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A Rose by Any Other Statute Would Smell as Sweet: Patent Protection of Ornamental Plants

Catherine Anne Barrett
University of Kentucky

A ROSE BY ANY OTHER STATUTE WOULD SMELL AS SWEET: PATENT PROTECTION OF ORNAMENTAL PLANTS

CATHERINE ANNE BARRETT*

I. INTRODUCTION

Claiming intellectual property rights in living plants, particularly agricultural crops, has become a controversial topic. This debate usually focuses on utility patents, but there are other forms of intellectual property protection available to varieties of plants, including a specialized plant patent. These multiple paths to protection overlap, and are not effective at promoting progress in the horticultural arts in their current form. This note will examine ornamental horticulture, and will propose that the choice of which protection to pursue should be based on the horticultural techniques used to develop plant varieties. It is time to revise the specialized plant patent to recognize its new, limited subject matter: plants which do not meet the requirements for a utility patent.

First, the history and goals of plant patents will be briefly discussed. Second, the methods usually used to develop plant varieties will be categorized to show that common methodologies readily are distinguishable from one another by their invasiveness to the organism, and propose that a line be drawn between utility patents and plant patents based on the level of direct manipulation of the plant material. This proposal will leave ornamental plants as the primary subject matter of plant patents. "Flowers . . . are a proud assertion that a ray of beauty outvalues all the utilities of the world."[1] Ornamental plants are not useful, and do not qualify for utility patents.[2] Third, two individual case studies will show that plant patents in their current form serve ornamental plants poorly. Two specific flowers are examined. Roses are one of the most-patented ornamental plants, and their popularity predates the legal birth of plant patents. African violets are a modern favorite, and, in addition to being commercially valuable, they are extremely easy to propagate in the home. However, for both species, patent protection is rarely sought. Patents are not linked to an increase in plant innovation, which can be measured by the registration of new varieties with national clubs. Fourth, this note will examine the reasons

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* Articles Editor, KY Journal of Equine, Agriculture, and Natural Resources Law, 2012-2013. B.F.A. Studio Art, 2009, The University of Georgia; J.D. expected 2013, University of Kentucky College of Law.

[1] Ralph Waldo Emerson, Gifts (1844) *available at* http://www.bartleby.com/5/113.html.

[2] The scope of this Note has been limited to patent law. It will not examine plant breeders' rights, which are an alternative way to protect plant varieties.

that plant patents in their current form are underutilized by plant breeders, in order to provide guideposts for a future revision of the plant patent.

II. INTELLECTUAL PROPERTY PROTECTION FOR PLANTS

The goal of patent law is to promote scientific progress by granting inventors a period of exclusive use of their invention, in order to recoup the costs of development.[3]These development costs can be particularly burdensome for varieties of ornamental plants, which require many years of selection for each commercially viable cultivar.[4] Asexually reproduced plant varieties were the first field in which patent protection was granted to innovative living organisms.[5] The Plant Patent Act of 1930 (PPA) was passed when Congress was convinced intellectual property protection of innovative plants was necessary to stimulate agriculture.[6]

The objective of patent law is to encourage "the introduction of new products and processes . . . into the economy," in order to have "increased employment and better lives for our citizens."[7] The PPA was the result of vigorous lobbying by nursery companies that wanted intellectual property rights equivalent to those granted to other industries.[8] Luther Burbank, the breeder of over 800 varieties of plants, famously complained that "a man can patent a mousetrap . but if he gives the world a new fruit that will add millions to the value of the earth's [sic] annual harvest, he will be fortunate if he is rewarded by so much as having his name connected with the result."[9] Thomas Edison supported the Act by arguing it would give America "many Burbanks" by encouraging new plant breeders.[10]

The requirements for plant patents are slightly different than the requirements for utility patents. To qualify for a plant patent, an invention must be a plant within the ordinary meaning of the term.[11] The plant must be asexually reproduced, since most new varieties are not genetically stable and will appear different if propagated sexually.[12] Utility is not required.

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[3] Kewanee Oil Co. v. Bicron Corp., 416 U.S. 470, 480 (1989).

[4] Petra Moser & Paul W. Rhode, *Did Plant Patents Create The Modern Rose?*, *in* THE RATE AND DIRECTION OF INVENTIVE ACTIVITY REVISITED 413, 426 (Josh Lerner & Scott Stern eds., 2012).

[5] In 1873, Louis Pasteur obtained a patent for purified, living yeast as an "article of manufacture," but as this was an isolated incident more than a hundred years before the legal debate over whether living things were within the scope of patentable subject matter it is viewed by the author as an interesting anomaly instead of precedential. *In re* Bergy, 596 F.2d 952, 985 (citing U.S. Patent No. 141,072 (filed May 9, 1873)).

[6] Moser & Rhode, *supra* note 4, at 416.

[7] *Kewanee Oil*, 416 U.S. at 480.

[8] Moser & Rhode, *supra* note 4, at 416-17.

[9] *Id.* at 417.

[10] *Id.* at 417 (quoting the Congressional Record, 71st Cong., 2d Sess. May 5, 1930, p. 839).

[11] *In re*Arzberger, 112 F.2d 834 (C.C.P.A. 1940).

[12] Moser & Rhode, *supra* note 4, at 418.

The requirement of distinctness replaces it.[13] Distinct plants need not be better than existing plants, merely distinguishable.[14] The "distinct and new" variety, like any other invention, must be nonobvious to qualify for patent protection.[15]

The nonobviousness requirement of patent law has been particularly difficult to apply to plants. Minor improvements which would occur to any person with skill in producing that type of invention should not be granted patents. However, this principle is easier to apply to mechanical inventions than to living organisms. Courts have struggled because plant breeding is rarely as simple as human effort improving a variety in the way the breeder intended. When the obviousness of a plant is challenged, courts examine the characteristics of similar previous plant varieties as well as the differences between the prior plants and the plants at issue.[16]Courts have difficulty defining a person having ordinary skill in the art of plant breeding because so many horticultural techniques have unpredictable results.[17]

Plant patents offer fewer rights to their holder than utility patents. The patent holder may only exclude others from asexually reproducing, using, and selling the plant.[18] This means that seeds may be produced from a patented plant without infringement, whether you cross-pollinate the plant with another variety or self-pollinate the plant.[19]

Since the PPA was passed, 21,000 plant patents have been issued, and it is estimated that more than half of those patents were filed in the past 25 years.[20] The increase is attributable to legal changes that have provided additional intellectual property protection to plants.

The Plant Variety Protection Act of 1970 (PVPA) extended plant patent protection to new and distinct sexually reproduced plants and tubers which are uniform and stable from generation to generation.[21] This Note has limited its scope to ornamental plants reproduced asexually. The PVPA does not provide a route to protection for these plants, because these plants generally do not grow true to variety from seed.[22] However, it is worth emphasizing that the legislative line was drawn at sexually stable ornamental plants, indicating a long history of traditional breeding.

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[13] Yoder Bros., Inc. v. California-Florida Plant Corp., 537 F.2d 1347, 1377 (1976).

[14] *Id.* at 1378.

[15] 35 U.S.C.A. § 161 (West 1952).

[16] *Id.* at 1379.

[17] *Id.*

[18] 35 U.S.C.A. § 161.

[19] Moser & Rhode, *supra* note 4, at 418.

[20] Allen Bush, *Plant Patents: Potted Gold,* THE HUMAN FLOWER PROJECT, http://www.humanflowerproject.com/index.php/weblog/comments/plant_patents_potted_gold/ (last visited Mar. 23, 2012).

[21] 7 U.S.C.A. § 2402 (West 1970).

[22] J. Raymond Kessler, Jr., *Commercial Greenhouse Production of African Violets,* AUBURN U. DEPARTMENT OF HORTICULTURE, http://www.ag.auburn.edu/hort/landscape/African_Violets.htm (last visited Mar. 26, 2012).

The largest changes in plant patent law have occurred as the result of court decisions affecting the scope of subject matter eligible for utility patent protection. In addition to building and patenting a better mousetrap, one can now build and patent a better mouse. In *Diamond v. Chakrabarty*, the United States Supreme Court held that a manmade organism was patentable as a manufacture or composition of matter.[23] Chakrabarty, a microbiologist, had genetically engineered a bacterium by inserting plasmids not present in naturally occurring bacteria.[24] The Court found that patentable subject matter did not exclude living organisms.[25] Chakrabarty was granted a patent because the bacterium, which could break down crude oil, otherwise met the requirements for a utility patent.[26]

Following this decision, the United States Patent and Trademark Office (USPTO) started to grant utility patents for living plants in 1985.[27] In *J.E.M. Agricultural Supply, Inc. v. Pioneer Hi-Bed Intern, Inc.* the Court upheld the practice.[28] Plant patents were not intended to be the exclusive means of protecting new plant varieties.[29] Instead, they provided a route to protection for plants which did not meet the requirements of a utility patent. Utility patents are the strongest form of protection available to plants.[30] A plant protected with a utility patent cannot be propagated sexually, whether as part of a breeding plan or simply seeds saved from one season to the next.[31]

III. METHODS OF VARIETY DEVELOPMENT

Now that the scope of utility patents has been extended, utility and plant patents overlap. The plant patent is still relevant as an intellectual property tool because not all plant varieties meet the requirements of a utility patent. The line between the two forms of protection should be drawn according to the invasiveness of the techniques used to create plant varieties. Horticultural methodologies used to create new plant varieties are predictable.[32] New plant varieties are developed using several different techniques, and then once a promising new plant is identified, it asexually propagated to create thousands of genetically identical plants for sale.[33]

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[23]Diamond v. Chakrabarty, 447 U.S. 303, 307 (1980).

[24]*Id.* at 305.

[25]*Id.* at 303.

[26]*Id.* at 305, 309-310.

[27] J.E.M. AG Supply, Inc. v. Pioneer Hi-Bred Int'l, Inc., 534 U.S. 124, 125 (2001).

[28]*Id.*

[29]*Id.* at 133.

[30] Katherine E. White, *An Efficient Way To Improve Patent Quality for Plant Varieties,* 3 NW. J. TECH. &INTELL. PROP.79 (2004).

[31]*Id.*

[32]*See* Moser &Rhode, *supra* note 4, at 428.

[33] Moser & Rhode, *supra* note 4, at 427.

A. Reprogramming Genetics: Transgenic Plants

First, the direct genetic engineering of plants is possible.[34] This involves introducing a gene from another species (one not naturally present within the plant's genome), and inserting the gene so that it will be expressed with novel effects.[35] One example of plant genetic engineering is the glowing orchid created at the National Institute of Education in Singapore.[36] A gene from fireflies was transferred to orchid tissue to create orchid plants that emit light from their flowers to their roots.[37]

Another visual novelty is to introduce genes from other flower species to create bloom colors that the plant cannot naturally produce.[38] For example, a blue rose is naturally impossible.[39] Roses do not produce delphinidins, the pigments that produce blue blossoms in other flowers and fruits.[40]Horticultural fact has not stopped gardeners from dreaming.[41] As early as 1840, horticultural societies offered huge monetary rewards to the first plant breeder to produce a blue rose.[42] Novels have been written fantasizing about its discovery.[43] Scientists share the dream of blue roses, and genes from pansy and iris plants have been transferred to create a mauve rose; researchers hope to perfect a truly vivid blue bloom in the near future.[44] Genetically engineered blue carnations have already been released commercially and have replaced dyed flowers in the cut-flower trade.[45]

Manmade genes are also used to block the expression of genes naturally occurring in the plant. This technique can also be used for pigment manipulation.[46] Gene blocking can also be used to remove undesirable traits, such as production of the hormones that cause cut flowers to wilt.[47]

Although these examples are ornamental, genetic transformation

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[34]*See Pocket K No. 17: Genetic Engineering and GM Crops*, INT'L SERVICE FOR THE ACQUISITION OF AGRI-BIOTECH APPLICATIONS, http://www.isaaa.org/resources/publications/pocketk/17/default.asp (last visited Mar. 26, 2012).

[35]*A Glowing Success in Floriculture*, NEW AGRICULTURIST ON-LINE, http://www.new-ag.info/01-5/focuson/focuson4.html [hereinafter *Glowing Success*] (last visited Mar. 26, 2012).

[36]*Id.*

[37]*Id.*

[38] Gerald Klingaman, *Plant of the Week: Blue Carnation – Moondust*, U. OF ARKANSAS DIVISION OF AGRIC. (May 7, 2004), http://arhomeandgarden.org/plantoftheweek/articles/blue_carnation.htm.

[39]*Id.*

[40]*Id.*

[41]*Id.*

[42]*Plant Gene Replacement Results in the World's Only Blue Rose*, PHYSORG.COM (April 4, 2005), http://www.physorg.com/news3581.html [hereinafter *Blue Rose*].

[43]*See, e.g.*, Anthony Eglin, THE BLUE ROSE: AN ENGLISH GARDEN MYSTERY (2005).

[44]*Blue Rose*, *supra* note 42.

[45]Klingaman, *supra* note 40.

[46]*Blue Rose*, *supra* note 42.

[47]Klingaman, *supra* note 40.

can also introduce utilitarian traits such as disease resistance.[48] Monsanto's controversial Roundup Ready® plants resist herbicide as a result of genetic engineering, so that when entire fields are sprayed with Roundup only the weeds are killed, while the crops remain unharmed.[49]

This method of plant creation is the most directly analogous to the bacterium in *Diamond v. Chakrabarty*. Chakrabary had combined four different plasmids, which were DNA molecules separate from bacterium's chromosomal DNA, together in a single organism.[50] He was introducing foreign genetic material into an organism, just as the iris genes were moved into the rose.[51] Plants created with genetic engineering clearly qualify for utility patents as either a man-made manufacture or composition of matter, just like Chakrabarty's bacterium.[52]

Transgenic plant varieties are eligible for protection under both utility patents and plant patents, but most inventors will pursue the more robust rights provided by a utility patent.[53] Plant marketing agencies, which assist plant breeders in bringing plants to market, view utility patents as the more appropriate choice for plant varieties developed with advanced technical breeding.[54]

B. Speeding up Nature: Mutagenesis

A second form of producing new plant varieties is to encourage random genetic mutations through mutagenesis.[55] Exposing seeds to radiation or chemicals may cause the genes inside to change randomly, which also increases the chance of discovering something new when they are germinated.[56] These changes also occur naturally, but this is a faster way to search for new traits than waiting for natural mutations.[57] However, this technique inserts nothing new into the plant's genetic code. It simply provides additional opportunities for beneficial mutation to occur.[58] Any changes to the plant's DNA are inherited by its offspring, and can be used

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[48] *Glowing Success*, *supra* note 35.

[49] *Roundup Ready Soybeans*, UNION OF CONCERNED SCIENTISTS,http://www.ucsusa.org/food_and_agriculture/science_and_impacts/impacts_genetic_engineering/roundup-ready-soybeans.html (last visited Mar. 26, 2012).

[50] *See* Diamond v. Chakrabarty, 447 U.S. 303, 305 n.1 (1980).

[51] *Id.* at 305.

[52] *Id.* at 309.

[53] *Can IP Rights Protect Plants?*,BIOS, http://www.patentlens.net/daisy/bios/1234 (last visited Mar. 26, 2012).

[54] *Plant Patents & Trademarks: Frequently Asked Questions*, PLANT HAVEN (November, 2009), http://www.planthaven.com/pdfs/PatentFAQ.pdf [hereinafter PLANT HAVEN].

[55] *See* Rebekah L. Fraser, *The Next Wave in Seed Research: Mutagenesis Meets DNA Transfer*, GROWING (June 2009), http://www.growingmagazine.com/article-3520.aspx.

[56] Helen Van Pelt Wilson, HELEN VAN PELT WILSON'S AFRICAN-VIOLET BOOK 93 (1970).

[57] Fraser, *supra* note 55.

[58] William J. Broad, *Useful Mutants, Bred with Radiation*, N.Y. TIMES (Aug. 28, 2008), http://www.nytimes.com/2007/08/28/science/28crop.html.

to create new plant varieties.[59]

In the laboratory, this mutagenesis may be accomplished with chemical agents or with radiation, including microwaves and ultraviolet rays.[60] This practice is more widespread than genetic engineering. Since its invention more than 80 years ago, it has been used worldwide to improve crop plants.[61]Mutating seeds with the help of a microwave or the X-ray machine at a dentist's office has even been recommended as a science project for schoolchildren.[62] It is also very inefficient: more negative mutations occur than positive, and many mutated plants simply die.[63] Beneficial traits are a rare outcome, and researchers do not view mutagenesis as an effective way to reach specific goals.[64] The outcome of irradiating seeds is unpredictable.[65]

As a specific example, African violet seeds have been launched into space to expose them to cosmic radiation.[66] When germinated, the seed manifested many genetic mutations, some with commercial value.[67] Plants were developed which flowered continuously, with less of a rest period between flowerings than existing African violets.[68] Other mutations were less aesthetically appealing: one plant set hundreds of buds without ever opening a single flower.[69] Although commercial appeal is in the eye of the beholder: this never-flowering flower received an award for being the best marketable plant novelty introduced in 2009.[70]

Mutagenesis, or "mutation breeding," is distinguishable from genetic engineering.[71]The radiation is transient, and leaves no "marks of human intervention" on the plant.[72] Scientists describe mutation breeding as "not doing anything different from what nature does."[73]

Although plant varieties created this way are clearly "a product of

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[59] Fraser, *supra* note 55.

[60] *Id.*

[61] Broad, *supra* note 58.

[62] *See Seed Germination and Radiation*, U. OF GEORGIA, COLLEGE OF AGRIC. & ENVTL.SCI., *available at* http://apps.caes.uga.edu/sbof/main/lessonPlan/seedGermRadiation.pdf (last visited Mar. 26, 2012).

[63] Fraser, *supra* note 55.

[64] *See id.*

[65] Broad, *supra* note 58.

[66] *EverFloris: The New Evolution of Space Violets*, OPTIMARA, http://www.optimara.com/everfloris.html [hereinafter *EverFloris*] (last visited Mar. 26, 2012).

[67] *Id.*

[68] *Id.*

[69] *See* Kylee Baumle, *The New African Violet – 'Neverfloris'*, SOIL SISTERS,http://www.thesoilsisters.com/2010/10/new-african-violet-neverfloris.html (last visited Mar. 26, 2012).

[70] Herman Holtkamp Greenhouses, Inc., *NeverFloris*,OPTIMARA GROWER CATALOG, 14 (2012)*available at* http://www.optimara.com/Optimara%20Grower%202012.pdf (The variety is called "Neverfloris," and won the Rabensteiner Award for "Best Marketable Plant Novelty for 2009.").

[71] Broad, *supra* note 58.

[72] *Id.*

[73] *Id.*

human ingenuity," like Chakrabarty's bacterium, the mutations that occur are "nature's handiwork."[74]After the *Chakrabarty* decision, mutation breeders have continued to file for plant patents instead of utility patents, even when their new varieties have substantial practical use.[75] The "space violets" discussed earlier have been issued plant patents, not utility patents, and are marketed commercially on the appeal of their continuous flowering and unique astronomical provenance.[76]

C. Selective Breeding

Methods of plant breeding that do not require specialized scientific equipment are far more common. The third method of creating new plant varieties is controlled sexual reproduction in order to select certain traits. Even casual hobby growers can try their hand at producing a new variety of their favorite plant. Anyone with even a single specimen of a self-fertile plant can self-pollinate it to see what will happen, and the owner of a small collection can follow his gut intuition to breed a plant that suits his tastes.[77] However, most plant varieties developed by selective breeding are the result of a breeding program with specific goals, as part of a plan to make the species stronger.[78]

Like all selective breeding, the goal is cross two plants with desirable qualities and to end with a plant that has the best traits of each parent.[79] The breeder selects the strongest parent plants from each generation and builds upon them with various breeding strategies.[80] Many popular ornamental plants' dominant and recessive traits have been studied as thoroughly as the colors of Gregor Mendel's peas, and plant crosses can be planned with very specific results.[81] For some plants, different species may be crossed to create hybrids with unique characteristics.[82] Although the breeder can predict the outcome of breeding efforts, he does not have the specific control over which genes the new plant inherits that a genetic

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[74]Diamond v. Chakrabarty, 447 U.S. 303, 309-310 (1980).

[75]*See* U.S. Patent No. 11,163 (filed July 24, 1997) (describing a bermudagrass for golf greens created with irradiation); U.S. Patent No. PP11,656 (filed July 13, 1998) (describing a disease-resistant Japanese pear created by irradiation).

[76]*EverFloris*, *supra* note 66. *See also* U.S. Patent No. PP13,842 (filed Jan. 17, 2002); U.S. Patent No. PP13,818 (filed Jan. 17, 2002); U.S. Patent No. PP13,789 (filed Jan. 17, 2002); U.S. Patent No. PP13,786 (filed Jan. 17, 2002).

[77]*See* Wilson,*supra* note 56, at 92-93.

[78]*See* U.S. Patent No. 7,772,466 (filed Sept. 4, 2007).

[79]SUSAN ORLEAN, THE ORCHID THIEF: A TRUE STORY OF BEAUTY AND OBSESSION 143 (1998).

[80] Plant breeding programs, like animal breeding programs, may involve pedigree breeding, backcrosses, and inbreeding in the quest for a genetically stable plant population. For a description of breeding methods (which utility patents are now claiming) *see* '466 Patent, *supra* note 78.

[81]*See* Jeff Smith, African Violet Hybridization: Tips, RACHEL'S REFLECTIONShttp://www.rachelsreflections.org/JeffSmithsnotes.htm (last visited Mar. 26, 2012).

[82]*See* ORLEAN,*supra* note 79, at 143.

engineer does.

Selectively bred plants were once thought to be unpatentable products of nature for the purposes of patent law.[83] However, after the PPA, the work of the plant breeder in improving nature was recognized as a patentable invention.[84] Years of careful breeding and selection are required to develop new varieties of plants this way.[85]Plant patents protect this investment. Selective breeding of plants is most effective when growers expend the resources to grow thousands of seedlings and identify the best.[86] Raising thousands of plants mean each new variety has "exorbitant development costs."[87]

Selective breeding, like genetic engineering, combines desirable traits in a single plant. Unlike genetic engineering, the desirable traits are all naturally occurring within the same species. Although hybrids between compatible species may be created to introduce new traits, the breeder always arranges crosses between plants; he does not intrude on a cellular level into the process of seed formation.[88]

Utility patents are also sought and granted for selectively-bred plants.[89] For example, the hybrid corn that was the subject of *J.E.M. Agricultural Supply, Inc.* was created by inbreeding.[90]But because utility patents confer greater rights, it becomes problematic to omit all consideration of the breeder's technique. The largest problem with granting utility patents for selectively-bred organisms is defining prior art. It is impossible to breed any plant or animal without building on every ancestor since domestication. Some plant varieties, such as basmati rice, have been cultivated and shaped by mankind for centuries.[91] Any improvement made by one breeder will be minor. Patents, however, do not always recognize a pedigree as "prior art."[92] In one notorious example, Larry Proctor bought a package of assorted beans while vacationing in Mexico.[93] He picked out yellow beans, a variety known in Mexico as Azufrado Peruano 87, from the mixed assortment.[94]After planting and harvesting these beans for only three generations, he successfully sought a utility patent and demanded royalties

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[83]Diamond v. Chakrabarty, 447 U.S. 303, 311 (1980).

[84]*Id.*

[85]*See* Bush, *supra* note 20.

[86] Moser & Rhode, *supra* note 4, at 426-27.

[87]*Id.* at 426.

[88]*See generally* U.S. Patent No. PP6,249 (filed Sept. 24, 1986) (describing a hybrid formed by crossing *Saintpauliaionanthaw*ith *Saintpauliaschumensis*in order to create a cold-tolerant variety).

[89]*See generally* U.S. Patent No. 7,772,466 (filed Sept. 4, 2007) (describing a variety of barley named Pronghorn, created by crossing the varieties Wanubet and Shonubet).

[90] J.E.M. AG Supply, Inc. v. Pioneer Hi-Bred Int'l, Inc., 534 U.S. 124, 127-28 (2001).

[91] Michael Woods, *Food For Thought: The Biopiracy of Jasmine and Basmati Rice*, 13 ALB. L.J. SCI. & TECH. 123, 124 (2002).

[92]*Id.*

[93]*In re* POD-NERS, L.L.C. 337 F. App'x 901, 902 (Fed. Cir. 2009).

[94]*Id.*

from Mexican importers of similar beans.[95]

Proctor's patent was eventually invalidated for obviousness, because "one of ordinary skill in the art seeking to reproduce (and hopefully improve) the yellow beans . . . would have done what he did: plant the beans, harvest the resulting plants for their seeds, planting the latter seeds, and repeat the process two more times."[96] He "followed normal and well-established agricultural methods and techniques," and did not devise a new breeding method.[97] Read broadly, this language implies that the obviousness of all selectively bred plant varieties is suspect; yet thousands of utility patents have been granted to scientific breeders of plants.[98]

The debate over where to draw the line for utility patents has consequences for other organisms. Selectively-bred plants are clearly analogous to selectively-bred animals; their development has involved identical breeding techniques. Scientific selective breeding, as first applied to roses, was directly borrowed from cattle breeding techniques.[99]Animal cloning now offers asexually propagated animals commercially, just as plants are duplicated.[100] If naturally-bred plants are considered to be made by man, then animal varieties are clearly within the subject matter of patents as well.[101] But for human intervention, animal breeds which are far removed from their wild origins would not exist.[102] Utility, novelty, and non-obviousness may eventually be demonstrable for new breeds.[103] For example, miniature cattle have obvious utility because they are an efficient way to raise meat on small acreages.[104] They are a novel development, since breeders usually seek larger cattle and have only pursued small cattle since 1960.[105]It can be argued that many animal breeds are not just an improvement over existing animals of their species, but are a new and unique kind, and thus non-obvious.[106] As a specific example of both the

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[95] *Id.*

[96] *Id.* at 903.

[97] *Id.*

[98] Woods, *supra* note 91, at 126.

[99] Moser & Rhode, *supra* note 4, at 423-24.

[100] Michael Inbar, *Encore! Couple Spend $155,000 to Clone Dead Dog*, MSNBC, http://today.msnbc.msn.com/id/28892792/ns/today-today_pets_and_animals/t/encore-couple-spend-clone-dead-dog/#.TxNen9Q7U1I (last updated Jan. 28, 2009).

[101] David S. Mader, *Wilbur's Conundrum: Property in the DNA of Selectively Bred Animals*, 86 TEX. L. REV. 191, 209 (2007), *available at* http://nationalaglawcenter.org/assets/bibarticles/mader_conundrum.pdf.

[102] *Id.* at 208.

[103] *Id.* at 214 (concluding that it may be difficult to show utility, novelty, and nonobviousness for a Thoroughbred horse, but this author believes that the claim is consistent with the current state of patent law if a novel breed is marketed in the form of genetic material). I have chosen to use the example of a unique cattle breed in development because cattle are often bred by artificial insemination.

[104] Dana W.R. Boden, *Miniature Cattle: For Real, For Pets, For Production*, 9 J. AGRIC. & FOOD INFO. 167, 169(2008), *available at* http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1154&context=libraryscience.

[105] *Id.*

[106] Mader, *supra* note 101, at 213.

inventiveness of breeders and their willingness to seek intellectual property protection, consider the Panda™ cattle raised by the Happy Mountain Miniature Cattle Farm®.[107] These miniature cows have distinctive markings resembling their namesake, and the breed name has been trademarked in an attempt to prevent imitation.[108] Breeding a slightly improved yellow bean from yellow beans may be obvious to someone with ordinary skill in the art; breeding a pet that looks like a panda from cattle is clearly a less obvious undertaking within the ordinary meaning of the term.

The lurking problem with extending utility patents to selectively-bred organisms supports a bright-line division between utility and plant patents based on horticultural technique.

D. Discovered mutations

When plants are grown by the thousands any natural mutations are obvious to the grower and may become new plant varieties. Random variations, called "sports," are frequently patented.[109] For example, the patented African violet cultivar Knoxville was "discovered in a flowering block of the parent cultivar Nashville."[110] Its pink flowers surely stood out when surrounded by its parent's red-purple blooms.[111]

It takes familiarity with a species to spot a new and different mutation, as well as skill to raise and propagate it.[112] However, these natural mutations are close to products of nature.In 1954, the USPTO ruled that mutant seedlings and other "mere fortuitous finds" were not patentable, but this decision was quickly followed by a legislative amendment to make it clear that patenting sports is allowed.[113] The plant patent statute now specifically includes "cultivated sports, mutants, hybrids, and newly found seedlings."[114]

IV. ORNAMENTAL PLANTS: CASE STUDIES

The extended scope of utility patents applies most clearly to the results of direct laboratory manipulation of genes. Ideally, plant varieties produced by selective breeding, even when accelerated by mutation, should be protected by plant patents instead. Natural mutations, without any

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[107] Richard H. Gradwohl, *The Panda® Miniature Cattle Breeding Program*, INT'L MINIATURE CATTLE BREEDERS SOC'Y& REGISTRY, http://www.minicattle.com/index.cfm?select=pandabreeding (last visited Mar. 26, 2012).

[108] *Id.*

[109] Moser & Rhode, *supra* note 4, at 418-19.

[110] U.S. Patent No. PP7,008 (filed Sept. 30, 1988).

[111] U.S. Patent No. PP4,533 (filed Jan. 8, 1979).

[112] Bush, *supra* note 20.

[113] Moser & Rhode, *supra* note 4, at 419.

[114] 35 U.S.C.A. § 161 (West 1952).

intervention, should arguably not be granted patent protection at all. However, because they grant stronger protection, utility patents are the patent of choice for plant breeders whenever they are available. This means that plant patents, in practice, have become a way to protect plant varieties that do not qualify for utility patents: ornamental plants, which have no utilitarian purpose. Ornamental plants are an ideal realm in which to examine the effectiveness of plant patents in their current state.

The economic rationale behind plant patents is that it is particularly challenging for an inventor to see a return on investment when he has invented a technology that is self-replicating; you cannot cut off parts of your toaster and grow a second, but any purchaser can produce her own plants by doing exactly that.[115] Legal protection must be provided so inventors can recover their investments in research and development before competing with free riders who propagate the plant.[116]In 1930, Congress wanted to encourage the domestic plant breeding industry as well as new inventors.[117] Whether or not these goals have been met will be considered with two specific ornamental species.

A. The Rose Study

America's rose breeders were a "driving force" behind the 1930 Plant Patent Act.[118] Developing a new rose variety has high costs.[119] Rose breeders fertilize one flower with pollen from another and grow thousands of seedlings to adulthood to find desirable characteristics, such as improved color, scent, or shape.[120]As few as 1 in 1,000 of these seedlings may be commercially successful.[121] However, once discovered, roses can be propagated quickly by grafting.[122] Prior to plant patents, the price of new rose introductions fell rapidly as competitors propagated the new rose, and it was difficult for growers to profit.[123]

After the Act was passed, the first plant patent ever issued was for a climbing rose named New Dawn.[124] Between 1930 and 1970, approximately half of the 3,010 plant patents on asexually reproduced plants were granted for varieties of roses.[125] Comparatively, few crop plants

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[115] Jason Savich, *Monsanto v. Scruggs: The Negative Impact of Patent Exhaustion on Self-Replicating Technology*, 22 BERKLEY TECH. L.J. 115 (2007).

[116] *Id.*

[117] Moser & Rhode, *supra* note 4, at 413.

[118] *Id.* at 416.

[119] *Id.* at 426.

[120] *Id.* at 427.

[121] *Id.*

[122] Moser & Rhode,*supra* note 4, at 428.

[123] *Id.*

[124] *Id.* at 420.

[125] *Id.* at 415. Examining this time frame is a way to limit results only asexually propagated plants, because it is before the Plant Variety Protection Act, which extended patent eligibility to sexually

were patented during this period.[126] This makes roses an ideal plant to use when examining whether the Plant Patent Act encouraged innovation in plant breeding. The number of patents sought suggests that intellectual property rights encouraged the rose industry, which is a significant part of the U.S. nursery plant industry.[127] However, an examination of numerical data shows that American rose breeders created fewer new varieties after patents were available than before.[128] Of these new varieties, only a small minority were patented under the new laws.[129]

Scientific selective breeding methods have been applied to roses since 1868.[130]In addition to commercial growers, hobbyist and public sector breeders create innovative rose varieties.[131] The American Rose Society (ARS) was formed to encourage rose development.[132] It offers variety registration that confers no legal rights, but establishes a name for a new rose, and publicity and prestige for the breeder.[133] These registrations can be used to measure actual innovation in rose breeding, and their number can be compared to patent applications.[134] Most rose patents can be matched to an ARS registration of the same variety.[135]

Less than one-fifth of new rose varieties are patented.[136]The majority of rose patents were filed by large commercial growers, and all of the top ten listed inventors were connected to major companies.[137] The majority of new roses continued to be created by European breeders.[138] Many of the most successful rose introductions were imported.[139] The number of new varieties created by American breeders actually declined after patent protection was introduced.[140]

Commercial breeders enforced patents against competitors to prevent propagation of their new varieties and feared infringement actions.[141] Filing of patents appears to have been a strategic move to protect against litigation.[142] Many of the rose varieties developed in the United

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propagated plants.

[126] *Id.* at 413.

[127] *Id.* at 415 (noting that "[i]n the 1950s and 1960s[,] roses accounted for 15 to 20 percent of U.S. nursery sales, which includes other ornamental plants and fruit trees."). *Id.* at 416 n.3.

[128] Moser & Rhode, *supra* note 4, at 415.

[129] *Id.*

[130] *Id.* at 423.

[131] *Id.* at 424.

[132] *Id.* at 425.

[133] *Id.* at 433.

[134] Moser & Rhode, *supra* note 4, at 433-34.

[135] *Id.* at 434 (ninety-six percent of patents between 1931 and 1970).

[136] *Id.*

[137] *Id.* at 415, 421.

[138] *Id.* at 415.

[139] *Id.* at 427.

[140] Moser & Rhode, *supra* note 4, at 436.

[141] *Id.* at 426.

[142] *Id.* at 415.

States were closely based on imported European varieties and are very similar.[143] Nurseries were afraid someone else would patent their variety firstand sue for infringement.[144] The danger was created by patent examiners, who were "lenient in granting patents" and granted patents to many roses that should have been ineligible because they had been introduced to the public years earlier.[145] The vast majority of plant patents for all plants continue to be granted.[146] This suggests that it is difficult for patent examiners to find and evaluate prior art.[147]

B. African Violets

The patent history of the African violet (*Saintpaulia ioanatha*), an indoor perennial, is remarkably similar. It has been described as "the most popular of house plants, as the rose is the best loved for gardens."[148] Twenty-two million African violets are sold in the United States each year.[149] Like roses, large commercial growers hold the majority of patents. There is a stark contrast between the number of patents and the number of varieties registered, which suggests that intellectual property protection does not foster innovation in the industry.

The African violet was discovered in Africa in 1897 and is unrelated to the violet, although in its natural form the single blue-purple flowers are similar.[150] Multiple *Saintpaulia* species have been discovered and the modern African violet offered in the florist trade is actually a fertile hybrid combining the best traits of multiple ancestors.[151] African violets became wildly popular just as modern heating systems were installed in most American homes.[152] Their timing was commercially perfect. Now that

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[143] *Id.*

[144] *Id.* at 432.

[145] *Id.* at 419.

[146] Moser &*Rhode, supra* note 4, at 418 (stating that between 1961 and 1965, 92 percent of plant patent applications were granted, while only 55 percent of design patents were granted).

[147] White, *supra* note 30, at 84.

[148] Wilson, *supra* note 56, at 18.

[149] Naomi Snyder, *Family's African Violet Business Reports Miracle Growth*, USA TODAY (Nov. 21, 2010), http://www.usatoday.com/news/nation/environment/2010-11-22-africanviolets22_ST_N.htm.

[150] *See* Wilson,*supra* note 56, at 108.

[151] *See* Wilson, *supra* note 56, at 108-22. *See generally* U.S. Patent No. PP5,185 (filed June 21, 1982) (matching the nomenclature widely used by the majority of commercial growers, this note uses the original species name "*Saintpauliaionatha*" to refer to all African violets in the florist trade in spite of hybridization in their early development; demonstrating the pervasiveness of this practice, consider that only 8 of the 312 patents filed for African violets identify their subject matter as a "*Saintpaulia hybrid*," and not "*Saintpauliaionantha*").

[152] Wilson, *supra* note 56, at 19 (noting initial popularity of African violets in the late 1930s, and that forced air furnaces were introduced in 1935). *See generally* John Van Doren, *A Brief History of Heating and Cooling America's Homes*, SUSTAINABLE DWELLING (Oct. 26, 2007), http://sunhomedesign.wordpress.com/207/10/26/a-brief-history-of-heating-and-cooling-americas-homes/ (discussing the development of heating and cooling technology in America).

households were warmer, many houseplants that preferred cool temperatures were failing to thrive for the home grower.[153] In contrast, the African violet was ideally suited to the new indoor environment.[154]Its popularity as a houseplant comes from its enthusiastic growth and frequent blooms under the same conditions that produce comfort for its owner.[155]

Dramatic variety in appearance has been created with selective breeding. Although the first plants commercially introduced were all blue and had single flowers, modern African violets usually do not resemble their namesake garden flower.[156] Bloom color ranges "from deep, intense purple through blue-violet, wine-red, and pink-violet to rose, pink, blush, and white."[157] White blossoms with distinct yellow and green tints have been developed, and clearer expressions of those colors may be available in the future.[158]Multiple colors may be combined in one bloom in the form of large "thumbprint" patches, scattered freckles called "fantasy" marking, or a differently colored petal edges.[159] Many blooms are double, forming a peony-like rosette of flowers, and modern flowers may be more than double the diameter of the original commercial introductions.[160] Some leaves are ruffled at the edges. Other leaves may exhibit dramatic white mottling, called variegation.[161] Miniature plants that can fit within a coffee cup have become as popular as "standard" varieties, which may reach a foot in diameter under good conditions.[162]

Once developed, new varieties of African violets can be asexually propagated and brought to market quickly. Part of the plant's appeal is the ease of vegetative propagation. A single leaf will yield multiple blooming-size plants in six to twelve months under average home conditions, and propagation can be even faster in a climate-controlled greenhouse.[163] This is in sharp contrast to other ornamental houseplants, many of which grant their breeder a natural monopoly on production for a time period because of their physiology. For example, orchids take seven years to bloom from seed after two parent plants are crossed.[164] Hundreds of seeds are produced and can be grown simultaneously.[165] This means the original breeder of a hybrid

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[153] Wilson, *supra* note 56, at 1.

[154] *Id.*

[155] *Id.*

[156] Wilson, *supra* note 56, at 123-24.

[157] *Id.* at 137-47.

[158] *See generally* LYNDON LYON GREENHOUSES, http://lyndonlyon.com/index.htm (last visited May 30, 2012) (examples of various African violets).

[159] Wilson, *supra* note 56, at 131.

[160] *Seeid.* at 123-24 (comparing *Saintpauliaionantha* 'Norseman,' one of the original varieties introduced in 1936, and *Saintpauliaionantha* 'MoroznaiaVishnia' under similar growing conditions).

[161] *Id.* at 83.

[162] *See id.* at 31-34.

[163] *Id.* at 76-84.

[164] ORLEAN, *supra* note 79, at 144.

[165] *Id.*

will have plants in stock when he reveals his work, and because of the time needed to grow orchids, he will be the only one with a supply of blooming-size plants to sell commercially for several years.[166]Even if other growers see the new plant and immediately cross the same parents, there will be a period of time when the original breeder is the only one to offer the plant for sale because of his head start on propagation.[167]

African violets give their breeders no such advantage. Because they can be so easily propagated, one would expect commercial growers to patent new varieties to reap the rewards of their labor. Developing a new African violet can take years, but once the plant exists it can be duplicated with very little effort by anyone with access to it.

However, the opposite is the case as most African violet breeders choose not to patent their work. Between January 1976 and January 2012, a total of 312 plant patents were issued for African violets.[168] This is a miniscule number when compared to the number of varieties registered with the African Violet Society of America (AVSA). The AVSA maintains a master list that describes all named African violet varieties, wild *Saintpaulia* species, and new varieties that have been formally registered with the society since its formation in 1949.[169] The Master Variety List currently contains more than 17,300 entries.[170] As with roses, club registrations are a more accurate measure of innovation in the field, and it is informative to compare them to patents.

Despite this great amount of innovation, all African violets patents have been issued to a mere handful of inventors. More than two-thirds of the patents list Reinhold Holtkamp, Sr. as the inventor.[171] Reinhold Holtkamp, Sr. moved to the United States in the 1970s and brought with him a family business based on growing African violets.[172]Holtkamp Greenhouses introduced the African violet to a wide audience in the United States. Many major retailers now carry their "Optimara" violets.[173]When introduced, their plants outperformed available African violets in typical home environments.[174] This was the result of generations of selective

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[166]*Id.*

[167]*Id.*

[168]*Patent Full-Text Database*, U.S. PAT. & TRADEMARK OFFICE,http://patft.uspto.gov/ (last visited Mar. 26, 2012).These numbers were generated by searching the US Patent Full-Text Database. *Id.*

[169]PAULINE BARTHOLOMEW, GROWING TO SHOW: HOW TO GROW PRIZE-WINNING AFRICAN VIOLETS 107 (1985).

[170] Telephone Interview with Amy Carruth, African VioletSoc'y of Am. (Jan. 11, 2012). The AVSA Master Variety List contains 17,277 entries as of December 2011, and the number of entries is expected to exceed 17,300 with the January 2012 update. *Id.*

[171] Two hundred twenty-two of the 312 total patents list Reinhold Holtkamp, Sr. as the inventor.

[172] Snyder, *supra* note 149.

[173]*Id.*

[174]*Id.*

breeding to make the plants "as easy to grow as they are beautiful."[175] Plants selected responded well to environmental stresses, including the poor growing conditions supplied by inexperienced owners.[176] More than 100 varieties of African violets have been introduced under the "Optimara" name, but not all of these plants were bred in the United States.[177] Development of new varieties also continues at the original Holtkamp family greenhouses in Germany.[178]

Holtkamp Greenhouses has been influential in shaping the modern African violet. Their work resulted in plants that do not drop their flowers and can withstand the colder temperatures encountered in shipping to stores.[179] However, not all influential breeders have sought patents. Lyndon Lyon, who has been called the "the world's most important breeder of African violets," was the first to breed blossoms with petals equal in size.[180] He did not patent any of his work. Dr. Ralph Robinson, an active African violet breeder who has won the AVSA's "Best New Cultivar" award ten times and done much to improve miniature varieties, does not patent any of his plants.[181]

Whether or not breeders seek patents depends not on how innovative their creations are, but on whether or not they sell to end consumers. The majority of African violet patents are held by large commercial propagators who do not merely develop new varieties, but also sell their plant material in the wholesale market. Holtkamp Greenhouses in Tennessee sells 15 million African violets a year, and their sales account for more than 70 percent of the wholesale market for African violets in the United States.[182]

Patents issued to inventors other than Reinhold Holtkamp Sr. continue to prove this trend. Forty-four patents list Arnold W. Fischer as the inventor. Arnold Fischer Greenhouses, like Holtkamp Greenhouses, is a large-scale propagator in addition to breeding African violets.[183] Twenty-six patents for African violet varieties list Eiichi Yoshida as the inventor. Eiichi Yoshida was the floral marketing pioneer who first promoted the idea of selling flowers through supermarkets, discount stores, and home

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[175] Holtkamp Greenhouses, Inc., *History of Optimara* ,OPTIMARA, http://www.optimara.com/history.html (last visited Mar. 26, 2012).

[176] *Id.*

[177] *Id.*

[178] Snyder, *supra* note 149.

[179] *Id.*

[180] William H. Honan, *Lyndon Lyon Is Dead at 94; A Breeder of African Violets*, N.Y. TIMES (May 26, 1999), http://www.nytimes.com/1999/05/26/nyregion/lyndon-lyon-is-dead-at-94-a-breeder-of-african-violets.html?src=pm. In their wild state, African violets have larger petals on the bottom of the bloom. Equally sized petals are a characteristic of most modern plants. *Id.*

[181] *About Us*, THE VIOLET BARN, http://www.violetbarn.com/about_us.html (last visited Mar. 26, 2012).

[182] Snyder, *supra* note 149.

[183] Kessler, *supra* note 22.

improvement stores.[184] Twelve patents list John Van Wingerden as the inventor, and Green Circle Growers, Inc. as the assignee. Green Circle Growers is a large greenhouse operation in Oberlin, Ohio, which produces live plants for the wholesale market.[185]

Unlike these wholesale sellers, the aforementioned Lyndon Lyon Greenhouses and Dr. Robinson's business, The Violet Barn, sell plants by mail and in person directly to consumers.[186] Because plants are self-replicating, "every consumer turns into a potential producer."[187] But without greenhouse facilities, the amount of patent infringement that can occur is limited. Because African violets have such a "prodigious ability to multiply" an interested hobbyist soon runs out of space.[188]

In contrast, wholesale propagators probably seek some form of protection because wholesale African violets are frequently sold as immature plants to commercial growers who nurture the plants to their full size for resale.[189]Optimara violets are available in six stages of growth, and a typical set of wholesale "plugs" will be "finished" and blooming in eight weeks under greenhouse conditions.[190] The commercial grower resells these fully-grown, blooming plants, which are offered to consumers. African violets require specific conditions, and a commercial grower will have a greenhouse dedicated to their production.[191] Propagating a near-infinite number of their own plants from the patented material would only take a little more effort than growing the immature plants to adult size. Propagation requires an investment of space and time, which may not be economically feasible for growers.[192] However, plant patents clearly offer some protection against free riders in the horticultural industry.[193]There does not appear to be effective patent enforcement against end consumers, even when they propagate African violets to share with others on a large scale.[194]

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[184]*Eiichi Yoshida; Floral Marketing Pioneer, Museum Fund-raiser*, L.A. TIMES (Feb. 14, 1994), http://articles.latimes.com/1994-02-14/news/mn-22732_1_floral-marketing.

[185]*About Us*, GREEN CIRCLE GROWERS, http://www.greencirclegrowers.com/about (last visited Mar. 26, 2012).

[186] Honan, *supra* note 166. Lyndon Lyon "built a thriving international mail-order business." *Id.*

[187]Savich, *supra* note 115, at 115.

[188] Wilson, *supra* note 56, at 19. By the early 1950s, all the mysterious secrets of good saintpaulia.*Id.*

[189]*See* Kessler, *supra* note 22.

[190] Herman Holtkamp Greenhouses, Inc. OPTIMARA GROWER CATALOG, 4 (2012), *available at* http://catalog.optimara.com/grower_2012/index.html#/1/

[191] Kessler, *supra* note 22.

[192]*Id.* (noting "[g]rowers who propagate using leaf cuttings maintain an extensive stock plant program and allocate a large area to leaf and plug flats. This requires investment in greenhouse space and labor both to perform the propagation and to maintain the stock plants . . . The decision to propagate in-house or to order in transplants is largely an economic decision and should be made carefully.").

[193]*Id.* (noting "[m]any of the cultivars better suited for commercial production are patented. Therefore, propagation should not be done without a propagators licence [sic].").

[194] Searching has not revealed any court cases or anecdotal evidence indicating patent

V. PATENT AND PLANT IN CONFLICT

It is difficult to apply utility patent case law to ornamental plants.[195] Seeking beauty for profit is not often the goal of inventors.[196] This means that plant patents still have a clear role in the patent system, even though utility patents are now available to some plants. Their use should be encouraged, because limited protection is more appropriate for living organisms.

The plant patent statute was written with roses, an ornamental plant, in mind.[197] Why, then, has the availability of plant patents failed to encourage innovation in ornamental plant breeding, and who do the majority of plant breeders do not seek patent protection? The answers to these questions are the factors that should be considered as the plant patent grows.

A. Non-commercial Motivations

When designing the PPA, Congress concluded, "to-day the plant breeder has no adequate financial incentive to enter upon his work."[198] And yet, hundreds of plant breeders were seeking new ornamental plants at the time.[199] Many hobby breeders, when they touch pollen to stigma, simply wish to "[add] to the sum total, never too great, of beauty and happiness in the world."[200] Even commercial breeders are "seekers of beauty."[201]

A breeder's goal is the pursuit of his own ideal flower and growth type, which may not fit commercial norms. Beauty is subjective. Opinions about ideal flower shape, color, and size can differ widely even among growers of the same species.[202] The most novel and unusual plants are sometimes the plants least likely to have consumer appeal. Variegation is one example of a trait that appeals to a minority of growers.[203]

B. Public Access

Patents require their inventors to disclose the details of their invention so that, after legal rights have expired, "any person skilled in the

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enforcement against hobby growers, even when they are operating businesses on a small scale.

[195] Yoder Bros., Inc. v. Cal.-Fla. Plant Corp., 537 F.2d 1347, 1377 n. 35 (1976).

[196] *Id.*

[197] *Id. See also* Moser &Rhode, *supra* note 4, at 413.

[198] Moser & Rhode, *supra* note 4, at 417.

[199] *Seeid.* at 415.

[200] Wilson, *supra* note 56, at 92.

[201] Yoder Bros., Inc. v. Cal.-Fla. Plant Corp. 537 F.2d 1347, 1377 n. 35 (1976).

[202] ORLEAN, *supra* note 79, at 144.

[203] Bush, *supra* note 20.

art may make and use the invention."[204] This disclosure is required so others can build upon the invention and make further significant advances in the field.[205] Advances in living plants are significantly different than advances in mechanical devices: building upon a new variety requires direct access to a living plant so that you may breed it with your plants. It is impossible to make a plant from a written description, no matter how skilled you are in the art.[206] This is why the disclosure requirements for plant patents are less stringent.[207] It also means that public access after protection ends depends on the plant actually surviving in cultivation after the patent term has expired.[208] However, plant varieties are frequently lost and cannot be found after they have died out.[209] Life can be extinguished if its flame is not tended. Consumers are not just consumers, but engaged in continuing care. It is often in the interest of variety survival to avoid restricting propagation.

Houseplants are particularly fragile, as any brown thumb knows. This makes the term of patent protection problematic for species with a short life cycle. Unlike roses, houseplants rarely live for 17 or 20 years and although "there have been reports of the same African violets being grown for 15 to 20 years," it is unusual.[210] When these plants do outlive the patent term, it is with care techniques that are technically propagation from a horticultural perspective. African violets are frequently "started over" from their crown or leaf cuttings because the plant has become unattractive.[211] Sometimes, a single leaf is all that can be rescued of a plant that has nearly died from poor cultural practices.[212] It is difficult to predict whether a court would view such techniques as permissible repair or infringing reconstruction, because existing cases about machines are difficult to apply. A dying potted plant that retains the spark of life in only a single leaf has no usefulness as a plant and is completely spent.[213] However, that spark of life is retained, and the plant can be restored to its former vivacity by propagation techniques.[214]

Plant breeders do not need patent as an incentive to disclose. All hybridizers wish to influence the future of their chosen species and the types of flowers grown by others.[215] To exert this influence, a variety must

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[204] Kewanee Oil Co. v. Bicron Corp., 416 U.S. 470, 480 (1974).

[205] *Id.* at 481.

[206] *See* ORLEAN,*supra* note 79, at 144.

[207] 35 U.S.C.A. § 162 (West 1952).

[208] Bush, *supra* note 20.

[209] Mark Griffiths, *The Search for Lost Roses*, ROBERT MATTOCK ROSES, http://www.robertmattockroses.com/lost.asp (last visited Mar. 26, 2012).

[210] BARTHOLOMEW, supra note 169, at 58.

[211] *Id.* at 60.

[212] *Id.* at 62.

[213] Wilbur-Ellis Co. v. Kuther, 377 U.S. 422, 423 (1964).

[214] Kessler *supra* note 22; BARTHOLOMEW, *supra* note 169, at 62.

[215] ORLEAN, *supra* note 79, at 144.

not only be publicized, but also widely propagated so breeders have access to it. Registration with a national club is frequently selected over patent.[216]However, registration with the ARS or the AVSA provides no legal rights.[217] Club registration does advertise a variety to other growers and promotes the hybridizer's nursery.[218] It creates a central source of information about plant varieties.[219] This desire for influence may be why so many breeders do not patent plants. Hobby breeders often share their new plants freely in order to encourage their spread.[220]

C. Lack of Economic Reward

The estimated total cost of a plant patent is $2,750 to $4,000 to the breeder.[221] These costs are passed on to consumers. For example, a typical price for leaves of a patented, standard-sized African violet is $6.00.[222] Leaves of non-patented varieties cost $2.75.[223] Any cost increase is particularly problematic for ornamental houseplants such as African violets because they are presented to the consumer as disposable impulse buys.[224] In theory, if a variety has significant benefits, the market will bear the increased cost.[225] In practice, raising plants in large quantities is the only way to recoup patent costs. This is why patents are only sought by large propagators and greenhouse owners. There is little money in patenting plants sold directly to consumers in non-market quantities, which is why many plant breeders do not pursue them.[226] It is even difficult to recover the cost of a patent if you intend to license the plant to a propagator. Licensees who propagate the plant for commercial sale must pay royalties on each plant, but typical royalties for plants may be as little as $0.15 for a perennial plant, or $1.00 per tree.[227]

Even though small growers dream of a "ticket to fortune" with a

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[216] Moser & Rhode, *supra* note 4, at 433-34.

[217] *Id.* at 433.

[218] ORLEAN, *supra* note 79, at 144.

[219] E-mail from Dr. Ralph Robinson, Owner of The Violet Barn, to author (Jan. 7, 2012) (on file with author).

[220] Moser & Rhode, *supra* note 4, at 425.

[221] PLANT HAVEN, *supra* note 54.

[222] African violets are easily propagated from leaves, and varieties are commonly sold in this form. *See African Violet Leaf, 4 Inch Variety*, SELECTIVE GARDENER, http://www.selectivegardener.com/African-Violets/African-Violet-Leaf/4-Inch-Variety-c18/ (last visited Mar. 26, 2012).

[223] *Online Store: Standards*, LYNDON LYON GREENHOUSES,http://lyndonlyon.com/store/index.php?main_page=index&cPath=1_2 (last visited Mar. 26, 2012).

[224] Ralph Robinson, *Let's Get The Ball Rolling*, VIOLETS ARE... PURPLE? (Dec. 5, 2010), http://violetbarn.com/blog/archives/3.

[225] PLANT HAVEN, *supra* note 54.

[226] E-mail from Dr. Ralph Robinson, Owner of The Violet Barn, to author (Jan. 7, 2012) (on file with author).

[227] PLANT HAVEN, *supra* note 54.

profitable patent, few succeed.[228] Even where royalties would provide a modest income, small and medium growers usually lack the resources to enforce patents, having no legal staff.[229] Enforcement can also be costly. Asexual reproduction is "the heart of the present plant patent system."[230] DNA testing is the most conclusive way to establish infringement in litigation, but it is expensive.[231]

D. Alternative Protection Is More Effective

Case studies show that large commercial growers are the most likely to take advantage of the plant patent system. The development of improved plant varieties requires a substantial investment of resources, and the "copying" requires far less. Clearly some protection should be provided, but there are alternatives to patent.

In addition to breeding improved plants, Holtkamp Greenhouses has put decades of research into commercializing African violets.[232] Their commercial success can be attributed to the strength of their brand as much as to the strength of their plants.

Compare Holtkamp Greenhouses to Hermann Engelmann Greenhouses, a business with a very similar history. Hermann Engelmann Greenhouses was also founded by a German immigrant during the "houseplant boom" of the 1970s.[233] Like Holtkamp Greenhouses, their branded plants are carried by major retailers; Engelmann delivers its Exotic Angel® houseplants to more than 10,000 stores nationwide.[234] Consumers frequently see their foliage plants on the same shelves as Holtkamp's Optimara violets. Unlike Optimara violets, none of the Exotic Angel® plants are patented. The company propagates several hundred "tried-and-true species" of houseplants including ficus, hoya, diffenbachia, ivy, and begonias.[235]Their plants are "essentially the same as the ones produced by any grower" and the market appeal of Exotic Angel® plants comes from the brand's reputation: "Engelmann is aware that it must stand behind its

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[228] Bush, *supra* note 20.

[229] E-mail from Dr. Ralph Robinson, Owner of The Violet Barn, to author (Jan. 7, 2012) (on file with author).

[230] Yoder Bros., Inc. v. Cal.-Fla. Plant Corp., 537 F.2d 1347, 1380 (1976).

[231] *See generally* California Table Grape Comm'n v. RB Sandrini, Inc., No. 1:06-cv-00842-OWW-TAG, 2007 WL 1847631, at *2 (E.D. Cal. June 27, 2007) (noting "DNA testing conclusively established Sandrini possesses the asexually propagated progeny of the first Autumn King plant.").

[232] Snyder, *supra* note 149.

[233] Jon VanZile, *Caring For Exotic Angel Plants – What are Exotic Angel Plants?*,ABOUT.COM, http://houseplants.about.com/od/pickingahouseplan1/a/Caring-For-Exotic-Angel-Plants.htm (last visited Mar. 26, 2012).

[234] *Company History,* EXOTIC ANGEL PLANTS, http://exoticangel.com/about-us/company-history (last visited Mar. 26, 2012).

[235] VanZile, *supra* note 233.

logo" and only ships hardy, healthy plants.[236] They conduct "extensive market research" on the plant selections offered.[237] This brand building suggests that trademark, not patent, is the most important intellectual property protection to wholesale propagators. Trademarks must be used as indications of source, and so individual variety names cannot be trademarked.[238] But consumer focus is already on the brand, not the specific plant. When selling African violets, "an important consideration is to provide consumers with a wide variety of flower colors and cultivar selection to maintain interest."[239] Cultivated varieties of the same bloom type are usually rotated in greenhouse production because offering consumers a choice is more important than carrying a specific type.[240]

Trademark protection is enough to protect Holtkamp African violets. All of their violets developed since 1977 are sold under the Optimara name, a registered trademark.[241] Consider Optimara Kentucky, a standard plant with single blue-violet blooms that was introduced commercially in 1987.[242] A plant patent for 'Kentucky' was filed on February 22, 1978, and expired in 1995.[243] Even though its patent has expired, it is still available to commercial growers and to consumers.[244] There is no evidence that this variety has been plundered in the intervening seventeen years. A commercial grower could propagate the plant (as he could propagate the thousands of unpatented varieties with similar characteristics) without infringing a patent, but he would not be able to sell the resulting plants as "Optimara Kentucky." The Optimara name has become famous as an indication of hardy plants, not the variety name.

VI. CONCLUSION

Patenting a living organism has greater societal costs than patenting a machine. There is no way to design or invent around an overbroad patent that takes natural developments out of the public domain.[245] This is why the plant patent, which gives appropriately limited protection to a living organism, needs to be revitalized and promoted as an alternative to utility patents.

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[236] *Id.*

[237] *Id.*

[238] PLANT HAVEN, *supra* note 54. Trademarks must describe a plant source, not its type, and the USPTO is vigilant about not registering variety names. *Id.*

[239] Kessler, *supra* note 22.

[240] *Id.*

[241] *History of Optimara*, *supra* note 175.

[242] *Optimara Field Guide: Optimara Kentucky*, OPTIMARA, http://www.optimara.com/optimarafieldguide/varietiesa-l/kentucky.html (last visited Mar. 26, 2012).

[243] U.S. Patent No. PP4,352 (filed Feb. 22, 1978).

[244] OPTIMARA GROWER CATALOG, *supra* note 190, at 13.

[245] White, *supra* note 30, at 34.

Furthermore, patents over living plants should be granted cautiously. Ordinary skill in the art of plant breeding can be concretely defined using horticultural science. The requirement of obviousness should be used to exclude first-generation natural mutants and strikes of luck from patentability. These unpredictable natural gifts are part of the joy of working with living things, but they should not be patented until refined by man, even if the mutation was artificially induced. For example, the Optimara Space Violet seeds were exposed to radiation to cause mutations, but the seedlings were then searched for "a plant with traits worthy of cross breeding with other varieties."[246] The final plants released in the marketplace were the product of measurable skill in the art.

It is necessary to weight the scale in favor of public access in order to promote progress in plant breeding. Roses show that the near-automatic approval of plant patents correlates with a decline in innovation. Prior art must be vigorously sought among the varieties in cultivation. The USPTO must, at the very least, utilize other government databases of plant varieties.[247]The variety registries maintained by national plant clubs would be another excellent resource for judging variety novelty and distinctiveness.

Utility patents can and should be used to protect varieties born in the laboratory, with the highest development costs of all, as new manufactures or compositions of matter. The stronger rights granted to utility patent holders should be viewed as a boon by opponents of genetic manipulation. After all, dominion over even the sexual offspring of a modified plant also means the power to contain and control genetically modified organisms, abating fears about genetic drift. However, utility patents are not appropriate for plants developed with less invasive measures. Varieties that are the product of selective breeding stand upon generations of domesticated plants, and belong to the broad public who nurtured them for so long.

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[246]Holtkamp Greenhouses, Inc., *OptimaraEverfloris™: Frequently Asked Questions*, OPTIMARA,http://www.optimara.com/everfloris_faq.html (last visited Mar. 26, 2012).

[247] White, *supra* note 30, at 36.