continues to decrease, private research and development becomes more critical. Furthermore, farmers understand that payment of license fees is tantamount to a down payment on future technology which will enable farmers to become more productive and efficient, by managing weeds and pests, resisting disease, improving yields, and providing substantial environmental benefits.

F. Plant Biotechnology Is the Future of American Agriculture

The impressive growth in private research expenditures has already brought many new varieties and genetic traits to the marketplace. However, crop biotechnology remains a relatively new phenomenon and the seed research pipeline contains several new genetic traits that will be released in the near future.

For soybeans, these innovations are expected to make crop management more efficient and environmentally sound, increase yields and improve the legume's nutritional characteristics.[41] For example, in 2014, Monsanto is expected to introduce a "stacked" soybean variety to combat weed species that have

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[41] While the assertion that "[n]o commercial transgenic crop has been engineered for increased yield, nutritional enhancement, increased fertilizer use efficiency, or many other promised traits." is technically accurate, the myopic tone ignores the new plant traits that are on the verge of commercialization. CFS Br. 3.

developed resistance to glyphosate.[42] Additionally, researchers are developing seed varieties stacked with genetic traits that will result in the development of soybeans with reduced saturated fat and trans fat levels, increased Omega-3 levels, improved yields, and genetic resistance to insects and pervasive diseases.[43] Pioneer, through the use of gene mapping technology, intends to introduce soybeans with improved yields.[44] Bayer, Dow, Pioneer, and Syngenta are each developing traits designed to provide genetic insect resistance and increased herbicide tolerance.[45]

Soybeans are hardly the only crop benefitting from biotechnology research. For example, stacked corn varieties that are resistant to glyphosate and the European Corn Borer, a major insect pest, are already available. Future varieties will likely include genetic

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[42] Monsanto Co., *Soybean Research & Development Pipeline*, http://www.monsanto.com/products/Pages/soybean-pipeline.aspx (last viewed Jan. 21, 2013). "Stacked" means the crop contains more than one genetically modified trait. Stacking is common in corn and is expected to be prevalent in other crops.

[43] CropLife International, *Plant Biotechnology Pipeline* at 2, *available at* www.croplife.org/view_document.aspx?docId=3457 (May 2011).

[44] Pioneer Hi-Bred, *Accelerated Yield Technology System*, https://www.pioneer.com/home/site/us/products/soybean/seed-traits-technologies-soybeans/ayt-system/ (last viewed Jan. 21, 2013); *see also* Karen McMahon, *Seed Pipeline: Seed Companies Stack Soybean Traits in Future Products*, FARM INDUSTRY NEWS, http://farmindustrynews.com/soybean-varieties/seed-pipeline-seed-companies-stack-soybean-traits-future-products (Aug. 29, 2011).

[45] *See* CropLife International, *supra* note 43, at 2.

traits with resistance to drought, stress, and a wider spectrum of herbicides, with a higher nutritional content, and which more efficiently utilize nitrogen fertilizer.[46] Cotton producers currently use stacked insect-tolerant and glyphosate-resistant varieties, and a drought-tolerant variety is anticipated in the future.[47] Sugar beet growers use glyphosate-resistant varieties and expect to soon have access to varieties that are genetically modified to improve yields.[48] Biotechnology companies are also developing wheat varieties that are genetically modified to increase yields, maximize the efficient use of nitrogen fertilizer, withstand beneficial herbicides, and improve nutritional quality.[49] Biotechnology is an issue of great importance to wheat growers given that there are currently no commercially available genetically modified wheat varieties.

There can be no doubt that if intellectual property protections remain in place, biotechnology will continue to play a substantial role in crop improvement. These advances are largely premised upon the continuation of private research conducted by seed breeders. Absent utility patent protection, little incentive will exist for biotechnology companies to conduct research. A determination that utility patent protection is unavailable to second and subsequent generations of soybean seeds containing Monsanto's patented

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[46] *See id.* at 1.

[47] *Id.* at 3.

[48] *Id.* at 6.

[49] *Id.*

technology is no different than an endorsement of Petitioner's fee circumvention scheme. Farmers, like other consumers of intellectual property, cannot be permitted to exploit the self-replicating nature of soybeans to conduct a practice which is an end run around patent law.

G. The Use of Crop Biotechnology Promotes Environmental Sustainability

Crop biotechnology provides a multitude of benefits, not only to farmers, but to society as a whole. Genetically modified crops have triggered changes in agricultural production practices that improve soil conservation and water quality, reduce greenhouse gas releases, improve carbon sequestration,[50] and reduce usage of persistent pesticides.[51]

Sustainability is not merely a buzzword that receives lip service from the agricultural community. The primary principle motivating "sustainable agriculture" is the utilization of production practices that meet current food demands, while conserving resources to ensure that producers can meet future food demands.[52] The Earth's population recently

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[50] Carbon sequestration is the process of the biological capture and long-term storage of atmospheric carbon dioxide.

[51] "Persistent" pesticides are stable in the environment and resist decay by natural processes.

[52] In 7 U.S.C. §3103(19), Congress defined "sustainable agriculture" as:

exceeded 7 billion and is expected to reach 9.3 billion by 2050.[53] At the same time, the land available for agricultural purposes is decreasing.[54] Feeding a growing world with dwindling resources requires the adoption of a comprehensive approach to ensure this daunting challenge can be met.

American farmers do not view genetically modified crops as a panacea to all challenges facing agriculture in the 21st century. However, crop biotechnology -- when used in concert with advances in conventional

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> An integrated system of plant and animal production practices having a site-specific application that will, over the long term –
>
> (A) satisfy human food and fiber needs;
> (B) enhance environmental quality and the natural resource base upon which the agriculture economy depends;
> (C) make the most efficient use of nonrenewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls;
> (D) sustain the economic viability of farm operations; and
> (E) enhance the quality of life for farmers and society as a whole.

[53] CIA, *World: People and Society*, CIA World Factbook, https://www.cia.gov/library/publications/the-world-factbook/geos/xx.html (Last viewed Jan. 21, 2013); Press Release, United Nations, World Population to Reach 10 Billion if Fertility in all Countries Converges to Replacement Levels (May 3, 2011), *available at* http://esa.un.org/unpd/wpp/Other-Information/Press_Release_WPP2010.pdf.

[54] UN FAO, *FAOSTAT*, http://faostat.fao.org/ (last viewed January 21, 2013). The global area of agricultural land decreased more than 1% between 2000 and 2009.

genetics, developments in equipment, improved herbicides and pesticides, and increased adoption of conservation production practices -- will ensure that American farmers continue to increase productivity, cause fewer adverse environmental impacts and meet the nutritional needs of a rapidly increasing world population. Without question, crop biotechnology is a critical player in modern sustainable agriculture.[55]

Herbicide-resistant technology has enabled farmers to increasingly adopt conservation tillage or no-till practices.[56] Prior to the introduction of glyphosate-resistant soybeans, methods of weed control typically included selecting plant varieties that crowd out weeds, mechanical removal through tillage, removal by physical hand labor, and the spot-specific application of chemical herbicides.

Non-genetically modified soybeans were, and continue to be, grown primarily with conventional tillage practices, which results in exposing bare soil and incorporating weeds and crop residue into the ground. This method requires multiple passes of

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[55] The United States Agency for International Development (USAID) recognizes the critical role that biotech traits will play in meeting global nutritional challenges. For example, USAID is a partner in developing insect resistant eggplants and cowpeas, virus-resistant papaya, bananas, and peanuts, and biofortified West African staple crops. *See* USAID, *Biotechnology Programs*, http://transition.usaid.gov/our_work/agriculture/pdfs/2011/biotech_flyer_english.pdf (last viewed Jan. 23, 2013).

[56] R. Derpsch, et al., *Current Status of Adoption of No-Till Farming in the World and Some of its Main Benefits.* INT'L J. AGRI. & BIOLOGICAL ENG'R. 3: 1–25 (2010).

primary and secondary tillage and necessitates the use of a variety of herbicides to control weeds. In a conservation tillage system, because the primary tillage step of turning the soil over for full incorporation is avoided, a larger amount of a prior season's crop residue remains on the soil surface than with conventional methods, reducing soil erosion and fuel use. In a no-till system, soil erosion is virtually eliminated because the only disturbance to the soil is where the seed is planted.

Although conservation tillage was promoted prior to the introduction of herbicide-resistant technology, its adoption was limited. For example, in 1995, prior to the introduction of glyphosate-resistant soybeans, only 27% of soybeans were grown in a no-till system.[57] Because of the availability of glyphosate-resistant technology, farmers have shifted towards no-till and conservation tillage practices.[58] By 2009, 50% of soybeans were grown with no-till practices.[59] Overall, nearly 90% of soybeans are grown in some form of a reduced-till, conservation tillage, or no-till system.[60]

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[57] John Horowitz, et al., *"No-Till" Farming is a Growing Practice* at 6, USDA Economic Research Service, EIB 70 (Nov. 2010).

[58] National Research Council, *The Impact of Genetically Engineered Crops on Farm Sustainability in the United States* (2010), at 151, *available at* https://download.nap.edu/catalog.php?record_id=12804.

[59] *See* Horowitz, et al., *supra* note 57, at 6.

[60] *Id.* at 14.

Conservation tillage and no-till practices, by leaving crop residue in place, reduce soil erosion. To the contrary, conventional tillage buries crop residue, making the soil vulnerable to soil erosion by both wind and rainfall. No-till cultivation methods reduce overall soil erosion by 93% compared to conventional tillage practices.[61] No-till and conservation tillage techniques reduce wind-caused topsoil erosion by between 70% and 90%.[62]

Reduced soil erosion has two primary benefits – improved soil structure and reduced pollution. Soil erosion threatens the productivity of soils by removing topsoil, the uppermost layer of soil, which contains high concentrations of nutrients and organic matter.[63] This well-structured layer of soil is the most hospitable to seeds and plant growth, but also the most vulnerable to soil erosion.

Adoption of no-till and conservation tillage practices also reduces water runoff by up to 69% compared to

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[61] R.S. Fawcett, et al., *The Impact of Conservation Tillage on Pesticide Runoff Into Surface Water: A Review and Analysis*, J. SOIL & WATER CONS., Vol. 49, Iss. 2, 126-135 (1994).

[62] D.J. Lyon and J.A. Smith, *Wind Erosion and Its Control*, NEBGUIDE, University of Nebraska Cooperative Extension Service, http://www.ianrpubs.unl.edu/pages/publicationD.jsp?publicationId=130 (2004).

[63] Overtillage was one of the causes of and/or contributed to the Dust Bowl of the 1930s. *See* B.I. Cook, et al., *Amplification Of The North American Dust Bowl Drought Through Human-Induced Land Degradation,* PNAS, Vol. 106, No. 13, 4997-5001 at 4997 (2009).

conventional tillage, decreasing soil, nutrient and pesticide runoff into nearby waterways.[64] Agricultural runoff contains sediment, pesticides, and excess nutrients, which easily binds to soil particles. Sediment pollution clouds water and reduces photosynthesis in waterways.[65] No-till and conservation tillage practices reduce phosphorus runoff by 81% and 70%, respectively, when compared to conventional tillage.[66] No-till cultivation also reduces herbicide runoff by 70%.[67]

The utilization of no-till and conservation tillage practices reduce greenhouse gases (GHG) emissions attributable to agriculture and can, in some instances, sequester atmospheric carbon. No-till and conservation tillage systems require less intensive equipment operations than conventional tillage, resulting in less fuel usage. For example, a farmer in a conventional tillage system uses an average of 5.32 gallons of diesel fuel per acre during a growing season. In contrast, no-till operators typically use an average of 2.33 gallons per acre, less than half of what a conventional tillage farmer uses. Between 1996 to 2010, conversion to no-

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[64] *See* Fawcett, *supra* at note 61.

[65] John D. Sutton, et al., *Water Quality and Agriculture: Status, Condition, and Trends*, USDA NRCS, Working Paper #16 at 2, *available at* http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_012448.pdf.

[66] B.J. Andraski, et al., *Phosphorus Losses in Runoff as Affected by Tillage*, SOIL SCI. SOC. AM. J., Vol. 49, No. 6, 1523-1527 at 1526 (1985).

[67] *See* Fawcett, *supra* at note 61.

till and conservation tillage on soybean farms resulted in 210 million fewer gallons of diesel fuel being consumed in the United States, the equivalent of removing the GHG emissions from 481,250 cars.[68]

Conservation tillage and no-till operations foster improved carbon sequestration. Soybeans and other plants sequester carbon dioxide during photosynthesis. No-till and conservation tillage techniques allow carbon to remain in the soil, whereas conventional tillage will release much of the carbon accumulated after plowing the subsequent crop. One study concluded that an Indiana soybean field using conventional tillage techniques stored 84 pounds of carbon per acre, far less than the 338 pounds of carbon per acre sequestered using conservation tillage and a fraction of the 446 pounds of carbon sequestered in an acre grown in no-till conditions.[69] If carbon sequestration savings are considered, soybean farmers have potentially removed the GHG emissions equivalent of 9.3 million cars from America's roads from 1996 to 2010.[70]

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[68] Graham Brookes & Peter Barfoot, *GM Crops: Global Socio-Economic and Environmental Impacts 1996-2010* at 144, PG Economics Ltd, UK, www.pgeconomics.co.uk/pdf/2012globalimpactstudyfinal.pdf (May 2012); US EPA Greenhouse Gas Equivalencies Calculator, http://www.epa.gov/cleanenergy/energy-resources/calculator.html#results (last viewed Jan. 21, 2013).

[69] P.J. Smith, *Quantifying the Change in Greenhouse Gas Emissions Due to Natural Resource Conservation Practice Application in Indiana*, The Indiana Carbon Storage Project, at 39 (2002), *available at* http://www.in.nrcs.usda.gov/pdf%20files/Indiana_Final_Report.pdf.

[70] *See* Brookes & Barfoot, *supra* note 68, at 144.

Although the introduction of chemical herbicides during the second half of the 20th century has significantly displaced hand labor and tillage-intensive mechanical weed control, the use of chemical herbicides is accompanied by employee safety and environmental concerns. Fortunately, glyphosate-resistant technology facilitates reductions in the use of persistent and riskier herbicides.

Prior to the introduction of glyphosate-resistant varieties, farmers controlled weed growth by applying a variety of herbicides, each of which targeted a specific type of weed. The effectiveness of available herbicides caused a shift in weed population dynamics such that less-adequately controlled species became more pervasive until other herbicides or mechanical methods were introduced to control those weeds.[71] Some of these herbicides have lengthy persistence periods, remaining active in the soil for a longer period of time after application. These persistent herbicides can run off into waterways, potentially harming aquatic plants, fish and animals.

In contrast, glyphosate is a broad spectrum herbicide. While effective against over 100 species of weeds, glyphosate does not have many of the deleterious environmental effects associated with other

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[71] Dan Towery & Steve Werblow, *Facilitating Conservation Farming Practices and Enhancing Environmental Sustainability with Agricultural Biotechnology* at 18, Conservation Technology Information Center, at 18 (2010).

types of herbicides.[72] Glyphosate is described as "practically non-toxic by ingestion" and non-carcinogenic, making it safer for applicators.[73] The use of glyphosate permits farmers to avoid using herbicides which EPA estimates are 3.4 to 16.8 times more toxic to humans.[74] Glyphosate binds tightly with soil, which renders it unlikely to result in stormwater runoff or leach into groundwater. Additionally, glyphosate is "practically nontoxic to fish."[75]

The conversion of farmland from conventional tillage systems to conservation tillage or no-till practices has also improved water conservation amongst soybean farmers. These practices minimize the evaporation that traditionally results from conventional tillage and improve water infiltration in soils. Conservation tillage and no-till techniques improve soil quality by encouraging the development of a healthier soil structure, including increased organic

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[72] Monsanto Co., *History of Monsanto's Glyphosate Herbicides*, Backgrounder, http://www.monsanto.com/products/Documents/glyphosate-background-materials/back_history.pdf, (June 2005).

[73] Extension Toxicology Network, *Pesticide Information Profile: Glyphosate*, http://extoxnet.orst.edu/pips/glyphosa.htm (June 1996).

[74] J.M. Shutske, *The Impact of Biotechnology and Information Technology on Agricultural Worker Safety*, University of Minnesota Extension (Jan. 2010), *available at* http://nasdonline.org/document/1845/d001780/the-impact-of-biotechnology-and-information-technology-on.html.

[75] *See* Extension Toxicology Network, *supra* note 73.

matter, macropores, cracks, and earthworm burrows.[76] One study concluded that moisture loss over a growing season was reduced by the equivalent of 5.9 inches of rainfall in a no-till system compared to conventional tillage.[77]

H. The Planting of Commodity Grain is an Unorthodox Practice

Petitioner makes the inaccurate assertion that farmers follow a time-honored tradition of using undifferentiated grain elevator-sourced commodity soybeans for seed, which he terms "commodity seed."[78] To the contrary, grain elevators typically sell soybeans and other commodity crops to millers and others in large quantities for feed, export, and processing into food products. Elevators selling commodity soybeans cannot represent that they can be used for seed.[79] The soybeans purchased by Petitioner at issue in this case were not sold as seed under the Indiana Seed Law nor

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[76] J.C. Siemans, *Soil Management and Tillage Systems*, ILLINOIS AGRONOMY HANDBOOK 1999-2000 at 122, University of Illinois Extension, Circular 1360 (1998).

[77] *Id*.

[78] Pet. Br. at 6. "Commodity seed" is a term fashioned by Petitioner and not utilized in the soybean industry. While virtually all soybeans are capable of being planted, soybeans cannot be sold as seed without complying with federal and state law. *See also* CHS Br. __.

[79] *See e.g.* IND. CODE §§ 15-15-1-32, 15-15-1-40. The Indiana Seed Law is modeled after the Recommended Uniform State Seed Law.

"commonly recognized in Indiana as agricultural seeds."[80]

Seed dealers are governed by federal and state laws and regulations designed to protect farmers and prevent the spread of weeds, the soybean's natural enemy.[81] For example, in Indiana, a seed dealer is required to certify that agricultural seed contains no more than 2.5% weed seed, 0.25% restricted noxious weed seed, nor any prohibited noxious weed seed.[82] Seed sold by dealers must be accompanied by a label stating, *inter alia*, the estimated germination rate, the percentage of hard seed, the calendar month that the seed was tested, and a sell-by date.[83]

Before the advent of biotech soybeans, soybean farmers frequently obtained seeds from dealers or by saving seed beans from the prior year's crop. Dealers select seed varieties from sellers that are well-suited to a particular region's growing conditions, as well as their resistance to insects, weeds, disease, weather pressures, and maturity.[84] The seeds sold by dealers

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[80] IND. CODE § 15-15-1-2.

[81] *See, e.g.,* The Federal Seed Act, 7 U.S.C. §§ 1551 *et seq*.

[82] IND. CODE § 15-15-1-32. Noxious weeds are perennial weeds that not only produce seed but also spread by underground roots and stems. They are destructive and not easily controlled by ordinary tillage and herbicide applications.

[83] *Id.*

[84] In the context, "maturity" means the length of a growing season necessary before a crop may be harvested.

have also been cleaned, removing crop residue, foreign matter and weed seeds. The cost of soybeans sold as seed includes research and development expenditures, license fees, processing and transportation costs and is more expensive than commodity grain.[85]

Grain elevators rarely, if ever, sell commodity grain to farmers as seed.[86] The reasons underlying a lack of viable seed market for grain elevators are not complex. Farmers, like any rational buyer of inputs, require information concerning seeds they intend to plant. Grain elevators selling "commodity soybeans" cannot neither verify nor certify the germination rate, hard seed or weed content, or maturity of the soybeans they sell. As a result, neither do the very small number of farmers who purchase such soybeans for use as seed.[87] The practice of purchasing seeds from grain elevators for planting is fraught with risk. Widespread adoption of Mr. Bowman's license fee circumvention scheme will hinder productivity, facilitate the spread of noxious weeds, and place elevators in the untenable position of serving as *de facto* state inquisitors regarding the intended uses of grain purchased by their customers.[88]

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[85] CHS Br. ___.

[86] "Commodity grain" is the grain harvested from a farmer's field and sold to a grain elevator or other buyer for use as animal feed, biofuels, food processing, or export. Commodity grains from various farms are intermingled and undifferentiated.

[87] Pet. Br. 5.

[88] CHS Br. ___.

SUMMARY OF ARGUMENT

American farmers will sustain severe harm in the event this Court determines that Monsanto's intellectual property rights in second and subsequent generation soybean seeds are exhausted. The self-replicating[89] nature of soybeans does not somehow transform Bowman's right to use commodity soybeans -- as feed or for other proper purposes -- into the right to make *new articles* containing patented technology. Amici submit that the use of biotechnology permits farmers to produce crops more efficiently and sustainably than ever before. Current and future research is likely to result in higher yields, better nutritional content, and will enable farmers to use more environmentally sustainable production practices. The simplification of weed management when using glyphosate-resistant technology allows soybean farmers to adopt cultivation practices that improve carbon sequestration and reduce deleterious environmental impacts, including erosion, runoff and greenhouse gas emissions. Utility patent protection provides the

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[89] Petitoner's use of the term "self-replicating" oversimplifies the conditions necessary for a soybean seed to germinate into a plant and produce new soybeans. *See* Pet. Br. 15. Soybeans typically need soil temperatures in excess of 50 degrees before germination commences. Soybean seeds need to be planted in loose, well-drained soils at a depth of 1 to 2.5 inches, depending on the soil's moisture content. Meeting these requirements requires proper timing and the use of machinery. The notion that soybean plants would reproduce themselves into perpetuity without human intervention borders on the preposterous. *See* National Soybean Research Laboratory, *Soybean Production: Planting, Growing, and Harvesting Soybeans*, www.nsrl.uiuc.edu/abouysoy/production02.html (last viewed Jan. 21, 2013).

necessary incentive for seed and biotechnology companies to develop groundbreaking, innovative genetically modified crops.

This Court should affirm the decision of the Federal Circuit and clarify that the patent exhaustion doctrine is inapplicable to the unauthorized planting of second and subsequent generation seeds containing Monsanto's technology. Moreover, neither *Quanta Computer, Inc. v. LG Electronics, Inc.*, 553 U.S. 617 (2008) nor any other decision of this Court stands for the proposition that a sale of a seed (or any other patented article) bestows upon a purchaser the right to "construct an essentially new article," absent authorization. *Jazz Photo Corp. v. International Trade Comm'n*, 264 F.3d 1094, 1102 (Fed. Cir. 2001). Reversal of the decision below will be tantamount to the endorsement of Bowman's highly unusual fee circumvention scheme and will have severe negative implications for the soybean industry, in particular, and American agriculture generally. There is little dispute that farmers are dependent on genetic advancements in order to meet growing demand and to remain competitive in a global marketplace. A decision that results in a lack of intellectual property protection for seed biotechnology firms will, in all likelihood, result in the prompt diversion of research dollars currently devoted towards the improvement of soybeans and other self-pollinating seeds.

ARGUMENT

I. The Federal Circuit Correctly Held that the Patent Exhaustion Doctrine Was Inapplicable to Bowman's Creation of Subsequent Generations of Soybean Seeds

Petitioner Bowman has twice argued that Monsanto's rights in its patented seeds were exhausted based upon this Court's decision in *Quanta*. Bowman's arguments were properly rejected by the Southern District of Indiana, Pet. App. 41a. The court of appeals affirmed, concluding that "even if Monsanto's patent rights in the commodity seeds are exhausted, such a conclusion would be of no consequence because once a grower . . . 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." Pet. App. 14a.

The Federal Circuit properly focused its analysis upon the cornerstone of patent exhaustion jurisprudence: *the article*.[90] Bowman's highly

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[90] In *United States v. Univis Lens Co.*, this Court explained that a "patentee may surrender his monopoly in whole by the sale of the patent or in part by the sale of *an article* embodying the invention. His monopoly remains so long as he retains the ownership of the patented article. But sale of it exhausts the monopoly *in that article*." 316 U.S. 241, 250 (1942)(emphasis added). Unlike the second and subsequent generation soybean seeds at issue at bar, *Univis Lens* concerned application of the patent exhaustion doctrine to a partially completed lens blank which was "capable of use only in practicing the patent." *Id.* at 249. The commodity soybeans planted by Petitioner were certainly capable of being used for feed, oil and applications other than planting.

unorthodox and uncommon practice of buying commodity soybeans did not bestow upon him the unrestricted right to replicate Monsanto's patented technology. While he was free to use the articles he purchased for feed or for any other *proper purpose,* Bowman did not possess a license or other "right to construct an essentially new article on the template of the original." *Jazz Photo,* 264 F.3d at 1102. Bowman's planting and cultivation of those commodity beans resulted in the creation of new soybeans, each of which constituted a "newly infringing article." Pet. App. 14a.

The Federal Circuit's decision is also consistent with *Quanta.* First, self-replicating technology was not at issue in *Quanta.* Second, Bowman's planting and growing of new seeds did not concern the re-use, repair, or re-sale of an article to which the patent exhaustion doctrine might apply. *See Aro Mfg. Co. v. Convertible Top Replacement Co.*, 365 U.S. 336, 342 (1961). To the contrary, Bowman's cultivation of a new crop of soybeans constituted infringement because he made *new articles* containing Monsanto's intellectual property.[91] Bowman's bundle of property rights in soybeans purchased from a grain elevator can be no greater than the bundle of rights possessed by the original soybean producer and the sale of a good to a third party does not vitiate a patentee's explicit restrictions on a licensee's use of its invention. *General Talking Pictures Corp. v. Western Electric Co.*, 304 U.S.

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[91] Monsanto did not sell any Roundup Ready® seeds unconditionally and therefore all soybeans containing its technology are similarly restricted.

175, 181 (1938). This Court should not permit the patent exhaustion doctrine to be used as a sword to sever a patentee's residual right to "exclude others from making . . . the invention throughout the United States . . . ." 35 U.S.C. §154(a)(1). Accordingly, this Court should affirm the Federal Circuit's decision and uphold Monsanto's right to exclude Petitioner from making new soybean seeds. Affirmance will maintain a legal environment that will permit seed breeders to devote the funds necessary to foster the research and development critical to agricultural innovation.

II. Soybean Farmers and Society Will Substantially Benefit From Advances in Plant Biotechnology

Amici respectfully submit that biotechnology is a critical tool that must be employed by farmers to feed a growing population while maximizing environmental sustainability. The public also benefits from this technology, which has applied innovation and ingenuity to the task of feeding a growing world.[92]

The introduction of glyphosate-resistant technology has revolutionized how farmers manage weeds. As a result, soil quality has improved because of reduced erosion and the re-generation of topsoil. Soil water loss has decreased, allowing farmers to produce more grain with less rainfall and irrigation. Runoff of sediments and pesticides has decreased substantially.

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[92] Haley Stein, *Intellectual Property and Genetically Modified Seeds: The United States, Trade, and the Developing World*, 3 NW. J. TECH & INTELL. PROP. 160, 161 (2005).

Conservation tillage and no-till practices reduce GHG emissions, sequester carbon, and improve agriculture's carbon footprint. Furthermore, use of glyphosate-resistant technology improves farmers' quality of life by making crops more manageable and reducing hand labor and exposure to more persistent and harmful pesticides.

The potential benefits of biotechnology are largely untapped. While glyphosate-resistant technology is one of the first genetically modified traits available to farmers, it will not be the last. Genetic researchers, bolstered by intellectual property protection, are developing cutting-edge traits that will make American farmers more productive while requiring the use of less fertilizer, water, and persistent pesticides. These new innovations will also produce fewer deleterious environmental consequences and assist in maximizing the efficient use of scarce resources to feed a rapidly expanding global population.

Biotechnology will also play a role in improving the productivity and nutritional content of crops in developing nations.[93] For example, disease resistant cassava plants have the potential to improve the yield of an important tropical food crop while reducing the use of riskier hand-applied pesticides. Genetically

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[93] Bill & Melinda Gates Foundation, *Why the Foundation Funds Research in Crop Biotechnology*, http://www.gatesfoundation.org/agriculturaldevelopment/Pages/why-we-fund-research-in-crop-biotechnology.aspx (last viewed Jan. 21, 2013).

modified "golden" rice promises to reduce nutritional deficiencies in countries dependent on rice as a staple.[94]

Amici strongly urge this Court to affirm the Federal Circuit's decision in light of the critically important negative consequences that would be triggered by reversal. If seed developers lack intellectual property protection, some farmers may adopt Petitioner's unorthodox scheme of license fee circumvention. In order to remain competitive with those who elect to mimic Petitioner's scheme, many farmers will need to gamble on a "grab bag" of grain not sold as seed. Research dollars are then likely to be diverted from developing better varieties of self-pollinating crops -- including soybeans and wheat -- because it will become difficult, if not impossible, to recoup research expenses.[95] Seed companies, like other publicly traded research entities, are duty-bound to their shareholders and are required to make economically rational decisions. The loss of intellectual property protection for second and subsequent soybean generations containing patented traits will undoubtedly result in a substantial reduction in crop research. Any stagnation in innovation will have negative impacts on America's farmers and consumers of food and other agricultural products.

In 1836, the State Department instituted the free seed distribution program to obtain the best seed technology for America's farmers in order to produce

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[94] *Id.*

[95] *See* American Seed Trade Association Br. __.

food for the nation. The free seed program was terminated because seed technology was not keeping pace with society's demands. During 2012, the State Department re-affirmed its support of agricultural biotechnology as a way to produce the food needed by a growing world population.[96] In order to meet this challenge, "more food will need to be produced in the next 50 years than has been produced during the last 10,000 years combined."[97] Agricultural biotechnology is a "proven means of building global food stores."[98] Little incentive exists for innovation unless seed research and development is afforded intellectual property protection. Soybean, corn, wheat and sugar beet farmers can help achieve these goals, but will require access to continued improvements in seed technology.

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[96] Jose W. Fernandez, Assistant Secretary, U.S. Dept. of State, Remarks: Boosting Agricultural Production (Mar. 16, 2012), *available at* http://www.state.gov/e/eb/rls/rm/2012/182459.htm?goMobile=0.

[97] *Id.*

[98] *Id.*

CONCLUSION

For the reasons stated herein, the judgment of the United States Court of Appeals for the Federal Circuit should be affirmed.

Respectfully submitted,

GARY H. BAISE
Counsel of Record
STEWART D. FRIED
JOHN G. DILLARD
Olsson Frank Weeda Terman Matz PC
600 New Hampshire NW
Washington, DC 20037
(202) 789-1212
gbaise@ofwlaw.com

Counsel for Amicus Curiae