

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference MONS:463WO		FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/US 19/43666	International filing date (day/month/year) 26 July 2019 (26.07.2019)	(Earliest) Priority Date (day/month/year) 30 July 2018 (30.07.2018)	
Applicant MONSANTO TECHNOLOGY LLC			

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 5 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the language, the international search was carried out on the basis of:

☒ the international application in the language in which it was filed.

☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

b. ☐ This international search report has been established taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91 (Rule 43.6bis(a)).

c. ☒ With regard to any nucleotide and/or amino acid sequence disclosed in the international application, see Box No. I.

2. ☐ Certain claims were found unsearchable (see Box No. II).

3. ☒ Unity of invention is lacking (see Box No. III).

4. With regard to the title,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the drawings,

a. the figure of the drawings to be published with the abstract is Figure No. _____

☐ as suggested by the applicant.

☐ as selected by this Authority, because the applicant failed to suggest a figure.

☐ as selected by this Authority, because this figure better characterizes the invention.

b. ☒ none of the figures is to be published with the abstract.

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Box No. I Nucleotide and/or amino acid sequence(s) (Continuation of item 1.c of the first sheet)

1. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of a sequence listing:
- ☒ forming part of the international application as filed:
 - ☒ in the form of an Annex C/ST.25 text file.
 - ☐ on paper or in the form of an image file.
 - ☐ furnished together with the international application under PCT Rule 13ter.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
 - ☐ furnished subsequent to the international filing date for the purposes of international search only:
 - ☐ in the form of an Annex C/ST.25 text file (Rule 13ter.1(a)).
 - ☐ on paper or in the form of an image file (Rule 13ter.1(b) and Administrative Instructions, Section 713).
2. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
3. Additional comments:

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Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be searched, the appropriate additional search fees must be paid.

Group I, claims 1-5, 8-11 and 15-21, directed to a DNA molecule (probe) or pair of DNA molecules (primers), or a plant, plant part, cell, or part thereof, nonliving corn plant material, microorganism or commodity product comprising the DNA molecule(s).

Group II, claims 6, 7, 14, 22-28, directed to a method of detecting the presence of a DNA segment diagnostic for corn event MON95379 DNA in a sample.

Group III, claims 12 and 13, directed to a method for protecting a corn plant from insect infestation.

*****Continued in Supplemental Box*****

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-5, 8-11 and 15-21

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

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A. CLASSIFICATION OF SUBJECT MATTER

IPC - A01C 11/00, A01C 7/00, A01G 1/00, A01H 1/00 (2019.01)

CPC - C12N1 5/8286, C12N 15/09, C12Q 1/6844, A01H 5/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

See Search History document

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

See Search History document

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

See Search History document

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Genbank submission KG815221 [database online], 23 December 2014, [retrieved on 2019-11-12]. Retrieved from: <https://www.ncbi.nlm.nih.gov/nuccore/KG815221> full document	1-2, 5, 8-11, 15-20
A	Genbank submission CP015659 [database online], 23 May 2016, [retrieved on 2019-11-05]. Retrieved from: <https://www.ncbi.nlm.nih.gov/nuccore/LR584442> full document	1-2, 5, 8-11, 15-20
A	Genbank submission F1982754 [database online], 22 May 2010, [retrieved on 2019-11-12]. Retrieved from: <https://www.ncbi.nlm.nih.gov/nuccore/F1982754> full document	1-2, 5, 8-11, 15-20
A	Genbank submission BZ318215 [database online], 6 November 2002, [retrieved on 2019-11-12]. Retrieved from: <https://www.ncbi.nlm.nih.gov/nuccore/BZ318215> full document	1-2, 5, 8-11, 15-20
A	Genbank submission LN503569 [database online], 15 September 2014, [retrieved on 2019-11-12]. Retrieved from: <https://www.ncbi.nlm.nih.gov/nuccore/LN503569> full document	1-2, 5, 8-11, 15-20
A	Genbank submission AC230033 [database online], 21 September 2013, [retrieved on 2019-11-12]. Retrieved from: <https://www.ncbi.nlm.nih.gov/nuccore/AC230033> full document	1-2, 5, 8-11, 15-20
A	US 9,469,880 B2 (MONSANTO TECHNOLOGY, LLC) 18 October 2016 (18.10.2016); abstract; col 2, ln 23-28, col 2, ln 44-54	3-5, 8-11, 15-21
A	US 6,593,273 B2 (ASRAR et al.) 15 July 2003 (15.07.2003); abstract; claims 15-16	3-5, 8-11, 15-21

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"D" document cited by the applicant in the international application

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

12 November 2019

Date of mailing of the international search report

07 JAN 2020

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US, Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450

Facsimile No. 571-273-8300

Authorized officer

Lee Young

Telephone No. PCT Helpdesk: 571-272-4300

INTERNATIONAL SEARCH REPORT
Information on patent family members

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Continuation of Box No. III (Observations where unity of invention is lacking):

The inventions listed as Groups I-III do not relate to a single special technical feature under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

Special technical features:

Group I has the special technical feature of consisting of a recombinant DNA molecule, that is not required by Group II, III.

Group II has the special technical feature of detecting hybridization of a DNA molecule to DNA in a sample or amplification of DNA in a sample, that is not required by Group I, III.

Group III has the special technical feature of providing in the diet of a Lepidopteran insect pest an insecticidally effective amount of cells or tissue of the corn plant comprising corn event MON 95379, that is not required by Group I, II.

Common technical features:

Groups I-III share the common technical feature of a corn plant, corn plant part, or corn seed thereof comprising DNA functional as a template when tested in DNA amplification method producing an amplicon diagnostic for the presence of event MON 95379 DNA, a DNA molecule comprising a polynucleotide segment of sufficient length to function as a DNA probe that hybridizes specifically under stringent hybridization conditions with corn event MON 95379 DNA in a sample, or a pair of DNA molecules, comprising a first DNA molecule and a second DNA molecule different from the first DNA molecule, that function as DNA primers when used together in an amplification reaction with a sample containing corn event MON 95379 template DNA.

However, this shared technical feature does not represent a contribution over prior art, because this shared technical feature is made obvious over US 9,469,880 B2 to Monsanto Technology, LLC (hereinafter "Monsanto") in view of US 6,593,273 B2 to Asrar et al. (hereinafter "Asrar").

Monsanto teaches a corn plant, corn plant part, or corn seed thereof comprising DNA functional as a template when tested in DNA amplification method producing an amplicon diagnostic for the presence of a transgenic event, a DNA molecule comprising a polynucleotide segment of sufficient length to function as a DNA probe that hybridizes specifically under stringent hybridization conditions with corn event DNA in a sample, wherein detecting hybridization of said DNA molecule under said stringent hybridization conditions is diagnostic for the presence of corn event DNA in said sample, or a pair of DNA molecules, comprising a first DNA molecule and a second DNA molecule different from the first DNA molecule, that function as DNA primers when used together in an amplification reaction with a sample containing corn event MON 95379 template DNA (Abstract "The present disclosure provides a transgenic corn comprising event MON87403 that exhibits increased grain yield. The disclosure also provides cells, plant parts, seeds, plants, commodity products related to the event, and DNA molecules that are unique to the event and were created by the insertion of transgenic DNA into the genome of a corn plant. The disclosure further provides methods for detecting the presence of said corn event nucleotide sequences in a sample, probes and primers for use in detecting nucleotide sequences that are diagnostic for the presence of said corn event."; col 2, ln 34-54 "the invention provides a pair of DNA molecules comprising a first DNA molecule and a second DNA molecule different from the first DNA molecule, wherein said first and second DNA molecules each comprise a nucleotide sequence of sufficient length of contiguous nucleotides of SEQ ID NO:10, or a full complement thereof, to function as DNA primers when used together in an amplification reaction...a method of detecting the presence of a DNA molecule from a transgenic corn plant comprising event MON87403 in a sample, said method comprising: (a) contacting said sample with the DNA probe of claim 6; (b) subjecting said sample and said DNA probe to stringent hybridization conditions; and (c) detecting hybridization of said DNA probe to a DNA molecule in said sample, wherein the hybridization of said DNA probe to said DNA molecule indicates the presence of a DNA molecule from a transgenic corn plant comprising event MON87403 in said sample."), however fails to teach wherein the corn event is MON95379.

While the corn event MON95379 was not known in the art at the time, the applicant's instant specification defines MON95379 as a corn event that provides protection from Lepidopteran pests of corn (Instant specification [07] "The invention provides a novel transgenic corn event - MON 95379 - that provides insecticidal control over Lepidopteran pests of corn.").

Asrar teaches a corn event that protects the corn from insects, specifically from the order Lepidoptera (abstract "A method to protect corn against feeding damage by one or more pests includes the treatment of corn seed having a transgenic event that is targeted against at least one of the pests with a pesticide in an amount that is effective against the same or another of the one or more pests. Seeds having such protection are also disclosed."; claim 15. "The method according to claim 2 wherein the transgenic event has activity against an insect."; claim 16. "The method according to claim 15 wherein the insect is selected from the group consisting of members of the orders Lepidoptera, Coleoptera and Hemiptera."). Given that Asrar teaches a corn event that protects the corn from Lepidoptera, it would have been obvious to an artisan of ordinary skill in the art to identify this event in corn using the method taught by Monsanto, in order to identify corn plants with resistance to Lepidoptera.

As the technical features were known in the art at the time of the invention, they cannot be considered special technical features that would otherwise unify the groups.

Therefore, Group I-III inventions lack unity under PCT Rule 13 because they do not share the same or corresponding special technical feature.