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— of inventorship (Rule 4.17(iv))

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— 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))

[Continued on next page]

(54) Title: INSECTICIDAL GENES AND METHODS OF USE

APG00422 (Seq ID 177) MNEVLNRSG QHSHSKRAL RRRSPVVF I NTTEEAQF QEIVAIIDD YLTQALTA 60
APG00290 variant (Seq ID 307) MNEVLNRSG QHSHSKRAL RRRSPVVF I NTTEEAQF QEIVAIIDD YLTQALTA 60
APG00647 variant (Seq ID 372) MNEVLNRSG QHSHSKRAL RRRSPVVF I NTTEEAQF QEIVAIIDD YLTQALTA 60
APG00698 variant (Seq ID 374) MNEVLNRSG QHSHSKRAL RRRSPVVF I NTTEEAQF QEIVAIIDD YLTQALTA 60
APG00736 variant (Seq ID 396) MNEVLNRSG QHSHSKRAL RRRSPVVF I NTTEEAQF QEIVAIIDD YLTQALTA 60

APG00422 (Seq ID 177) LFNGAIDNTT GRFIPGKARE LIANYNESLD SRSQYKIGI FNTHOTTLTQ QNSAVSAMIN 120
APG00290 variant (Seq ID 307) LFNGAIDNTT GRFIPGKARE LIANYNESLD SRSQYKIGI FNTHOTTLTQ QNSAVSAMIN 120
APG00647 variant (Seq ID 372) LFNGAIDNTT GRFIPGKARE LIANYNESLD SRSQYKIGI FNTHOTTLTQ QNSAVSAMIN 120
APG00698 variant (Seq ID 374) LFNGAIDNTT GRFIPGKARE LIANYNESLD SRSQYKIGI FNTHOTTLTQ QNSAVSAMIN 120
APG00736 variant (Seq ID 396) LFNGAIDNTT GRFIPGKARE LIANYNESLD SRSQYKIGI FNTHOTTLTQ QNSAVSAMIN 120

APG00422 (Seq ID 177) GJLETLKVM GVALGASSV QNTAAVTDFA TNLDEQSGDA WIFWEKTSN KTTYSAILF 180
APG00290 variant (Seq ID 307) GJLETLKVM GVALGASSV QNTAAVTDFA TNLDEQSGDA WIFWEKTSN KTTYSAILF 180
APG00647 variant (Seq ID 372) GJLETLKVM GVALGASSV QNTAAVTDFA TNLDEQSGDA WIFWEKTSN KTTYSAILF 180
APG00698 variant (Seq ID 374) GJLETLKVM GVALGASSV QNTAAVTDFA TNLDEQSGDA WIFWEKTSN KTTYSAILF 180
APG00736 variant (Seq ID 396) GJLETLKVM GVALGASSV QNTAAVTDFA TNLDEQSGDA WIFWEKTSN KTTYSAILF 180

APG00422 (Seq ID 177) AFQDSSTGKL MFALPMSLEI EVDVSYERVL FITVEDKETV SVKLDTMKVG QLLFPKSPGA 240
APG00290 variant (Seq ID 307) AFQDSSTGKL MFALPMSLEI EVDVSYERVL FITVEDKETV SVKLDTMKVG QLLFPKSPGA 240
APG00647 variant (Seq ID 372) AFQDSSTGKL MFALPMSLEI EVDVSYERVL FITVEDKETV SVKLDTMKVG QLLFPKSPGA 240
APG00698 variant (Seq ID 374) AFQDSSTGKL MFALPMSLEI EVDVSYERVL FITVEDKETV SVKLDTMKVG QLLFPKSPGA 240
APG00736 variant (Seq ID 396) AFQDSSTGKL MFALPMSLEI EVDVSYERVL FITVEDKETV SVKLDTMKVG QLLFPKSPGA 240

APG00422 (Seq ID 177) NALQARRLG TRSGSADLLA APSPITVV TNWAKTTTFA TAATGYTTE HPLVQVMA 300
APG00290 variant (Seq ID 307) NALQARRLG TRSGSADLLA APSPITVV TNWAKTTTFA TAATGYTTE HPLVQVMA 300
APG00647 variant (Seq ID 372) NALQARRLG TRSGSADLLA APSPITVV TNWAKTTTFA TAATGYTTE HPLVQVMA 300
APG00698 variant (Seq ID 374) NALQARRLG TRSGSADLLA APSPITVV TNWAKTTTFA TAATGYTTE HPLVQVMA 300
APG00736 variant (Seq ID 396) NALQARRLG TRSGSADLLA APSPITVV TNWAKTTTFA TAATGYTTE HPLVQVMA 300

APG00422 (Seq ID 177) PNVNPLVDG NOYLVSFTLN GVRQTGFL NGTLPDGLW FVSI 344
APG00290 variant (Seq ID 307) PNVNPLVDG NOYLVSFTLN GVRQTGFL NGTLPDGLW FVSI 344
APG00647 variant (Seq ID 372) PNVNPLVDG NOYLVSFTLN GVRQTGFL NGTLPDGLW FVSI 344
APG00698 variant (Seq ID 374) PNVNPLVDG NOYLVSFTLN GVRQTGFL NGTLPDGLW FVSI 344
APG00736 variant (Seq ID 396) PNVNPLVDG NOYLVSFTLN GVRQTGFL NGTLPDGLW FVSI 344

Figure 1

(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.



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

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

22 December 2016

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2016/027710

A. CLASSIFICATION OF SUBJECT MATTER
INV. C12N15/82 A01N63/00 C07K14/195 C07K14/325
ADD.

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)
C07K C12N A01N

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, Sequence Search, EMBASE, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DATABASE Geneseq [Online] 15 June 2007 (2007-06-15), "Delta-endotoxin 201T6.", XP002758551, retrieved from EBI accession no. GSP:AAR70754 Database accession no. AAR70754 the whole document -& WO 95/02693 A1 (MYCOGEN CORP [US]) 26 January 1995 (1995-01-26) abstract; claims 2 and 7; pages 2, 3 and 6; Seq. ID No. 6-9; Table 1; Examples 1-7 ----- -/--	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

20 October 2016

Date of mailing of the international search report

22/11/2016

Name and mailing address of the ISA/

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Kurz, Birgit

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2016/027710

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	SARVJEET KAUR: "Molecular approaches for identification and construction of novel insecticidal genes for crop protection", WORLD JOURNAL OF MICROBIOLOGY AND BIOTECHNOLOGY, KLUWER ACADEMIC PUBLISHERS, DO, vol. 22, no. 3, 1 March 2006 (2006-03-01), pages 233-253, XP019271780, ISSN: 1573-0972 abstract; pages 233-237, 240; Figure 1 -----	1-23
A	A Guerchicoff ET AL: "Identification and characterization of a previously undescribed cyt gene in Bacillus thuringiensis subsp. israelensis", Applied and Environmental Microbiology, 1 July 1997 (1997-07-01), pages 2716-2721, XP055278816, UNITED STATES Retrieved from the Internet: URL:http://aem.asm.org/content/63/7/2716.full.pdf abstract; pages 2716 and 2719; Figures 1 and 2 -----	1-23
A	DATABASE UniProt [Online] 15 May 2007 (2007-05-15), "SubName: Full=Cytolytic delta-endotoxin (Insecticidal protein) {ECO:0000313 EMBL:AB090193.1}";", XP002763181, retrieved from EBI accession no. UNIPROT:A4SMS1 Database accession no. A4SMS1 the whole document -----	1-23
A	DATABASE UniProt [Online] 11 June 2014 (2014-06-11), "SubName: Full=Putative cytolytic delta-endotoxin {ECO:0000313 EMBL:GAJ51067.1}";", XP002763182, retrieved from EBI accession no. UNIPROT:A0A023EB63 Database accession no. A0A023EB63 the whole document -----	1-23

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2016/027710

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

Information on patent family members

International application No

PCT/US2016/027710

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9502693	A1	26-01-1995	
		AU 698511 B2	29-10-1998
		AU 7332594 A	13-02-1995
		CA 2166711 A1	26-01-1995
		EP 0708830 A1	01-05-1996
		JP H09500275 A	14-01-1997
		NZ 269438 A	19-12-1997
		US 5436002 A	25-07-1995
		US 5635480 A	03-06-1997
		US 5888976 A	30-03-1999
		US 6150165 A	21-11-2000
		WO 9502693 A1	26-01-1995

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)

Recombinant polypeptide having pesticidal activity and comprising Seq. ID No. 177, as well as sequences 90% identical thereto. Compositions, host cells and plants comprising the peptide, nucleic acid encoding it and methods of use. As Seq. ID No. 307 shows 94.2% sequence identity to Seq. ID No. 177, it also forms part of the scope of invention 1.

2-43. claims: 1-23(partially)

Recombinant polypeptide having pesticidal activity and comprising Seq. ID No. 372-313, as well as sequences 90% identical thereto. Compositions, host cells and plants comprising the peptide, nucleic acid encoding it and methods of use. Numbering of the inventions is based on their order in claim 1, i.e. invention 2 is directed to Seq. ID No. 372, invention 3 to Seq. ID No. 374, ..., invention 44 to Seq. ID No. 313.
