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(81) **Designated States** *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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— *with sequence listing part of description (Rule 5.2(a))*

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13 March 2014

(54) **Title**: CORN EVENT MON 87411

(57) **Abstract**: The invention provides corn event MON 87411, and plants, plant cells, seeds, plant parts, and commodity products comprising event MON 87411. The invention also provides polynucleotides specific for event MON 87411 and plants, plant cells, seeds, plant parts, and commodity products comprising polynucleotides specific for event MON 87411. The invention also provides methods related to event MON 87411.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US13/40173

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - A01H 1/00, C12N 15/82; A01N 57/00 (2013.01)
USPC - 800/265, 320.1; 504/194
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)
IPC(8): A01H 1/00, 1/02, 5/00; C12N 15/82; A01N 57/00; A23K 1/00; C07H 21/02; C12Q 1/68 (2013.01)
USPC: 800/265, 320.1, 260, 320, 298, 295, 536/23.1, 22.1, 18.7, 1.11; 426/615; 435/6; 504/194

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
MicroPatent (US-G, US-A, EP-A, EP-B, WO, JP-bib, DE-C,B, DE-A, DE-T, DE-U, GB-A, FR-A); Google/Google Scholar; ProQuest; ScienceDirect; Search Terms Used: 'Zea Mays', corn, rootworm, herbicide, Diabrotica, glyphospate, recombinant, transgenic, DNA, amplification, primer

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- A	US 2008/0028482 A1 (BEAZLEY, KA et al.) January 31, 2008; paragraphs [0007], [0008], [0018], [0027], [0028], [0039], [0040], [0043], [0044], [0047], [0057]-[0059], [0061]-[0063], [0070], [0072]; Table 2; Claim 12,	22, 23, 25, 26, 32 ----- 1, 2, 4/1, 4/2, 5/1, 5/2, 6, 7, 9, 10, 12-19, 20/1, 20/2, 21/1, 21/2, 24, 27/1, 27/2, 28/1, 28/2, 29/28/1, 29/28/2
A	WO 2009/075860 A2 (MADAPPA, S et al.) June 18, 2009; paragraphs [0005], [0010], [0011], [0020]	1, 2, 4/1, 4/2, 5/1, 5/2, 6, 9, 10, 12-19, 20/1, 20/2, 21/1, 21/2, 24, 27/1, 27/2, 28/1, 28/2, 29/28/1, 29/28/2
A	US 2006/0127889 A1 (DOTSON, SB et al.) June 15, 2006; paragraphs [0019], [0020], [0077], [0081]; Table 1	1, 7
A	EP 2281447 A2 (STEINER, HY et al.) February 9, 2011; paragraphs [0006], [0007], [0009], [0033]	2, 4/1, 4/2, 5/1, 5/2, 6, 7, 9, 10, 12-19, 20/1, 20/2, 21/1, 21/2, 24, 27/1, 27/2, 28/1, 28/2, 29/28/1, 29/28/2

☐ Further documents are listed in the continuation of Box C. ☐

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"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	Date of mailing of the international search report
05 December 2013 (05.12.2013)	16 DEC 2013

Name and mailing address of the ISA/US	Authorized officer:
Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Shane Thomas PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US13/40173

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:

-***-Please See Supplemental Page-***-

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.:

Claims 1, 2, 4/1, 4/2, 5/1, 5/2, 6, 7, 9, 10, 12-26, 27/1, 27/2, 28/1, 28/2, 29/28/1, 29/28/2, 32, SEQ ID NOs: 1, 2

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.:

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.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US13/40173

-***-Continuation of Box No. III - Observations Where Unity of Invention Is Lacking:

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 examined, the appropriate additional examination fees must be paid.

Groups I+: Claims 1-3, 4/1-3, 5/1-3, 6-10, 12-19, 20/1-3, 21/20/1-3, 22-26, 27/1-3, 28/1-3, 29/28/1-3, 30-32 and SEQ ID NO:1 (DNA construct) are directed toward a recombinant DNA molecule detectable in a sample containing corn DNA, wherein the nucleotide sequence of said molecule is: (a) selected from the group consisting of SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO:8, SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:21, SEQ ID NO:25, SEQ ID NO:12, SEQ ID NO:14, SEQ ID NO:16, SEQ ID NO:41, SEQ ID NO:42, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:45, SEQ ID NO:49, SEQ ID NO:50, SEQ ID NO:51, and SEQ ID NO:52 or (b) a nucleotide sequence completely complementary to (a), wherein the presence of such DNA molecule is diagnostic for corn event MON 87411 DNA in said sample; a DNA molecule comprising a polynucleotide segment of sufficient length to function as a DNA probe that hybridizes under stringent hybridization conditions with corn event MON 87411 DNA or the construct comprised therein in a sample, wherein said probe specifically hybridizes under said conditions to one or more junction segments diagnostic for corn event MON 87411 or the construct comprised therein as set forth in SEQ ID NO: 1, and wherein detecting hybridization of said DNA probe under said hybridization conditions is diagnostic for corn event MON 87411 DNA or the construct comprised therein in said sample; 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 polynucleotide segment of sufficient length of contiguous nucleotides of SEQ ID NO: 1 or SEQ ID NO:2 or SEQ ID NO:3 or SEQ ID NO:4 to function as DNA primers when used together in an amplification reaction with a sample containing corn event MON 87411 template DNA to produce an amplicon diagnostic for said corn event MON 87411 DNA in said sample, wherein the amplicon comprises the nucleotide sequence selected from the group consisting of SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO:8, SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:21, SEQ ID NO:25, SEQ ID NO:12, SEQ ID NO:14, SEQ ID NO:16, SEQ ID NO:41, SEQ ID NO:42, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:45, SEQ ID NO:49, SEQ ID NO:50, SEQ ID NO:51, and SEQ ID NO:52; a corn plant, or corn part thereof or seed comprising a recombinant polynucleotide molecule comprising the nucleotide sequence of SEQ ID NO:1; a corn plant, or corn plant part thereof comprising DNA functional as a template when tested in a DNA amplification method, wherein conducting said DNA amplification method using said template produces an amplicon diagnostic for the presence of event MON 87411 DNA or the construct comprised therein; a method of producing a corn plant tolerant to glyphosate herbicide comprising providing the corn event MON 87411 in the genome of said corn plant, wherein said corn plant is an inbred corn plant homozygous for event MON 87411 or is a F1 hybrid progeny of at least one parent corn plant comprising event MON 87411; a method for controlling the growth of weeds in a field, comprising growing corn plants comprising event MON 87411 in a field, and treating said field with an effective amount of glyphosate to control the growth of weeds; a DNA molecule comprising: (a) the recombinant polynucleotide as set forth in SEQ ID NO: 12; and (b) the recombinant polynucleotide as set forth in SEQ ID NO:14; and (c) the recombinant polynucleotide as set forth in SEQ ID NO:16, wherein said recombinant polynucleotide sequences are linked together by phosphodiester linkage; and a method of protecting a field of corn plants comprising cultivating a field of corn plants comprised of from about 50 to about 100 percent of corn plants comprising corn event MON 87411.

SEQ ID NO: 1 will be searched without the payment of any additional fees. Additional SEQ ID NOs can be searched upon the payment of additional fees. An Exemplary Election would be: SEQ ID NO: 2. Failure to clearly identify how any paid additional invention fees are to be applied to the "+" group(s) will result in only the first claimed invention to be searched/examined.

Groups I+ share the technical features including a recombinant DNA molecule detectable in a sample containing corn DNA, or (b) a nucleotide sequence completely complementary to (a), wherein the presence of such DNA molecule is diagnostic for corn event MON 87411 DNA in said sample; a DNA molecule comprising a polynucleotide segment of sufficient length to function as a DNA probe that hybridzes under stringent hybridization conditions with corn event MON 87411 DNA or the construct comprised therein in a sample, wherein said probe specifically hybridizes under said conditions to one or more junction segments diagnostic for corn event MON 87411, and wherein detecting hybridization of said DNA probe under said hybridization conditions is diagnostic for corn event MON 87411 DNA or the construct comprised therein in said sample; 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 polynucleotide segment of sufficient length of contiguous nucleotides to function as DNA primers when used together in an amplification reaction with a sample containing corn even MON 87411 template DNA to produce an amplicon diagnostic for said corn event MON 87411 DNA in said sample; a corn plant, or corn plant part thereof or seed comprising a recombinant polynucleotide molecule; a corn plant, or corn plant part thereof comprising DNA functional as a template when tested in a DNA amplification method, wherein conducting said DNA amplification method using said template produces an amplicon diagnostic for the presence of MON 87411 DNA or the construct comprised therein; a method of producing a corn plant tolerant to glyphosate herbicide comprising providing the corn event MON 87411 in the genome of said corn plant, wherein said corn plant is an inbred corn plant homozygous for event MON 87411 or is a F1 hybrid progeny of at least one parten corn plant comprising event MON 87411; a method for controlling the growth of weeds in a field, comprising growing corn plants comprising event MON 87411 in a field, and treating said field with an effective amount of glyphosate to control the growth of weeds; a DNA molecule comprising: a recombinant polynucleotide; and wherein said recombinant polynucleotide sequences are linked together by phosphodiester linkage; and a method of protecting a field of corn plants comprising cultivating a field of corn plants comprised of from about 50 to about 100 percent of corn plants comprising corn event MON 87411.

-***-Continued on Next Supplemental Page-***-

-***-Continued from Previous Supplemental Page:

Groups I+ share the technical features including a recombinant DNA molecule detectable in a sample containing corn DNA, or (b) a nucleotide sequence completely complementary to (a), wherein the presence of such DNA molecule is diagnostic for corn event MON 87411 DNA in said sample; a DNA molecule comprising a polynucleotide segment of sufficient length to function as a DNA probe that hybridzes under stringent hybridization conditions with corn event MON 87411 DNA or the construct comprised therein in a sample, wherein said probe specifically hybridizes under said conditions to one or more junction segments diagnostic for corn event MON 87411, and wherein detecting hybridization of said DNA probe under said hybridization conditions is diagnostic for corn event MON 87411 DNA or the construct comprised therein in said sample; 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 polynucleotide segment of sufficient length of contiguous nucleotides to function as DNA primers when used together in an amplification reaction with a sample containing corn even MON 87411 template DNA to produce an amplicon diagnostic for said corn event MON 87411 DNA in said sample; a corn plant, or corn plant part thereof or seed comprising a recombinant polynucleotide molecule; a corn plant, or corn plant part thereof comprising DNA functional as a template when tested in a DNA amplification method, wherein conducting said DNA amplification method using said template produces an amplicon diagnostic for the presence of MON 87411 DNA or the construct comprised therein; a method of producing a corn plant tolerant to glyphosate herbicide comprising providing the corn event MON 87411 in the genome of said corn plant, wherein said corn plant is an inbred corn plant homozygous for event MON 87411 or is a F1 hybrid progeny of at least one parent corn plant comprising event MON 87411; a method for controlling the growth of weeds in a field, comprising growing corn plants comprising event MON 87411 in a field, and treating said field with an effective amount of glyphosate to control the growth of weeds; a DNA molecule comprising: a recombinant polynucleotide; and wherein said recombinant polynucleotide sequences are linked together by phosphodiester linkage; and a method of protecting a field of corn plants comprising cultivating a field of corn plants comprised of from about 50 to about 100 percent of corn plants comprising corn event MON 87411.

However, these shared technical featured are previously disclosed by US 2008/0028482 A1 to Beazley, et al. (hereinafter 'Beazley'). Beazley discloses a recombinant DNA molecule (DNA molecule comprising an inserted transgene (recombinant DNA molecule); paragraph [0008]) detectable in a sample containing corn DNA (detectable in a sample containing corn plant DNA; paragraph [0008]), or (b) a nucleotide sequence completely complementary to (a) (a nucleotide sequence completely complementary; paragraph [0043]), wherein the presence of such DNA molecule (paragraph [0008]) is diagnostic for corn event MON 97411 DNA in said sample (limitation is not afforded patentable weight, as corn event MON 87411 is a corporation-specific tradename, and tradenames are not to be afforded patentable weight); a DNA molecule comprising a polynucleotide segment of sufficient length to function as a DNA probe that hybridizes under stringent hybridization conditions (paragraph [0040]) with corn event MON 87411 DNA (limitation is not afforded patentable weight, as corn event MON 87411 is a corporation-specific tradename, and tradenames are not to be afforded patentable weight) or the construct comprised therein in a sample, wherein said probe specifically hybridizes under said conditions to one or more junction segments (paragraphs [0070], [0072]; Table 2) diagnostic for corn event MON 87411 (limitation is not afforded patentable weight, as corn event MON 87411 is a corporation-specific tradename, and tradenames are not to be afforded patentable weight), and wherein detecting hybridization of said DNA probe under said hybridization conditions is diagnostic (paragraphs [0008], [0040], [0043]) for corn event MON 87411 DNA (limitation is not afforded patentable weight, as corn event MON 87411 is a corporation-specific tradename, and tradenames are not to be afforded patentable weight) or the construct comprised therein in said sample; a pair of DNA molecules comprising a first DNA molecule and a second DNA molecule (a pair of different DNA molecules; paragraph [0039]), wherein said first and second DNA molecules each comprise a polynucleotide segment of sufficient length of contiguous nucleotides to function as DNA primers (polynucleotide segments of sufficient length to function as DNA primers; paragraph [0039]) when used together in an amplification reaction with a sample to produce an amplicon (when used together in an amplification reaction to produce an amplicon; paragraph [0039]) for said corn event MON 87411 DNA in said sample (limitation is not afforded patentable weight, as corn event MON 87411 is a corporation-specific tradename, and tradenames are not to be afforded patentable weight); a corn plant (abstract), or corn plant part thereof or seed comprising a recombinant polynucleotide molecule (abstract); a corn plant (abstract), or corn plant part thereof comprising DNA functional as a template when tested in a DNA amplification method (paragraphs [0050], [0072]; Claim 18), wherein conducting said DNA amplification method using said template produces an amplicon diagnostic for the presence (paragraphs [0050], [0072]; Claim 18) of MON 87411 DNA (limitation is not afforded patentable weight, as corn event MON 87411 is a corporation-specific tradename, and tradenames are not to be afforded patentable weight) or the construct comprised therein; a method of producing a corn plant tolerant to glyphosate herbidide (Claim 8, 10) comprising providing the corn event MON 87411 (limitation is not afforded patentable weight, as corn event MON 87411 is a corporation-specific tradename, and tradenames are not to be afforded patentable weight) in the genome of said corn plant (Claims 8, 10, 17, 18, 20), wherein said corn plant is an inbred corn plant homozygous for (paragraphs [0028], [0030]) event MON 87411 (limitations is not afforded patentable weight, as corn event MON 87411 is a corporation-specific tradename, and tradenames are not to be afforded patentable weight) or is a F1 hybrid progeny of at least one parent corn plant comprising event MON 87411; a method for controlling the growth of weeds in a field (Claim 12), comprising growing corn plants comprising (Claim 12) event MON 87411 (limitation is not afforded patentable weight, as corn event MON 87411 is a corporation-specific tradename, and tradenames are not to be afforded patentable weight) in a field (Claim 12); and treating said field with an effective amount of glyphosate to control the growth of weeds (Claim 12); a DNA molecule (abstract; Claims 8, 23) comprising: a recombinant polynucleotide (abstract; Claims 8, 23); and wherein said recombinant polynucleotide sequences are linked together by a linkage (transgenes (polynucleotide sequences) are linked on the same DNA segment; by phosphodiester linkage; paragraph [0027]); and a method of protecting a field of corn plants (corn plants were treated with glyphosate (protecting a field of corn plants); paragraph [0063]) comprising cultivating a field of corn plants comprised of from about 50 to about 100 percent of corn plants comprising (cultivating a field of corn plants comprised of from about 50 to about 100 percent of corn plants; paragraph [0063], Table 1) corn event MON 87411 (limitaiton is not aforded patentable weight, as corn event MON 87411 is a corporation-speciifc tradename, and tradenames are not to be afforded patentable weight). Beazley does not disclose wherein said recombinant polynucleotide sequences are linked together by phosphodiester linkage. However, it would have been obvious to a person of ordinary skill in the art, at the time of the invention, to have implemented the linkage of the previously disclosed polynucleotide sequences together by phosphodiester linkage, as it was common and well-known in the art that linkages of polynucleotides are created and formed through the linkage of phosphoidester bonds.

Since none of the special technical features of the Groups I+ inventions is found in more than one of the inventions, and since all of the shared technical features are previously disclosed by the Beazley reference, unity of invention is lacking.