

The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

## UNITED STATES PATENT AND TRADEMARK OFFICE

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### BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

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*Ex parte* PRAMOD K. GUPTA, DIANE HOLMSTROM,  
and BONNIE LARSON

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Appeal 2007-1026  
Application 10/405,819  
Technology Center 1600

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Decided: May 21, 2007

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Before DEMETRA J. MILLS, LORA M. GREEN,  
and RICHARD M. LEBOVITZ, *Administrative Patent Judges*.

LEBOVITZ, *Administrative Patent Judge*.

### DECISION ON APPEAL

This is a decision on appeal from the final rejection of claims 1-26, 28, and 29. We have jurisdiction under 35 U.S.C. § 6(b). We affirm-in-part.

### STATEMENT OF CASE

The claimed invention relates to methods of producing cotyledonary pine embryos comprising culturing pine embryonic tissue on different media which comprises the plant hormones (Specification 4, 9) gibberellin (GA) and abscisic acid (ABA).

Tissue culture of pine embryonic tissue is utilized to prepare pine tree clones to ultimately produce pine tree forests which have desirable characteristics (*id.* at 1). Pine embryos are cultured on tissue culture medium in the presence of plant hormones to form cotyledonary pine embryos (*id.*). “The embryos may then be germinated and grown to yield pines trees.” (*Id.*)

Claims 1-26, 28, and 29, all the pending claims, are on appeal (Br. 3). All the pending claims stand rejected over prior art (*id.*). The Examiner has rejected claims 1, 7-9, 16-26, 28, and 29 under 35 U.S.C. § 102(b) as anticipated by Pullman,<sup>1</sup> and claims 1-26, 28, and 29 under 35 U.S.C. § 103(a) as obvious over Pullman (*id.* at 6). Appellants provide separate arguments only for claim 28 (Reply Br. 2-4). Consequently, all the claims stand or fall together in each rejection, except for claim 28. We select claim 1 as representative for deciding the rejection of claims 1, 7-9, 16-26, and 29 under § 102 and of claims 1-26 and 29 under § 103. *See* 37 C.F.R. § 41.37(c)(1)(vii). Claims 1 and 28 read as follows:

1. A method for producing cotyledonary pine embryos, said method comprising the steps of:

(a) culturing embryogenic pine tissue in, or on, a maintenance medium comprising at least one gibberellin, provided that the maintenance medium does not comprise abscisic acid; and

(b) culturing the embryogenic pine tissue treated in accordance with step (a) in, or on, a development medium that does not comprise a gibberellin to yield cotyledonary pine embryos.

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<sup>1</sup> Pullman, U.S. Patent 5,294,549, Mar. 15, 1994.

28. A method for producing cotyledonary pine embryos, the method comprising the steps of:

- (a) culturing pine embryonal suspensor masses on solid maintenance medium that does not comprise a gibberellin;
- (b) culturing the pine embryonal suspensor masses treated in accordance with step (a) in liquid maintenance medium that does not comprise a gibberellin;
- (c) culturing the pine embryonal suspensor masses treated in accordance with step (b) in a liquid maintenance medium comprising at least one gibberellin, provided that the liquid maintenance medium comprising a gibberellin does not comprise abscisic acid; and
- (d) culturing the pine embryonal suspensor masses treated in accordance with step (c) on solid development medium, that does not comprise a gibberellin, to yield cotyledonary pine embryos.

#### THE PRIOR ART

Pullman describes “a method for reproducing coniferous trees by somatic embryogenesis using plant tissue culture techniques in a multistage culturing process.” (Abstract.) Four primary culturing stages are described, each associated with a particular culture medium composition:

1) *Initiation or induction.* “A suitable explant, typically the fertilized embryo excised from an immature seed, is first cultured on a medium that induces multiple early stage proembryos.” (Abstract). The medium utilized in this step is referred to as “initiation” or “induction” medium (col. 6, ll. 22-24; col. 13-14, Table 2).

2) *Multiplication.* The proembryos are multiplied in a maintenance medium (col. 7, ll. 29-36). “It appears now that the inclusion . . . of selected active gibberellins and/or abscisic acid in the maintenance . . . media is also beneficial for improvement of proembryo quality.” (Col. 8, ll. 4-8.)

3) *Singulation.* “The proembryos tend to form in tight clumps or clusters which must first be singulated before going to the development stage. This singulation is carried out in a series of liquid shake cultures which . . . have exogenous abscisic acid as a necessary new hormone. . . . It now appears to be beneficial to include . . . an active gibberellin in the singulation medium.” (Col. 8, ll. 21-39.)

4) *Development.* “The early stage embryos may then be placed in or on a late stage proembryo development culture in order to develop very robust late stage proembryos having at least 100 cells. Culturing from this point continues in a cotyledonary embryo development medium containing an active gibberellin (GA) . . . . Preferably exogenous abscisic acid (ABA) is also present . . . . After several weeks somatic embryos having the appearance of zygotic embryos will have formed.” (Abstract.)

Example 1 in Pullman describes a culture method (col. 13, ll. 65-67). “The embryonal-suspensor masses containing early stage proembryos are transferred to a solid Stage II maintenance and multiplication medium containing greatly reduced plant growth hormones and preferably a somewhat raised osmotic level. . . . Low concentrations of a gibberellin and/or abscisic acid are frequently beneficial at this stage of culture.” (Col. 14, ll. 55-64.)

In Example 2, the effect of GA on embryonic development (Col. 15, ll. 65-67) was determined. Rinsed embryos were transferred to *development medium*, without ABA, in which the concentration of GA varied from 0-25 mg/L (col. 16, ll. 8-13). GA improved embryo quality (col. 16, ll. 20-33).

Example 7 determined the effect of adding GA and ABA to the *maintenance medium*. Three primary conditions were examined: 1) GA alone; 2) ABA alone; and GA and ABA (col. 20, ll. 1-9). Difference concentrations of each were utilized (*id.*). Table 6 shows that “either GA alone or ABA alone improve embryo quality.” (Col. 20, ll. 34-25.)

## DISCUSSION

### *Anticipation over Pullman*

Claims 1, 7-9, 16-26, 28, and 29 stand rejected under 35 U.S.C. § 102 (b) as anticipated by Pullman.

Claim 1 lists two culturing steps. In the first step, pine tissue is cultured in, or on, maintenance medium comprising at least one GA, but which lacks ABA. Following this step, the pine tissue is then cultured in or on a development medium which does not comprise GA.

According to the Examiner, Pullman in Example 1 describes culturing embryos in a maintenance medium containing GA, but without ABA (Answer 3), meeting the first step of instant claim 1. The Examiner asserts that Example 2 utilizes the maintenance medium of Example 1, and further cultures the embryos in a development medium lacking GA (Answer 3), the latter which satisfies the second step recited in claim 1. The Examiner concludes:

The combination of Examples 1 and 2 thus discloses a method wherein embryogenic tissue is cultured in maintenance medium containing gibberellin and lacking abscisic acid, then later cultured in development medium lacking gibberellin, thus meeting the limitations of claim 1. The examples utilized Douglas fir, but the method is disclosed to be useful for pine. Therefore claim 1 is anticipated.

(Answer 3.)

To find anticipation, “[a] single reference must describe the claimed invention with sufficient precision and detail to establish that the subject matter existed in the prior art.” *Verve LLC v. Crane Cams Inc.*, 311 F.3d 1116, 1120, 65 USPQ2d 1051, 1054 (Fed. Cir. 2002). “[T]he reference must describe the applicant’s claimed invention sufficiently to have placed a person of ordinary skill in the field of the invention in possession of it.” *In re Spada*, 911 F.2d 705, 708, 15 USPQ2d 1655, 1657 (Fed. Cir. 1990). In this case, we are persuaded by the Examiner’s arguments that Pullman’s disclosure is adequate to put the skilled worker in possession of the claimed invention.

Example 2 discloses an experimental condition in which embryos are cultured in a development medium lacking GA (col. 16, ll. 13, 20), as required by claim 1. Although Pullman does not describe the hormone content of the maintenance medium utilized in this example, Example 1 states explicitly states that GA “and/or” ABA are beneficial in the maintenance media (col. 14, ll. 62-64). In other words, there are only three preferred choices for the maintenance medium: 1) GA alone; 2) ABA alone; and 3) GA and ABA. These choices were tested in Example 7 (cols. 19-20);

“Results clearly show that either GA alone or ABA alone improve embryo quality.”). (*See supra* at p. 5.)

As persuasively argued by the Examiner (Answer 3), Example 1 apparently uses a maintenance medium in which only GA is present. First, Pullman states in Example 1 that GA is beneficial in the maintenance medium (col. 15, l. 28-30). Secondly, it describes ABA as “newly added” to the singulation media (col. 15, l. 15), the step immediately following culture in the maintenance medium. Thus, it is logical to conclude that the maintenance medium of claim 1 contained GA, but not ABA – as recited in claim 1.

With a small number of conditions (three, i.e., GA, ABA, or GA and ABA) and a preferred embodiment using only GA, but not ABA (Example 1 *supra*) in the maintenance medium, we find that the skilled worker would have recognized and been in possession of a method in which culture in a development medium lacking GA (Example 2) is preceded with culture in maintenance medium containing GA, but no ABA.

Appellants argue that

there is no teaching or suggestion in Example 2 with respect to the type of maintenance media used to produce the late stage proembryos. . . [T]here is no teaching in [Pullman] . . . that describes a method comprising the steps of culturing embryonic pine tissue on *maintenance medium comprising at least one gibberellin and no abscisic acid*, followed by culturing the same embryonic pine tissue on *a development medium that does not comprise a gibberellin*, as required by Claim 1.

(Reply Br. 2)

We do not find this argument persuasive. Pullman clearly teaches that to reach the late stage embryo, the embryonic tissue must be subjected to

several culturing steps, which includes culturing on maintenance medium. *See* summary of Pullman, *supra* at pp. 3-4. Thus, although Example 2 may not disclose which maintenance medium was used, surely the embryos were cultured on a maintenance medium. Appellants do not dispute this fact. The only question is what maintenance medium was used in Example 2. As discussed *supra*, there are three preferred choices. For the condition described in Example 2 where the embryos were cultured on a development medium without GA, the skilled worker would immediately envision three methods: using a development medium without GA preceded by a maintenance medium with either 1) GA and ABA, 2) GA alone, or 3) ABA alone – the latter method which would meet the requirements of claim 1.

We emphasize that there is no requirement in the law for a single working example to disclose a claimed method in order to find anticipation. For example, anticipation has been found in circumstances where the anticipatory species was not specifically named in the reference, but could be envisioned within the disclosed genus by the skilled worker upon reading the reference's description. *See In re Petering*, 301 F.2d 676, 681, 133 USPQ 275, 279 (CCPA 1962); *In re Schaumann*, 572 F.2d 312, 315, 197 USPQ 5, 8 (CCPA 1978); *Sanofi-Synthelabo v. Apotex Inc.*, 470 F.3d 1368, 1377, 81 USPQ2d 1097, 1102-03 (Fed. Cir. 2006).

For the foregoing reasons, we affirm the rejection of claim 1. Claims 7-9, 16-27, and 29 fall with claim 1 because they were not separately argued.

*Claim 28*

Claim 28 recites three culturing steps (a through c) in a maintenance medium, followed by culturing (d) in a development medium. In step (a) and (b), no GA is present in the medium. In step (c), however, GA is present, but ABA is absent. No GA is present in the development medium (d).

The Examiner contends that these steps are disclosed in Pullman's Example 1 (Answer 3). However, after thoroughly reviewing Example 1, we are in agreement with Appellants that the steps in claim 28 are not taught by Pullman. In particular, Pullman does not teach culturing in three different maintenance medium, in which GA absent in the first two, but present in the third as required by claim 28. To the contrary, Pullman describes a first solid and a second liquid maintenance medium (col. 14. ll. 55-67. Even if the singulation medium (col. 15, ll. 11-13 is considered to be a maintenance medium, Pullman does not describe alternating the gibberellin (steps (b), (c), and (d)) as required by the claim. Accordingly, we reverse the rejection of claim 28 under § 102(b).

*Obviousness over Pullman*

Claims 1-26, 28, and 29 stand rejected under 35 U.S.C. § 103(a) as obvious over Pullman.

The Examiner asserts that it would have been routine to optimize the experimental conditions described in Pullman to achieve the claimed subject matter (Answer 4). In making this determination, the Examiner cites Pullman which states:

It should be recognized that there is not one single set of culturing conditions that will be suitable for achieving somatic embryogenesis of all species or for all genotypes within a species. . . . Adjustments in the mineral and plant hormone constituents of the culture media must frequently be made depending on the particular species and genotype being cultured. This applies to each of the various stages of culturing from explants to plantlets. These adjustments are considered to be within the routine experimental capability of those skilled in the art of tissue culture.

(Pullman, col. 22, l. 66 to col. 23, l. 9.)

Appellants contend that Pullman “teaches directly away from the present invention because . . . [it] teaches the advantage of the combination of abscisic acid and gibberellins” in the development media (Br. 10). *See also* Reply Br. 4-5.

We do not find Appellants’ argument persuasive. The Examiner’s conclusion that it would have been routine to optimize conditions is reasonable. “[I]t is not inventive to discover the optimum or workable ranges by routine experimentation.” *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). Moreover, Pullman (above) clearly states that optimization “considered to be within the routine experimental capability of those skilled in the art of tissue culture.” (Pullman, col. 23, ll. 8-10).

Appellants’ do not respond to this basis of the rejection, but argue that Pullman only teaches the absence of GA as a “negative control” in Example 2 (Reply Br. 4). We agree with Appellants’ characterization of Example 2 with respect to the development medium without GA as being an

experimental control; however, this does not detract from the fact that Example 2 is an anticipatory disclosure of the subject matter of claim 1. Appellants have not explained why it would not have been obvious, as asserted by the Examiner, to optimize the culture conditions to have achieved the claimed subject matter, e.g., where the cultured tissue is a suspensor mass (claim 2) or to have selected a particular amount of GA in the maintenance medium (e.g., claims 7-9), conditions which do not relate to the development medium.

Accordingly, we affirm the rejection of claim 1. Claims 2-26 and 29 fall with claim 1 because they were not separately argued.

*Claim 28*

The Examiner bears the initial burden of showing unpatentability.

*In re Rijckaert*, 9 F.3d 1531, 1532, 28 USPQ2d 1955, 1956 (Fed. Cir. 1993). In this case, the Examiner has not explained why the four step culture method of claim 28 would have been obvious to the person of skill in the art in view of Pullman. Consequently, because the Examiner did not meet her burden, we agree with Appellants that the rejection is improper (Reply Br. 5). The rejection of claim 28 is reversed.

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TIME PERIOD

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED-IN-PART

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