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 *AMICUS CURIAE* OF THE AMERICAN SEED TRADE ASSOCIATION IN SUPPORT OF RESPONDENTS

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STATEMENT OF INTEREST OF AMICUS CURIAE

Founded in 1883, the American Seed Trade Association (ASTA) is a voluntary, nonprofit national trade association representing approximately 700 members involved in seed production and distribution, plant breeding, and related industries in North America.[1]

[1] No counsel for any party authored this brief in whole or in part, and no person or entity, other than the amici curiae and their members, made a monetary contribution to the prepara-

As an authority on the seed industry, ASTA monitors and takes positions on science and policy issues of industry-wide importance. Its mission is to enhance the development and movement of quality seed worldwide.

Many ASTA members are research-intensive companies engaged in the discovery, development, and marketing of enhanced seed—seed that incorporates one or more patented seed technologies. These ASTA members annually invest billions of dollars researching and developing patented seed technology to make American agriculture more productive and the Nation's food supply more plentiful and nutritious. To protect this investment, these entities seek patent protection for their discoveries. There are a number of different patented seed technologies, including novel plant varieties created through traditional breeding, technologies that improve traditional breeding methods, improved research techniques for identifying beneficial genes, enabling technology for incorporating these genes into plant germplasm, and transgenic crops with one or more beneficial traits.[2] These ASTA members hold a significant percentage of the utility patents claiming plant-related subject matter that have been granted by the U.S. Patent &

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tion and submission of this brief. This brief is filed with the consent of the parties, whose letters of consent have been filed with the Clerk. Respondent, Monsanto Company is a member of ASTA.

[2] The term "germplasm" refers to all of the genetic information in the seed—meaning all of the plant's genes. Specific genes in the germplasm provide a plant with specific characteristics, or "traits"; this in turn means that traits such as high yield, pest resistance, or drought resistance can be traced back to one or more genes in a seed's germplasm. Plants of the same type with different traits are referred to as "varieties." For example, there are many varieties of corn or soybeans and seed developers strive to produce improved varieties through both traditional breeding techniques and modern biotechnology.

Trademark Office. With this patent protection in hand, many of these entities take on the responsibility of obtaining and maintaining the global regulatory authorizations necessary for both cultivation and trade in products produced from transgenic crops such as grain, many processed foods, plastics, biofuels, and oils.

In addition, 65% of ASTA's members are medium sized seed companies with annual sales of $4 million or less. Many are licensed to incorporate patented seed technology developed by others into their own seed varieties, thereby ensuring that there is a wide variety of enhanced seeds on the market.

ASTA participates as an amicus in patent cases affecting its members. *See, e.g.*, ASTA Amicus Br. in *Quanta Computer, Inc.* v. *LG Electronics, Inc.*, 553 U.S. 617, 625 (2008)**;** ASTA Amicus Br. in *J.E.M. Ag Supply* v. *Pioneer Hi-bred Intern., Inc.*, 534 U.S. 124 (2001). And ASTA and its members have a substantial interest in this case. Private seed patentees typically make their seed technology available in a manner consistent with the Court's patent precedents. If the Court were to hold that the sale of *one* generation of seed exhausts all rights in every *successive* generation, a patentee would, with only a handful of sales, lose the ability to exclude any infringing products from the markets, including those of competitors. This would have a devastating effect on the seed industry, evaporate investment in patented seed technology, and deprive farmers and the public of the current and future benefits of enhanced seed.

SUMMARY OF ARGUMENT

The Patent Act separately protects each copy of a patented article, and this Court's precedents consistently recognize that each patent right may be separately granted. These principles apply to all technol-

ogies. An exception should not be made for seed technology. Indeed, the success of enhanced seed—its overwhelming popularity with farmers, the benefit it confers on the public, and the burgeoning private investment in research and development—all counsel in favor of finding that the Court's current precedent strikes the right balance and should be maintained.

1. Patented seed technology benefits farmers, consumers, and the environment. The many documented benefits of this technology include reduced pesticide use, simplified weed control, increased crop yield, improved nutrition in certain staple foods, and increased use of certain conservation practices.[3] These primary benefits also create secondary benefits. For example, as the world population increases, improved yield reduces the demand for farmland resulting in less water use and supporting biodiversity by putting land to other uses. There is no better example of the benefit of enhanced seed to farmers than its overwhelming popularity. Currently, 88 percent of the Nation's corn, 94 percent of its soybeans, and 90 percent of its cotton is grown from enhanced seeds.[4]

The benefits of patented seed technology are many. But researching, developing, and obtaining (and maintaining) regulatory approvals for this technology can be expensive and time consuming. For example, in order to protect global trade, including both

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[3] *See* American SoyBean Association *et al.* (ASA) Br. at G (detailing conservation practices).

[4] U.S. Dep't of Agriculture, Econ. Research Serv. Report, *Adoption of Genetically Engineered Crops in the U.S.* (2012), http://www.ers.usda.gov/data-products/adoption-of-genetically-engineered-crops-in-the-us.aspx; U.S. Dep't of Agriculture, National Agricultural Statistics Service, Statistics by Commodity, http://www.nass.usda.gov/Statistics_by_Subject/index.php?sector=CROPS; *see also* ASA Br. at E.

domestic trade and U.S. export markets, global regulatory approvals for products produced from transgenic crops must be obtained and maintained. Indeed, private research expenditures in this field totaled $3.5 billion in 2010, a figure that has increased nearly every year since 1994, when expenditures totaled $1.5 billion.[5]

2. The Patent Act and this Court's long-standing precedent separately protect each copy of a patented article and recognize that each patent right (to make, use, sell, offer for sale, or import) may be separately licensed. These settled principles correctly balance the incentive to improve technology with the need for society to benefit from the improvements.

The sale of a single patented article does not exhaust the patentee's rights in future copies of the patented article. Thus, while an authorized purchase of a patented article or machine carries with it "the right to the use of that machine so long as it [is] capable of use," *Adams* v. *Burke*, 84 U.S. 453, 455 (1873), that transaction does not confer on the purchaser the right to "make a new article." *Aro Mfg. Co.* v. *Convertible Top Replacement Co.*, 365 U.S. 336, 346 (1961) (quoting *United States* v. *Aluminum Co. of America*, 148 F.2d 416, 425 (2d Cir 1945)). Rather, the patent grant is called "into play for a second time" upon a "second creation of the patented entity." *Aro*, 365 U.S. at 346; *see also American Cotton-Tie Co.* v. *Simmons*, 106 U.S. 89 (1882).

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[5] Paul W. Heisey and Keith O. Fuglie, *Private Research and Development for Crop Genetic Improvement* 39, in Keith O. Fuglie *et al.*, Econ. Research Serv., U.S. Dep't of Agric., Econ. Research Report No. 130, *Research Investments and Market Structure in the Food Processing, Agricultural Input, and Biofuel Industries Worldwide* (Dec. 2011), at 25-48 ("Private Research and Development for Crop Genetic Improvement"), *available at* http://www.ers.usda.gov/media/199879/err130_1_.pdf.

3. The seed industry operates within these principles and its success demonstrates that the correct balance is being struck. In typical seed industry practice, a patentee grants a farmer the rights to plant, cultivate, and harvest such that the patented seed purchased by the farmer is spent. The patentee also grants the right to certain uses of the second generation of seeds. But the patentee does not, in that transaction, grant the right to plant the second generation and grow a third generation; that would constitute a "second creation of the patented entity," in *Aro*'s words, 365 U.S. at 346, and is not covered by the initial grant.

These principles are both straightforward and settled. Their efficacy is demonstrated by the overwhelming popularity of patented seed technology among farmers, the benefits to society it confers, and the continued private investment it spurs. Given these successes, there is no justification for creating an exception to these principles.

4. Petitioner, however, seeks just such an exception. Under Bowman's proposed rule, purchasing one generation of seeds would enable the purchaser to *indefinitely* generate successive generations of seed with the same patented improvements. If that rule controls, a patentee would be unable to stop a farmer—or a competitor—from using this second seed generation to produce future generations of the improved seed at an ever-accelerated rate. Thus, with only a handful of sales, the patentee would lose the ability to exclude any infringing products from the market—including those of competitors.

The consequences of this lack of control over future seed replication would be devastating for the seed industry. Firms that have developed patented seed technology would stand to lose hundreds of millions of dollars in revenues in very short order. And hundreds of seed companies that license patented

seed technology—and whose entire corporate livelihoods are based on the right to incorporate this technology into their own seed varieties—would be at serious risk of going out of business.

The loss of control over downstream enhanced seed replication would quickly produce other consequences, too. Investment in patented seed technology, which is currently on the order of billions of dollars a year, would be expected to slow to a trickle; private firms would have little incentive to invest the substantial resources required to develop improved seed technology if their patent rights were basically forever extinguished upon the very first sale. And for those few stalwart developers remaining in the business, those companies would have to recoup their research and development and regulatory costs—and earn a return on investment—all through a limited number of transactions with first-time customers. The price of seed in such circumstances would likely be so prohibitively expensive that few farmers could afford it, and farmers (and the public) would be deprived of the current and future benefits of enhanced seed.

Further, adopting Petitioner's rule would, at best, severely disrupt global trade. Patentees currently expend significant resources obtaining and maintaining the necessary global regulatory approvals for cultivating and trading in seeds, crops, and end products containing transgenic technology. Without patent protection for successive generations of seed, patentees would be unable to justify this expense thereby disrupting, if not entirely halting, the global grain trade in these products.

The Court should maintain its current course, decline Bowman's offer to carve out an exception to its settled rule, and declare that in seed technology, just like any other technology, the sale of a patented

article does not exhaust the patentee's rights in future copies of the article.

ARGUMENT

I. PATENTED SEED TECHNOLOGY PROVIDES NUMEROUS BENEFITS TO SOCIETY BUT IS COSTLY AND TIME-CONSUMING TO RESEARCH AND DEVELOP.

A. Overview

Farmers and scientists have long searched for ways to create and improve plants by altering their genetic makeup. One such technique, with ancient origins, is selective breeding. This approach involves a farmer or company saving seed from plants with desirable characteristics, such as high yield, and replanting only these seeds the next growing season. Over many growing seasons, this selective breeding creates a buildup of favorable genes in the seed's germplasm. Another approach involves crossing one variety of a plant with another variety to create a new "hybrid" variety of the same plant.[6] For example, a corn variety with high yield may be crossed with another corn variety with good drought resistance in order to combine these two beneficial traits in one plant.

Over time, plant breeders have developed and perfected breeding techniques. In fact, traditional breeding has had a huge impact on global agriculture. Almost without exception, the commercial crops grown today have been genetically modified

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[6] *See* H.R. Subcomm. on Basic Research of H.R. Comm. on Science, *Seeds of Opportunity: An Assessment of the Benefits, Safety, and Oversight of Plant Genomics and Agricultural Biotechnology*, Comm. Print 106-B, at 10, 14 (2000) ("*Seeds of Opportunity*"), *available at* http://test.bio.org/foodag/background/NickSmith_SeedsOfOpportunity.pdf.

over time by one of these techniques. Indeed, most important food crops "have been altered to such an extent that their wild ancestors are unrecognizable, and in some cases they are unknown altogether."[7] Modern corn, for instance, bears little resemblance to its early ancestor, teosinte, whose cobs measured only one to two inches long and boasted few kernels. Ancient varieties of potatoes and tomatoes also were vastly different from their modern relatives—and barely edible, if at all. It took centuries of careful breeding to develop those crops into the foods we consume today.[8] Indeed, traditional breeding is still employed to produce new plant varieties today and a number of improved breeding techniques, and the resultant varieties, are patented.

Despite this, these techniques have certain limitations. For example, traditional breeding involves the transfer of many genes—some carrying desirable traits, others not—to create a new plant variety. Producing a plant with the right combination of genes thus requires repeated rounds of breeding, without any guarantee that the beneficial traits will be successfully expressed in the next generation.

This is where modern biotechnology adds further value. With recent advances in biotechnology, scientists can now insert genes bearing *only* desirable traits directly into seed germplasm—significantly speeding the process to market.[9] And where traditional breeding techniques combine only plant traits, limiting the number of potentially beneficial combinations, modern biotechnology can add beneficial traits from other species, such as bacteria, to plants.

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[7] *Id.*

[8] *See* Council for Biotechnology Information, *Good Ideas Are Growing: Plant Biotechnology* 2 (2003) ("*Good Ideas*"), *available at* http://www.massey.ac.nz/~ychisti/AgBiotech.pdf.

[9] *Good Ideas* at 2; *Seeds of Opportunity* at 14.

This ability to transfer specific genes into a plant from a variety of sources has been likened by one commenter to the "discovery of fire";[10] it significantly broadens the potential for adding beneficial traits to the Nation's crops.

In order to realize these benefits, companies expend significant resources researching and developing a wide variety of improved seed technologies. For example, companies develop novel plant varieties through traditional breeding, more efficient breeding techniques, improved research techniques for identifying beneficial genes, enabling technologies for incorporating these genes into plant germplasm, and transgenic crops with one or more beneficial traits. To protect this investment, companies obtain patent protection for their discoveries. In fact, the current patent protection afforded seed is widely credited for the dramatic growth of private investment in, and the development of, improved seed technology.[11] Thus, both traditional breeding and modern biotechnology have produced, and continue to produce, a wide variety of patented seed technologies.

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[10] Haley Stein, *Intellectual Property and Genetically Modified Seeds: The United States, Trade, and the Developing World*, 3 N.W. J. of Tech. & Intell. Prop. 160, 169 (Spring 2005) ("*Intellectual Property and Genetically Modified Seeds*") (quotation omitted), *available at* http://scholarlycommons.law. northwestern.edu/cgi/viewcontent.cgi?article=1033&context=njtip.

[11] Jorge Fernandez-Cornejo, *et al.*, *Have Seed Industry Changes Affected Research Effort?*, Amber Waves Vol. 2 Issue 1, at 17 (Feb. 2004), *available at* http://www.ers.usda.gov /AmberWaves/February04/Features/HaveSeed.htm; Stein, *Intellectual Property and Genetically Modified Seeds* at 160, 178; Brian D. Wright, Univ. of Cal., Div. of Agric. & Nat. Res., *Plant Genetic Engineering and Intellectual Property Protection*, Agric. Biotechnology in Cal. Series, Pub. 8186, at 3-5 (2006), *available at* http://ageconsearch.umn.edu/bitstream/131780 /2/features_seedindustry.pdf.

B. Patented Seed Technology Benefits Farmers, Consumers, And The Environment.

Patented seed technology produces many documented benefits and will play a crucial role in addressing the challenges facing U.S. agriculture. This technology reduces pesticide use, increases crop yield, improves nutrition in certain staple foods, simplifies weed control, and benefits the environment. These primary benefits in turn create secondary benefits. For example, as the world's population increases, improved crop yield reduces the demand for farmland, resulting in less water use and supporting biodiversity by putting land to other uses.[12]

All these benefits have not gone unrecognized. The near-universal adoption of certain crops by United States farmers demonstrates the overwhelming popularity of patented seed technology, as well as its real-world benefits.

There are a number of enhanced crops on the market and in development. "Bt" crops, for example, are genetically engineered to carry genes from *Bacillus thuringiensis* ("Bt"), a naturally-occurring soil bacterium. Bt corn is resistant to the European corn borer, a pernicious pest that costs U.S. corn growers over $1 billion each year.[13] Other crops, such as the

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[12] Graham Brookes and Peter Barfoot, *GM Crops: Global Socio-Economic and Environmental Impacts 1996-2009* (2011), ("*Global Socio-Economic and Environmental Impacts*"), *available at* http://www.pgeconomics.co.uk/pdf/2012globalimpactstudyfinal.pdf.

[13] Jorge Fernandez-Cornejo, *et al.*, Econ. Research Serv., U.S. Dep't of Agric., Agric. Economic Rep. No. 786, *Genetically Engineered Crops for Pest Management in U.S. Agriculture: Farm-Level Effects* 2 (May. 2000) ("*Genetically Engineered Crops*"), *available at*http://www.ers.usda.gov/media/323484/aer786_1_.pdf; *Seeds of Opportunity* at 15.

soybean crops at issue here, have been modified to tolerate certain broad-spectrum herbicides used by farmers to control weeds. This significantly simplifies weed control making farming more efficient. *See* ASA Br. at G. Still other crops like papaya and squash have been modified to protect themselves against viral infection in much the same way humans are protected from disease—through "inoculation" and the resultant building of a natural defense.[14]

The use of these crops has had a "significant impact on U.S. agriculture,"[15] including simplified weed control, increased yields, reduced pesticide use, increased household income for farmers, and environmental benefits. A 2011 assessment of the impacts of patented seed technology found that enhanced crops have increased farm income in the U.S. by $29.8 billion between 1996 and 2009.[16] One study of 13 enhanced crops planted in 2005 found that the use of such crops increased yields by 8.3 billion pounds, raised farm net income by $2 billion, and reduced pesticide use by 69.7 million pounds.[17] Further, these technologies have allowed the use of

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[14] *Genetically Engineered Crops* at 2; *Good Ideas* at 3; *Seeds of Opportunity* at 15-16.

[15] Sujatha Sankula, *et al.*, National Center for Food and Agricultural Policy, *Impacts on U.S. Agriculture of Biotechnology-Derived Crops Planted in 2003: An Update of 11 Case Studies*, Executive Summary 1 (Oct. 2004), *available at* www.ncfap.org/whatwedo/pdf/ExecSummary10-18-04.pdf.

[16] Brooks, *Global Socio-Economic and Environmental Impacts* at 30-59.

[17] Sujatha Sankula, National Center for Food and Agricultural Policy, *Quantification of the Impacts on U.S. Agriculture of Biotechnology-Derived Crops Planted in 2005*, Executive Summary 2 (Nov. 2006), *available at* http://www.ncfap.org/documents/2005biotechExecSummary.pdf. *see also Genetically Engineered Crops* at 15-16.

more benign herbicides.[18] In addition to reduced pesticide use, studies have found other significant environmental benefits, including an increase in "no-till" farming practices due to the use of herbicide-tolerant crops.[19] No-till conservation practices—which leave soil virtually undisturbed from harvest to planting—minimize soil erosion and moisture loss and have been credited with creating better wildlife habitats, reducing fuel costs by up to 50 percent, and reducing greenhouse gases.[20] The study concludes that "[t]he fact that adoption of biotechnology-derived crops has continued to grow each year since they were first introduced is a testimony to the ability of these crops to deliver tangible positive impacts and to the optimistic future they hold."[21]

A government report issued in 2000 on the use of insect-resistant and herbicide-tolerant corn, soybeans, and cotton presented similar findings. The report found that the use of such crops generally led to higher yields, increased farm returns, and reduced pesticide use.[22] In particular, the report found that the use of Bt cotton led to "significantly reduced insecticide use" and that the use of herbicide-tolerant

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[18] Fernandez-Cornejo, *Genetically Engineered Crops*, at 3. The report explains, herbicide-tolerant crops "may require lower application rates or fewer herbicide applications," and "in many cases, [herbicide-tolerant] crops allow farmers to use more benign herbicides instead of more harmful ones."

[19] Sankula, *Impacts on U.S. Agriculture of Biotechnology-Derived Crops Planted in 2003* at 7; National Research Council, *The Impact of Genetically Engineered Crops on Farm Sustainability in the United States* (2010), at 151, 215 ("*Impact of Genetically Engineered Crops*"), *available at* https://download.nap.edu/catalog.php?record_id=12804.

[20] *Id.*; *Good Ideas* at 12.

[21] Sankula, *Quantification of the Impacts on U.S. Agriculture of Biotechnology-Derived Crops Planted in 2005* at 12.

[22] *Genetically Engineered Crops* at iii.

soybeans led to "significant decreases in herbicide use."[23]

These positive trends have continued as more growers have planted enhanced seed. A government report found that in 2011, with 88 percent of the nation's corn acreage planted with enhanced seed varieties, the average yield of corn for grain was 34 percent higher than in 1995—the last year before enhanced seed varieties were first planted.[24] Soybean yields have similarly increased by 19 percent between 1995 and 2011, with 94 percent of U.S. soybean acreage planted with enhanced seed varieties today.[25] Cotton yields are up by 23 percent between the period 1990-1995 and 2011, when 90 percent of U.S. upland cotton was genetically engineered.[26]

Those higher yields spur yet more benefits. A 2007 government study, for example, found a positive and statistically significant relationship between the planting of herbicide-tolerant soybeans and off-farm household income.[27] The study's authors hypothe-

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[23] *Id.*

[24] U.S. Dep't of Agriculture, Econ. Research Serv. Report, *Adoption of Genetically Engineered Crops in the U.S.* (2012), http://www.ers.usda.gov/data-products/adoption-of-genetically-engineered-crops-in-the-us.aspx; U.S. Dep't of Agriculture, National Agricultural Statistics Service, Statistics by Commodity, http://www.nass.usda.gov/Statistics_by_Subject/index.php?sector=CROPS.

[25] *Id.*

[26] *Id.*; *see also* ASA Br. at E.

[27] Jorge Fernandez-Cornejo, Econ. Research Serv. U.S. Dep't of Agric., Econ. Research Report No. 36, *Off-Farm Income, Technology Adoption, and Farm Economic Performance* 20 (Feb. 2007), available at http://www.ers.usda.gov/media/200316/err36_1_.pdf (finding that a 15.9 percent increase in off-farm

sized that adoption of enhanced seed technologies frees operators' time for use in non-farm activities. All of these yields and numbers amply confirm why U.S. farmers have enthusiastically, and almost universally, adopted enhanced seed with respect to certain crops.[28]

Consumers, too, benefit from patented seed technology. Decreased pesticide use reduces adverse impacts on public health. More fundamentally, as the U.S. population has grown, the Nation's supply of arable land has steadily decreased. In 1950, farm acreage totaled over 1.1 billion acres.[29] By 2006, farm acreage had shrunk to just 930 million acres—a reduction of nearly 20 percent.[30] Despite this continuing decrease in arable land, "[o]ver the past 70 years, there has been a remarkable *increase* in the yields of *all* major field crops in the United States," and "*more than half* of [those] yield gains are attributed to genetic improvements achieved by plant breeders."[31]

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household income is associated with a 10-percent increase in the probability of adopting HT soybeans).

[28] Fernandez-Cornejo, *Genetically Engineered Crops* at 18; ASA Br. at E.

[29] National Agric. Statistics Serv., U.S. Dep't of Agric., *Trends in U.S. Agriculture—Farm Numbers and Land in Farms* (Aug.. 2009), *available at* http://www.nass.usda.gov/Publications/Trends_in_U.S._Agriculture/Farm_Numbers/index.asp.

[30] National Agric. Statistics Serv., U.S. Dep't of Agric., *Farms, Land in Farms, and Livestock Operations: 2006 Summary* 2 (Feb. 2007), *available at* http://usda01.library.cornell.edu/usda/nass/FarmLandIn//2000s/2007/FarmLandIn-02-02-2007.pdf.

[31] Jorge Fernandez-Cornejo, Econ. Research Serv., U.S. Dep't of Agric., Agric. Information Bulletin No. 786, *The Seed Industry in U.S. Agriculture: An Exploration of Data and Information on Crop Seed Markets, Regulation, Industry Structure, and Research and Development* 5 (Feb. 2004) ("*The Seed Industry in*

Looking forward, U.S. agriculture faces a number of significant challenges as it attempts to address the needs of a rapidly growing world population with reduced farmland resources. Future generations of patented seed technology will be crucial to successfully navigating these challenges. Environmental stresses such as extremes in temperatures and drought exact an enormous toll on crop production. For example, the USDA estimates losses in excess of $1 billion for Iowa's corn and soybean growers following 2012's drought.[32] Increased resistance to currently used herbicides is also a significant concern. In light of these challenges, drought and freeze resistant crops are currently under development.[33] Crops resistant to multiple herbicides are also close to the market.[34] Continued investment in patented seed technology is essential to addressing the evolving challenges facing U.S. agriculture. *See* ASA Br. at F.

C. Substantial Time and Resources Are Required to Research, Develop, And Obtain Regulatory Approval for Patented Seed Technology.

It takes time, effort, and money to develop and secure approvals for patented seed technology.

U.S. Agriculture"), *available at* http://www.ers.usda.gov/media/260729/aib786_1_.pdf (emphases added).

[32] U.S. Dep't of Agriculture, Risk Management Agency, Federal Crop Insurance Corporation, *Crop Year Statistics for 2012*, Jan. 21, 2013, http://www3.rma.usda.gov/apps/sob/current_week/state2012.pdf.

[33] CropLife International, *Plant Biotechnology Pipeline* at 2, *available at* www.croplife.org/view_document.aspx?docId=3457 (May 2011); *see also Seeds of Opportunity* at 30-31.

[34] Monsanto Co., *Soybean Research & Development Pipeline*, http://www.monsanto.com/products/Pages/soybean-pipeline.aspx (last viewed Jan 20, 2013).

And while plant breeding was "traditionally the domain of public sector investment,"[35] the private sector has assumed a leading role over the last few decades, resulting in a marked "shift of more R&D activity to the private sector."[36] Individual private firms invest substantial resources each year in enhanced seed technology. Of the $3.5 *billion* total R&D expenditures in 2010 by the seed industry, the largest six agricultural seed companies alone spent $2.6 billion. Even smaller firms spent one-quarter of the total R&D expenditures in 2010, with other seed companies spending a total of $732 million and small and medium-sized biotechnology firms spending nearly $100 million.[37]

Once an improved seed is developed, an entity (usually the patentee) must obtain and maintain regulatory approvals for as long as certain seed technologies are in the supply chain. For example, the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS) oversees field trial and large-scale production of all new transgenic plant varieties. And the Environmental Protection Agency regulates plant varieties enhanced to resist pests. The cost of guiding a single genetically engineered event through the regulatory approval process in the U.S. alone is estimated at between $6 and $15 million.[38] These regulatory approvals must

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[35] *The Seed Industry in U.S. Agriculture* at 42 n.11.

[36] *Id*. at 41. *See also* Stein, *Intellectual Property and Genetically Modified Seeds* at 176 ("Private firms now lead in research and development of [genetically engineered] seeds—a role once dominated by governments and international public institutions.").

[37] Paul W. Heisey and Keith O. Fuglie, *Private Research and Development for Crop Genetic Improvement* 39, at 25-48.

[38] Nicholas Kalaitzandonakes *et al.*, *Compliance Costs for Regulatory Approval of New Biotech Crops, in* Richard E. Just *et al.* (eds.), *Regulating Agricultural Biotechnology* 25 Nature

be obtained and maintained throughout the world to protect the Nation's export markets. But, as long as one entity maintains the necessary regulatory approvals, the remaining members of the supply chain can rely on those approvals. Thus, the patentee takes on the costly and time-consuming regulatory process for the benefit of all who cultivate or trade in the seed, grain, or end products containing these seed technologies.

II. THIS COURT'S PRECEDENT CORRECTLY BALANCES THE INCENTIVE TO IMPROVE SEED PRODUCTS WITH THE NEED FOR SOCIETY TO BENEFIT FROM THOSE IMPROVEMENTS.

All seeds follow the same course from genesis to end. Planting and cultivating a seed destroys it and creates the next generation of seeds. Under the right soil, weather, and water conditions, and with the work of an experienced farmer, seeds are germinated, cultivated, protected from pests and invasive weeds, and grown into a new, second generation of plants. After this process, the original seed is spent and the crop is harvested. However, the new plant produces a second generation of seeds; in fact, each single original seed creates multiple second-generation seeds. Soybeans, for example, have been shown to produce up to eighty second-generation seeds from just one first-generation seed. Resp. Br. at 5. Those second-generation seeds may in turn be planted and cultivated to produce a third generation of plants, and seeds, and so on. In this way, a seed

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Biotechnology 5, 509-10 (2007) *Available at* http://fbae.org/2009/FBAE/website/images/pdf/important-publiction/ Compliance_costs_Kalaitzandonakes_Alston_Bradford_May_2007.pdf.

may be reproduced indefinitely and at an accelerated rate.[39]

The question in this case, of course, is whether the sale of patented first-generation seed exhausts all patent rights in each successive generation of seeds. The answer is no.

For over 130 years, this Court has hewed to the principle that the patent exhaustion doctrine limits the patentee's control of *the article sold*, and no more than that. *See Quanta Computer, Inc.* v. *LG Electronics, Inc.*, 553 U.S. 617, 625 (2008) ("the longstanding doctrine of patent exhaustion provides that the initial authorized sale *of a patented item* terminates all patent rights *to that item*") (emphases added); *Adams*, 84 U.S. at 455 ("the sale by a person who has the full right to make, sell, and use * * * a machine carries with it the right to the use of *that machine* to the full extent to which *it* can be used in point of time") (emphases added); *United States* v. *Univis Lens Co.*, 316 U.S. 241, 251 (1942) (patent exhaustion restrains "the use and enjoyment *of the thing sold*") (emphasis added). This makes sense; as this Court explained decades ago, when a patented item is sold, the seller *receives the consideration for its use* and he parts with the right to "restrict *that use*." *Adams*, 84 U.S. at 456 (emphasis added); s*ee also Univis*, 316 U.S. at 251.

The Court has also long recognized that separate patent rights may be separately granted. *See Adams*, 84 U.S. at 456 ("The right to manufacture, the right to sell, and the right to use are each substan-

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[39] While each generation of seed may be planted we note that the grain planted by Petitioner is not typically used for this purpose. Indeed, selling grain as seed, without proper labeling, would violate both State and Federal law. *See generally* CHS, Inc. (CHS) Br.; ASA Br. at H. Needless to say, this is not typical grain elevator practice. *Id*.

tive rights, and may be granted or conferred separately by the patentee"); *United States* v. *General Electric Co.*, 272 U.S. 476, 490 (1926); *General Talking Pictures Corp.* v. *Western Elec. Co.*, 305 U.S. 124, 127 (1938). For example, it is not uncommon for a patentee to license another to use or sell—but not to make—its invention. *Id*.

This in turn leads to another, equally settled, corollary to the patent exhaustion doctrine: if only a first copy of a patented article is sold, the patentee has not relinquished rights to future copies. In other words, the right to use and sell a purchased article does *not* include the right to "make a new article." *Aro*, 365 U.S. at 346; *see also Hewlett-Packard* v. *Repeat-O-Type Stencil Mfg. Co.*, 123 F.3d 1445, 1451 (Fed. Cir. 1997) ("The authority to use and sell a purchased device, however, does not include the right to make a new device or to reconstruct one which has been spent"); *Jazz Photo Corp.* v. *ITC*, 264 F.3d 1094, 1102 (Fed. Cir. 2001) ("the ownership of a patented article does not include the right to make a substantially new article").

The seed industry's standard practices are consistent with the Court's long-standing patent law principles. In typical seed industry practice, a patentee grants a farmer the right to plant, cultivate, and harvest the patented seed it purchases such that the seed is spent. The patentee also grants the right to certain uses of the second generation of seeds; for example, a farmer may sell his second-generation seed, which is referred to as grain in this context, to a grain elevator, which in turn sells the grain further down the supply chain to be incorporated into a variety of end products (such as, in the case of soybeans, food, cooking oils, plastics, and biofuels).

But the patentee does not grant that farmer the right to plant the second generation of seeds and grow a third generation. That right to exclude

justifies the patentee's extensive regulatory expenses. It also can be an effective vehicle for enforcing environmentally sound stewardship practices like resistance management, and, in the case of universities, which develop a significant percentage of patented seed technologies, to ensure that their technology is used in accordance with their public mission. *See* Wisconsin Alumni Research Foundation (WARF) Br. at II.

A purchasing farmer thus is entitled to use the original patented seed "to the full extent that it can be used." *Adams*, 84 U.S. at 455. The farmer is entitled to plant the seed, thereby destroying it, and to harvest and sell all that the original seed produces. This Court's case law also supports conferral on that farmer of only the right to make and sell second-generation seeds, but *not* the right to plant or harvest them. *See Adams*, 84 U.S. at 456 (each patent right "may be granted or conferred separately by the patentee"); *General Electric Co.*, 272 U.S. at 490 ("the patentee may make and grant a license to another to make and use the patented article but withhold his right to sell"). And the limitation on creating a third, or further, generation of seed protects the patentee's exclusive right to make an entirely new article. *See Aro*, 365 U.S. at 346. Purchasing grain, planting it, and cultivating a *third* generation of seed is an unauthorized use of that grain, and an unauthorized making of the third-generation seed—both infringing acts. *Id.*

These principles are settled. They balance the incentive to invest in improved technology with the need to ensure that the public benefits from those improvements. And there is currently no exception to them. But Petitioner urges the Court to create one in this case, by holding that purchasing *one* generation of seeds automatically conveys unlimited rights in every *successive* generation of those seeds.

For support, Bowman relies on the Court's most recent patent exhaustion case, *Quanta*, 553 U.S. 617 at 628. Pet. Br. at 34-37. *Quanta*, and the case upon which it primarily relied, *Univis*, involved the test for applying patent exhaustion to the sale of *unpatented* components. In that situation, the Court explained, the unpatented component must "sufficiently embod[y] the patent—even if it does not completely practice the patent—such that its only and intended use is to be finished under the term of the patent." *Id.* at 628. Petitioner attempts to build his argument from this inapposite starting point. But his attempt to rely on *Quanta*'s "substantial embodiment" test only illustrates the confusion created by misapplying this test to *patented* material. Petitioner argues that a first generation of (patented) seed "substantially embodies" all subsequent generations of seed, such that the sale of one generation of seed exhausts all rights in subsequent generations. But there is a fundamental logical flaw in applying a test instructive for a sale of *unpatented* components to that of *patented* components. A patented product always "substantially embodies" the patent. Otherwise it would not be patented. Of course, simply because all copies of a patented article substantially embody the patent does not mean that the sale of one copy exhausts rights in all future copies. Only by misapplying the *Quanta* test to patented products can Bowman arrive at this incorrect conclusion.[40]

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[40] Bowman also argues that *he* did not "make" a third generation of seeds, placing the blame, and infringement liability, on the soybean plant itself. Pet. Br. 42. (contending that "it was the planted soybean, not Bowman, that 'physically connected' all elements of the claimed invention into an 'operable whole'"). In essence, according to Bowman, it's the soybean's fault. If the Court recognizes this as a valid defense, then no patented product that relies upon nature for its assembly, even in part, would ever be infringed. As a result, patents in chemistry,

This is not what the Court intended in *Quanta*. Indeed, *Quanta* and *Univis* both confirm the result that should be reached here: the authorized sale "of a *patented* item" exhausts only the rights in "that item." *Quanta*, 553 U.S. at 625 (emphasis added); *see also Univis*, 316 U.S. at 251-252. There is no justification in the Patent Act, this Court's precedent, or public policy for providing less protection to patented seed technology. And as we next explain, if an exception is created, the seed industry, and the public, will suffer.

III. REMOVING PROTECTION FOR EACH GENERATION OF PATENTED SEED WOULD DEVASTATE THE NATION'S SEED INDUSTRY, EVAPORATE INVESTMENT IN PATENTED SEED TECHNOLOGY, AND DEPRIVE THE PUBLIC OF THIS TECHNOLOGY'S CURRENT AND FUTURE BENEFITS.

Under Petitioner's rule, seed (and any other technology that replicates during a foreseeable use) would be entitled to a significantly reduced form of patent protection compared to every other technology. For, under Petitioner's rule, a purchaser of one generation of seeds would be able to indefinitely generate successive generations of seed with the same patented improvements. The holder of the patent—the initial seller—would be unable to stop the farmer, or a competitor, from using this second generation to produce future generations of the improved seed at an accelerated rate. Competitors would be able to perform research with the improved seed, piggybacking on the original improvements without compensating the patentee. Foreign competitors could purchase second-generation seed, produce

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biotechnology, and seeds, to name just a few, would be severely undermined, if not entirely worthless.

future generations or improved technology overseas and then export it back into the United States—all without paying any licensing fees. In this manner, a mere handful of sales could effectively saturate the entire market in only a few years, supplying a patentee's direct competitors with patented technology free of charge and with no further conditions on use.

This lack of control over successive generations of seed would severely harm the seed industry. Firms that have developed patented seed technology would immediately stand to lose hundreds of millions of dollars in revenues. They would also lose any competitive advantage that their patent protection would have afforded them in developing further improvements. Seed technology developed in public universities with taxpayer money would be freely available for any use without respect for the public mission of such universities. Patentees would be unable to enforce environmentally sound stewardship practices. And hundreds of smaller seed companies that license patented seed technology—and whose entire corporate livelihoods depend on the right to incorporate this technology into their own seed varieties—would be at serious risk of going out of business.

The current patent protection afforded seed is widely credited for the dramatic growth of private investment in and the development of improved seed technology.[41] By restricting the use of successive generations of seed, a seed developer is able to make its patented technology available to farmers and

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[41] Jorge Fernandez-Cornejo, *et al.*, *Have Seed Industry Changes Affected Research Effort?*, Amber Waves Vol. 2 Issue 1, at 17 (Feb. 2004), *available at* http://www.ers.usda.gov/AmberWaves/February04/Features/HaveSeed.htm; *Intellectual Property and Genetically Modified Seeds* at 160, 178; Brian D. Wright, *Plant Genetic Engineering and Intellectual Property Protection*, Agric. Biotechnology in Cal. Series, Pub. 8186 at 3-5.

other end-users at reasonable prices.[42] But if patentees cannot protect their patents once sold, such that their patented seeds are replicated and spread in just a few short growing generations, investment in enhanced seed technology will evaporate. The few developers remaining would need to look to a smaller and smaller pool of first-time (and only-time) buyers to recoup their R&D and regulatory costs and earn a return on its investment, forcing the price of seed sky-high, and forcing farmers out of that market. Private firms would thus have little incentive to invest the substantial resources required to develop improved seed technology, much to the detriment of farmers and the public. Indeed, without the right to exclude, patentees would not invest the resources necessary to maintain the multiple regulatory approvals required for certain seed technologies, approvals on which the entire downstream supply chain relies. Without these approvals, both domestic trade and U.S. export markets would be—and this is a *best*-case scenario—severely disrupted.

The seed industry's current success demonstrates that this Court's precedent correctly balances the incentive to improve technology with the need to ensure the public benefits from any improvements. The Court should not disrupt that delicate balance. And it should decline Petitioner's invitation to adopt an exception to its settled patent precedent in order to provide less protection to technologies, such as seed, that replicate through foreseeable use.

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[42] Press Release, Iowa State Univ., College of Agric., *Consumers Benefit from Strong, Enforceable Intellectual Property Protection in Seed Industry, According to Iowa State Study* (Oct. 31, 2005), *available at* http://www.ag.iastate.edu/news/releases/99/ (strong patent protection "encourage[s] private agricultural seed companies to invest in research and development that will bring new technologies to farmers around the world").

CONCLUSION

For the foregoing reasons, and for those in Respondents' brief, the Federal Circuit's judgment should be affirmed.

Respectfully submitted,

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