

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INARI AGRICULTURE, INC.,
Petitioner,

v.

PIONEER HI-BRED INTERNATIONAL, INC.
Patent Owner.

Case No. PGR2024-00023
Patent No. 11,696,545

**PETITION FOR POST-GRANT REVIEW
UNDER 35 U.S.C. §§ 321-329 AND 37 C.F.R. § 42.1 et seq**

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1004	Curriculum Vitae of Dr. Ray Riley
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1006	U.S. Patent No. 10,660,288 (“Benson”)
1007	U.S. Patent No. 10,681,888 (“Longenberger”)
1008	Plant Variety Protection Certificate No. 201200324
1009	Plant Variety Protection Certificate No. 202000332
1010	Plant Variety Protection Certificate No. 202200416
1011	Lundmark, C. Genetically Modified Maize. <i>BioScience</i> 2007, 57, 996
1012	Lee, E.A.; Tracy, W.F. <i>Modern Maize Breeding</i> , in Handbook of Maize: Genetics and Genomics; Bennetzen, J.L., Hake, S., Eds.; Springer: New York, NY, USA, 2009; pp. 141–160. ISBN 978-0-387-77863-1
1013	Byerlee, D., <i>The Globalization of Hybrid Maize</i> , 1921–1970. <i>J. Glob. Hist.</i> , 15:101–122 (2020)
1014	Varshney, R.K.; Tuberosa, R. <i>Genomics-Assisted Crop Improvement: An Overview</i> , in Genomics-Assisted Crop Improvement: Vol. 1: Genomics Approaches and Platforms; Varshney, R.K., Tuberosa, R., Eds.; Springer Netherlands: Dordrecht, The Netherlands, 2007; pp. 1–12. ISBN 978-1-4020-6295-7
1015	Andorf et al., <i>Technological advances in maize breeding: past, present and future</i> , <i>Theor Appl Genet.</i> , 132(3):817-849 (2019)
1016	Fehr et al., <i>Principles of Cultivar Development</i> (1987)
1017	Wych et al., <i>Production of Hybrid Seed, Corn and Corn Improvement</i> , Chapter 9 (1988)
1018	Schnable et al., The B73 Maize Genome: Complexity, Diversity, and Dynamics, <i>Science</i> , 326:1112-1115 (2009)
1019	“A Brief History of Corn – From Domestication to 1995,” Pioneer Hi-Bred International, Inc. (Dec. 19, 2022), https://www.pioneer.com/us/agronomy/domestication-of-corn.html
1020	Geiger, <i>Doubled Haploids in Hybrid Maize Breeding</i> , <i>Maydica</i> 54:485-99 (2009)
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1022	Hostetler, <i>Bracing for sustainable agriculture</i> , Curr. Opin. Plant. Biol. 59:101985 (2021)
1023	Executive Order 14036: Promoting Competition in the American Economy, 86 Fed. Reg. 36987 (July 9, 2021)
1024	Thomas J. Vilsack, Secretary of Agriculture, and Kathi Vidal, Under Secretary of Commerce for Intellectual Property and Director of the U.S. Patent and Trademark Office, Increasing transparency, boosting competition, and supporting innovation can deliver better choices for farmers in the seed marketplace (March 7, 2023), https://www.uspto.gov/subscription-center/2023/increasing-transparency-boosting-competition-and-supporting-innovation-can
1025	USDA Agricultural Marketing Service, More and Better Choices for Farmers: Promoting Fair Competition and Innovation in Seeds and Other Agricultural Inputs (March 2023), https://www.ams.usda.gov/sites/default/files/media/SeedsReport.pdf
1026	March 7, 2023 Letter from USPTO Director Katherine K. Vidal to Secretary of Agriculture Thomas J. Vilsack and Undersecretary for Marketing and Regulatory Programs Jenny Lester Moffitt, https://www.uspto.gov/sites/default/files/documents/uspto-usda-letters03072023.pdf
1027	MacDonald, J.M., Dong, X., & Fuglie, K.O. (2023). Concentration and competition in U.S. agribusiness. U.S. Department of Agriculture, Economic Research Service, EIB-256, https://www.ers.usda.gov/webdocs/publications/106795/eib-256.pdf?v=7459
1028	W. Lesser, <i>From Penury to Prodigious: Protection Creep for U.S. Plant Varieties</i> , 14 Va. J. L. & Tech. 235 (2009)
1029	Brief for Respondent Pioneer Hi-Bred Int'l, <i>J.E.M. AG Supply, Inc. v. Pioneer Hi-Bred Int'l, Inc.</i> , 534 U.S. 124 (2001) (No. 99-1996) (filed June 2001), 2001 WL 674228
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1033	Excerpts from Encyclopaedia Britannica
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1035	Altman, <i>Standard deviations and standard errors</i> , Brit. Med. J., 331:903 (2005)
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1055	U.S. Patent No. 8,962,949
1056	U.S. Patent No. 8,889,966
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1058	U.S. Patent No. 11,666,020
1059	U.S. Patent No. 10,165,747
1060	U.S. Patent No. 10,863,705
1061	U.S. Patent No. 11,758,865
1062	U.S. Patent No. 10,881,064
1063	USPTO Biotech/Chemical Partnership (BCP) Meetings: Biotechnology, Chemical and Pharmaceutical (BCP) Partnership Meeting, March 12, 2008, http://www.cabic.com/bcp/031208/

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1067	U.S. Patent No. 10,492,410
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1072	U.S. Patent No. 10,011,828
1073	U.S. Patent No. 8,927,214
1074	Amended Complaint for Patent Infringement, <i>Pioneer Hi-Bred Int’l, Inc. v. J.E.M. AG Supply, Inc. et al</i> , No. C98-4016 (N.D. Iowa September 11, 1998)
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1076	U.S. Patent No. 5,347,081
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1086	U.S. Patent No. 5,557,035
1087	U.S. Patent No. 5,567,861
1088	U.S. Patent No. 5,569,822
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1090	U.S. Patent No. 5,689,034
1091	U.S. Patent No. 5,689,036
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1093	U.S. Patent No. 11,707,033
1094	Plant Variety Protection Certificate No. 200700388

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1096	USDA Agricultural Marketing Service, Objective Description of Variety—Corn (<i>Zea mays</i> L.), https://www.ams.usda.gov/sites/default/files/media/28-Corn%20ST-470-28%202015.pdf
1097	USDA Agricultural Marketing Service, PVPO Program Requirements, https://www.ams.usda.gov/services/plant-variety-protection/pvpo-requirements
1098	Corteva’s Answering Brief in Opposition to Defendants’ Motion to Dismiss the First Amended Complaint (Docket No. 26 in <i>Corteva Agriscience LLC, Pioneer Hi-Bred Int’l, and Agrigenetics, Inc. v. Inari Agriculture, Inc. & Inari Agriculture NV</i> , C.A. No. 23-1059 (JFM)) (filed Jan. 9, 2024)
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I. INTRODUCTION

Claims 1-20 (“Challenged Claims”) of U.S. Patent No. 11,696,545 (EX1001, “the ’545 Patent”) are utility patent claims to a plant—specifically, a particular variety of corn.

Patent Owner Pioneer Hi-Bred International (“PO”) obtained the claimed corn variety— designated “PH4CYJ”—by crossing (i.e., breeding) two other corn varieties—“PH1VNA” and “PH1KTF.” EX1001, 37:60-64. But such crosses were well within the level of skill for a person of ordinary skill (“POSA”) in the corn breeding field as of the ’545 Patent’s 7/2/2021 effective filing date. And nothing in the ’545 Patent or elsewhere in the record suggests the claimed PH4CYJ variety was patentably distinguishable over PH1VNA, PH1KTF, or any other preexisting corn variety. The ’545 Patent’s specification does not undertake any such comparison. On the contrary, it is largely identical to the specifications of other patents owned by PO and constituting indisputable prior art—including one reference describing a closely related corn variety created by crossing PH1KTF (i.e., one of the claimed variety’s two parent varieties) together with a separate preexisting variety. *See, e.g.*, EX1101 (comparison between the ’545 Patent’s specification and EX1006 (Benson)).

The only differences of any note between the ’545 Patent and the indisputable prior art are the recitations of different codes (corresponding to

different corn varieties) and different parental lines (corresponding to how the varieties were bred), along with tables reporting patentably insignificant differences in properties such as leaf angle. But the '545 Patent is a *utility* patent—not a plant patent or certificate under the Plant Variety Protection Act (PVPA). And the properties reported by the '545 Patent concerning the claimed PH4CYJ variety fall well within the mainstream of corn phenotypes known long before the '545 Patent's 7/2/2021 effective filing date, and/or have no meaningful utility. Instead, the listing of characteristics included in the '545 Patent mirror the characteristics required to be identified in PVP certificates, which unlike utility patents do not require identified plant varieties to be useful or non-obvious.

Nor does the '545 Patent otherwise suggest any reason why the particular combination of reported properties made the claimed PH4CYJ variety any better in any respect than any preexisting type of corn for any application. On the contrary, the '545 Patent's "Industrial Applicability" section (EX1001, 36:21-65) is—like the specification as a whole—essentially a cut-and-paste of a passage PO included in numerous prior art patents, including Benson (EX1006, 37:11-55) and Longenberger (EX1007, 37:21-65). In sum, while the claimed PH4CYJ variety may have been different from prior varieties in some respect, it was neither inventive under §103 nor useful under §101.

Yet the '545 Patent's prosecution history does not reflect the necessary level of consideration of §103 or §101.¹ Benson and Longenberger were not even of record. Moreover, the Examiner's only prior art-based rejection confusingly found dependent claims 3-7 anticipated, but never addressed the corresponding independent claim 1. EX1002, 100. The Examiner did not specifically compare the claimed variety to the prior art, but instead based the rejection on a claim interpretation that "any maize seed/plant" anticipated. *See id.* The Examiner subsequently allowed Applicant to overcome the "any maize seed/plant" interpretation by reciting the variety name in the claim (EX1002, 101)—without any indication the Examiner properly assessed the patentability of the claimed variety.

Moreover, the Examiner stated that "[t]he closest prior art is U.S. Patent Number 7,718,856 [EX1066], which teaches inbred line PHE2E having the same anther color, silk color, and cob color. However, inbred line PHE2E exhibits distinct aleurone color and genetic background." EX1002, 101. That is, the Examiner apparently relied for patentability on two features: (1) genetic

¹ Section cites are to 35 U.S.C. or 37 C.F.R. as context indicates, and all emphasis/annotations added unless noted.

background (i.e., meaning different parentage, but without providing or pointing to any information about gene expression) and (2) aleurone color.

However, other varieties—including that disclosed in Benson—share at least one parent, and many varieties—again, including that disclosed in Benson—share the same aleurone color. *See infra* §V. Benson plainly is a closer prior art reference than the '856 Patent—particularly given that it discloses a variety sharing a common parent. Applicant's failure to disclose it (despite Benson being a sibling of the claimed variety and sharing 50% of the same genetic background) and the Examiner's failure otherwise to identify Benson highlights the inadequacy of the prosecution of the '545 Patent.

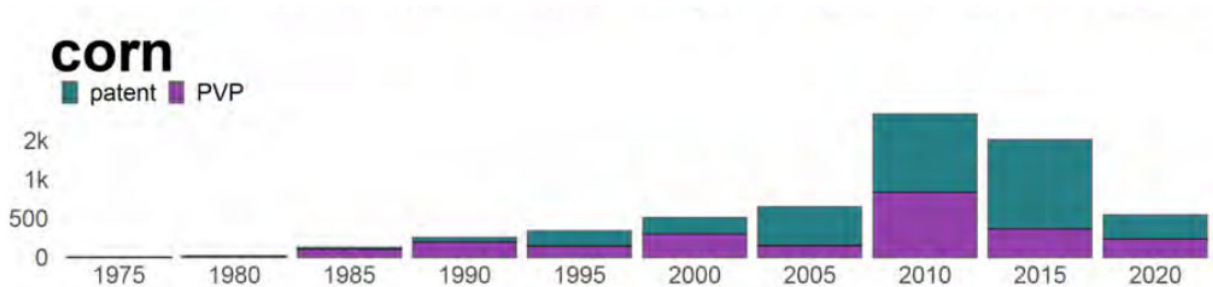
More fundamentally, the Examiner's willingness to rely on these alleged distinctions prevented fulsome examination of the Challenged Claims in view of the statutory non-obviousness requirement for utility patent protection. Under the Examiner's legally erroneous approach, plant breeders could obtain utility patent protection for *any* new variety provided it is actually novel—regardless of how little it actually varies from earlier varieties and whether those differences serve any useful purpose. But utility patent protection is not available for such “ordinary innovation,” which if monopolized would “stifle, rather than promote, the progress of useful arts.” *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 427 (2007) (citing U.S. Const., Art. I, § 8, cl. 8).

PO and other plant breeders who invest the time in such breeding remain free to pursue PVP certificates, which as the Director has explained “strike a different balance from patents in permitting farmers to save seeds and for plant breeders to engage in continued research on the protected variety.” EX1026, 4. But, utility patents must meet a higher standard. As the Supreme Court has stressed—in a case involving PO—“[i]t is ***much more difficult*** to obtain a utility patent for a plant than to obtain a PVP certificate because a utility patentable plant must be new, ***useful, and nonobvious***,” whereas “a plant variety may receive a PVP certificate without a showing of usefulness or nonobviousness.” *J.E.M. Ag Supply, Inc. v. Pioneer Hi-Bred Int’l, Inc.*, 534 U.S. 124, 142 (2001). In *J.E.M.*, the Supreme Court echoed PO’s own emphasis that PVP certificates offered “narrower” protection than utility patents (EX1029, *13), but likewise had no “requirement of nonobviousness or utility” (*id.*, *11).

Here, however, PO obtained the ’545 Patent even though the claims fail both the non-obviousness and utility requirements. PO’s disclosures are at best consistent with PVP-type protection—not the more rigorous requirements for utility patent protection. The situation is similar to that the Board faced in an earlier case that affirmed an obviousness rejection for a plant variety—a decision (*Ex parte C*) that PO itself cited to the Supreme Court in *J.E.M.* as proof the non-

obviousness requirement had teeth as applied to plant utility claims. EX1029, *20-21, *38, & n.25 (citing *Ex parte C*, 27 U.S.P.Q.2d 1492, 1496 (BPAI 1992)).

The '545 Patent indeed reflects a broader trend in which PO and other breeders have shifted their focus *away* from PVP certificates and toward utility patents—notwithstanding that the ever-increasing level of skill in the art should be elevating rather than lowering the bar for patentability and tilting the balance in the opposite direction. As the U.S. Department of Agriculture (“USDA”) noted in a recent report, “[a]cross all crops, IP composition generally shifted from mostly PVP certificates in the 1990s to a higher percentage of utility patents in 2020.” EX1025, 20. This trend was particularly pronounced for corn-related IP, which also saw a dramatic concentration of “IP ownership” during the period “by the top four firms,” including PO. *Id.*, 20 & n.25; *see also id.* at 21:



See also EX1028, 236 (noting that “the protection available for new plant varieties exceeds that for other patentable subject matter,” particularly given “the interpretation of nonobviousness by the Patent Office”); EX1027, 19; *cf.* 8 Chisum on Patents § 24.05 (2023) (noting that “a particular plant variety may not satisfy

the nonobviousness requirement”: “Protection for undefined size or color improvements of seed plants is more easily obtained and enforced under the PVPA....”).

The USDA prepared its report in consultation with the Office (see EX1026, 2) as part of broader partnership efforts following the President’s Executive Order tasking the Director together with the Secretary of Agriculture to collaborate on strategies for ensuring that the patent system does not “unnecessarily reduce competition in seed and other input markets beyond that reasonably contemplated by the Patent Act.” EX1023. The Director subsequently reiterated this as a “priority” and pledged that the Office would “[e]xplore initiatives to enhance the quality of the patent examination process for innovations related to agricultural products and processes.” EX1026, 2, 4.

Instituting post-grant review (“PGR”) on the ’545 Patent would further this priority, enhance patent quality in this vital space, and add some much needed “teeth” to the Office’s partnership with the USDA. Notwithstanding the President’s mandate (issued the week after PO filed the application at issue here along with numerous other near-identical applications based on an assembly line process relying on a prior art template), the ’545 Patent wrongly reduces competition in the corn seed market beyond that reasonably contemplated by the Patent Act.

Indeed, aside from being unpatentable as obvious (Grounds 1-3) and lacking specific utility (Ground 4), the Challenged Claims fail to satisfy the written description (Ground 5) and enablement (Ground 6) requirements. The '545 Patent violates the “bargain” underlying utility patent protection as it applies to new plant varieties.

Instead of providing a proper specification that builds upon the state of the art and thereby describes the invention while enabling POSAs to practice its full scope, the '545 Patent reflects an emerging template practice that is drawn entirely from the prior art and includes no information above and beyond that which PO would have needed even to obtain a PVP certificate on the new variety. Yet as the Office stressed to the Supreme Court in *J.E.M.*, the utility patent system requires applicants to make a higher “level of contribution to the public” than “certificate holders under the PVPA”—consistent with the fact that utility patent rights are more “absolute” than the protections PVP certificates provide. EX1030, 25. In PO’s own words to the Supreme Court when defending its earlier patents in *J.E.M.*, PVP certificates merely involve a “*fill-in-the boxes enumeration* of the distinguishing characteristics” of the new variety. EX1029, *12. PO contrasted the PVP system with utility patents and stressed how PO’s own patents at issue in *J.E.M.* provided “lengthy disclosures” that highlighted each claimed variety’s

“specific features” and “useful characteristics compared with other varieties as measured in numerous important ways.” *Id.*, *14.

Here, however, the '545 Patent reflects the new trend of PVP template recycling in which PO took its prior art disclosure and merely updated a handful of fields with information no different from what PO would have needed to provide if seeking a PVP certificate on the new variety. Such fill-in-the box disclosures do not satisfy the demanding written description and enablement requirements for utility patent claims under §112. The '545 Patent stands in stark contrast to PO's *J.E.M.*-era patent families, which were each highly individualized and included extensive disclosures above and beyond what had been available in the prior art at the time. Here, on the other hand, the '545 Patent includes no such comparisons of “useful characteristics compared with other varieties.” EX1029, *14. The only characteristics disclosed are in Table 1 (EX1001, 38:11-39:28), which merely excerpts some—not even all—fields from a USDA form (EX1096) required when seeking PVP certificates on new corn varieties. It does not compare those characteristics with other varieties. Nor does the '545 Patent even disclose where (i.e., location) or when (i.e., growing season) the corn reflected in Table 1 was harvested. Without such information, the characteristics reflected in Table 1 are not helpful to POSAs in characterizing the invention. A given corn seed will yield a very different plant if grown in North Dakota during a cold and wet summer than

if it is grown in Iowa during a hot and dry summer. By contrast, PO's *J.E.M.*-era patents disclosed where and when the disclosed data had been generated—allowing POSAs to understand the relevant environmental conditions. *E.g.*, EX1082, 6:59 (“Johnston, Iowa in 1990”).

Despite PO's drift away from such individualized disclosures in the *J.E.M.* era to the PVP Template approach reflected in the '545 Patent's specification, PO sought and obtained **broader** claims in the '545 Patent as compared to PO's *J.E.M.*-era patents. This paradox highlights the '545 Patent's violation of the bargain underlying §112 and the utility patent system as a whole. As the Supreme Court recently stressed along those same lines, “[t]he more one claims, the more one must enable.” *Amgen Inc. v. Sanofi*, 598 U.S. 594, 610 (2023). Yet the '545 Patent discloses **less** than PO's earlier patents while claiming **more**.

In particular, the Challenged Claims refer to PO's deposited seed as merely being “representative” of the variety being deposited—without even disclosing what the inventor even meant by that phrase. By contrast, PO's earlier claims to inbred lines in *J.E.M.* consistently either (1) were limited to seeds or plants stemming from actual deposited seed or (2) required that plants possess “**all** the physiological and morphological characteristics” of the variety. Further, as noted above, PO's *J.E.M.*-era patents not only disclosed detailed “physiological and morphological characteristics” for corn plants associated with the claimed

varieties, but also indicated where and when the plants had been grown. Yet the '545 Patent withholds such data from the public.

Instituting review would facilitate a return to the appropriate balance PO and the Office both stressed to the Supreme Court as between PVPA protection (*not* subject to non-obviousness and utility requirements or mandating the level of disclosure required by §112, but subject to statutory exceptions) and utility patent protection (subject to non-obviousness and utility requirements and §112's demanding standards, but *not* subject to the PVPA's carveouts). It would likewise promote the Office's partnership with the USDA to implement the President's Executive Order and "help ensure that competition in agricultural markets remains vigorous and in accord with what is reasonably contemplated by the Patent Act." EX1026, 2. Granting patents on new plant varieties based on a fill-in-the-box template from the prior art wrongly impairs competition and is not reasonably contemplated by the Patent Act.

II. REQUIREMENTS FOR POST-GRANT REVIEW

A. Grounds for Standing

Pursuant to §42.204(a), Petitioner certifies that the '545 Patent is available for PGR and that Petitioner is not barred or estopped from requesting PGR of the Challenged Claims on the grounds identified herein. The '545 Patent issued on

7/11/2023, and this Petition is being filed within nine months of that issue date (4/11/2024). *See also* §II.B.1 below regarding eligibility for PGR.

B. Identification of Challenge

Pursuant to 37 C.F.R. §§42.204(b) and (b)(1), Petitioner requests PGR of the Challenged Claims and that the Board cancel the same as unpatentable. The '545 Patent matured from U.S. Patent Application No. 17/366,079, filed 7/2/2021 (“’079 Application”).

1. The '545 Patent is Eligible for PGR

The '545 Patent is eligible for PGR because it does not assert an effective filing date earlier than the '079 Application's actual 7/2/2021 filing date. It is unquestionably therefore an AIA “first-to-file” patent filed on or after 3/16/2013.

2. Statutory Grounds on Which the Challenge is Based

Petitioner respectfully requests institution of PGR and cancelation of the Challenged Claims on the following grounds:

Ground	Statute	Basis	Claims
1	§103	Obviousness based on Smalley (EX1005) and Corresponding PVPA Certificate (EX1008)	1-20
2	§103	Obviousness based on Benson (EX1006) ²	1-20

² Benson has a corresponding PVP certificate (EX1009) dated August 20, 2021.

Ground	Statute	Basis	Claims
3	§103	Obviousness based on Longenberger (EX1007) ³	1-20

Ground	Statute	Basis	Claims
4	§101	Lack of utility	1-20

Ground	Statute	Basis	Claims
5	§112(a)	Lack of written description	1-20
6	§112(a)	Lack of enablement	1-20

The information required by §§42.204(b)(4)-(5) is provided in Sections V-VI. As explained therein—including with supporting citations to the declaration of Dr. Raymond Riley (EX1003)—the information presented in the petition demonstrates that is more likely than not that at least one of claims 1-20 is unpatentable. *See* §324(a).

³ Longenberger has a corresponding PVP certificate (EX1010) dated December 15, 2023.

III. THE '545 PATENT

A. Summary of the '545 Patent

The '545 Patent is directed to an inbred corn variety designated PH4CYJ, which “originated from a cross between inbred line PH1KTF and inbred line PH1VNA.” EX1001, 37:60-64. In particular, “PH4CYJ was developed by producing a doubled haploid from the F1 plants, selfing and using pedigree selection amongst the D1 lines, and selfing and bulking from the subsequent generations.” EX1001, 37:64-38:3. These techniques were well known to POSAs (Riley, ¶52) and disclosed verbatim in prior art references like Longenberger. EX1007, 38:57-61. *See infra* §V.A.2. Indeed, Smalley—which discloses PH1KTF, the only publicly-disclosed parent of the '545 Patent's PH4CYJ—states that “an F1 hybrid for which PH1KTF is a parent can be used to produce double haploid plants.” EX1005, 30:15-18.

Aside from the variety designation itself, the “Abstract,” “Background,” and “Summary” sections are essentially identical to those in multiple prior art patents such as Benson (EX1006) and Longenberger (EX1007)—disclosing information already well known to POSAs. Riley, ¶¶53-54; EX1101 (redline comparison between '545 Patent and Benson); EX1102 (redline comparison between '545 Patent and Longenberger).

For example, the Background sections of Benson, Longenberger, and the '545 Patent conclude by noting that a “continuing goal of maize breeders is to develop stable, high yielding maize varieties and hybrids that are agronomically sound with maximal yield over one or more different conditions and environments.” EX1001, 1:23-26; Benson, 1:23-26; Longenberger, 1:23-26.

The “Detailed Description” section likewise closely tracks multiple prior art patents such as Benson and Longenberger. Riley, ¶55.

While the data in the '545 Patent’s “Table 1” (“Variety Description Information,” EX1001, 38:11-39:28) varies slightly from that in the prior art tables, the differences are insubstantial. Riley, ¶56. Moreover, the fields themselves (e.g., “branch angle” and “tassel length”) are taken verbatim from USDA forms (e.g., EX1096) and fields used with PVP certificates. Riley, ¶57; *see also* EX1008, 7-8; EX1009, 6-11; EX1010, 6-11. The characteristics in question facilitate assessing distinctiveness for purposes of the PVPA—not utility or non-obviousness for purposes of the Patent Act.

B. Level of Ordinary Skill in the Art

The level of ordinary skill in the art is evidenced by the prior art. *See In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (determining that Board did not err in adopting the approach that the level of skill in the art was best determined by references of record). The prior art discussed herein and in the declaration of Dr.

Riley demonstrates that POSAs as of July 2021 had a high level of skill, with a doctoral degree in plant breeding or a related field, at least five years of experience with corn breeding, and additional experience interfacing with laboratory-side personnel (including a computational biologist as along with genetics specialists) and field-side personnel. Alternatively, additional experience could take the place of an advanced degree. Riley, ¶¶50-51.

C. Prosecution History

The '079 Application was filed on 7/2/2021 along with numerous other applications with virtually identical specifications filed on the same day but claiming purportedly different inbred corn varieties identified by different codes. *See, e.g.*, EX1103 (comparison between the '545 Patent and U.S. Patent No. 11,659,803, EX1057); EX1104 (comparison between the '545 Patent and U.S. Patent No. 11,666,020, EX1058).⁴

PO subsequently filed an Information Disclosure Statement (IDS)—the only IDS filed during prosecution—identifying one issued patent (U.S. Patent No. 8,895,819 (Smalley, EX1005) and one then-pending application (17/377850).

⁴ The '803 Patent is the subject of Petitioner's PGR2024-00019. The '020 Patent is the subject of Petitioner's PGR2024-00020.

EX1002, 88-89. Smalley discloses corn variety PH1KTF (EX1005, Abstract)—one of the two parental lines identified in the '545 Patent as noted above.⁵

The '850 application, which issued as U.S. Patent No. 11,758,865 (EX1061) discloses maize hybrid X13R120, “made by crossing inbreds PH4CYJ [*i.e.*, the variety disclosed in the '545 patent] and PH41M2.” EX1061, 11:18. It discloses no data aside from the baseline Variety Description table reflecting PVPA requirements.

On 10/27/2022, the Examiner mailed a non-final Office Action. EX1002, 94-102.⁶ The Examiner’s only prior-art based rejection confusingly found

⁵ The other parental line (PH1VNA) was also one of the parents for the variety disclosed in the '020 Patent, which as noted above was filed on the same day as the '545 Patent and is the subject of Petitioner’s PGR2024-00020. As described therein, the prosecution history for the '020 Patent included a Request for Information under §1.105 concerning the PH1VNA line, but PO failed to provide the requested information because PH1VNA was purportedly “proprietary” to PO. Here, by comparison, a different examiner was handling the application and failed even to request information concerning PH1VNA.

⁶ Petitioner’s summary focuses on the aspects of the Office Action potentially pertinent to the grounds in the Petition. The Examiner also raised certain

dependent claims 3-7 were anticipated, but not the independent claim from which they depended. *Id.*, 100. The Examiner did not specifically compare the claimed variety to the prior art, but instead based the rejection on a claim interpretation under which “any maize seed/plant” anticipated. *See id.* (“[w]ithout knowing the other parent for the crossing, the F2 seed/plant of claims 3-4 reads on any maize seed/plant...” and “claims 5-7 read on a method of producing any maize plant by applying any breeding technique”). The Examiner stated that Applicant could overcome the “any maize seed/plant” interpretation by reciting a “hybrid maize seed of PH4CYJ.” *Id.*, 101.

The Examiner also stated that the closest prior art was U.S. Patent No. 7,718,856 (EX1066), which disclosed a variety designated PHE2E “having the

objections and indefiniteness rejections (EX1002, 96-99), which PO later overcame by purportedly perfecting its seed deposit and amending certain claims to recite “of PH4CYJ.” (*id.*, 121). In addition, the Examiner also rejected pending claim 10 (related to a converted version of PH4CYJ) and claims 11-17 (depending directly or indirectly from claim 10) for lack of written description. In response, PO amended claim 10 to specify that the converted version comprised “**all of** the physiological and morphological characteristics of maize variety PH4CYJ when grown under the same environmental conditions.”

same anther color, silk color, and cob color” (EX1002, 101). “However,” the Examiner continued, “inbred line PHE2E exhibits distinct aleurone color and genetic background.” EX1002, 101. The Examiner did not explain how these could render the claims unpatentable where the aleurone color was well known in the art and a parent and sibling variety were also previously disclosed. *Id.* Nor did the Examiner explain the basis for treating the ’856 Patent as the closest prior art. Indeed, Smalley, Benson, and Longenberger are each more similar in numerous respects. Riley, ¶69.

There is no indication in the record that the Examiner ever considered the prospect of an obviousness rejection based on Smalley, Benson, or Longenberger, notwithstanding that:

- (1) Smalley and Benson share genetic heritage with the ’545 Patent, and
- (2) Benson and Longenberger have the same clear aleurone color as the ’545 Patent (i.e., the same allegedly distinguishing feature relied upon by the Examiner).

Indeed, Benson and Longenberger were not even of record during prosecution.

In particular, there is no indication the Examiner ever assessed whether the “differences between the claimed variety and the [prior art varieties] are so significant and unexpected that they should weigh more heavily than the numerous similarities between the claimed variety and the varieties of the cited prior art.” *Ex*

parte C, 27 U.S.P.Q.2d at 1497 (affirming obviousness determination concerning plant utility claims). Nor is there any indication the Examiner assessed PO’s specification to determine whether it provided “a base for judging whether the differences” between the claimed variety and the prior art varieties were “in fact, significant and unexpected.” *Id.* (noting that “specification says nothing regarding the significance and relative importance of such criteria as maturity date, shortness of plant, flower color and flowering date”).

PO failed to disclose that parental line PH1KTF had been one of the two parental lines for corn varieties claimed in at least **twenty-two** other U.S. patents and then-pending applications—including **fourteen** indisputable §102(a)(1) prior art references, one to an inbred line (i.e., Benson, EX1006) and thirteen to hybrid lines (EX1044-EX1056). *See infra* §V.A.3; *see also* Riley, ¶84. PO likewise failed to disclose that parental line PH1VNA had been one of the two parental lines for a different corn variety in an application filed the same day as the instant application. EX1058. *See infra* §V.A.3; *see also* Riley, ¶94. PO indeed was obligated to disclose those highly material applications. *See Dayco Prod., Inc. v. Total Containment, Inc.*, 329 F.3d 1358, 1365-69 (Fed. Cir. 2003).

PO’s response to the §102 rejection was to amend claims 3 and 4 to recite PH4CYJ and claim 4 to recite “somatic cell.” EX1002, 121. PO presented no arguments for patentability over the prior art. EX1002, 125-26. The Examiner

then allowed the application without identifying any reasons for patentability or further discussing prior art. EX1002, 132.

D. Challenged Claims

Claims 1-20 are reproduced in the Claim Listing (*infra* §XI).

IV. CLAIM INTERPRETATION

Claim terms subject to PGR are to be “construed using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. §282(b), including construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” §42.200(b). Because Petitioner’s grounds plainly render the claims unpatentable under any plausible construction, no outer boundary constructions are necessary. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017).⁷

⁷ See generally *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005); 37 C.F.R. §42.200(b). This claim-construction analysis is not a concession as to the scope of any claim term in litigation, or a waiver of any argument in any proceeding that claim terms are indefinite, invalid, or unpatentable.

V. GROUNDS 1-3: CLAIMS 1-20 ARE UNPATENTABLE AS OBVIOUS OVER THE PRIOR ART

Claims 1-20 are demonstrated herein as more likely than not unpatentable as obvious over one or more of multiple prior art corn varieties that are structurally and phenotypically similar to the claimed PH4CYJ variety. And nothing in the specification or otherwise in the record suggests any basis for overcoming the obviousness showing herein. On the contrary, the specification suggests no reason why color differences or other distinctions between PH4CYJ and prior art varieties were at all significant.

The Challenged Claims parallel those the Board rejected in *Ex parte C*, 27 U.S.P.Q.2d 1492, which concerned utility patent claims to a soybean plant. PO itself cited *Ex parte C* to the Supreme Court in *J.E.M.* when successfully arguing that utility patent protection should be available for plant varieties if—and only if—the claimed variety satisfies all statutory requirements, including non-obviousness. EX1029, *20-21, *38, n.25. In other words, PO cited *Ex parte C* in successfully arguing that utility patent protection can coexist with PVPA protection because the requirements to obtain a patent are more stringent than those to obtain a PVP certificate.

In *Ex parte C*, as here, the specification was “cryptic” and offered “little more detail than would be” expected in a PVPA disclosure. 27 U.S.P.Q.2d at 1493. The *Ex parte C* specification had “little specific language which

distinguishes the claimed soybean variety from other soybean varieties and [did] not explain the significance of any differences in attributes between the novel variety and varieties that are old in the art.” *Id.* Here, likewise, the specification says nothing regarding any such distinctions relative to prior art varieties. Riley, ¶¶68-92, 99-100.⁸

The Board in *Ex parte C* affirmed obviousness rejections over prior art plants that were similar to the claimed plant in many respects despite certain variations in “color” and resistance to a particular kind of rot. *Id.* at 1496-1498. Nothing in the record explained why such differences were “so significant and unexpected that they should weigh more heavily than the numerous similarities between the claimed variety and the varieties of the cited prior art.” *Id.* at 1497. The specification offered no basis even for assessing whether the differences were “significant and unexpected”; it said nothing regarding the relevance of criteria such as “flower color.” *Id.* The same is true here, as detailed below.

⁸ By contrast, PO’s earlier patents had extensive comparative data. *See* Riley, ¶¶175-190. PO stressed these “extensive recitations” to the Supreme Court in *J.E.M.* when likewise citing *Ex Parte C* to the Court as proof the non-obviousness requirement had teeth. EX1029, *20-21, *38, n.25.

Aside from having been cited by PO to the Supreme Court, the Board’s approach in *Ex parte C* tracks binding controlling precedent concerning the obviousness of other types of claims—for example, those to chemical compounds—based on structurally similar prior art. *See, e.g., In re Dillon*, 919 F.2d 688, 697 (Fed. Cir. 1990) (en banc); *Application of Payne*, 606 F.2d 303, 314 (CCPA 1979) (“The similarity in chemical structures and properties between the prior art and claimed compounds is sufficiently close to support a prima facie case of obviousness.”).

Here, likewise, that approach confirms the obviousness of claims 1-20, which concern corn varieties insubstantially different from those disclosed in prior art references.

A. *Graham* Factor Analysis Relevant to Grounds 1-3

Obviousness is resolved based on underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; (4) any secondary considerations identified by PO. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966).

Obviousness may be found, for example, where “a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way...unless its actual

application is beyond that person’s skill.” *KSR*, 550 U.S. at 401. Additionally, in cases where “a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product [was] not of innovation but of ordinary skill and common sense.” *Id.* at 421.

1. Scope and Content of the Prior Art

a. General State of the Art

As one of the world’s most important staple crops, Maize (*Zea mays*; commonly known as corn) has been the subject of well-developed breeding and selection techniques dating back roughly nine thousand years. Riley, ¶58.

Modern cross techniques date back to 1867, when plant breeders began directing pollen from one maize plant to another. In 1878–1881, crossing maize varieties to grow the production of commercial cultivars was proposed. Maize genes important for commercially relevant traits also began to be discovered. A revolutionary step in maize breeding began with the discovery of ‘hybrid vigor’ or heterosis in 1909. EX1013, 104. This was the first step toward maize scientific breeding. In 1933, the first hybrid maize created by crossing inbred lines was introduced, and maize breeding started entering the “hybrid era.” Riley, ¶59

Employment of modern genetics and molecular biology techniques in maize breeding started in the 1970s–1980s with the first regenerated plant from a cell

culture and sequencing the first maize genes. These modern techniques aided the identification of genes conferring desirable traits such as disease and/or insect resistance. Transgenic maize varieties began to emerge in the late 1990s, and transgenic hybrids that could confer insect resistance, herbicide tolerance, high lysine content, and drought-resistance were commercialized. EX1011; *see also* Riley, ¶60.

Principles and methods of maize breeding and cultivar development to produce maize varieties with desirable traits have been described in various textbooks and publications including, *e.g.*, Fehr et al., Principles of Cultivar Development, (1987) (EX1016); Wych et al., Production of Hybrid Seed, Corn and Corn Improvement, Chapter 9 (1988) (EX1017); Lee et al., Handbook of Maize, Modern Maize Breeding (2009) (EX1012); and Andorf et al., Theor Appl Genet. 132(3):817-849 (2019) (EX1015). Such principles and techniques are also well known and routinely practiced by POSAs. Riley, ¶¶61-63.

b. Prior Art Disclosing Closely Related Inbred Maize Varieties

Smalley (EX1005), Smalley's related PVP certificate (EX1008), Benson (EX1006), and Longenberger (EX1007) are indisputable post-AIA §102(a)(1) prior art—all issued over one year before 7/2/2021:

Reference	Issued
Smalley	11/25/2014
Benson	05/26/2020
Longenberger	06/16/2020
PVP Certificate Associated with Smalley	03/11/2014

These references disclose inbred corn lines with characteristics very similar to those of the claimed PH4CYJ as illustrated below. Riley, ¶69.

	‘545 Patent (PH4CYJ)	Smalley (PH1KTF)⁹	Benson (PH47W4)	Longenberger (PH47K2)
Grain Texture	Dent	Flint	Dent	Dent
Comparative Relative Maturity (days)	111	N/D	111	108
Emergence to 50% plants in silk (days)	55	N/D [62]	52	51
Emergence to 50% plants in	1348	N/D [1279.5]	1325	1299

⁹ PH1KTF data is from Smalley (EX1006) except for maturity data (such as “Emergence to 50% plants in silk (heat units)” and weight per 100 kernels), which are not available in Smalley and are taken from the corresponding PVP certificate (EX1009) as indicated in brackets. While the data for certain other fields in the PVP certificate vary slightly from those reported in Smalley, POSAs would understand that the variations are within the range expected for a given corn variety. Riley, ¶69.

	‘545 Patent (PH4CYJ)	Smalley (PH1KTF)⁹	Benson (PH47W4)	Longenberger (PH47K2)
silk (heat units)				
Emergence to 50% plants in pollen shed (days)	54	N/D [61]	52	52
Emergence to 50% plants in pollen shed (heat units)	1325	[1264]	1325	1325
Plant height (to tassel tip) (cm), mean (SE)	213.3 (11.86)	194.9 (1.47)	211.4 (7.41)	207 (6.1)
Ear height (to base of top ear node) (cm), mean (SE)	72.3 (10.78)	62.9 (1.24)	78 (3.83)	75.1 (9.31)
Length of Top Ear Internode (cm), mean (SE)	13.3 (0.95)	15.1 (0.22)	17 (2.53)	16.7 (1.98)
Number of Nodes Above Ground, mean (SE)	12.9 (1.41)	N/D	13.2 (1.11)	11.9 (0.77)
Anthocyanin of Brace Roots (1 = absent, 2 = faint, 3 = moderate, 4 = dark)	2	2	1	2
Width of Ear Node Leaf (cm), mean (SE)	9.1 (0.83)	9.5 (0.10)	10.2 (0.65)	9.3 (0.62)

	‘545 Patent (PH4CYJ)	Smalley (PH1KTF)⁹	Benson (PH47W4)	Longenberger (PH47K2)
Length of Ear Node Leaf (cm), mean (SE)	84.3 (4.89)	75.5 (0.54)	87 (2.29)	83.9 (4.7)
Number of Leaves Above Top Ear, mean (SE)	6.1 (0.92)	6.3 (0.09)	7.3 (0.94) ¹⁰	5.9 (0.85)
Leaf Angle (degrees) (at anthesis, 2 nd leaf above top ear to the stalk), mean (SE)	35.5 (6.87)	22.5 (0.64)	34.3 (6.57)	26.3 (4.44)
Leaf Color	V. Dark Green	V. Dark Green	V. Dark Green	V. Dark Green
Leaf Sheath Pubescence (1 = none to 9 = peach-like fuzz)	7	2	2	4
Number of Primary Lateral Branches, mean (SE)	2 (1.3)	0.0 (0.24)	0.4 (0.58)	1.5 (1.24)
Branch Angle from Central Spike (degrees), mean (SE)	18.3 (9.57)	27.5 (5.70)	15 (5.35)	38.9 (18.73)

¹⁰ The related PVP Certificate reports a mean number of leaves above top ear of 7.

EX1009, 7.

	‘545 Patent (PH4CYJ)	Smalley (PH1KTF)⁹	Benson (PH47W4)	Longenberger (PH47K2)
Tassel Length (from peduncle node to tassel tip) (cm), mean (SE)	57.6 (4.15)	51.9 (0.60)	58.8 (5.57)	56.5 (4.59)
Peduncle Length (from top leaf node to lower branch) (cm), mean (SE)	27.6 (4.57)	23.4 (0.46)	25.7 (5.14)	21.3 (3.74)
Central Spike Length (cm), mean (SE)	27.2 (1.69)	N/D	29.2 (2.58)	30.9 (3.26)
Flag Leaf Length (cm) (from flag leaf collar to tassel tip), mean (SE)	43.1 (4.54)	N/D	33.4 (3.71)	36.4 (4.28)
Pollen Shed (0 = male sterile to 9 = heavy shed)	3	1	8	7
Bar Glumes (1 = absent, 2 = present)	1	1	1	1
Anther Color	Light Red	Red	Pink	Pale Yellow
Silk Color	Light Red	Light Green	Yellow	Light Red
Fresh Husk Color	Light Green	Med. Green	Light Green	Light Green
Dry Husk Color	White	White	White	Buff
Ear position at dry husk stage (1 = upright, 2	1	1	3	1

	‘545 Patent (PH4CYJ)	Smalley (PH1KTF)⁹	Benson (PH47W4)	Longenberger (PH47K2)
= horizontal, 3 = pedant)				
Husk Tightness (1 = very loose to 9 = very tight)	9	7	4	7
Husk Extension (at harvest) (1 = short (ears exposed), 2 = medium (< 8 cm), 3 = long (8-10 cm), 4 = very long (> 10cm))	3	2	2	2
Length of Interior Husk (cm), mean (SE)	20.2 (1.11)	N/D	16.9 (2.7)	20.2 (2.84)
Shank Length (cm), mean (SE)	6.1 (1.33)	8.2 (0.31)	9.1 (1.16)	8.9 (1.79)
Ear Length (cm), mean (SE)	15.3 (0.89)	15.9 (0.20)	14.1 (1.09)	17 (0.87)
Ear Diameter at mid-point (mm), mean (SE)	40.4 (1.57)	40.3 (0.35)	41.9 (1.56)	36.1 (2.26)
Ear Weight (gm), mean (SE)	126 (15.79)	127.3 (3.06)	121.1 (17.56)	107.8 (25.95)
Number of Kernel Rows, mean (SE)	14.2 (0.96)	14.6 (0.24)	16.5 (1.12)	14 (1.3)

	‘545 Patent (PH4CYJ)	Smalley (PH1KTF)⁹	Benson (PH47W4)	Longenberger (PH47K2)
Number of Kernels Per Row, mean (SE)	27.2 (2.15)	N/D	27 (4.2)	25.4 (4.85)
Kernel Rows (1 = indistinct, 2 = distinct)	2	2	2	2
Row Alignment (1 = straight, 2 = slightly curved, 3 = spiral)	1	2	1	1
Ear Taper (1 = slight cylindrical, 2 = average, 3 = extreme conical)	1	2	1	1
Kernel Length (mm), mean (SE)	10.9 (0.78)	10.9 (0.12)	10.4 (0.59)	8.7 (1.27)
Kernel Width (mm), mean (SE)	8.3 (0.79)	8.6 (0.11)	7.2 (0.74)	7.5 (0.68)
Kernel Pericarp Color	Clear	N/D	Clear	Clear
Aleurone Color Pattern	Homozygous	Homozygous	Homozygous	Homozygous
Aleurone Color	Clear	Yellow	Clear	Clear
Hard Endosperm Color	Yellow- Orange	Yellow	Yellow- Orange	Yellow- Orange
Weight per 100 Kernels	33.1	[34.0 (2.83)]	26.1	24.3

	‘545 Patent (PH4CYJ)	Smalley (PH1KTF)⁹	Benson (PH47W4)	Longenberger (PH47K2)
(unsized sample) (gm), mean (SE)				
Cob Diameter at mid-point (mm), mean (SE)	23.7 (1.2)	24.4 (0.21)	22.5 (1.25)	20.3 (1.37)
Cob Color	Red	Pink-Orange	White	White

Smalley, Benson, and Longenberger likewise disclose that the disclosed inbred lines provide “source[s] of breeding material that may be used to develop new maize inbred varieties.” EX1005, 28:37-39; EX1006, 32:33-35; EX1007, 32:41-43.

2. Differences Between the Prior Art and the Claimed Invention

Any differences between the prior art and the claimed invention are insubstantial. Riley, ¶73. Both the claims and the prior art are directed to stable inbred maize varieties for use in industrial applications as well as breeding other inbred and/or hybrid lines. *Id.* Virtually all of the ‘545 Patent’s specification is identical to Benson and Longenberger and also substantially overlaps with Smalley. *Id.* Moreover, as the above table illustrates, the disclosed characteristics of the claimed PH4CYJ plant and its associated crop (i.e., corn ears) closely track those of the identified prior art maize lines. *Id.*, ¶¶74-85. Simply put, “[t]he claimed plant does not appear to differ significantly from the prior art plants as

measured by numerous characteristics.” *Ex parte C*, 27 U.S.P.Q.2d at 1496. The disclosed properties concerning the claimed PH4CYJ variety instead fall well within the mainstream of corn phenotypes observed long before the ’545 Patent’s 7/2/2021 effective filing date. Riley, ¶74. Even to the limited extent that certain reported characteristics of the claimed PH4CYJ vary to some degree from those reported in the prior art on which the petition focuses, other prior art corn varieties—including other prior art sibling varieties—included comparable characteristics. *Id.*, ¶¶75-85.

In particular, there is no basis in the record from which to conclude that the identified traits would have fallen outside the range of expected outcomes from the cross yielding the claimed invention (Riley, ¶¶75-85)—in other words crossing PH1KTF (disclosed in Smalley) with another line such as the PH1VNA variety that PO used to obtain the claimed variety but about which PO never disclosed to the Examiner. *See supra* §III.C. Like that in *Ex parte C*, the specification here never indicates “(1) the characteristics possessed by each parent variety, (2) which of these characteristics were expected to be passed on to progeny plants, and (3) what inheritable characteristics (goals) were sought in the progeny.” 27 U.S.P.Q.2d at 1493-94.

3. Level of Ordinary Skill in the Art

The level of skill in the art is high, as exemplified by PO's repeated use of the PH1KTF (disclosed in Smalley) and PH1VNA varieties as one of the parent lines when breeding other corn varieties—as disclosed in at least **fourteen** other patents (EX1006, EX1044-EX1056) that are indisputable §102(a)(1) prior art issued before 7/2/20 and **six** other more recent patents filed before the '545 Patent's 7/2/21 filing date (EX1038-EX1043) and further confirming the high level of skill. Riley, ¶94; *In re Epstein*, 32 F.3d 1559, 1563, 1567 (Fed. Cir. 1994). **Seven** of those siblings are inbred lines—including PH47W4, which is indisputable prior art (EX1006 and EX1036-EX1043). Riley, ¶94. **Two** additional applications on sibling inbred lines were filed the same day as the '545 Patent. EX1036-EX1037.

The same breeding approach was also known. For example, U.S. Patents 10,765,076; 10,827,697; and 11,432,497 recite the use of PH1KTF along with the exact same breeding technique—involving a “doubled haploid” approach—as the '545 Patent. *Compare* EX1001, 37:66-38:3, with EX1043, 38:59-64; EX1041, 38:57-61; EX1040, 38:54-57. Benson in particular recites PH1KTF and has a similar breeding history including the doubled haploid step. Benson, 38:54-61. The only difference between Benson and the '545 was the selection of the second parent (PH1VNA).

PO also filed a different application on the same day as the '545 Patent directed to a separate inbred line based on a cross with that second parent (i.e., the purportedly proprietary PH1VNA). EX1058, 38:25-28; Riley, ¶95.

Yet PO did not disclose any of these sibling varieties during prosecution. *See supra* §III.C; see also MPEP § 2004 (citing *Dayco*: “Do not rely on the examiner of a particular application to be aware of other applications belonging to the same applicant or assignee.”).

As PO’s earlier patents confirm, corn breeding was a sophisticated science by 2021, with multi-disciplinary teams harnessing computational biology and sophisticated understandings of the corn genome (which had been sequenced in 2009) to create new varieties incorporating desired phenotypical features. Riley, ¶96; EX1018. These breeding efforts focused not only on the hybrid varieties sold to farmers, but also the “inbred” varieties used for breeding new hybrids. Riley, ¶96. As the '545 Patent, the virtually identical Longenberger prior art, and the likewise virtually identical Benson prior art disclosing an inbred sibling, each state, “[a] continuing goal of maize breeders is to develop stable, high yielding maize varieties and hybrids that are agronomically sound with maximal yield over one or more different conditions and environments.” EX1001, 1:23-26; EX1006, 1:23-26; EX1007, 1:23-26. Given the competitive nature of the market, constant

evolution and improvement of a company's inbred lines was a commercial imperative. Riley, ¶97.

In sum, “the desire to enhance commercial opportunities by improving [inbred corn varieties] is universal—and even common-sensical.” *DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1368 (Fed. Cir. 2006). Accordingly, “the proper question” when assessing obviousness “is whether the ordinary artisan possesses knowledge and skills rendering him *capable* of combining the prior art references.” *Id.* (emphasis original). And the high level of skill in the modern corn breeding field confirms such capability. POSAs were capable of breeding inbred lines to incorporate essentially any desired inbred phenotypical trait in descendent inbred lines provided it was within the scope of corn's existing gene pool as confirmed by the existence of the trait in one or more preexisting corn varieties (as is the case with all of the identified characteristics in the '545 Patent). Riley, ¶98; *see also Ex parte Ketkar*, Appeal 2017-008056, 2018 WL 3812708, at *6 (PTAB July 24, 2018) (affirming obviousness determination as to claimed corn variety: “The art in this case presents one skilled in the art with a finite number of known possibilities for crossing corn plants to produce the desired results.”).

It would constitute legal error “to discount the significant abilities of [POSAs] in” this “advanced area of art.” *In re Kubin*, 561 F.3d 1351, 1360 (Fed.

Cir. 2009) (affirming obviousness rejection and “declin[ing] to cabin *KSR*” only to ostensibly “predictable arts”); *see also Ex parte Reid*, Appeal 2010-004943, 2010 WL 4876440, at *3 (BPAI Nov. 29, 2010) (addressing obviousness rejection of plant utility claims and analogizing to *Kubin*: “In our opinion, *Kubin* applies in these circumstances.”).

For example, changes in grain color could be incorporated via established techniques such as locus conversions. Riley, ¶98; EX1005, 16:47-50 (“Desired traits that may be transferred through locus conversion include...grain color (white)”); EX1006, 20:5-8 (same); EX1007, 20:14-17 (same); *see Ex parte Reid*, 2010 WL 4876440, at *3 (addressing obviousness rejection of utility claims to cotton plant: “The ordinary skilled worker would have routinely selected progeny desirable cotton fiber length and strength. It was therefore unnecessary for the Examiner to show that a plant with the physical attributes of Sicala 350B would have been predicted or suggested by the prior art.”). As in *Kubin*, obviousness did not require that the structure—or physical attributes here—be “suggested by the prior art.”¹¹ *Id.*

¹¹ *Reid* ultimately reversed the obviousness rejection based on secondary considerations, whereas the record here does not suggest any such indicia. *See infra* §V.A.4.

4. Secondary Considerations

Nothing in the record suggests any purportedly unexpected results or other potential secondary considerations of non-obviousness. *Riley*, ¶¶99-100. On the contrary, the minor variations between the reported properties of the claimed variety versus prior art varieties are well within the bounds of what POSAs would expect in the ordinary course of plant breeding. *Id.* Moreover, nothing in the specification or elsewhere in the record provides any comparative data—much less an analysis relative to the closest prior art. *See Ex parte Frohberg*, Appeal 2018-002288, 2019 WL 3033154, at *5 (PTAB July 3, 2019) (affirming obviousness rejection despite purported unexpected results: “[T]he data is not compared to the closest prior art, the 0% amylose rice plant of Hu.”); *Ex parte Ketkar*, 2018 WL 3812708, at *6 (noting that applicants had “presented no objective evidence,” and further that specification did “not identify [asserted] result as unexpected or surprising in any way”); *cf. Ex parte Reid*, 2010 WL 4876440, at *5 (reversing obviousness rejection based on evidence that cotton fiber from the claimed cotton plant variety was “unexpectedly better than the closest prior art”).

B. Ground 1: Claims 1-20 Are Unpatentable as Obvious Over Smalley (EX1005) and the Corresponding PVP Certificate (EX1008)

Smalley and the corresponding PVP Certificate disclose PH1KTF—one of the two parent varieties of the PH4CYJ variety claimed in the ’545 Patent.

Smalley discloses that PH1KTF can be used “to Develop Another Maize Plant” and in particular is a “source of breeding material that may be used to develop new maize inbred varieties.” EX1005, 28:34-39. It also discloses specific cross breeding techniques for producing such “new inbred” varieties. *Id.*, 2:43-49; Riley, ¶¶101-103.

Consistent with these disclosures, PH1KTF had repeatedly been used as one of the parents for other maize varieties—including at least seven inbred lines (one of them—Benson, EX1006— indisputable §102(a)(1) art). Riley, ¶104; *see also supra* §V.A.1.3.

As Smalley itself discloses and these other crosses confirm, POSAs would have had reason to use PH1KTF as the starting point to create other inbred lines. The nature of the maize market and the “desire to enhance commercial opportunities” (*DyStar*, 464 F.3d at 1368) confirms the reasons to create a wide array of new varieties using PH1KTF as the starting point. Riley, ¶¶105-106; *see also supra* §V.A.1.3.

POSAs would have had a reasonable expectation of obtaining an inbred maize variety with PH1KTF as a parent, particularly given (1) the routine nature of the breeding techniques involved and (2) the multiple other instances already reported in which PH1KTF had been used to breed other lines, including at least one indisputably prior art inbred line. Riley, ¶106.

1. Claim 1: Variety PH4CYJ

Claim 1 encompasses a seed, plant part, or plant cell of variety PH4CYJ. PH4CYJ's disclosed characteristics are highly similar to those in the PH1KTF parent, and nothing in the specification or otherwise in the record suggests any property that POSAs would have viewed as surprising or unexpected over PH1KTF. *Supra* §V.A; Riley, ¶¶107-114. Instead, as with the claims the Board found unpatentable in *Ex parte C*, the record does “not explain the significance of any differences in attributes between the novel variety and varieties that are old in the art.” 27 U.S.P.Q.2d at 1493. To the extent such differences exist, nothing suggests they are “so significant and unexpected that they should weigh more heavily than the numerous similarities between the claimed variety and the” PH1KTF variety disclosed in Smalley and touted therein as a potential starting point for future inbred lines. *Id.* at 1497.

For one, statistical analysis of the '545 Patent data shows that *all* of the reported characteristics for Smalley's PH1KTF fall within the 95% confidence interval (i.e., within 1.96 x standard error) of the corresponding PH4CYJ data reported in the '545 Patent. *See* Riley, ¶¶86-92 and Appendix B.

It was well-known in the art to cross inbreds to create other inbreds with similar characteristics to the parent inbred. Riley, ¶93. Comparing the '545 Patent's PH4CYJ to other varieties having Smalley's PH1KTF variety as a parent

confirm that PH4CYJ's characteristics fall within the range that was predictable for crosses of PH1KTF.

For example, where the '545 Patent reports PH4CYJ had a comparative relative maturity of 111 days, inbred sibling Benson had the same 111 days EX1006, 39:7; Riley, ¶69. Where the '545 Patent reports PH4CYJ had a mean plant height of 213.3 cm, inbred sibling Benson had 211.4 cm. EX1006, 39:13, Riley, ¶69. Where the '545 Patent reports PH4CYJ had an ear length of 15.3 cm, inbred sibling Benson had 14.1 cm. EX1006, 39:55, Riley, ¶69. Where the '545 Patent reports PH4CYJ had an ear weight of 126 g, inbred sibling Benson had 121.1 g. EX1006, 39:59, Riley, ¶69. Each of these falls within the 95% confidence interval for the '545 Patent's values. Riley, ¶¶75-85, Appx. B. Other prior art varieties also demonstrated values similar to, and indeed surrounding, the values reported for PH4CYJ, including relative maturities of 97 to 115 days; mean plant heights of 182.5 cm to 248.3 cm; ear lengths of 13.4 cm to 18.9 cm; and ear weights of 99.6 g to 167 g. *See* Riley, ¶¶75-85.

None of these small differences have any material commercial significance. Riley, ¶¶107-114. In particular, none of them are relevant to the '545 Patent's underlying goal of developing "stable, high yielding maize varieties and hybrids that are agronomically sound with maximal yield over one or more different conditions and environments." EX1001, 1:23-26; Riley, ¶108. Nor are they

relevant to the nature of the '545 Patent's disclosed "Industrial Applicability."

EX1001, 36:21-65; Riley, ¶¶108-109.

For example, while the '545 patent's PH4CYJ has clear aleurone color, the PH1KTF parent disclosed in Smalley has yellow aleurone. EX1005, 35:40. But nothing in the specification suggests any reason why such differences were "so significant and unexpected that they should weigh more heavily than the numerous similarities between the claimed variety and" Smalley. *Ex parte C*, 27 U.S.P.Q.2d at 1497. Moreover, other prior art varieties—including the inbred disclosed in Benson and sharing the same PH1KTF parent—feature clear aleurone. EX1006, 40:11; *see also* Riley, ¶111; EX1028, 265 ("[F]ood consumers are the ultimate losers when low nonobviousness standards are applied to plant varieties."); *id.*, 272 ("Proposed here is the designation of a limited number of plant characteristics, all of practical agronomic importance, which might be achieved to establish nonobviousness.").

Accordingly, claim 1 would have been obvious over Smalley and the corresponding PVP Certificate.

2. Claims 2-20: Variations and Hybrids Related to PH4CYJ

Claims 2-20 likewise would have been obvious over Smalley and the corresponding PVP Certificate. They recite variations, hybrids, and related methods concerning the claimed inbred line. Claims 2-20 indeed essentially mirror

analogous claim sets in multiple prior art patents (EX1067-EX1071) directed to other inbred corn varieties—confirming that using and/or modifying the PH4CYJ inbred line in those ways would have been obvious. Riley, ¶¶115-116. PO indeed filed the applications for other earlier patents on the same day, and they all issued on 12/3/19—making them indisputable §102(a) references.

a. Claim 2: Ovule or Pollen From PH4CYJ

Claim 2 depends from claim 1 and requires that “the plant part” be “an ovule” or “pollen.” EX1001, 39:33-34. Smalley discloses that a “plant part” includes “pollen” and “ovules.” EX1005, 9:6-9. POSAs would have recognized that inbred lines created from PH1KTF likewise include both ovules and pollen. Riley, ¶117; *see also* EX1067, 44:5-6 (“wherein the plant part is an ovule or pollen”).

b. Claims 3-8: Hybrids and Related Uses Derived From PH4CYJ

Claim 3 is to “[a]n F1 hybrid maize seed of PH4CYJ produced by crossing the plant or plant part of claim 1 with a different maize plant.” EX1001, 39:35-37. Smalley discloses that hybrids are generated by crossing two inbred varieties (such as PH1KTF itself and/or other inbred lines such as those Smalley discloses can be created using PH1KTF, *see* EX1005, 12:48-49, 28:35-39), and further that “F1” hybrids—the “first generation” of the cross—are desired because they are “more vigorous than their inbred parents.” EX1005, 14:42-50. Claim 3 is obvious in

view of these disclosures in addition to the above-discussed reasons concerning claim 1. POSAs would have had reason to create the PH4CYJ inbred variety using PH1KTF as the starting point, and would further have had reason to use that inbred variety to create F1 hybrid seeds for commercialization. Riley, ¶118.

Claim 4 is to a plant or plant part produced by growing the F1 hybrid seed of claim 3, and in particular to “at least one somatic cell of the F1 hybrid maize plant of PH4CYJ.” EX1001, 39:38-41. It is obvious for the same reasons as claim 3 given that the purpose of creating an F1 hybrid seed is to grow an F1 hybrid plant. Riley, ¶119.

Claim 5 concerns “[a] method for producing a second maize plant” by “applying plant breeding techniques to the F1 plant or plant part of claim 4.” EX1001, 39:42-50. Claim 5 would have been obvious given Smalley’s disclosure that plant breeding techniques can be used to cross an “F1 hybrid” with either another F1 hybrid or another inbred line. EX1005, 15:14-24; Riley, ¶120.

Claim 6 concerns “[a] method for producing a second maize plant or plant part, the method comprising doubling haploid seed generated from a cross of the plant or plant part of claim 4 with an inducer variety.” EX1001, 39:46-50. Claim 6 would have been obvious for the same reasons as claim 5 and in further view of Smalley’s disclosure of the use of “Haploid induction systems” for maize in which “haploid plants from any genotype” may be created “by crossing a selected variety

(as female) with an inducer variety.” EX1005, 30:28-41; Riley, ¶121. Smalley’s claim 7 likewise parallels challenged claim 6 and further confirms the obviousness of crossing an inbred maize line with an inducer variety to produce haploid seed. EX1005, 41:55-60.

Claim 7 concerns “[a] method of making a commodity plant product comprising silage, starch, fat, syrup or protein, the method comprising producing the commodity plant product from the maize plant or plant part of claim 4.” EX1001, 39:51-54. Claim 7 would have been obvious for the same reasons as claim 4 in further view of Smalley’s disclosure “of harvesting the grain of the F1 plant of variety PH1KTF and using the grain in a commodity,” such as “starches, syrups, proteins, and sugars.” EX1005, 34:3-7. POSAs would have understood that F1 hybrids created from the inbred line of claim 1 (which would have been obvious as discussed above) could be used for the same generic application. Riley, ¶122.

Claim 8 concerns “[a] method of producing a maize seed derived from the variety PH4CYJ” that includes (1) “crossing the plant of claim 1 with itself or a second plant”; (2) “growing the progeny seed to produce a progeny plant,” then (3) “crossing the progeny plant with itself or a different plant to produce maize seed derived from the variety PH4CYJ.” EX1001, 39:55-62. Claim 8 would have been obvious for the same reasons as claim 5, which concerns a more specific method of

generating a second-generation progeny plant derived from PH4CYJ using an F1 hybrid as the first-generation plant. Riley, ¶123; *see also* EX1005, 41:37-54 (Smalley’s claims 3-6).

Claims 3-8 likewise mirror analogous claim sets in multiple prior art patents directed to other inbred corn varieties—further confirming that it would have been obvious to use the PH4CYJ variety (itself obvious as detailed in V.A.B.1) for hybridization purposes as claims 3-8 specify:

Claim in '545 Patent	Analogous Claim in each of Exhibits 1067-1071
3	3
4	5
5	6
6	7
7	8
8	9 ¹²

See Riley, ¶124.

¹² Claim 9 in the prior art discloses an additional step of an additional cross to create a subsequent generation, but encompasses the steps of challenged claim 8.

c. Claim 9: Nucleic Acids Isolated From PH4CYJ

Claim 9 concerns “[a] method for producing nucleic acids” by “isolating nucleic acids from the seed, plant, plant part, or plant cell of claim 1.” EX1001, 40:1-3. Claim 9 would have been obvious for the same reasons as claim 1 in view of POSAs’ knowledge that it was routine to isolate nucleic acids from inbred maize lines—as confirmed by Smalley. Riley, ¶125; EX1005, 8:52-54 (defining nucleic acid as “[a]n acidic, chainlike biological macromolecule...”); 41:31-32 (claim including “isolating nucleic acids from the seed, plant, plant part, or cell”); 42:20-21 (same); *see also* EX1067, 44:42-44 (“method for producing nucleic acids, the method comprising isolating nucleic acids from the seed, plant, plant part, or plant cell of claim 1”); EX1072, Abstract (“isolating DNA from biological materials such as seeds”); EX1073, Title (“Methods and compositions for dual extraction of protein and nucleic acid”).

d. Claims 10-17: Converted Seeds of PH4CYJ

Claim 10 concerns “[a] converted seed, plant, plant part or plant cell of inbred maize variety PH4CYJ” with “a locus conversion” such that “the plant or a plant grown from the converted seed, plant part or plant cell comprises the locus conversion and otherwise comprises all of the physiological and morphological characteristics of maize variety PH4CYJ when grown under the same environmental conditions.” EX1001, 40:4-14.

Claim 10 would have been obvious for the same reasons as claim 1 (concerning variety PH4CYJ) in further view of POSAs' knowledge that locus conversions such as those recited in claim 10 were a routine technique to incorporate desirable traits into inbred maize lines—as further confirmed by Smalley's disclosure that “[o]ne or more locus conversion traits” such as “male sterility, insect control, disease control or herbicide tolerance” can “be introduced into a single corn variety.” EX1005, 7:43-52; *see also id.*, 16:46-61; 16:61-65 (“triple stacks” of loci); 42:13-19 (claim to seed, plant, plant part or cell of inbred variety PH1KTF with “a locus conversion” that “confers a trait”). Further, locus conversion technology was sufficiently advanced such that the additional trait(s) could be introduced without impacting the plant's “physiological and morphological characteristics.” Riley, ¶¶126-128.

Claim 11 depends from claim 10 and states that the locus conversion of claim 10 “confers a property selected from the group consisting of male sterility, site-specific recombination, abiotic stress tolerance, altered phosphate, altered antioxidants, altered fatty acids, altered essential amino acids, altered carbohydrates, herbicide tolerance, insect resistance and disease resistance.” EX1001, 40:15-21. Claim 11 is obvious in view of Smalley's claim 9 reciting the same traits conferred via locus conversion. EX1005, 42:13-19; Riley, ¶129.

Smalley teaches that “[o]ne or more locus conversion traits” such as “male sterility, insect control, disease control or herbicide tolerance” can “be introduced into a single corn variety.” EX1005, 7:43-52. Smalley also separately discusses developing each of the properties recited in claim 11. EX1005, 21:57-28:22.

Claims 12-17 depend directly or indirectly from claim 10 and otherwise parallel the limitations of claims 3-7 and 9, respectively. EX1001, 40:22-46. They would have been obvious for the same reasons as claim 10 and in further view of the above-discussed reasons why dependent claims 3-7 and 9 would have been obvious. The above discussions apply equally to converted seeds incorporating locus conversions, which impart additional properties but otherwise do not impact the variety or how it can be used. Riley, ¶130. PO’s other prior art patents likewise include analogous dependent claims. *E.g.*, EX1067, 44:62-45:11.

e. Claims 18-20: F1 Hybrid Derived From PH4CYJ with a Transgene

Much like dependent claim 3, claim 18 recites an F1 hybrid seed produced by crossing a plant or plant part of PH4CYJ with another variety. However, it also requires that (1) “PH4CYJ further compris[es] a transgene”; (2) “the transgene is inherited by the F1 hybrid seed;” and (3) the transgene was incorporated by “backcrossing or genetic transformation.” EX1001, 40:45-53. As Smalley discloses, incorporating a transgene into a corn variety is one particular technique for incorporating a locus conversion (as discussed in connection with claim 10).

EX1005, 7:43-52. Smalley also discloses that backcrossing is a technique for incorporating locus conversions in general and transgenes in particular. *Id.*, 16:8-37. Claim 18 would have been obvious for the same reasons as above-discussed claims 3 and 10 and in further view of these additional disclosures in Smalley. Riley, ¶131. PO's other prior art patents likewise include claims directed to the inclusion of a "transgene" incorporated "by backcrossing or genetic transformation." *E.g.*, EX1067, 44:9-14.

Claim 19 concerns "[a] method of producing progeny seed" by "crossing a plant grown from the seed of claim 18 with itself or a second plant to produce progeny seed." EX1001, 40:53-55. It parallels above-discussed claim 5 aside from (1) the more specific requirement concerning the nature of the starting F1 hybrid seed; and (2) the fact that claim 19 refers to "progeny seed" rather than a "plant" itself. Claim 19 accordingly would have been obvious for the reasons discussed above in connection with claims 5 and 8. Riley, ¶132. In particular, POSAs would have understood that Smalley's disclosure of crossing an "F1 hybrid" with either another F1 hybrid or another inbred line (EX1005, 15:14-24) was applicable to F1 hybrids created by crossing inbred varieties incorporating transgenes. Riley, ¶133.

Claim 20 parallels claim 7 (i.e., "[a] method of making a commodity plant product....") aside from reciting the plant of claim 18 rather than claim 4.

EX1001, 40:57-61. Claim 20 would have been obvious for the same reasons as claim 7. Riley, ¶134.

C. Ground 2: Claims 1-20 Are Unpatentable as Obvious Over Benson (EX1006)

Benson discloses PH47W4—a prior art inbred variety that shares a parent variety (PH1KTF) in common with the '545 Patent's PH4CYJ and has very similar properties. EX1006, 38:56-57. Benson was not of record during prosecution despite its common parent variety, similar properties to the '545 Patent's PH4CYJ variety, and otherwise substantially identical disclosures, as explained by Dr. Riley. *See* Riley, ¶135; *see also* ¶¶69, 75-92, 140-144, Appendix B; EX1101 (redline comparison). For example, Benson's Table 1 reports “dent” grain texture—identical to that disclosed in the '545 Patent. EX1001, 38:15; EX1006, 39:5. The values reported for 20 of the 25 characteristics in Benson fall within the 95% confidence interval for the '545 Patent. *See* Riley, ¶141, Appendix B. Each of the remaining five characteristics have overlapping confidence intervals. *Id.*

Benson discloses that PH47W4 can be used “to Develop Another Maize Plant” and in particular is a “source of breeding material that may be used to develop new maize inbred varieties.” EX1006, 32:30-35. It also discloses specific cross breeding techniques for producing such “new inbred” varieties. *Id.*, 5:38-44; Riley, ¶136.

Consistent with these disclosures, PH47W4 was previously used as one of the parents for at least one hybrid corn variety. EX1062, 11:19-24; Riley, ¶137.

As Benson itself discloses, POSAs would have had reason to use PH47W4 as the starting point to create other inbred lines. The nature of the maize market confirms the reasons to create a wide array of new varieties using PH47W4 as the starting point. Riley, ¶138; *see also* §V.A.3 (citing *DyStar*).

POSAs would have had a reasonable expectation of obtaining an inbred maize variety with PH47W4 as a parent, particularly given (1) the routine nature of the breeding techniques involved, (2) Benson’s disclosure of preparing new inbred varieties (EX1006, 5:38-44, 32:32-42), and (3) the previous instance already reported in which PH47W4 had been used as a parent to obtain another line. Riley, ¶139.

1. Claim 1

Claim 1 encompasses a seed, plant part, or plant cell of variety PH4CYJ. PH4CYJ’s disclosed characteristics are highly similar to PH47W4’s, as disclosed in Benson, and nothing in the ’545 Patent’s specification or otherwise in the intrinsic record suggests any property of PH4CYJ that POSAs would have viewed as surprising or unexpected over PH47W4. *Supra* § V.A.2; Riley, ¶¶140-141. Instead, as with the claims the Board found unpatentable in *Ex parte C*, the record does “not explain the significance of any differences in attributes between the

novel variety and varieties that are old in the art.” 27 U.S.P.Q.2d at 1493. To the extent such differences exist, there is no basis from which to conclude they are “so significant and unexpected that they should weigh more heavily than the numerous similarities between the claimed variety and the” PH47W4 variety disclosed in Benson and touted therein as a potential starting point for future inbred lines. *Id.* at 1497. Indeed, none of the differences have any material commercial significance. Riley, ¶¶142-144. In particular, none are relevant to the underlying goal identified in the ’545 Patent of developing “stable, high yielding maize varieties and hybrids that are agronomically sound with maximal yield over one or more different conditions and environments.” EX1001, 1:23-26; Riley, ¶142. Nor are they relevant to the nature of the ’545 Patent’s disclosed “Industrial Applicability.” EX1001, 36:21-65; Riley, ¶¶142-143.

Accordingly, claim 1 would have been obvious over Benson.

2. Claims 2-20

Claims 2-20 are likewise unpatentable as obvious over Benson for the same reasons detailed immediately above concerning claim 1 and for the additional reasons explained in §V.B.2 concerning why claims 2-20 are obvious over Smalley. Benson has disclosures paralleling Challenged Claims 2-20 and/or disclosures in Smalley identified in §V.B.2 concerning claims 2-20. Riley, ¶145. In particular:

	Relevant Disclosures in Benson (EX1006)
Claim 2	12:32-39 (“plant part” includes “pollen” and “ovules”)
Claims 3 and 12	40:24-25 (“An F1 hybrid maize seed produced by crossing the plant or plant part of claim 1 with a different maize plant”)
Claims 4 and 13	40:26-28 (“An F1 hybrid maize plant or plant part produced by growing the maize seed of claim 3, wherein the plant part comprises at least one cell of the F1 hybrid maize plant.”)
Claims 5, 14, and 19	40:29-32 (“A method for producing a second maize plant, the method comprising applying plant breeding techniques to the F1 plant or plant part of claim 4 to produce the second maize plant.”)
Claims 6 and 15	40:33-37 (“A method for producing a second maize plant or plant part, the method comprising doubling haploid seed generated from a cross of the plant or plant part of claim 4 with an inducer variety, thereby producing the second maize plant or plant part.”)
Claims 7, 16, and 20	37:20-34 (“Maize grain is used as human food, livestock feed, and as raw material in industry. ...The maize wet-milling industry can provide maize starch, maize syrups, and dextrose

	Relevant Disclosures in Benson (EX1006)
	for food use. ... non-grain portions of the [maize] plant, [are] also used extensively as livestock feed.”)
Claim 8	40:42-49 (“8. A method of producing a maize seed derived from the variety PH47W4, comprising: a) crossing the plant of claim 1 with itself or a second 45 plant to produce progeny seed; and b) growing the progeny seed to produce a progeny plant and crossing the progeny plant with itself or a different plant to produce maize seed derived from the variety PH47W4.”); <i>see also</i> 40:24-32 (claims 3-5).
Claims 9 and 17	16:6-57 (“Methods of isolating nucleic acids from maize plants ... are well known in the art. ... A method comprising, isolating nucleic acids, such as DNA, from a plant, a plant part, plant cell or a seed of the maize plants disclosed herein is provided.”) 40:50-53 (“A method for producing nucleic acids, the method comprising isolating nucleic acids form the seed, plant, plant part, or plant cell of claim 1.”); 42:1-3 (similar)
Claims 10 and 11	18:4-5 (“locus conversion of PH47W4 for herbicide tolerance”); 18:6-7 (“locus conversion for insect or disease resistance”);

	Relevant Disclosures in Benson (EX1006)
	20:26-29 (“At least one, at least two or at least three and less than ten, ...may be introduced”); 11:21-29 (“A locus conversion refers to plants within a variety that have been modified in a manner that retains the overall genetics of the variety...”); 20:5-13 (“Desired traits that may be transferred through backcross conversion include, but are not limited to, waxy starch, sterility (nuclear and cytoplasmic), fertility restoration, grain color (white), nutritional enhancements, drought tolerance, nitrogen utilization, altered fatty acid profile, increased digestibility, low phytate, industrial enhancements, disease resistance (bacterial, fungal, or viral), insect resistance, and herbicide tolerance or resistance.”).
Claim 18	23:45-47 (“In some embodiments, a transformed variant of PH47W4 may comprise at least one transgene...”); 24:44-48 (“a backcrossing approach is commonly used to move a transgenic event from a transformed maize plant to another variety, and the resulting progeny would then comprise the transgenic event(s)”; 20:39-41 (“Transgenes transferred via backcrossing typically function as a dominant single gene trait

	Relevant Disclosures in Benson (EX1006)
	and are relatively easy to classify.”); 23:31-32:29 (identifying particular types of transgenes).

Benson’s own claims 2-20 likewise parallel Challenged Claims 2-20:

Claim in '545	Corresponding Claim in Benson
2	2 (EX1006, 40:22-23)
3	3 (40:24-25)
4	4 (40:26-28)
5	5 (40:29-32)
6	6 (40:33-37)
7	7 (40:38-41)
8	8 (40:42-49)
9	9 (40:50-53)
10	10 (40:54-62)
11	11 (40:63-41:2)
12	12 (41:3-4)
13	13 (41:5-7)
14	14 (41:8-11)
15	15 (41:12-16)

Claim in '545	Corresponding Claim in Benson
16	16 (41:17-20)
17	17 (42:1-3)
18	18 (42:4-11)
19	19 (42:12-14)
20	20 (42:15-18)

The unpatentability of claims 2-20 is further confirmed by PO's other prior art patents (EX1067-EX1071) including analogous claims related to other inbred corn lines. Riley, ¶146.

D. Ground 3: Claims 1-20 Are Unpatentable as Obvious Over Longenberger (EX1007)

Longenberger discloses PH47K2—a prior art inbred variety with properties very similar to those of the PH4CYJ.

Longenberger was not of record during prosecution despite its substantially identical disclosures and highly similar traits as compared to the '545 Patent. Riley, ¶¶147-148, 69, 75-92, 152-156; *see also* EX1102 (redline comparison).

Longenberger discloses that PH47K2 can be used “to Develop Another Maize Plant” and in particular is a “source of breeding material that may be used to develop new maize inbred varieties.” EX1007, 32:38-43. It also discloses specific

cross breeding techniques for producing such “new inbred” varieties. *Id.*, 5:38-45; Riley, ¶148.

Consistent with these disclosures, PH47K2 was previously used as one of the parents for another maize variety. EX1060, 11:19-21; Riley, ¶149; *see also supra* §V.A.3.

As Longenberger itself discloses and the other prior art cross confirms, POSAs would have had reason to use PH47K2 as the starting point to create other inbred lines. The nature of the maize market confirms the reasons to create a wide array of new varieties using PH47K2 as the starting point. Riley, ¶150; *see also* §V.A.3 (citing *DyStar*).

POSAs would have had a reasonable expectation of obtaining an inbred maize variety with PH47K2 as a parent, particularly given (1) the routine nature of the breeding techniques involved, (2) Longenberger’s disclosure that its claimed variety can be “used to develop new maize inbred varieties” (EX1007, 32:38-43) and (3) the previous instance already reported in which PH47K2 had been used as a parent to obtain another line. Riley, ¶151.

1. Claim 1

Claim 1 encompasses a seed, plant part, or plant cell of variety PH4CJ. PH4CJ’s disclosed characteristics are highly similar to PH47K2’s as disclosed in Longenberger, and nothing in the ’545 Patent’s specification or otherwise in the

intrinsic record suggests any property of PH4CYJ that POSAs would have viewed as surprising or unexpected over PH47K2. *Supra* §V.A.2; Riley, ¶¶86-92, 152-156. Instead, as with the claims the Board found unpatentable in *Ex parte C*, the record does “not explain the significance of any differences in attributes between the novel variety and varieties that are old in the art.” 27 U.S.P.Q.2d at 1493. To the extent such differences exist, there is no basis from which to conclude they are “so significant and unexpected that they should weigh more heavily than the numerous similarities between the claimed variety and the” PH47K2 variety disclosed in Longenberger and touted therein as a potential starting point for future inbred lines. *Id.* at 1497. Indeed, none of the differences have any material commercial significance. Riley, ¶¶154-156. In particular, none of them are relevant to the underlying goal identified in the ’545 Patent of developing “stable, high yielding maize varieties and hybrids that are agronomically sound with maximal yield over one or more different conditions and environments.” EX1001, 1:23-26; Riley, ¶154. Nor are they relevant to the nature of the ’545 Patent’s disclosed “Industrial Applicability.” EX1001, 36:21-65; Riley, ¶154.

Accordingly, claim 1 would have been obvious over Longenberger. Riley, ¶¶155-156.

2. Claims 2-20

Claims 2-20 are likewise unpatentable as obvious over Longenberger for the same reasons detailed immediately above concerning claim 1 and for the additional reasons explained in §V.B.2 concerning why claims 2-20 are obvious over Smalley. Longenberger indeed has disclosures paralleling the disclosures in Smalley identified in §V.B.2 concerning claims 2-20. Riley, ¶¶157-158. In particular:

	Relevant Disclosures in Longenberger (EX1007)
Claim 2	12:40-47 (“plant part” includes “pollen” and “ovule”); 41:14-15 (“The plant part of claim 1, wherein the plant part is an ovule or pollen”)
Claims 3-4 and 12-13	18:20-28 (“F1 hybrids” sought as “commercial hybrids” because they “are more vigorous than their inbred parents”)
Claims 5, 14, and 19	18:67-19:1 (disclosing crossing “F1 hybrid” with “third inbred”)
Claims 6 and 15	34:22-26 (disclosing “[h]aploid induction systems” in which “haploid plants from any genotype” may be created “by crossing a selected variety (as female) with an inducer variety”)
Claims 7, 16, and 20	37:60-65 (“The seed of maize variety PH47K2, the plant produced from the seed, the hybrid maize plant produced from

	Relevant Disclosures in Longenberger (EX1007)
	the crossing of the variety, hybrid seed, and various parts of the hybrid maize plant and transgenic versions of the foregoing, can be utilized for human food, livestock feed, and as a raw material in industry.”)
Claim 8	18:67-19:1 (disclosing crossing “F1 hybrid” with “third inbred”); 41:22-25 (claim 5)
Claim 10	18:12-13 (“locus conversion of PH47K2 for herbicide tolerance”); 18:15-16 (“locus conversion for insect or disease resistance”); 19:45-51 (“PH47K2 represents a new base genetic variety into which a new locus may be introgressed”); 11:28-36 (“A locus conversion refers to plants within a variety that have been modified in a manner that retains the overall genetics of the variety and further comprises one or more loci with a specific desired trait...”); 20:35-43 (“At least one, at least two or at least three and less than ten, less than nine, less than eight, less than seven, less than six, less than five or less than four locus conversions may be introduced into the plant by backcrossing, introgression or transformation to express the desired trait”)

	Relevant Disclosures in Longenberger (EX1007)
Claim 11	11:28-36 (“A locus conversion ...comprises one or more loci with a specific desired trait, such as male sterility, insect resistance, disease resistance or herbicide tolerance or resistance.”); 42:11-17 (“locus conversion confers a property selected from the group consisting of male sterility, site-specific recombination, abiotic stress tolerance, altered phosphate, altered antioxidants, altered fatty acids, altered essential amino acids, altered carbohydrates, herbicide tolerance, insect resistance and disease resistance”)
Claim 18	11:34-36 (“Examples of single locus conversions include... transgenes”); 20:48-50 (“Transgenes transferred via backcrossing typically function as a dominant single gene trait and are relatively easy to classify.”); 26:4-32:37 (identifying particular types of transgenes)

Longenberger’s own claims 2-20 likewise parallel Challenged Claims 2-20:

Claim in '545	Corresponding Claim in Longenberger
2	2 (EX1007, 41:15-16)
3	3 (41:17-18)

Claim in '545	Corresponding Claim in Longenberger
4	4 (41:19-21)
5	5 (41:22-25)
6	6 (41:26-30)
7	7 (41:31-34)
8	8 (41:35-42)
9	9 (41:43-45)
10	10 (41:46-55)
11	11 (42:11-17)
12	12 (42:18-19)
13	13 (42:20-22)
14	14 (42:23-26)
15	15 (42:27-31)
16	16 (42:32-35)
17	17 (42:36-38)
18	18 (42:39-46)
19	19 (42:47-49)
20	20 (42:50-54)

The unpatentability of claims 2-20 is further confirmed by PO's other prior art patents (EX1067-1071) with analogous claims related to other inbred corn lines. *E.g.*, EX1067, 44:62-65; Riley, ¶¶159-160.

VI. GROUND 4: CLAIMS 1-20 LACK SPECIFIC UTILITY

Aside from being obvious, claims 1-20 are unpatentable for the separate and independent reason that the claimed invention “lacks a specific and substantial utility” as required by §101. *In re Fisher*, 421 F.3d 1365, 1367 (Fed. Cir. 2005) (affirming Board's finding that claims lacked utility).

A. The '545 Patent Fails to Disclose Any Specific Utility for the Claimed Variety

Nothing in the specification suggests any “specific benefit” provided by the claimed invention consistent with “[t]he basic quid pro quo contemplated by the Constitution and the Congress for granting a patent monopoly.” *Brenner v. Manson*, 383 U.S. 519, 534 (1966) (reversing CCPA and upholding Office's determination that claim to chemical compound lacked disclosed utility). Corn breeding has a long history, and PO alone controls over 3000 corn-related utility patents (EX1027, 14)¹³—including the three detailed in §V above. EX1025, 77. Nothing in the specification of *this particular patent* establishes that claims 1-20 are a “useful improvement” over earlier corn varieties. Accordingly, there is no

¹³ PO merged with another entity to become Corteva. EX1027, 11.

basis to conclude that issuance and maintenance of *this particular patent*

“promote[s] the Progress of Science and useful Arts.” U.S. Const. art. I, § 8, cl. 8.

It serves no purpose but to inflate PO’s patent estate and create an unjustified

“monopoly of knowledge” not “clearly commanded by the statute.” *Brenner*, 383

U.S. at 534.

In particular, it is immaterial under §101 that the claimed corn variety is similar to those disclosed in earlier corn varieties. In *Brenner*, the Supreme Court reversed the CCPA and reinstated the Office’s utility rejection concerning claims to methods of producing a steroid even though published literature confirmed that a closely related “homologue” had “tumor-inhibiting effects.” 383 U.S. at 531.

Fisher likewise affirmed a Board rejection that had cited *Brenner* and reasoned by the same logic that claimed expressed sequence tags (ESTs) lacked substantial utility because they required “further research” to “confirm” any “real world” benefit. 421 F.3d at 1368-69. While the applicant suggested various potential uses, “[n]othing about [applicant’s] uses” distinguished them “from *any* EST derived from *any* organism.” *Id.* at 1374; *see also Ex parte Kropp*, 143 U.S.P.Q. 148, 151 (PBA 1959) (affirming rejection for lack of utility of claims to process for producing antibiotic because applicant had not shown the claimed antibiotic had “any particular value or utility” aside from the generic function “of inhibiting some bacteria,” as would be true for any antibiotic generically).

It is likewise immaterial that the claimed inbred corn lines may be “useful as building blocks of value to” plant breeders in developing future hybrid varieties. *In re Kirk*, 376 F.2d 936, 945 (CCPA 1967). On the contrary, §101 requires a “substantial” utility—“one that provides a ***specific benefit in currently available form.***” *Ex parte Fisher*, 72 U.S.P.Q.2d 1020, 1025 (BPAI 2004) (citing *Brenner*).

Here, however, the ’545 Patent “only disclosed general uses for its claimed [PH4CYJ variety], not specific ones that satisfy §101.” *Fisher*, 421 F.3d at 1374. The specification’s “Industrial Applicability” section is essentially identical to those in *Benson* and *Longenberger* and very similar to that in *Smalley*. See EX1001, 36:21-65; EX1005, 34:1-38; EX1006, 37:12-55; EX1007, 37:21-65; Riley, ¶¶161-163; EX1095, 23 (presentation by supervisory patent examiner in March 2008 (EX1063) concerning plant utility patents and stressing that §101 requires “[u]tility ***specific to the subject matter claimed as opposed to a general utility to a broad class of inventions***”).

Nothing in the record suggests any utility specific to the PH4CYJ variety itself beyond that generic to any species of corn. Riley, ¶¶164-174; *Ex parte Kropp*, 143 U.S.P.Q. at 151 (affirming finding that claims to production of a particular antibiotic was unpatentable “when there is no showing, or even assertion, of the production of other than routine or ordinary results”).

Likewise, to the extent the '545 Patent suggests particular phenotypical differences between the claimed PH4CYJ variety and prior art varieties, it never even expressly identifies such differences—much less explains why they confer some specific benefit not already available from the prior art. Riley, ¶164. The relevant table (“Variety Description Information”) instead excerpts fields from a form prepared by the USDA (EX1096) and used in connection with PVP certificates for new corn varieties. Riley, ¶164. But the claimed inventions in utility patents must be “useful” whereas “a plant variety may receive a PVP certificate without a showing of usefulness.” *J.E.M.*, 534 U.S. at 142.

**B. The '545 Patent Fails to Disclose Any Characteristics
Markedly Different From Those Found in Other Varieties**

As the Supreme Court noted in *J.E.M.* when upholding the availability of utility patent protection for new plant varieties if—and only if—they satisfy all patentability requirements including utility, the Office’s rationale for issuing such patents tracked the Supreme Court’s earlier decision in *Diamond v. Chakrabarty*, 447 U.S. 303 (1980). *J.E.M.*, 534 U.S. at 145 (“[T]he Board...relied heavily on this Court's decision in *Chakrabarty* when it interpreted the subject matter of § 101 to include plants.”) (discussing *In re Hibberd*, 227 U.S.P.Q. 443 (BPAI 1985)).

Chakrabarty held that utility patents are available for living organisms if—and only if—the organism has “markedly different characteristics from any found in nature.” 447 U.S. at 310. In particular, utility patent protection was available

for a “human-made, genetically engineered bacterium...capable of breaking down multiple components of crude oil”—a property that “no naturally occurring bacteria” possessed and which suggested “significant value for the treatment of oil spills.” *Id.* at 305. Specifically, “[b]y breaking down multiple components of oil, Chakrabarty’s micro-organism promis[ed] more efficient and rapid oil-spill control” than was possible with “naturally occurring bacteria.” *Id.* at 305 n.2.

By contrast, man-made organisms are not patentable if they lack such “markedly different characteristics” and corresponding “significant utility” as compared to naturally occurring organisms. *In re Roslin Institute (Edinburgh)*, 750 F.3d 1333, 1336 (Fed. Cir. 2014) (affirming §101 rejection of claims directed to cloned animal, which did not possess “markedly different characteristics from any found in nature”); *Ex parte Uchiyama*, Appeal No. 2017-005387, 2018 WL 1378136, at *4 (PTAB Mar. 12, 2018) (affirming §101 rejection of claims to composition of bacteria because appellants had not cited “evidence showing that the viable bacteria in the claimed composition are ‘markedly different’ from the viable bacteria naturally found in human stools”) (quoting *Chakrabarty*, 447 U.S. at 310).

Nothing in the ’545 Patent suggests any reason why the claimed variety’s properties have such characteristics and provide significant value as compared to preexisting corn varieties. Riley, ¶¶164-174. Any argument by PO to that effect

would instead necessarily flow from POSAs' preexisting knowledge rather than being based on the specification's actual disclosures. Aside from being insufficient as a matter of law for purposes of §101, such preexisting knowledge would simply further confirm the obviousness of claims 1-20 as detailed in Grounds 1-3. For example, if one assumed *arguendo* that the claimed variety's length of ear node leaf, or some other characteristic recited in Table 1, somehow established the variety's specific utility because POSAs would recognize some alleged benefit (despite the length falling within the range defined by PO's own prior art patents), such a conclusion would simply confirm the obviousness of claims. Achieving such phenotypical variations through breeding techniques was well within the level of ordinary skill in the art as of July 2021. Riley, ¶¶164-174.

Accordingly, claims 1-20 are unpatentable under §101 for lack of substantial utility.

VII. GROUNDS 5-6: PO'S PVP TEMPLATE SPECIFICATION FAILS TO MEET §112 WRITTEN DESCRIPTION AND ENABLEMENT STANDARDS

In addition to being obvious and lacking specific utility, the Challenged Claims are also unpatentable under §112 for lack of written description or enablement. The '545 Patent violates the bargain underlying the utility patent system and provides no more information than that which would have been required for PO to obtain a PVP certificate on the new variety. Aside from the

existence of the new variety itself and the corresponding properties, nothing in the disclosure teaches POSAs anything beyond which the prior art already had disclosed. Indeed, the '545 Patent's specification is essentially identical to that of multiple prior art patents issued more than a year before the '545 Patent's July 2, 2021 filing date and disclosing other inbred corn varieties—including Longenberger as well as Benson (disclosing a sibling variety as detailed in *supra* §V.C)—aside from:

- (1) the code names themselves and corresponding deposit information;
- (2) the data in the “Variety Description Information” tables; and
- (3) the “breeding history” sections identifying the particular parents used for the original crosses.

See, e.g., EX1101 (redline comparison between '545 Patent and Benson); EX1102 (redline comparison between '545 Patent and Longenberger);); *see also* Riley, ¶¶191-197. Aside from those fields, the '545 Patent is likewise essentially identical to numerous other patents PO obtained based on other applications PO filed on 7/2/21—the same day as the application for the '545 Patent. *See, e.g.*, EX1103 (redline comparison between '545 Patent and '803 Patent, EX1057); EX1104 (redline comparison between '545 Patent and '020 Patent, EX1058); EX1105 (redline comparison between '545 Patent and '033 Patent, EX1093).

Relying on such a prior art template does not satisfy the “demanding description requirement” for utility patent protection. *J.E.M.*, 534 U.S. at 134; *see also id.* at 138 (“Because it is harder to qualify for a utility patent than for a Plant Variety Protection (PVP) certificate, it only makes sense that utility patents would confer a greater scope of protection.”). The Supreme Court specifically cited §112 when later reiterating that emphasizing that “the requirements for obtaining a utility patent under §101 are more stringent than those for obtaining a PVP certificate.” *Id.* at 142. In particular, the PVPA does not “require a description and disclosure as extensive as those required” for utility patents. *Id.*

The Supreme Court’s discussion echoed PO’s briefing, which stressed that no type “of written description required by 35 U.S.C. § 112 has ever been part of the PVPA,” which instead—in PO’s own words—merely involved “a ***fill-in-the boxes enumeration*** of the distinguishing characteristics.” EX1029, *11-12.

As noted above, however, the ’545 Patent’s disclosure exemplifies such a “fill-in-the boxes” template approach in which patent drafting is reduced to an assembly line of patentably meaningless data tables. The information PO provided concerning the PH4CYJ variety itself (as distinguished from the prior art template) is nothing more than what PO would have needed to obtain a PVP certificate on the new variety. *See infra* §VII.A.

As such, the Office’s issuance of the ’545 Patent subverted the bargain underlying the utility patent system, under which the “disclosure required by the Patent Act is ‘the *quid pro quo* of the right to exclude.’” *J.E.M.*, 534 U.S. at 142 (quoting *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 484 (1974)). As the Office emphasized to the Supreme Court in *J.E.M.*, “[b]ecause certificate holders under the PVPA are not required to make the same level of contribution to the public that patent holders must make, Congress reasonably determined that certificate holders’ rights to exclude others from using their inventions should be less absolute during the term of the certificate than the rights of patent holders under Section 101.” EX1030 at 25. Yet the ’545 Patent affords PO more absolute rights—for example, protection without the PVPA’s statutory research exemption—even though the level of contribution as compared to the prior art is at most in line with the contributions required for PVP certificates.

Tellingly, the ’545 Patent’s disclosure and claims differ fundamentally from PO’s earlier patents at issue in *J.E.M.* Those earlier patents each had detailed and highly individualized descriptions. *See infra* §VII.C. As PO explained to the Supreme Court, each of those patents included “lengthy disclosures” highlighting the relevant variety’s “specific features” and “useful characteristics compared with other varieties as measured in numerous important ways.” EX1029, *14. Yet they had *narrower* claims than the ’545 Patent, which references a purportedly

“representative” deposit without ever disclosing what that means—highlighting the failure to satisfy §112’s written description and enablement requirements. *See infra* §VII.B.

This disconnect—in which the ’545 Patent has ***broader*** claims than PO’s earlier patents despite providing ***less*** information—highlights how the Challenged Claims subvert the bargain underlying the Patent Act. *Cf. Amgen*, 598 U.S. at 610 (“The more one claims, the more one must enable.”). Instituting review and finding the claims unpatentable would restore this balance and incentivize proper drafting practice—returning the plant utility patent regime to that which the Supreme Court upheld in *J.E.M.*

A. The Minimal Differences Between the ’545 Patent’s Specification and the Prior Art Are At Best Consistent With the Disclosures Required for PVP Certificates

As the above-noted redlines reflect, the ’545 Patent’s specification is virtually identical to that of multiple prior art references. For example, as compared to the indisputable §102(a)(1) prior art Benson patent (disclosing an inbred sibling of the claimed variety—sharing one of the two parental lines), the only additional information the ’545 Patent provides is that:

- (1) the code name of the new variety is PH4CYJ (rather than PH47W4 as in Benson)

- (2) the new variety was created by crossing inbred line PH1KTF (also used in Benson) with inbred line PH1VNA (as opposed to PH18FC as in Benson)
- (3) the new variety has shown uniformity and stability for the traits identified in the Variety Description Information (Table 1), which are different from those in Benson’s Table 1; and
- (4) PO made a deposit of the new variety with a public repository under a particular ascension number.

EX1101 (redline comparison between ’545 Patent and Benson); Riley, ¶191. But PO would have needed to make comparable disclosures even for purposes of seeking a PVP certificate, with its lesser protection.

To obtain a PVP certificate, applicants must describe the new variety’s “distinctiveness, uniformity, and stability,” as well as the “genealogy and breeding procedure.” 7 U.S.C. §2422. Applicants must also deposit seed “in a public repository.” *Id.*; see also 7 C.F.R. § 97.6 (same). ***Tellingly, however, this is the sum total of the information the ’545 Patent’s assembly-line, template-based approach provided to POSAs beyond what Benson already had disclosed.***

Aside from the different code name (PH4CYJ in the ’545 Patent versus PH47W4 in Benson, reflecting the fact that each patent concerns a different variety), the only new information the ’545 Patent’s specification provides to

POSAs is contained in the “Breeding History” (37:60-38:3) and “Variety Description Information” (i.e., Table 1, 38:11-39:25) sections. Riley, ¶¶193-196 (discussing EX1101, redline). But the breeding history disclosure merely concerns the “genealogy and breeding procedure” one must disclose to obtain a PVP certificate. 7 U.S.C. §2422. Likewise, as both Benson and the ’545 Patent acknowledge, the “Variety Description Information” tables disclose traits for purposes of demonstrating “uniformity and stability”—both requirements under the PVPA. (EX1001, 15:4-7; EX1006, 14:66-15:2). In PO’s own words, these tables are merely “*fill-in-the boxes enumeration[s]* of the distinguishing characteristics” required even for PVPA protection. EX1029, *11-12. Indeed, the table of properties reflects some—not even all—of the fields in the form applicants must submit when seeking PVP certificates on new corn varieties. See EX1096 (“The Objective Description Form is a necessary part of an application for Plant Variety Protection (Breeder’s Rights)...”); Riley, ¶197.

Nor is it material that the seeds PO deposited to obtain the ’545 Patent are purportedly publicly available whereas seeds deposited for purposes of PVPA protection are not accessible during the period of protection. Once PVP certificates expire, the seed becomes publicly available for anyone to request and use however they desire—just as with utility patents. 7 C.F.R. § 97.7 (requiring that depositories maintain samples in confidence during “term of protection but,

after control of the sample is transferred by the Office to the depository, furnish samples of the deposited material in an expeditious and proper manner”); *see also* EX1097, 4 (“Requests of expired PVP varieties can be made at the Germplasm Resources Information Network (GRIN)”). Search on the PVP number or variety name.”). By contrast, when utility patents are still in force, any use of seed covered by the claims is restricted by the Patent Act itself. At the end of the deposit section in the ’545 Patent itself, PO warns that it “does not waive any infringement of rights granted under this patent.” EX1001, 37:57-58.

Indeed, in co-pending litigation, PO contends that it constitutes infringement even to obtain a sample of deposited seed and export it abroad and/or conduct a simple laboratory test required to obtain the necessary documentation for such exportation (EX1098, 10-11; EX1099, 2-3)—notwithstanding that issued patents are freely accessible in “countries foreign to the United States.” 53 Fed. Reg. 39420, 39423 (Oct. 6, 1988) (rejecting proposal to restrict exportation of biological materials except to countries for which relevant patents had been granted). Under PO’s theory, POSAs can do little with deposited seeds during the term of utility patent protection aside from gazing at them inside the United States. By contrast, PVP protection includes a statutory research exemption, including for “plant breeding.” *See* 7 U.S.C. §2544. If credited, PO’s position would further reinforce

how the '545 Patent violates the bargain underlying utility patents, which provide more protection than PVP certificates while in exchange requiring more disclosure.

B. The Minimal Differences Between the '545 Patent's Specification and the Prior Art Do Not Adequately Describe or Enable Claims 1-20

The inadequacy of the '545 Patent's disclosure for purposes of utility patent protection is readily apparent given that the Challenged Claims all directly or indirectly concern "*inbred maize variety PH4CYJ, representative seed of the variety* having been deposited under NCMA accession number 202212062."

EX1001, 39:30-32. Claims 1, 10, and 18 include such language directly, and the other claims depend from one of these three claims. On their face, in other words, the Challenged Claims purport to cover seeds and plants regardless of whether they are derived from the seed stock PO supplied to the depository (i.e., the NCMA).¹⁴

Yet the '545 Patent fails to describe or enable claims of such scope. Indeed, the patent fails even to convey the inventor's understanding of such "representativeness." Aside from the claims themselves, the '545 Patent refers to

¹⁴ This stands in contrast to the claims at issue in *J.E.M.* concerning inbred lines. *E.g.*, EX1083, 20:47-49 (claiming "*Inbred corn seed designated PHP38, having ATCC accession No. 75612*"); *see infra* §VII.C.2.

“representative seed” only twice—both in column 34.¹⁵ But each of these disclosures includes additional language absent from the claims themselves. Riley, ¶¶198-199.

The first sentence describes “maize seed derived from the inbred maize variety PH4CYJ” that “*has 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99%...*”^[16] of the same polymorphisms for molecular markers as the plant or plant part of inbred maize variety PH4CYJ.” EX1001, 34:22-30. By contrast, the claims include no such quantitative restrictions and/or references to the claimed variety’s genotype. Riley, ¶200.

The second sentence describes “seed derived from the inbred maize variety PH4CYJ” and having “*essentially the same morphological characteristics as maize variety PH4CYJ when grown in the same environmental conditions.*” EX1001, 34:35-43.¹⁷ By contrast, aside from claim 10, none of the Challenged

¹⁵ Nor does the specification disclose “representative” species in any other context.

¹⁶ POSAs would understand the “A” omitted here is a typographical error. Riley, ¶200.

¹⁷ Even this sentence never specifies what morphological characteristics are required; the specification instead later notes that they “*can be* those listed in Table 1.” EX1001, 34:44-45.

Claims references morphological characteristics and/or environmental conditions.

More fundamentally, the '545 Patent never ties any particular morphological characteristics to any particular environmental conditions. Riley, ¶201. While Table 1 reflects certain morphological characteristics associated with PH4CYJ, the '545 Patent never discloses the environmental conditions under which the plants corresponding to Table 1 were grown. As such, the '545 Patent's specification is essentially useless to POSAs seeking to understand and/or reproduce the claimed invention. Riley, ¶202. For example, many of the physical properties of a corn plant grown in North Dakota under cold and wet conditions would be very different from those of a plant grown from the exact same seed in Iowa under hot and dry conditions. *Id.* . By contrast, the specifications of PO's earlier patents at issue in *J.E.M.* included detailed information regarding growing conditions. *See, e.g.,* EX1083, 9:27-29 (“Data...is based primarily on a maximum of two reps from Johnson, Iowa grown in 1988....”); *see also* Riley, ¶¶203-204.

1. Lack of Written Description

The Challenged Claims are unpatentable for lack of adequate written description because the '545 Patent's specification fails to “describe an invention understandable to that skilled artisan and show that the inventor actually invented the invention claimed.” *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc). Nothing in the disclosure provides any basis to

understand what the inventor possessed and distinguish it from materials the inventor did not purport to claim. *See id.* at 1350 (noting that an “adequate written description requires a precise definition...to distinguish the genus from other materials”). The reference in the claims to “representative seed” merely indicates that the inventor did not view the invention as limited to what was deposited—begging the question of what the inventor actually possessed. *See Idenix Pharms. LLC v. Gilead Sciences Inc.*, 941 F.3d 1149, 1164 (Fed. Cir. 2019) (reversing district court and holding that claims lacked written description as a matter of law because specification provided “no method of distinguishing effective from ineffective compounds for the compounds reaching beyond the formulas disclosed”). Likewise, the ’545 Patent lacks a description otherwise allowing POSAs to distinguish infringing seeds or plants from non-infringing ones. Riley, ¶205. *University of Rochester v. G.D. Searle & Co., Inc.*, 358 F.3d 916, 926 (Fed. Cir. 2004) (“[T]he inventor cannot lay claim to that subject matter unless he can provide a description of the compound sufficient to distinguish infringing compounds from non-infringing compounds, or infringing methods from non-infringing methods.”).

Moreover, PO’s deposit of “at least 625 seeds of Maize Variety PH4CYJ” with a depository (NCMA), EX1001, 37:32-40 would be immaterial to the written description analysis even apart from the particular “representative” language here.

Indeed, deposits cannot substitute for an adequate written description. As the Supreme Court stressed in *J.E.M.*, §112 requires “a written description of the plant **and** a deposit of seed that is publicly accessible.” 534 U.S. at 598; *see also* EX1032 at 16 n.2 (PO’s admission that “the requirements of section 112 can be met through a written description **combined** with a deposit of the invention”). Similarly, the Office’s *J.E.M.* briefing to the Supreme Court expressly **contrasted** the “description requirements of Title 35” with the need to deposit seed “in a public repository, which the Office noted is a requirement even under the PVPA. EX1031, 10 & n.4. To that same end, as a Supervisory Patent Examiner stressed in a 2008 presentation (EX1063) concerning utility patent protection for plants, the “deposit of biological materials” is “**not** a substitute for written description” (EX1095, 29).

2. Lack of Enablement

The Challenged Claims are also unpatentable for lack of enablement because the ’545 Patent’s specification fails to “enable the full scope of the invention as defined by its claims.” *Amgen*, 598 U.S. at 610. The Challenged Claims on their face are not limited to the deposited seed, but instead merely recite the deposited seed as “representative”—without defining any means to enable POSAs to determine whether or not other seeds, plants, plant parts, or plant cells satisfy this requirement. Indeed, without an indication of the environmental conditions under

which the plants reflected in Table 1 were grown, the properties reflected in that table—the only data the '545 Patent provides—offer insufficient guidance to POSAs. Riley, ¶¶206-207. Without such guidance, the specification and related deposit are at best “starting point, a direction for further research.” *ALZA Corp. v. Andrx Pharm., LLC*, 603 F.3d 935, 941 (Fed. Cir. 2010) (affirming determination that claims were not enabled).

C. The Minimal Differences Between the '545 Patent's Specification and the Prior Art Stand in Sharp Contrast to PO's Earlier Plant Utility Patents the Supreme Court Considered in *J.E.M.*

PO's own past practices confirm the reasonableness of requiring individualized specifications—not an assembly-line, PVP template-based approach—if plant breeders seek utility patent protection for new varieties rather than merely pursuing PVP certificates. Riley, ¶208. The '545 Patent reflects an unmistakable drift away from standard practices at the time of the Supreme Court's *J.E.M.* decision holding that utility patent protection was available for new plant varieties provided that applicants complied with all statutory requirements, including §112. Granting review would enable the Office to arrest this trend and return the system to that which the Supreme Court upheld.

1. Unlike the '545 Patent, PO's Earlier Patents Had Individualized Specifications Highlighting Distinctive Properties of the Claimed Inbred Lines

Each of the patent families PO asserted in the *J.E.M.* case heard by the Supreme Court (EX1074) had a highly individualized disclosure explaining what was inventive about the new variety as compared to others. EX1075-1092; Riley, ¶¶209-213, *see also* Riley, ¶¶175-190 (discussing patents asserted in *J.E.M.*). Such disclosures were consistent with the bargain underlying §112 and the utility patent system as a whole. PO itself stressed to the Supreme Court how each patent at issue in *J.E.M.* included “*lengthy disclosures*” highlighting the relevant variety’s “specific features” and “useful characteristics compared with other varieties as measured in numerous important ways.” EX1029, *14.

For example, U.S. Patent No. 5,491,295 (EX1080)—the very first patent identified in PO’s *J.E.M.* complaint (EX1074, 4), and naming Petitioner’s expert Dr. Riley as one of the inventors—concerned a hybrid corn plant “characterized by superior yield for maturity, excellent seedling vigor, very good roots and stalks, and exceptional stay green.” EX1080, 2:66-3:3. In *J.E.M.*, the Supreme Court highlighted this language (534 U.S. at 128), which does not appear in any other patent asserted in the *J.E.M.* case or for that matter in any other patent available in the Office’s searchable database.

Similarly, PO's other patent families at issue in *J.E.M.*—including those with priority dates multiple years after the February 1, 1991 application to which the '295 Patent claimed priority—each included highly differentiated disclosures. Instead of relying on a single template and an assembly line, PO at the time prepared individualized specifications crafted to highlight what was purportedly inventive about each new variety and how it augmented the state of the art.

Indeed, while the details across PO's other patents asserted in the *J.E.M.* case vary, all include detailed tables comparing the claimed varieties to other corn varieties and indicating to POSAs particular commercially significant benefits of the claimed varieties. Riley, ¶¶212, 175-190. PO included these tables ***in addition to*** the initial “Variety Description Information” table specific to the claimed variety and mirroring the information required for PVP certificates. Riley, ¶212. By contrast, PO failed to include any such comparative data or particularized analysis in the '545 Patent distinguishing the claimed PH4CYJ variety over other corn varieties. Yet in the twenty-five years that had passed between the most recent of PO's earlier patents (i.e., those at issue in the *J.E.M.* case) and the filing of the '545 Patent in July 2021, the corn variety landscape became even more crowded (Riley, ¶¶189-190, 213)—making it even more important for applicants to provide particularized information regarding new plant varieties in order to obtain utility patent protection as opposed merely to PVPA protection.

2. Unlike the '545 Patent, PO's Earlier Patents Had Narrower Claims Specifically Linked to PO's Deposits and/or "All" Disclosed Characteristics of the New Varieties

Despite having individualized and far more fulsome disclosures than the '545 Patent, PO's earlier patents at issue in *J.E.M.* consistently had *narrower* claims that did not raise §112 problems of the sort detailed in *supra* VII.B. For example, the above-noted '295 patent had three independent claims:

- Claim 1: A hybrid corn plant designated as 3394 and its parts, and *having ATCC accession number 97224.*
- Claim 6: Seed produced by a hybrid corn plant designated as 3394, said hybrid corn plant *having ATCC accession number 97224.*
- Claim 5: A hybrid corn plant having *all the physiological and morphological characteristics of 3394*, ATCC accession number 97224.

EX1080, 22:35-55. Similarly, one of PO's earlier patents to an inbred line had two independent claims:

- Claim 1: Inbred corn seed designated PHP38, *having ATCC accession number 75612.*
- Claim 6: An inbred corn plant having *all the physiological and morphological characteristics of the plant of claim 2 [a corn plant produced by the seed of claim 1].*

EX1083, 20:47-61.

Unlike the Challenged Claims, none of these claims recite purportedly “representative seed.”¹⁸ Instead, claims 1 and 6 of the patent to the hybrid and claim 1 of the patent to the inbred are limited to plants or seed actually derived from the deposited line. And while claim 5 of the patent on the hybrid and claim 6 of the patent on the inbred are broader, they still require plants having “***all the physiological and morphological characteristics***” of the new variety. The patents disclose extensive information to that effect, including but not limited to the specific locations and growing seasons in which the tested samples reflected in the Variety Description Information were grown. By contrast, the ’545 Patent provides less information and does not even reflect where the measured plants were grown. Unlike the earlier patents, the PVP template specification fails (1) to convey to POSAs that the inventor was in possession of the claimed invention and/or (2) to enable POSAs to practice the full scope of the claims. Riley, ¶¶214-215.

¹⁸ Indeed, out of all the claims in the *J.E.M.* patents, only a single patent (EX1091) includes “representative” claim language. Significantly, moreover, *J.E.M.* did not address §112. See EX1032, 21 n.3.

VIII. NO BASIS EXISTS FOR DISCRETIONARY DENIAL

A. §314(a)

There is no previous petition concerning the '545 Patent that would warrant discretionary denial of this Petition based on the factors in *General Plastic Industrial Co., Ltd. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19 (Sept. 6, 2017) (precedential).

B. §324(a)

There is no co-pending litigation involving the '545 Patent that would warrant discretionary denial of this Petition based on the factors in *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (Mar. 20, 2020) (precedential).

C. §325(d)

Considering the two-part framework discussed in *Advanced Bionics, LLC v. Med-El Elektromedizinische Gerate GMBH*, IPR2019-01469, Paper 6 (Feb. 13, 2020) (precedential), the Board should not exercise its §325(d) discretion to deny institution based on any arguments herein.

1. Ground 1-3 (Obviousness)

The obviousness arguments in Grounds 1-3 are not the same or substantially the same as arguments considered during prosecution. For this reason, the *Advanced Bionics* inquiry ends at the first step. For one, the Benson and Longenberger references were not of record during prosecution. Nor did the

Examiner ever conduct an obviousness analysis in line with *Ex parte C*, 27

U.S.P.Q.2d 1492 (BPAI 1992) as detailed in §V above.

Even if the Board reached part two of *Advanced Bionics* because Smalley was cited, “specific teachings [in Smalley] impact[ing] patentability of the Challenged Claims” were “misapprehend[ed] or overlook[ed].” *Cellco P’ship v. Huawei Device Co.*, IPR2020-01117, Paper 10 at 12 (Feb. 3, 2021). The “fact that [Smalley] was not [a] basis of rejection weighs strongly against exercising [the Board’s] discretion to deny institution under 35 U.S.C. § 325(d).” *Id.* at 13.

Moreover, the Examiner plainly erred legally by failing to discuss the variety disclosed in Smalley and whether it would have been obvious to breed another inbred from that variety, as taught by Smalley itself and well known to POSAs. Indeed, motivation can be found ‘in the knowledge generally available to’ POSAs. *National Steel Car, Ltd. v. Canadian Pacific Ry., Ltd.*, 357 F.3d 1319, 1337–39 (Fed. Cir. 2004) (reversing district court). Separately, “motivation” per se is not even a requirement for obviousness. *KSR*, 550 U.S. at 419. In the relevant field, and as detailed in §V.A.3, “the desire to enhance commercial opportunities by improving [inbred corn varieties] is universal—and even common-sensical.” *DyStar*, 464 F.3d at 1368. Accordingly, “the proper question” when assessing obviousness “is whether the ordinary artisan possesses knowledge and skills rendering him *capable* of combining the prior art references.” *Id.*

(emphasis original). The Examiner erred in failing to consider that question and indeed citing U.S. Patent No. 7,718,856 (EX1066) as the purportedly “closest prior art” while failing to cite Smalley or Benson even though (1) both share generic background with the claimed variety—Smalley as a parent, Benson as a sibling, and (2) Benson further has the exact same aleurone color that the Examiner viewed as distinguishing the claimed variety over the ’856 Patent.

More fundamentally, the Examiner erred in stressing color while failing to assess whether the “differences between the claimed variety and the [prior art varieties] are so significant and unexpected that they should weigh more heavily than the numerous similarities between the claimed variety and the varieties of the cited prior art.” *Ex parte C*, 27 U.S.P.Q.2d at 1497 (affirming obviousness determination concerning plant utility claims). The Board in *Ex parte C* affirmed obviousness rejections over prior art plants that were similar to the claimed plant in many respects despite certain variations in “color” and resistance to a particular kind of rot. *Id.* at 1496-1498. Nothing in the record explained why such differences were “so significant and unexpected that they should weigh more heavily than the numerous similarities between the claimed variety and the varieties of the cited prior art.” *Id.* at 1497. The specification offered no basis even for assessing whether the differences were “significant and unexpected”; it

said nothing regarding the relevance of criteria such as “flower color.” *Id.* The same is true here, as detailed above.

2. Grounds 4-6 (Lack of Specific Utility, Adequate Written Description, or Enablement)

The lack of utility argument in Ground 4 and the §112 arguments in Grounds 5-6 are not the same or substantially the same as arguments considered during prosecution. Nothing in the record suggests any consideration of whether claims 1-20 satisfy the specific utility requirement under §101 or the written description and enablement requirements under §112. *Cf. Hybrigenics v. Forma Therapeutics*, PGR2018-00098, 2019 WL 1308262, at *9 (PTAB Mar. 20, 2019) (instituting review based on written description ground: “[T]he mere absence of a written description rejection does not establish that the Examiner considered the arguments presented in the Petition.”). The prosecution history does not reflect any analysis of specific utility or enablement for any claim. Moreover, the only analysis concerning written description was specific to claims 10-17 and in particular originally-filed claim language concerning “the phenotypic characteristics of maize variety PH4CYJ.” EX1002, 95-102. There is no indication the Examiner considered whether the application supported the claims to “representative seed.” *Id.*

IX. CONCLUSION

Substantial, new, and noncumulative technical teachings have been presented for each Challenged Claim, which are unpatentable as obvious (Grounds 1-3), lacking substantial utility (Ground 4), and failing to comply with the written description and enablement requirements (Grounds 5-6) for the reasons set forth above. It is more likely than not that Petitioner will prevail as to each of these Challenged Claims. PGR of claims 1-20 of the '545 Patent is accordingly requested in accord with §§321-329 and §42.200 et seq.

Dated: April 11, 2024

Respectfully submitted,
Inari Agriculture, Inc.

By: /Scott A. McKeown/
Scott A. McKeown, Reg. No. 42,866
WOLF, GREENFIELD & SACKS, P.C.

X. MANDATORY NOTICES

A. Real Party-In-Interest

Pursuant to §42.8(b)(1), Petitioner identifies Inari Agriculture, Inc. as real party-in-interest. No other party had access to or control over the present Petition, and no other party funded or participated in preparation of the present Petition.

B. Related Matters

A decision in this proceeding could affect or be affected by the following:

1. United States Patent & Trademark Office

No U.S. patent applications claim the benefit of the priority of the filing date of U.S. Patent No. 11,696,545.

C. Counsel and Service Information - §42.8(b)(3) and (4)

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Backup Counsel	Oona M. Johnstone, Reg. No. 68,177 Zhiyun Ge, Reg. No. 73,869 Thomas F. Foley, Reg. No. 76,384 Charles T. Steenburg, pending admission <i>pro hac vice</i>
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A power of attorney is submitted with the Petition. Counsel for Petitioner consents to service of all documents via electronic mail.

XI. CLAIM LISTING

Claim 1
A seed, plant, plant part, or plant cell of inbred maize variety PH4CYJ, representative seed of the variety having been deposited under NCMA accession number 202212062.
Claim 2
The plant part of claim 1, wherein the plant part is an ovule or pollen.

Claim 3
An F1 hybrid maize seed of PH4CYJ produced by crossing the plant or plant part of claim 1 with a different maize plant.
Claim 4
An F1 hybrid maize plant or plant part produced by growing the maize seed of claim 3, wherein the plant part comprises at least one somatic cell of the F1 hybrid maize plant of PH4CYJ.
Claim 5
A method for producing a second maize plant, the method comprising applying plant breeding techniques to the F1 plant or plant part of claim 4 to produce the second maize plant.
Claim 6
A method for producing a second maize plant or plant part, the method comprising doubling haploid seed generated from a cross of the plant or plant part of claim 4 with an inducer variety, thereby producing the second maize plant or plant part.
Claim 7
A method of making a commodity plant product comprising silage, starch, fat, syrup or protein, the method comprising producing the commodity plant product from the maize plant or plant part of claim 4.
Claim 8
A method of producing a maize seed derived from the variety PH4CYJ, comprising:
a) crossing the plant of claim 1 with itself or a second plant to produce progeny seed; and
b) growing the progeny seed to produce a progeny plant and crossing the progeny plant with itself or a different plant to produce maize seed derived from the variety PH4CYJ.
Claim 9
A method for producing nucleic acids, the method comprising isolating nucleic acids from the seed, plant, plant part, or plant cell of claim 1.
Claim 10
A converted seed, plant, plant part or plant cell of inbred maize variety PH4CYJ, representative seed of the maize variety PH4CYJ having been deposited under NCMA accession number 202212062,
wherein the converted seed, plant, plant part or plant cell comprises a locus conversion, and

wherein the plant or a plant grown from the converted seed, plant part or plant cell comprises the locus conversion and otherwise comprises all of the physiological and morphological characteristics of maize variety PH4CYJ when grown under the same environmental conditions.

Claim 11

The converted seed, plant, plant part or plant cell of claim 10, wherein the locus conversion confers a property selected from the group consisting of male sterility, site-specific recombination, abiotic stress tolerance, altered phosphate, altered antioxidants, altered fatty acids, altered essential amino acids, altered carbohydrates, herbicide tolerance, insect resistance and disease resistance.

Claim 12

A maize seed produced by crossing the plant or plant part of claim 10 with a different maize plant.

Claim 13

A hybrid maize plant or plant part produced by growing the seed of claim 12, wherein the plant part comprises at least one cell of the hybrid maize plant.

Claim 14

A method for producing a second maize plant, the method comprising applying plant breeding techniques to the plant or plant part of claim 13 to produce the second maize plant.

Claim 15

A method for producing a second maize plant or plant part, the method comprising doubling haploid seed generated from a cross of the plant or plant part of claim 13 with an inducer variety, thereby producing the second maize plant or plant part.

Claim 16

A method of making a commodity plant product comprising silage, starch, fat, syrup or protein, the method comprising producing the commodity plant product from the maize plant or plant part of claim 13.

Claim 17

A method for producing nucleic acids, the method comprising isolating nucleic acids from the seed, plant, plant part, or plant cell of claim 10.

Claim 18

An F1 hybrid seed of PH4CYJ produced by crossing a plant or plant part of inbred maize variety PH4CYJ
further comprising a transgene, representative seed of the inbred maize variety PH4CYJ having been deposited under NCMA accession number 202212062 with a different maize plant,
wherein the transgene is inherited by the F1 hybrid seed,
wherein the transgene was introduced into inbred maize variety PH4CYJ by backcrossing or genetic transformation.
Claim 19
A method of producing progeny seed, the method comprising crossing a plant grown from the seed of claim 18 with itself or a second plant to produce progeny seed.
Claim 20
A method of making a commodity plant product comprising silage, starch, fat, syrup or protein, the method comprising producing the commodity plant product from a maize plant or plant part of grown from the F1 hybrid seed of claim 18.

CERTIFICATE OF SERVICE UNDER 37 C.F.R. § 42.6 (E)(4)

I certify that on April 11, 2024, I will cause a copy of the foregoing document, including any exhibits or appendices filed therewith, to be served via Priority Mail Express at the following correspondence address of record for the patent:

Pioneer Hi-Bred International, Inc.
7250 NW 62nd Avenue
PO Box 552
Johnston, IA 50131-0552

Date: April 11, 2024

/MacAulay Rush/
MacAulay Rush
Paralegal
WOLF, GREENFIELD & SACKS, P.C.

CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24, the undersigned certifies that the foregoing Petition for Post-Grant Review contains 18,498 words excluding a table of contents, a table of authorities, Mandatory Notices under § 42.8, a certificate of service or word count, or appendix of exhibits or claim listing. Petitioner has relied on the word count feature of the word processing system used to create this paper in making this certification.

Date: April 11, 2024

/MacAulay Rush/
MacAulay Rush
Paralegal
WOLF, GREENFIELD & SACKS, P.C.