



(51) International Patent Classification:

C12N 15/82 (2006.01) A01H 5/00 (2006.01)
C07K 14/325 (2006.01)

(21) International Application Number:

PCT/US2016/033126

(22) International Filing Date:

18 May 2016 (18.05.2016)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

62/170,345 3 June 2015 (03.06.2015) US

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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, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, 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, SA, 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.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— of inventorship (Rule 4.17(iv))

Published:

— with international search report (Art. 21(3))

— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

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

(88) Date of publication of the international search report:

16 March 2017

(54) Title: PESTICIDAL GENES AND METHODS OF USE

(57) Abstract: Compositions having pesticidal activity and methods for their use are provided. Compositions include isolated and recombinant polypeptides having pesticidal activity, recombinant and synthetic nucleic acid molecules encoding the polypeptides, DNA constructs and vectors comprising the nucleic acid molecules, host cells comprising the vectors, and antibodies to the polypeptides. Nucleotide sequences encoding the polypeptides can be used in DNA constructs or expression cassettes for transformation and expression in organisms of interest. The compositions and methods provided are useful for producing organisms with enhanced pest resistance or tolerance. Transgenic plants and seeds comprising a nucleotide sequence that encodes a pesticidal protein of the invention are also provided. Such plants are resistant to insects and other pests. Methods are provided for producing the various polypeptides disclosed herein, and for using those polypeptides for controlling or killing a pest. Methods and kits for detecting polypeptides of the invention in a sample are also included.



INTERNATIONAL SEARCH REPORT

International application No
PCT/US2016/033126

A. CLASSIFICATION OF SUBJECT MATTER
INV. C12N15/82 C07K14/325
ADD. A01H5/00

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)
C12N C07K

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)

EPO-Internal, BIOSIS, CHEM ABS Data, EMBASE, WPI Data, Sequence Search

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 2009/158470 A2 (ATHENIX CORP [US]; AGARWAL SHRUTI [US]; CAMPBELL CHRIS [US]; MCNULTY B) 30 December 2009 (2009-12-30) claims; examples; sequences 48,108 & DATABASE Geneseq [Online] 18 March 2010 (2010-03-18), "Bacillus thuringiensis pesticidal axmi116 protein, SEQ ID 108.", retrieved from EBI accession no. GSP:AXU72397 Database accession no. AXU72397 sequence -/-	1-23



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

"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

10 January 2017

Date of mailing of the international search report

27/01/2017

Name and mailing address of the ISA/

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Burkhardt, Peter

INTERNATIONAL SEARCH REPORT

International application No.

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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:
 - a. ☒ 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.
 - b. ☐ furnished together with the international application under PCT Rule 13~~ter~~.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
 - c. ☐ 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 13~~ter~~.1(a)).
 - ☐ on paper or in the form of an image file (Rule 13~~ter~~.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:

INTERNATIONAL SEARCH REPORT

International application No.
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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:

see additional sheet

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 an 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.:
1-23(partially)
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/US2016/033126

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	& DATABASE Geneseq [Online] 18 March 2010 (2010-03-18), "Bacillus thuringiensis pesticidal axm116 gene, SEQ ID 48.", retrieved from EBI accession no. GSN:AXU72337 Database accession no. AXU72337 sequence -----	
Y	WO 2011/084314 A2 (PIONEER HI BRED INT; ABAD ANDRE R; DONG HUA; LO SUE B; SHI XIAOMEI; WO) 14 July 2011 (2011-07-14) page 27, line 3 - line 28 -----	1-23
Y	CARUCCIO NICHOLAS: "Preparation of next-generation sequencing libraries using Nextera(TM) technology: simultaneous DNA fragmentation and adaptor tagging by in vitro transposition", METHODS IN MOLECULAR BIOLOGY (CLIFTON, N.J.)UNITED STATES2010,, vol. 733, 1 January 2011 (2011-01-01), pages 241-255, XP009157814, ISSN: 1940-6029, DOI: 10.1007/978-1-61779-089-8_17 [retrieved on 2011-01-01] the whole document -----	1-23
Y	WO 2009/099602 A1 (MASSACHUSETTS INST TECHNOLOGY [US]; GNIRKE ANDREAS [US]; NUSBAUM CHAD) 13 August 2009 (2009-08-13) paragraphs [0010] - [0030]; claims; figures -----	1-23
Y	TRAVIS C. GLENN: "Field guide to next-generation DNA sequencers", MOLECULAR ECOLOGY RESOURCES, vol. 11, no. 5, 19 May 2011 (2011-05-19), pages 759-769, XP055064385, ISSN: 1755-098X, DOI: 10.1111/j.1755-0998.2011.03024.x tables 2-4 ----- -/-	1-23

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2016/033126

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	SHMUEL COHEN ET AL: "Cyt1Aa Toxin: Crystal Structure Reveals Implications for Its Membrane-Perforating Function", JOURNAL OF MOLECULAR BIOLOGY, ACADEMIC PRESS, UNITED KINGDOM, vol. 413, no. 4, 13 September 2011 (2011-09-13), pages 804-814, XP028326149, ISSN: 0022-2836, DOI: 10.1016/J.JMB.2011.09.021 [retrieved on 2011-09-19] cited in the application page 804, column 2, paragraph 1 - page 805, column 2, last paragraph; figure 1 -----	1-23
Y	WO 2010/003065 A2 (ATHENIX CORP [US]; SAMPSON KIMBERLY S [US]; AGARWAL SHRUTI [US]; CAMPB) 7 January 2010 (2010-01-07) claims; examples -----	1-23
Y	WO 2013/028563 A2 (SYNTHETIC GENOMICS INC [US]; GRANDLIC CHRISTOPHER J [US]; RICHARDSON T) 28 February 2013 (2013-02-28) claims; examples; sequences 53,60 & DATABASE Geneseq [Online] 25 April 2013 (2013-04-25), "Bacillus sp. biotoxin protein, SEQ ID 60.", retrieved from EBI accession no. GSP:BAL59112 Database accession no. BAL59112 sequence & DATABASE Geneseq [Online] 25 April 2013 (2013-04-25), "Bacillus sp. biotoxin encoding DNA, SEQ ID 53.", retrieved from EBI accession no. GSN:BAL59105 Database accession no. BAL59105 sequence -----	1-23

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2016/033126

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2016/033126

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		US 2013227743 A1	29-08-2013
		WO 2013028563 A2	28-02-2013

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-23(partially)

relating to the polypeptide of SEQ ID NO:96, the
corresponding polynucleotide sequence and products and
methods comprising said sequences

2-13. claims: 1-23(partially)

as invention 1 but relating to the polypeptides of SEQ ID
NOs:79, 117, 316, 56, 57, 167, 276, 267, 109, 121, 75 or 22
