

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
11 June 2009 (11.06.2009)

(10) International Publication Number
WO 2009/073069 A3

PCT

(51) International Patent Classification:
C12N 15/82 (2006.01) *A01H 5/10* (2006.01)
A01H 5/00 (2006.01)

(21) International Application Number:
PCT/US2008/012175

(22) International Filing Date:
27 October 2008 (27.10.2008)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/190,041 31 October 2007 (31.10.2007) US

(71) Applicant (for all designated States except US): **MON-SANTO TECHNOLOGY, LLC** [US/US]; 800 North Lindbergh Boulevard, St. Louis, MO 63167 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **BOHANNON, Maria, C.** [US/US]; Monsanto Technology, Llc, 800 North Lindberg Boulevard, St. Louis, MO 63167 (US). **COFFIN, Marie** [US/US]; Monsanto Technology, Llc, 800 North Lindberg Boulevard, St. Louis, MO 63167 (US). **SHAIKH, Faten** [US/US]; Monsanto Technology, Llc, 800 North Lindberg Boulevard, St. Louis, MO 63167 (US). **WINSLOW, Amanda** [US/US]; Monsanto Technology, Llc, 800 North Lindberg Boulevard, St. Louis, MO 63167 (US).

(74) Agent: **WUELLNER, Gail**; Monsanto Technology, Llc, 800 North Lindbergh Boulevard, Mail Zone E2na, St. Louis, MO 63167 (US).

(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, BR, BW, BY, BZ, CA, CH, 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, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, 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, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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:
20 August 2009

(54) Title: GENES AND USES FOR PLANT ENHANCEMENT

(57) Abstract: Transgenic seed for crops with enhanced agronomic traits are provided by trait-improving recombinant DNA in the nucleus of cells of the seed where plants grown from such transgenic seed exhibit one or more enhanced traits as compared to a control plant. Of particular interest are transgenic plants that have increased yield. The present invention also provides recombinant DNA molecules for expression of a protein, and recombinant DNA molecules for suppression of a protein.



WO 2009/073069 A3

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2008/012175

A. CLASSIFICATION OF SUBJECT MATTER
 INV. C12N15/82 A01H5/00 A01H5/10

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)

C12N C07K A01H

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DATABASE EMBL [Online] 25 May 2000 (2000-05-25), NAKAMURA Y. ET AL.: "Arabidopsis thaliana genomic DNA, chromosome 5, P1 clone:MPH15." XP002514341 retrieved from EBI accession no. EMBL:AP002032 Database accession no. AP002032 see nucleotides 41,180 to 41,880 abstract -----	1-3,6-10
X	US 2007/214517 A1 (ALEXANDROV NICKOLAI [US] ET AL) 13 September 2007 (2007-09-13) see SEQ ID NO: 105313 and 105315 the whole document ----- -/--	1-14

☒ 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

13 February 2009

Date of mailing of the international search report

16/06/2009

Name and mailing address of the ISA/

European Patent Office, P.B. 5618 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040,
 Fax: (+31-70) 340-3016

Authorized officer

Oderwald, Harald

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2008/012175

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2004/031349 A (MENDEL BIOTECHNOLOGY INC [US]; JIANG CAI-ZHONG [US]; HEARD JACQUELINE) 15 April 2004 (2004-04-15) see SEQ ID NO: 599 and 600 the whole document -----	1-14
A	WO 2004/092398 A (BASF PLANT SCIENCE GMBH [DE]; PUZIO PIOTR [DE]; CHARDONNENS AGNES [DE]) 28 October 2004 (2004-10-28) the whole document -----	1-14

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2008/012175

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.:
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.:

see annex

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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

Invention 1: claims 1-14 partially

A plant cell nucleus comprising a protein coding DNA encoding a protein having an amino acid sequence comprising a Pfam domain module zf-CCCH::KH_1::zf-CCCH (SEQ ID NO: 137). Transgenic plant cells, plants, seeds and pollen grains; and methods for manufacturing seeds and of producing hybrid corn seeds comprising said DNA.

Inventions 2-4701: claims 1-14 partially

same as invention 1, but comprising an amino acid sequence selected from SEQ ID NO: 115 through 4815, i.e. invention 2 is limited to SEQ ID NO: 115, ..., and invention 4701 is limited to SEQ ID NO: 4815.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2008/012175

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2007214517 A1	13-09-2007	US 2006150283 A1	06-07-2006
WO 2004031349 A	15-04-2004	AU 2003285856 A1	23-04-2004
		BR 0314389 A	12-07-2005
		EP 1546336 A2	29-06-2005
WO 2004092398 A	28-10-2004	AU 2004230490 A1	28-10-2004
		BR PI0409442 A	18-04-2006
		CA 2521754 A1	28-10-2004