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Datasheet for the decision of 24 November 2020

Case Number: T 1935/16 - 3.3.04

Application Number: 06740467.3

Publication Number: 1874935

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Language of the proceedings: EN

Title of invention:
Polynucleotides and methods for making plants resistant to fungal pathogens

Patent Proprietor:
E. I. du Pont de Nemours and Company
Pioneer Hi-Bred International Inc.
University of Delaware

Opponent:
Limagrain Europe

Headword:
Plants resistant to fungal pathogens/DUPONT

Relevant legal provisions:
EPC Art. 56, 53(b)

Keyword:
Main and auxiliary reqest 1: Inventive step - (no)
Auxiliary request 2: Exceptions to patentability - essentially biological process for the production of plants (no)

Decisions cited:

Catchword:

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Office européen des brevets

Beschwerdekammern

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Case Number: T 1935/16 - 3.3.04

D E C I S I O N
of Technical Board of Appeal 3.3.04
of 24 November 2020

Appellant: (Opponent)	Limagrain Europe Biopole Clermont-Limagne Rue Henri Mondor 63360 Saint Beauzire (FR)
Representative:	Lavoix 2, place d'Estienne d'Orves 75441 Paris Cedex 09 (FR)
Respondents: (Patent Proprietors)	E. I. du Pont de Nemours and Company 1007 Market Street Wilmington, DE 19898 (US)
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:	University of Delaware Office of the Vice Provost for Research, 210 Hullihen Hall Newark, DE 19716-1551 (US)
Representative:	J A Kemp LLP 14 South Square Gray's Inn London WC1R 5JJ (GB)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 8 June 2016 concerning maintenance of the European Patent No. 1874935 in amended form**

Composition of the Board:

Chairwoman	G. Alt
Members:	A. Chakravarty
	M. Blasi

Summary of Facts and Submissions

I. The opponent (appellant) filed an appeal against the decision of the opposition division that European patent EP 1 874 935 as amended according to auxiliary request 3 and the invention to which it relates, met the requirements of the EPC.

II. The patent proprietors are respondents to the appeal.

III. With the reply to statement of grounds of appeal, the respondents maintained the claim request found allowable by the opposition division as the main request and submitted a set of claims of auxiliary request 1. With a letter dated 4 November 2020, the respondents submitted sets of claims of auxiliary requests 2 to 9. At the oral proceedings the respondents withdrew auxiliary requests 2 to 7. Former auxiliary request 8 became auxiliary request 2.

IV. Claim 36 of the main request reads as follows:

"36. Corn seed comprising:
(a) a first MP305 derived chromosomal interval defined by BNLG2162 and UMC1051, and not comprising a second MP305 derived chromosomal interval; or
(b) a first MP305 derived chromosomal interval between, but not including, MZA15842 (SEQ ID NO: 141) and UMC15a, and not comprising a second MP305 derived chromosomal interval".

Claim 33 of auxiliary request 1 is identical to this.

Claims 11 and 21 of auxiliary request 2 read:

"11. A process of identifying a corn plant that displays newly conferred or enhanced resistance to *Colletotrichum* infection compared to a corn plant lacking the polynucleotide of SEQ ID NO: 1 or as defined in claim l(b), the process comprising detecting in the corn plant alleles of at least two markers, wherein at least one of said markers is on or within a chromosomal interval defined by UMC2041 and the polynucleotide of SEQ ID NO: 1 or as defined in claim 1(b), and at least one of said markers is on or within a chromosomal interval defined by the polynucleotide of SEQ ID NO: 1 or as defined in claim l(b) and UMC2200; wherein:
(i) said at least two markers each have a recombination frequency of about 10% or less with the polynucleotide of SEQ ID NO: 1 or as defined in claim 1 (b), as determined on a single meiosis map; or
(ii) said at least two markers are each located within 500 kbp or less of the polynucleotide of SEQ ID NO: 1 or as defined in claim l(b).

21. The process of claim 19, wherein the corn plant has been obtained by a process of introgressing the polynucleotide of SEQ ID NO: 1 or as defined in claim l(b) from a donor corn plant into a recipient corn plant to produce an introgressed corn plant".

Claim 21, through claim 19, is ultimately dependent on claim 11, whilst claims 22 and 23 are directly dependent on claim 21.

V. The following documents are referred to in this decision:

D1: Jung *et al.* (1994), Theor. Appl. Genet., 89: 413-418.

D2 : Weldekian and Hawk (1993), Maydica, 38: 189-192.

D6: Polacco *et al.* (2003), Maize Genetics Cooperation Newsletter, Vol. 77, "*VI. A consensus genetic map, Inter-mated B73 x Mo17 (IBM) Neighbors 5718 Loci*" (http://mnl.maizegdb.org/mnl/77)

D7: Extract of pages 156 and 157 of document D6.

D16: Declaration of James A. Hawk, dated 14 July 2010, filed in reply to the communication pursuant to Article 94(3) EPC dated 19 January 2010.

D21: Declaration of Petra J. Wolters, dated 21 May 2015, filed on 22 May 2015.

VI. The arguments of the appellant relevant to the decision are summarised as follows:

Main request - claim 36
Auxiliary request - claim 33

Inventive step (Article 56 EPC)

In the decision under appeal, the opposition division recognised that at the relevant date, the skilled person knew that the Rcg1 gene mapped to a 20 centiMorgan (cM) DNA segment delimited by the markers UMC 15 and UMC 133. The opposition division considered that the objective technical problem to be solved was

the provision of a shorter introgressed DNA fragment comprising the Rcg1 gene.

The claimed invention solved this problem by providing a DNA fragment delimited by markers no more than 10 cM from the Rcg1 gene. However, the examples of the patent did not show that there was a link between the specific size of the introgressions described in the patent, i.e. in line DE811ASR(BC5), and a technical advantage (for example suppression of undesirable traits) compared to the introgression described in document D1, i.e. in line DE811ASR(BC3). Therefore the choice of a plant comprising a DNA fragment delimited by specific markers was arbitrary and the definition of a DNA fragment defined by markers located up to 10 cM on each side of the Rcg1 gene was made *a posteriori*.

It was not necessary to clone or characterise the responsible Rcg1 gene to arrive at a plant comprising a DNA fragment detectable by polymorphic markers located at up to 10 cM on either side. The skilled person knew that a new introgression conferring a specific trait could be obtained from a source of germplasm by successive backcrossing without previously having cloned the gene responsible of the trait. Indeed, the line DE811ASR(BC5) mentioned in the patent had been obtained and selected through backcrosses under phenotypic selection (see declaration D16, page 3 paragraph 8). Moreover, line DE811ASR(BC7) which comprised a shorter introgression than DE811ASR(BC5) (see figure 8b of the patent) was also created before the Rcg1 gene had been cloned (see patent, Example 1, paragraph 2).

As a matter of fact, the Rcg1 locus had a high frequency of recombination (see patent, paragraph

[147]) which allowed the generation of new recombinant lines from successive backcrosses and therefore the generation of shorter introgressions compared to the initial introgression. Furthermore, hundreds of suitable markers were available (see documents D1 and D6) which would have helped the skilled person to select the desired introgression.

In view of all of the above, the skilled person at the relevant date needed no inventive skill to arrive at the claimed plants, which were therefore obvious.

Auxiliary request 2

Auxiliary request 2 should not be admitted into the appeal proceedings. It was late filed and was not allowable in view of in the outstanding objections to the subject-matter of claims 21 to 23.

Exceptions to patentability (Article 53(b) EPC) - claims 21 to 23

In its decision, the opposition division held that claims 40 and 41 of the then first auxiliary request fell under the exception to patentability defined in Article 53(b) EPC because their subject-matter included an essentially biological process for the production of plants comprising a step of plant breeding. This finding applied to all claims comprising such a breeding step, including claims 21 to 23, which included the same language as claims 40 and 40 of auxiliary request 1 considered by the opposition division.

VII. The arguments of the respondents relevant to the decision are summarised as follows:

Main request - claim 36
Auxiliary request 1 - claim 33

Inventive step (Article 56 EPC)

The opposition division's decision on inventive step was correct. Plants grown from the claimed corn seed were resistant to *Colletotrichum* and had improved properties. The closest prior art, document D1, disclosed *Colletotrichum* resistant corn plants where the resistance was conferred by an introgression from line MP305.

The difference between these known plants and the claimed ones was that the latter had a shorter introgressed chromosomal interval derived from line MP305 than that in the plants disclosed in document D1 and because of this had improved agronomic properties. Moreover, document D1 provided only a general indication of the position of the Rcg1 gene on maize chromosome 4, whereas the invention localised the gene precisely and provided its sequence.

The beneficial technical properties of plants containing a shorter introgressed chromosomal interval were known to the skilled person even if, in principle, the introgressed segment conferred the same phenotype as a longer one. The advantages lay both in the potential loss of deleterious material in the longer introgression and in retaining a larger amount of the recipient genome.

Furthermore, the skilled person knew that the benefit of a shorter introgression in general was how it behaved during a breeding process. A shorter interval had less physically linked but phenotypically irrelevant donor material around the resistance gene(s). Thus, there was less "linkage drag", in that less unrelated and potentially deleterious material was brought into the elite background.
The objective technical problem solved by the claimed corn was the provision of a *Colletotrichum* resistant corn having a smaller introgressed segment derived from line MP305 than line DE811ASR(BC3) disclosed in document D1. As such it included the localisation and positional cloning of the Rcg1 gene.

To solve the problem it had been necessary to shift from the linkage map strategy disclosed in documents D1 and D6 to a BAC strategy that allowed the characterisation of a previously unrecognised chromosomal region that, unexpectedly, was non-colinear between the resistant and susceptible maize varieties. The discovery of the non-colinearity of the Rcg1 locus and the approach taken by the inventors was very significant to cloning the gene.

Moreover, the gene was cloned from within a very large physical region containing many genes (see declaration D21). Although some public markers were available in the relevant region, the skilled person would have known from document D1 that only a small subset of these would be polymorphic and thus useful for fine-mapping designed to narrow the chromosomal interval comprising the Rcg1 gene. This was a complex and unpredictable exercise.

The claimed invention was not obvious in the light of the disclosure in documents D1 and D6 because the identification of Rcg1 was inventive. This was not changed by the appellant's speculation concerning the suppression of undesirable traits in the shorter DE811ASR(BC5) fragments of Figure 8(a) of the patent as compared to the longer DE811ASR(BC3) fragments.

As to the appellant's argumentation that cloning the Rcg1 gene was unnecessary for breeding purposes in that a shortened introgression fragment comprising the Rcg1 gene could in the light of document D1 have been obtained through successive backcrosses under phenotypic selection, the size of the 'starting point' fragment of document D1 in combination with the non-colinearity of the Rcg1 locus still meant that the claimed subject-matter was inventive.

Auxiliary request 2

Admittance of auxiliary request 2 into the appeal proceedings

Auxiliary request 2 should be admitted into the appeal proceedings. The amendments made were mere deletions of claims held not allowable by the board. They were therefore straightforward to deal with and raised no new issues.

Exceptions to patentability (Article 53(b) EPC) - claims 21 to 23

Claim 21 was dependent on claim 11 which related to a process of detecting markers, not to a process of plant breeding. The references to introgressed plants in claims 21 to 23 merely specified the source of the

plants to be tested and did not incorporate introgression steps into the methods claimed. The methods of claims 21 to 23 could be carried out in their own right and were not inextricably linked to any breeding steps carried out in a separate, prior method.

VIII. The parties' requests were as follows:

The appellant requested that the decision under appeal be set aside and that the patent be revoked in its entirety.

The respondents requested that the appeal be dismissed, alternatively that the patent be maintained in amended form on the basis of the set of claims of auxiliary request 1 filed with the reply to the statement of grounds of appeal, or further alternatively, on the basis of the set of claims of auxiliary request 2, filed as auxiliary request 8 with letter dated 4 November 2020, or further alternatively, on the basis of the set of claims of auxiliary request 3, filed as auxiliary request 9 with letter dated 4 November 2020.

Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 99 EPC and is admissible.

Main request - claim 36
Auxiliary request - claim 33

Inventive step (Article 56 EPC)

Claim construction

2. The claim is for a corn (maize) seed which, when grown, produces a corn plant that exhibits resistance to *Colletotrichum* infection due to the presence of genetic material originally introgressed from corn line MP305. The claimed seed is defined as comprising, in a first alternative (a), a section of chromosome (referred to as "a chromosomal interval" in the claim) also present in corn line MP305 and defined by two molecular markers termed BNLG2162 and UMC1051. The corn seed is further defined in that it does not comprise a "second MP305 derived chromosomal interval". There was agreement between the parties that this latter feature defined the claimed corn seed as containing a shorter introgressed segment than line MP305.

The closest prior art

3. Both parties agreed that the disclosure in document D1 of plants/seeds of maize line DE811ASR (referred to as BC3 in the patent, see for example paragraph [0172]), could serve as closest prior art for the claimed subject-matter.

4. This maize line, first described in document D2, is disclosed in paragraph [0172] of the patent as being the result of a breeding programme in which anthracnose stalk rot (ASR) sensitive line "*DE811 had been crossed to* [ASR resistant line] *MP305 and the progeny had been backcrossed to the sensitive line DE811 three times, at each backcross selecting for resistance to Cg and otherwise for characteristics of DE811 (Weldekidan and Hawk, (1993), Maydica,38: 189-192)* [this is document D2 in the present proceedings]. *The resulting line was designated DE811ASR (BC3) (Weldekidan and Hawk, (1993) supra)*".

5. In document D1 (with reference to document D2) the BC3 maize line is described as "*an inbred obtained using MP305 as a source of resistance*" (see page 414, left column). Document D1 discloses quantitative trait loci (QTL) mapping studies using this line and reports that "*The QTL mapping results provided strong evidence for an ASR-resistance QTL on linkage group 4*" (see page 417, left column). It further discloses that "*The entire region coding for resistance may be less than 12 cM, because the markers UMC52 (6.8 cM away) and UMC133 (5.2 cM away) flanking UMC15 do not show polymorphism even when many enzyme-probe combinations are used [...]. This is consistent with the assumption that the disease-resistance locus is a small region, with one or a few genes present, as has been shown for other disease-resistance loci*" (page 417, passage bridging left and right columns).

The objective technical problem

6. The difference between the claimed corn plants/seeds and the BC3 line plants/seeds representing the closest prior art is that the latter comprise a longer

introgressed fragment derived from line MP305 which confers resistance to *Colletotrichum.* This structural difference has not been shown to be associated with any technical effect in terms of the phenotype of the claimed plants.

7. The appellant argued that the claimed corn seeds led to plants that had improved agronomic properties due to reduced linkage drag. However, although both parties accepted that avoidance of linkage drag was a generally known goal in plant breeding, the board has seen no evidence that the *Colletotrichum* resistant plants grown from the claimed seeds, which are not defined as having any particular genetic background (i.e. not to those having an elite genetic background), have any improved properties.

8. It is established case law of the boards of appeal that alleged advantages to which the patent proprietor/ applicant merely refers, without offering sufficient evidence to support the comparison with the closest prior art, cannot be taken into consideration in determining the problem underlying the invention and therefore in assessing inventive step (see Case Law of the Boards of Appeal of the European Patent Office, 9th edition 2019, I.D.4.2). Accordingly, the alleged improved agronomic phenotype of the claimed plants cannot be taken into account as a technical effect of the claimed plants and cannot play a role in the formulation of the objective technical problem.

9. In view of the absence of a technical effect associated with the structural difference between the claimed subject-matter and the closest prior art, (see point 6. above, the objective technical problem to be solved by the claimed subject-matter is the provision of

alternative corn seeds which when grown, result in plants resistant to *Colletotrichum.*

Obviousness

10. The claimed solution was obvious because the skilled person, starting from the *Colletotrichum-resistant* BC3 plants disclosed, *inter alia*, in document D1 for the following reasons. In seeking to provide alternative plants resistant to *Colletotrichum,* they would have been motivated by the general desire to reduce linkage drag and would have embarked on a traditional breeding programme involving (back)crossing and selection for the desired trait - *Colletotrichum resistance*. Such a scheme was used to obtain the DE811ASR (BC3) line disclosed in document D1 (see page 414, "*Materials and Methods*"). By virtue of the biological process of genetic recombination, such a breeding programme would have resulted in a number of different *Colletotrichum* resistant lines (and resulting seeds) all containing the corresponding QTL from the BC3 line. Indeed, it would be expected that the lines obtained as a result of such a breeding programme would contain MP305-derived chromosomal intervals of various lengths, and would include ones having an interval defined by the markers referred to in the claim.

11. Given that no beneficial properties have been demonstrated for the claimed seeds and resulting plants, the board considers that selecting the claimed corn seeds from all the other possible solutions obtained does not involve an inventive step. A selection, in the present case one of plants having a "shorter" MP305 derived chromosomal interval, which encodes the genes responsible for the *Colletotrichum* resistance trait, which is not associated with a

technical effect is often described as "*arbitrary*" in the jurisprudence (see Case Law of the Boards of Appeal of the European Patent Office, 9th edition 2019, I.D. 9.10 and 9.19.8. Such an arbitrary selection, by the very fact of it being arbitrary, does not involve an inventive step (*ibid*).

12. The respondents' argument that inventive step should be recognised in view of the non-obvious strategy used in cloning the Rcg1 gene (see Section VII.) fails because the finding of obviousness does not rely on the cloning of the gene. In other words, the board agrees with the appellant's argument that skilled person did not need to clone the Rcg1 gene to arrive at the claimed subject-matter (see Section VI.), rendering the non-obviousness of the cloning strategy moot.

13. Thus, the subject-matter of claim 36 lacks an inventive step and does not meet the requirements of Article 56 EPC.

14. Since auxiliary request 1 contains an identical claim to claim 36 of the main request, claim 33, this claim request is also not allowable.

15. In view of the finding in points 13 and 14 above, the appellant's further arguments relating to inventive step are moot.

Auxiliary request 2

Admittance into the proceedings (Article 13 RPBA)

16. This claim request was filed as auxiliary request 8 with the respondents' letter dated 4 November 2020, i.e. after oral proceedings had been arranged. The

board at oral proceedings decided to admit this claim request into the appeal proceedings. The reasons for this were the following:

17. Pursuant to Article 13(1) RPBA, an amendment of a party's case after it has filed its grounds of appeal or reply may be admitted and considered at the board's discretion, taking into account *inter alia* the complexity of the new subject-matter submitted, the state of the proceedings and the need for procedural economy. Under Article 13(3) RPBA amendments sought to be made after oral proceedings have been arranged are not admitted if they raise issues which the board or the other party or parties cannot reasonably be expected to deal with without adjournment of the oral proceedings.

18. In the present case, the amendments to the claims of auxiliary request 8 were submitted in writing about three weeks before the oral proceedings and were in the form of a mere deletion of claims. Albeit filed late in the appeal proceedings, the amendments were straightforward and removed a substantial part of the disputed subject-matter from the appeal proceedings, leaving only a minor part of the disputed matter. The board also saw no indication that the appellant could not deal with the amended set of claims, in particular since no arguments to this effect were made by the appellant and no new issues were raised by the amendments.

Exceptions to patentability (Article 53(b) EPC)

Claims 21 to 23

19. Claim 21 is dependent on claim 19, which in turn is dependent on claim 11. Claims 22 and 23 are dependent on claim 21. It follows from the formal claim dependency that the subject-matter of claims 21 to 23 is a process of identifying a corn plant comprising the step detecting in the corn plant alleles of at least two markers. Hence, these claims do not relate to a process for the production of plants as referred to in Article 53(b) EPC and therefore do not relate to subject-matter which is excepted from patentability according to Article 53(b) EPC.

20. The indication in claim 21 that "*the corn plant has been obtained by a process of introgressing the polynucleotide of SEQ ID NO: 1 or as defined in claim 1(b) from a donor corn plant into a recipient corn plant to produce an introgressed corn plant*" does not alter the subject-matter of the claim. This is because the information concerning of how the corn plant is obtained further defines the plant to be identified according to the claimed method. The process of introgression referred to in claim 21 and dependent claims 22 and 23 is therefore not subject-matter of the claims but describes a process outside of their scope that produces a plant that is then used in the claimed method.

21. In view of these considerations, the subject-matter of claims 21 to 23 is not excepted from patentability pursuant to Article 53(b) EPC.

22. As there were no further objections to this claim request it is allowable.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the opposition division with the order to maintain the patent in amended form on the basis of the set of claims of auxiliary request 2, filed as auxiliary request 8 with letter dated 4 November 2020, and a description and drawings to be adapted thereto.

The Registrar: The Chair:

I. Aperribay G. Alt

Decision electronically authenticated