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(71) Applicant (for all designated States except US):

ATHENIX CORP. [US/US]; 3500 Paramount Parkway,
Morrisville, NC 27560 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **SAMPSON, Kim-berly, S.** [US/US]; 5505 Frenchman's Creek Dr., Durham, NC 27713 (US). **TOMSO, Daniel, John** [US/US]; 114 Vista Del Rio Dr., Bahama, NC 27503 (US).

(74) Agent: **SHAW MCBEE, Susan, E.**; Baker Donelson

Bearman, Caldwell & Berkowitz, 920 Massachusetts Avenue, N.w., Suite 900, Washington, DC 20007 (US).

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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:

1 December 2011

(54) Title: AXMI218, AXMI219, AXMI220, AXMI226, AXMI227, AXMI228, AXMI229, AXMI230, AND AXMI231 DELTA-ENDOTOXIN GENES AND METHODS FOR THEIR USE

(57) Abstract: Compositions and methods for conferring pesticidal activity to bacteria, plants, plant cells, tissues and seeds are provided. Compositions comprising a coding sequence for a toxin polypeptide are provided. The coding sequences can be used in DNA constructs or expression cassettes for transformation and expression in plants and bacteria. Compositions also comprise transformed bacteria, plants, plant cells, tissues, and seeds. In particular, isolated toxin nucleic acid molecules are provided. Additionally, amino acid sequences corresponding to the polynucleotides are encompassed, and antibodies specifically binding to those amino acid sequences. In particular, the present invention provides for isolated nucleic acid molecules comprising nucleotide sequences encoding the amino acid sequence shown in SEQ ID NO: 13-30, or the nucleotide sequence set forth in SEQ ID NO: 1-12, as well as variants and fragments thereof.



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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER INV. C12N15/32 C12N5/14 C12N1/20 A01H5/00 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		
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 practical, search terms used) EPO-Internal, Sequence Search, WPI Data, BIOSIS		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2006/083891 A2 (ATHENIX CORP [US]; CAROZZI NADINE [US]; HARGISS TRACY [US]; KOZIEL MIC) 10 August 2006 (2006-08-10) The Axmi018 sequence with SEQ ID NO: 2 -----	1-25
X	WO 2007/147029 A2 (ATHENIX CORP [US]; CAROZZI NADINE [US]; DUCK NICHOLAS [US]; KAHN THEOD) 21 December 2007 (2007-12-21) The Amxi 049 with SEQ ID NO:35 -----	1-25
X	US 2004/016020 A1 (ARNAUT GRETA [BE] ET AL) 22 January 2004 (2004-01-22) paragraph [0004] ----- -/-	1-25
☒ 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 document 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	
12 October 2011	19/10/2011	
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Cupido, Marinus	

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International application No

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE MAAGD R A ET AL: "How Bacillus thuringiensis has evolved specific toxins to colonize the insect world", TRENDS IN GENETICS, ELSEVIER SCIENCE PUBLISHERS B.V. AMSTERDAM, NL, vol. 17, no. 4, 1 April 2001 (2001-04-01), pages 193-199, XP004231927, ISSN: 0168-9525, DOI: 10.1016/S0168-9525(01)02237-5 cited in the application the whole document -----	1-25

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2011/025171

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2006083891 A2	10-08-2006	AU 2006210880 A1 BR PI0606803 A2 CA 2595901 A1 EP 1844064 A2 NZ 560935 A WO 2006083891 A2	10-08-2006 14-07-2009 10-08-2006 17-10-2007 26-06-2009 10-08-2006
WO 2007147029 A2	21-12-2007	AR 061467 A1 AU 2007260716 A1 CN 101501066 A EP 2032598 A2 US 2007294787 A1 US 2009181116 A1 WO 2007147029 A2	27-08-2008 21-12-2007 05-08-2009 11-03-2009 20-12-2007 16-07-2009 21-12-2007
US 2004016020 A1	22-01-2004	US 2004016020 A1 US 2008193417 A1	22-01-2004 14-08-2008

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-25(partially)

relating to the nucleic acid sequence of SEQ ID NO: 3 (Axmi220), the associated synthetic sequence with SEQ ID NO:12, and the corresponding polypeptide sequences with SEQ ID NO: 17 or 28, and products and methods employing said sequences.

2. claims: 1-25(partially)

relating to the nucleic acid sequence of SEQ ID NO:1 (Axmi218), and the corresponding polypeptide sequences with SEQ ID NO: 13, or 14, and products and methods employing said sequences.

3. claims: 1-25(partially)

relating to the nucleic acid sequence of SEQ ID NO: 2 (Axmi219), the associated synthetic sequence with SEQ ID NO:11, and the corresponding polypeptide sequences with SEQ ID NO: 15 or 16, and products and methods employing said sequences.

4. claims: 1-25(partially)

relating to the nucleic acid sequence of SEQ ID NO: 4 (Axmi226), and the corresponding polypeptide sequences with SEQ ID NO: 19 or 20, and products and methods employing said sequences.

5. claims: 1-25(partially)

relating to the nucleic acid sequence of SEQ ID NO: 5 (Axmi227), and the corresponding polypeptide sequences with SEQ ID NO: 21, or 22, and products and methods employing said sequences.

6. claims: 1-25(partially)

relating to the nucleic acid sequence of SEQ ID NO: 6 (Axmi228), and the corresponding polypeptide sequences with SEQ ID NO: 23, or 24, and products and methods employing said sequences.

7. claims: 1-25(partially)

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

relating to the nucleic acid sequence of SEQ ID NO: 7 (Axmi229), and the corresponding polypeptide sequences with SEQ ID NO: 25, or 26, and products and methods employing said sequences.

8. claims: 1-25(partially)

relating to the nucleic acid sequence of SEQ ID NO: 8 (Axmi230), and the corresponding polypeptide sequences with SEQ ID NO: 27 or 28, and products and methods employing said sequences.

9. claims: 1-25(partially)

relating to the nucleic acid sequence of SEQ ID NO: 9 (Axmi231), and the corresponding polypeptide sequences with SEQ ID NO: 29 or 30, and products and methods employing said sequences.

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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 and necessary to the claimed invention, the international search was carried out on the basis of:
 - a. (means)

☐

 on paper
 - ☒

 in electronic form
 - b. (time)

☒

 in the international application as filed
 - ☐

 together with the international application in electronic form
 - ☐

 subsequently to this Authority for the purpose of search
2.

☐

 In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
3. Additional comments:

INTERNATIONAL SEARCH REPORT

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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.:
1-25(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.