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Designing An Optimal Intellectual Property System for Plants:
A U.S. Supreme Court Debate

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**Designing An Optimal Intellectual Property System for Plants:
A U.S. Supreme Court Debate**

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Historically, intellectual property systems have facilitated the commercialization of plant innovation by offering specialized protection regimes for specialized circumstances. In 1930, the U.S. Congress created a “plant patent” regime designed specifically to provide rights against unauthorized *asexual* propagation, a serious problem in the nursery industry. In 1970, Congress created a “plant variety protection” (PVP) regime that is tailored to provide limited rights against duplication of protected varieties via seeds, a matter of obvious importance in the commercialization of crop plants. At the time, no one perceived any conflict between the specialized regimes and the general “utility” patent system. However, today, the emergence of plant biotechnology, and continued advances in plant breeding techniques, have prompted new questions about the reach of the utility patent regime and its compatibility with plant-specific regimes. In October 2001, the U.S. Supreme Court heard arguments in *J.E.M. Ag Supply v. Pioneer Hi-Bred*, in which the Court considered whether plant innovation can be protected -- like all other innovation -- under the general “utility” patent system, or whether plant innovation is to be consigned exclusively to specialized regimes. The Court’s decision is likely to have major ramifications for the future application of intellectual property regimes to plant research.

The decision is likely to have significant practical implications as well. Since 1985, the U.S. Patent and Trademark Office (PTO) has granted hundreds of utility patents on all aspects of innovation relating to plant science: on plants themselves, seeds, breeding methods, plant biotechnology. The Court’s *J.E.M.* decision could impact the validity of many of these existing utility patents on plants.

In this article, we explain the issues that the Court will be asked to consider, assess the Court’s options in resolving the case, and propose a resolution that best balances private rights and public access to the results of plant research. Our proposal calls for the Court to preserve the current state of the law, in which plants fall among the categories of subject matter that are eligible for utility patent protection. The Court should decline the invitation to rework the nation’s intellectual property policy as applied to plants, leaving the job of comprehensive policy reformulation – if it is needed at all – to Congress.

Designing an optimal intellectual property system for plants: a US Supreme Court debate

In *J.E.M. Ag Supply v. Pioneer Hi-Bred*, the Supreme Court's decision could radically alter the agbiotech landscape.

Mark D. Janis and Jay P. Kesan

Historically, intellectual property systems have facilitated the commercialization of plant innovation by offering specialized protection regimes for specialized circumstances. In 1930, the US Congress created a “plant patent” regime designed specifically to provide rights against unauthorized asexual propagation, a serious problem in the nursery industry. In 1970, Congress created a “plant variety protection” (PVP) regime that is tailored to provide limited rights against duplication of protected varieties via seeds, a matter of obvious importance in the commercialization of crop plants. At the time, no one perceived any conflict between the specialized regimes and the general “utility” patent system. Today, however, the emergence of plant biotechnology and continued advances in plant breeding techniques have prompted new questions about the reach of the utility patent regime and its compatibility with plant-specific regimes. This month, the US Supreme Court will hear arguments in *J.E.M. Ag Supply v. Pioneer Hi-Bred*, in which the Court will consider whether plant innovation can be protected—like all other innovation—under the general “utility” patent system, or whether plant innovation is to be consigned exclusively to specialized regimes. The Court's decision is likely to have major ramifications for the future application of intellectual property regimes to plant research.

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options in resolving the case, and propose a resolution that best balances private rights and public access to the results of plant research. Our proposal calls for the Court to preserve the current state of the law, in which plants fall among the categories of subject matter that are eligible for utility patent protection. The Court should decline the invitation to rework the nation's intellectual property policy as applied to plants, leaving the job of comprehensive policy reformulation—if it is needed at all—to Congress¹.

Origins of the dispute

The complex intellectual property dispute that is now before the Supreme Court has origins in rural Iowa. Pioneer Hi-Bred sells seed corn to farmers in Iowa and elsewhere through authorized dealers. A Pioneer seed corn bag includes a “label license”—that is, a patent license printed on the bag, authorizing the use of the seed only for crop production, analogous to the “click-wrap” intellectual property license that one might encounter when installing new software on a computer.

Pioneer owns numerous patents directed to its inbred and hybrid corn lines. For example, at least three patents cover various aspects of Pioneer's 3394 hybrid seed corn product: one patent claims the hybrid itself, along with its seed and tissue culture², and two others claim relevant inbred corn lines as well as hybrid corn plants produced from those inbreds³.

The dispute arose when Farm Advantage, an agricultural supply dealer in north-central Iowa, allegedly sold bags of Pioneer's 3394 hybrid, and several other Pioneer products, without Pioneer's authorization. In early 1998, Pioneer sued Farm Advantage in Federal District Court in the Northern District of Iowa, alleging unauthorized sales of 10 hybrid seed corn lines and asserting that the sales infringed some 20 of Pioneer's patents—seemingly a routine patent dispute.

Farm Advantage set forth a broad defense seeking a reexamination of the entire array of intellectual property protection for seed-grown plants. In essence, Farm Advantage argued that Pioneer was double-dipping by

acquiring patent rights to the hybrids when it had already acquired rights for the same hybrids through the plant variety protection (PVP) regime⁴. According to Farm Advantage, because of the existence of the PVP regime, the PTO has no authority under the patent statute to grant utility patents on plants; its decision to begin granting such patents (announced formally in a 1985 administrative ruling⁵) was legally erroneous; and, therefore, all utility patents on plants are invalid.

The District Court rejected this argument, but permitted Farm Advantage to seek immediate appeal to the Court of Appeals for the Federal Circuit, which has jurisdiction over all appeals in federal court cases arising under the patent laws. Recognizing that the case involved an important issue of law, the Federal Circuit agreed to hear the appeal, and, like the district court, rejected Farm Advantage's argument, expressly confirming that seeds and seed-grown plants constitute patent-eligible subject matter. Farm Advantage persisted, petitioning the Supreme Court to review the case. Although the Supreme Court rarely grants review in patent cases, in early 2001, the Supreme Court granted Farm Advantage's petition, agreeing to consider the following question: “Are patents issued under 35 USC §101 granting the right to exclude others from sexually reproducing plants or plant varieties, or from selling or using plants or plant varieties reproduced by means of sexual reproduction (by seed), invalid because the [PVPA] and the Plant Patent Act ... are the exclusive means of obtaining a federal statutory right to exclude others from reproducing, selling, or using plants or plant varieties?”

The Court scheduled argument for October 3, 2001.⁶

Utility patent protection v. plant variety protection

Once previously, the Supreme Court has confronted a question about whether the 1930 Plant Patent Act (PPA) and the 1970 Plant Variety Protection Act (PVPA) limited the type of subject matter that could be eligible for protection under the utility patent regime. In *Diamond v. Chakrabarty*, decided

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in 1980, the Court ushered in the age of biotechnology patenting, holding that genetically modified bacteria fell within the scope of patent-eligible subject matter⁷. The Court considered, but narrowly rejected, the argument that Congress' passage of the PVPA, and the PPA before it, implied an intent to exclude all biological subject matter from the utility patent system.

Now, the Supreme Court has the opportunity to revisit *Chakrabarty*. According to Farm Advantage, Congress' passage of the PVPA implies at least Congress' intent to exclude *plants* from the utility patent system, even if it does not imply that Congress intended to exclude all biological subject matter.

Neither the PVPA's express language nor its legislative history are particularly illuminating on this point. The PVPA includes no express provision establishing any relationship between the PVP and utility patent protection. And the legislative history is ambiguous: it contains few references to patent protection, and those references speak to the manner in which patent protection is "presently limited" as of 1970, stating that "no protection is available to those varieties of plants which reproduce sexually, that is, generally by seeds."⁸ Some, like Farm Advantage, urge that this reference to then-present unavailability be read as definitively contemplating *future* unavailability of utility patents for plants. Others read this passage as merely characterizing the state of affairs in 1970. At that time, it was not clear whether the courts would broadly exclude living subject matter from the utility patent system (the Supreme Court refused to do so 10 years later in *Chakrabarty*); it was not clear whether living subject matter could satisfy the utility patent statute's written description requirement (a subsequent decision to allow deposits of living subject matter facilitated compliance with the requirement); and plant biotechnology had not yet emerged. A third reading of the legislative history is simpler yet: Congress was probably not referring to the utility patent system at all; it was probably simply referring to the *plant* patent system and its requirement for asexual reproduction, and making no comment whatsoever as to the possibility of utility patent protection for plants.

In sum, to resolve the issue of whether the PVPA regime impliedly limits the utility patent regime, the Court must look beyond the language and legislative history of the PVPA. It must look more closely than it did in *Chakrabarty* at the overall structural differences between the PVPA and utility patent regimes, and assess the significance of these differences. It is really this last point—the significance of the differences—that is

the nub of the dispute in the *J.E.M.* case.

That important structural differences exist would be difficult to dispute. The utility patent regime gives much, but asks much. A utility patent owner enjoys broad rights to exclude others from exploiting the patented invention without authorization for 20 years measured from the application filing date, but inventions are deemed patentable only if they are new and nonobvious, and only if the patent applicant adequately discloses the details of the invention in writing⁹. For biological inventions, the patent applicant often must also deposit a sample in a public depository in order to satisfy the disclosure requirement.

By contrast, the PVP regime strikes a very different bargain, giving very narrow protection in exchange for a limited, relatively low-quality disclosure. PVP protection extends only to a discrete "variety" (defined in the PVPA as "a plant grouping within a single botanical taxon of the lowest known rank") and its "essentially derived varieties" (defined very restrictively in the PVPA to extend only to two generations of derivation), and the exclusionary rights under the PVP regime are subject to a multiplicity of limitations that shield many types of activities from liability: experimentation, noncommercial acts, the saving of seed for replanting, "developing" rather than "producing" a new variety. And the PVP regime elicits only low-quality disclosure: there is no rigorous patent-style disclosure requirement, and there is no non-obviousness criterion; varieties are protectable if they are new, distinct, uniform, and stable (all statutory terms of art)¹⁰. Indeed, because the US Department of Agriculture administers the PVP regime, the patent-examining corps plays no role in deciding whether to grant a PVP certificate.

To decide *J.E.M.*, the Court will need to decide what to make of these differences. One position, aligned with the interests of Farm Advantage, is that because the PVP regime and the utility patent regime grant different rights in potentially overlapping subject matter, the two regimes must necessarily be incompatible, and utility patent protection must give way. Some even argue that the grant of utility patent rights in such circumstances exceeds the bounds of the constitutional prerogative for the patent system, which must serve the purpose of promoting the progress of the useful arts.

The opposing position is that it is commonplace to encounter intellectual property regimes that grant different rights in overlapping subject matter. Rarely, if ever, do such regimes fit together seamlessly. There is no justification in intellectual property theory for the proposition that overlap in intellectual property regimes—even where the

overlap was not expressly anticipated by Congress—is inherently bad. The question is an empirical one: is there evidence that the overlap between regimes skews the incentives provided by those regimes so far in favor of private rights that technological progress is inhibited? In the case of the PVP–utility patent overlap specifically, and in the case of overlaps generally, the empirical work remains to be done. The Court in *J.E.M.* could do great harm by accepting, without empirical support, the proposition that overlapping intellectual property regimes that afford different rights must be deemed counterproductive.

Potential outcomes of *J.E.M. v. Pioneer*

The outcome of the *J.E.M.* case will depend upon the Court's assessments of the differences between the PVP and utility patent regimes as noted in the preceding section. Viewed more broadly, the *J.E.M.* case has elements of the classic tension between judicial activism and judicial restraint. If it operates on activist impulses, and accepts the proposition that overlap between the PVPA and utility patent regimes is problematic, the Court may be tempted to use the *J.E.M.* case to reshape intellectual property protection for plants by announcing new, formal restrictions on patent eligibility for plant innovation. On the other hand, principles of judicial restraint would counsel in favor of preserving the existing regime—that is, tolerating PVP–utility patent overlap—and inviting Congress to reconsider the optimal design for intellectual property protection for plant innovation.

Formal eligibility restrictions for plants. If the Court decides to fashion rules restricting the eligibility of plants for utility patent protection, it is likely to choose either to prohibit outright any utility patents on "plants", or to craft a more narrowly tailored restriction that would ban utility patent protection for "plant varieties". For the reasons that we discuss below, both rules would be problematic.

A rule excluding "plants". The Court might create a new rule that "plants" are ineligible for utility patent protection. The Court should decline to create a "no plants" rule, for three principal reasons. First, such a rule would presumably spring from a theory that patent rights and PVPA rights are incompatible.

Second, we doubt that a "no plants" rule would actually be effective to remove plant inventions from the utility patent system. Plant inventions need not be claimed as "plants" per se. Patent lawyers might well capture the value of plant innovations by drafting claims to seed, pollen, plant tissue, other plant parts, or breeding methods, as opposed to plants per se. Indeed, the very patents at issue in the *Pioneer* case contain a

range of claims, not limited to claims directed specifically to plants. Where the invention relates to plant genetics, the opportunities for drafting claims around a “no plants” rule are even more abundant: claims to DNA sequences, other gene constructs, or genetic transformation methods immediately come to mind. The courts and the PTO could then find themselves faced with an excess of litigation over whether claims drafted in these alternative formats constitute claims to “plants”.

Recent history suggests that efforts to fine-tune intellectual property protection by restricting patent eligibility can lead to opportunistic behavior and counterproductive ancillary litigation. In the area of computer software, the Supreme Court adopted a “mathematical algorithm” exclusion from patent eligibility, only to stimulate years of litigation over patent lawyers’ attempts to draft claims around the exclusion. In current law, the mathematical algorithm exclusion has all but disappeared in favor of a more liberal eligibility regime. The same phenomenon could well occur in the plant area if the Court decides to implement restrictive rules.

Third, even if courts could fashion a workable rule for excluding plant inventions from the utility patent system, it might—paradoxically—result in *reduced* public access to the products of plant sciences research. In the absence of patent protection, plant researchers—and their lawyers—would presumably redirect their efforts toward obtaining or implementing alternative forms of protection. Alternative forms of intellectual property protection, including not only plant variety protection, but also trade secret protection, might be more aggressively employed. Further, major seed producers might respond to a broad “no plants” rule by accelerating research into genetic surrogates for intellectual property enforcement—for example, genetic use restriction technologies that limit plant reproduction.

It is simply not clear how the widespread deployment of these alternatives to patent protection would affect the incentive to pursue and commercialize plant research. The overall weakening of protection resulting from a transition from patents to fragile systems like PVP and trade secret, together with the loss of technical disclosures that would have been provided under the patent regime, may result in an overall reduction in investment in plant research. Any increased reliance on genetic surrogates is likely to generate substantial social costs. Patents may well come to look like the best deal going—or, taken from a different perspective, the least objectionable.

A rule excluding “plant varieties”. As an alternative to excluding all “plants” from eli-

gibility for utility patent protection, the Court might decide to exclude only “plant varieties”. Some may find this approach attractive as a moderate solution, less restrictive than a “no plants” rule but more restrictive than current practice.

Despite its superficial appeal, a “no varieties” rule is undesirable. It shares with the “no plants” rule the erroneous premise that the utility patent and PVP regimes are mutually incompatible. Moreover, it is misleading. Under a “no varieties” rule, a patent claim drawn narrowly to a specific variety fails to define patent-eligible subject matter, but a patent claim drawn more broadly to a “plant” may well be considered to define patent-eligible subject matter, even though the “plant” claim would encompass multiple varieties. Indeed, this startlingly awkward result is the current law in Europe; the European Patent Office, saddled with a “no varieties” rule in the current Article 53(b) of the European Patent Convention, confirmed in a major decision that claims drawn to “plants” would avoid the “no varieties” exclusion, even though casual intuition might suggest the contrary¹¹.

Judicial restraint and deference to Congress. The Court, of course, need not accept the proposition that overlap between the utility patent regime and the PVP regime is inherently problematic. Instead, the Court could—and should—acknowledge that Congress has created a complicated and overlapping system of rights under different intellectual property regimes, and then invite Congress to reconsider the matter. That is, instead of running the risk of short-circuiting an important policy debate, and a critical empirical investigation, by announcing new, restrictive eligibility rules, the Court should preserve the status quo and allow Congress to legislate if new legislation is desirable.

In its famous *Chakrabarty* ruling, the Supreme Court rejected the argument that the passage of the PVP Act implies Congress’ intent to limit the utility patent system. The Court also took pains to emphasize its limited role as adjudicator rather than legislator. *J.E.M. v. Pioneer* presents the Supreme Court with an excellent opportunity to reinforce its *Chakrabarty* decision on both of these levels. First, the Court should again reject the argument that passage of the PVP Act implies exclusions to the utility patent regime, and confirm that plants and plant varieties constitute patent-eligible subject matter.

Then the Court should defer to Congress. Congress failed to contemplate the prospect of dual PVP and patent protection for plants, so there is simply no legislative record on whether dual protection is optimal.

Theoretical and empirical research on the economics of the patent and PVP regimes as applied in the seed industry could go a long distance in assessing optimality. If such studies suggest that the current combination of regimes provides suboptimal *ex ante* incentives for plant research, Congress should consider legislative reforms. The Supreme Court would best serve private and public interests by deferring to Congress to allow intellectual property policymaking in the plant area to mature on the basis of solid empirical knowledge.

Conclusions

The *J.E.M.* case presents the Court with an important opportunity—but, predominantly, it is an opportunity to do great harm while achieving little benefit. The Court could announce new rules restricting or eliminating utility patent protection for plants or plant varieties, or it can acknowledge that Congress has to establish an overlapping and even disjoint combination of intellectual property systems for plants, and turn to Congress to determine whether the systems need tidying. As the Court contemplates the optimal design for intellectual property systems for 21st-century plant innovation, the Court should take seriously the need for empirical study and full legislative public policy debate. It would be unfortunate if the Court thwarts such a debate by imposing aggressive new restrictions en route to deciding the *J.E.M.* case.

1. Some of the arguments presented here are developed in greater detail in Janis, M.D. Sustainable agriculture, patent rights, and plant innovation. *Ind. J. Global Leg. Stud.* (in press).
2. Hybrid corn plant and seed. US 5,491,295 (issued Feb. 13, 1996).
3. Inbred corn line PHP38. US 5,506,397 (issued Apr. 9, 1996); Inbred corn line PHN46. US 5,567,861 (issued Oct. 22, 1996).
4. Plant Variety Protection Act, 7 USC §§2321–2583. An overview of the entire array of intellectual property regimes that might be employed in protecting plant biotechnology inventions can be found in Kesan, J.P. Intellectual property protection and agricultural biotechnology—a multidisciplinary perspective. *Am. Behavioral Scientist* 44, 464 (2000).
5. *Ex Parte* Hibberd, 227 USPQ (BNA) 443 (Bd. Pat. App. Int. 1985).
6. See *J.E.M. Ag Supply, Inc. v. Pioneer Hi-Bred Int'l, Inc.*, 121 S.Ct. 1077 (2001) (Supreme Court's decision granting certiorari); *Pioneer Hi-Bred Int'l, Inc. v. J.E.M. Ag Supply, Inc.*, 200 F.3d 1374 (Fed. Cir. 2000) (appellate decision); *Pioneer Hi-Bred Int'l, Inc. v. J.E.M. Ag Supply, Inc.*, 49 USPQ 2d (BNA) 1813 (N.D. Iowa 1998) (district court decision).
7. *Diamond v. Chakrabarty*, 447 US 303 (1980).
8. Cong. Rep. 91-1605 (1970).
9. See 35 USC §271 (nature of the right to exclude); 35 USC §102 (novelty); 35 USC §103 (obviousness); 35 USC §112, 1st ¶ (adequacy of description).
10. For limitations and exclusions, see 7 USC §2544 (experimentation); 7 USC §2541(e) (noncommercial acts); 7 USC §2543 (saved seed); 7 USC §2541(a) (produce v. develop). For protectability criteria, see 7 USC §§2402(a)(1)–(4) (new, distinct, uniform, stable).
11. G 0001/98, *NOVARTIS II/Transgenic Plant*, [2000] EPOR 303 (decision of the Enlarged Board of Appeal of the European Patent Office).