

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
20 February 2003 (20.02.2003)

PCT

(10) International Publication Number
WO 2003/013227 A3

(51) International Patent Classification⁷: C12N 15/82,
A01H 5/00

(US). YU, Guo-Liang [US/US]; 242 Gravett Drive, Berkeley, CA 94705-1531 (US). BROUN, Pierre, E. [FR/US]; 921 Sunnybrae Boulevard, San Mateo, CA 94402 (US).

(21) International Application Number:
PCT/US2002/025805

(74) Agents: WARD, Michael, R. et al.; Morrison & Foerster LLP, 425 Market Street, San Francisco, CA 94105-2482 (US).

(22) International Filing Date: 9 August 2002 (09.08.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/310,847 9 August 2001 (09.08.2001) US
60/336,049 19 November 2001 (19.11.2001) US
60/338,692 11 December 2001 (11.12.2001) US
10/171,468 14 June 2002 (14.06.2002) US

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.

(71) Applicant (*for all designated States except US*): MENDEL BIOTECHNOLOGY, INC. [US/US]; 21375 Cabot Boulevard, Hayward, CA 94545 (US).

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): RATCLIFFE, Oliver [GB/US]; 814 East 21st Street, Oakland, CA 94606 (US). RIECHMANN, Jose, Luis [ES/US]; 518 S. El Molino Avenue, #308, Pasadena, CA 91101 (US). ADAM, Luc, J. [CA/US]; 25800 Industrial Boulevard, Apt. L403, Hayward, CA 94545 (US). DUBELL, Arnold, N. [US/US]; 14857 Wake Avenue, San Leandro, CA 94578 (US). HEARD, Jacqueline, E. [US/US]; 810 Guilford Avenue, San Mateo, CA 94402 (US). PILGRIM, Marsha, L. [US/US]; 1368 Patrick Henry Drive, Phoenixville, PA 19460 (US). JIANG, Cai-Zhong [US/US]; 34495 Heathrow Terrace, Fremont, CA 94555 (US). REUBER, T., Lynne [US/US]; 1115 S. Grant Street, San Mateo, CA 94402 (US). CREELMAN, Robert, A. [US/US]; 2801 Jennifer Drive, Castro Valley, CA 94546 (US). PINEDA, Omaira [CO/US]; 4060 9th Place, Vero Beach, FL 32960

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:
16 September 2004

(15) Information about Correction:

Previous Correction:
see PCT Gazette No. 27/2003 of 3 July 2003, Section II

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: YIELD-RELATED POLYNUCLEOTIDES AND POLYPEPTIDES IN PLANTS

(57) Abstract: The invention relates to plant transcription factor polypeptides, polynucleotides that encode them, homologs from a variety of plant species, and methods of using the polynucleotides and polypeptides to produce transgenic plants having advantageous properties compared to a reference plant. Sequence information related to these polynucleotides and polypeptides can also be used in bioinformatic search methods and is also disclosed.



WO 2003/013227 A3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US02/25805

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : C12N 15/82; A01H 5/00
 US CL : 800/298, 290, 278, 287; 435/468

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)
 U.S. : 800/298, 290, 278, 287; 435/468

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)
 WEST, STN (including Agricola, Biosis, Caba, Caplus) DNA encoding SEQ ID NO:860

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 01/26459 A2 (MENDEL BIOTECHNOLOGY, INC.) 19 April 2001 (19.04.2001), pages 20-29.	1-6, 42, 45

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	"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
"E" earlier application or patent published on or after the international filing date	"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
"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)	"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
"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	"&" document member of the same patent family

Date of the actual completion of the international search 04 June 2004 (04.06.2004)	Date of mailing of the international search report 06 JUL 2004
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 872-9306	Authorized officer Stuart F. Baum <i>J. Roberts for</i> Telephone No. (571) 272-1600

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US02/25805

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claim Nos.: 43 and 44
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:
Claim 43 is not listed. Claim 44 is duplicated.

3. Claim Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation 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 fee, this Authority did not invite payment of any additional fee.
 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.: 1-6, 42 and 45 including DNA encoding SEQ ID NO:860
- Remark on Protest The additional search fees were accompanied by the applicant's protest.
 No protest accompanied the payment of additional search fees.

BOX II. 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.

Group I, claim(s) 1-5, 6, 42, 45, drawn to a transgenic plant comprising a recombinant polynucleotide encoding the polypeptide of SEQ ID NO:860 and method of using the transgenic plant in a breeding program.

Group II, claim(s) 1-5, 7, 42, 45, drawn to a transgenic plant comprising a recombinant polynucleotide encoding the polypeptide of SEQ ID NO:802 and method of using the transgenic plant in a breeding program.

Group III, claim(s) 1-5, 8, 42, 45-47, 59-69, drawn to an isolated or recombinant polynucleotide comprising a nucleotide sequence encoding a polypeptide of SEQ ID NO:240 and a transgenic plant comprising said recombinant polynucleotide and method of using the transgenic plant in a breeding program.

Group IV, claim(s) 1-5, 9, 42, 45, 48, 59-69, drawn to an isolated or recombinant polynucleotide comprising a nucleotide sequence encoding a polypeptide of SEQ ID NO:274 and a transgenic plant comprising said recombinant polynucleotide and method of using the transgenic plant in a breeding program.

Group V, claim(s) 1-5, 10, 42, 45, 49, 59-69, drawn to an isolated or recombinant polynucleotide comprising a nucleotide sequence encoding a polypeptide of SEQ ID NO:558 and a transgenic plant comprising said recombinant polynucleotide and method of using the transgenic plant in a breeding program.

Group VI, claim(s) 1-5, 11, 42, 45, drawn to a transgenic plant comprising a recombinant polynucleotide encoding the polypeptide of SEQ ID NO:24 and method of using the transgenic plant in a breeding program.

Group VII, claim(s) 1-5, 12, 42, 45, drawn to a transgenic plant comprising a recombinant polynucleotide encoding the polypeptide of SEQ ID NO:1120 and method of using the transgenic plant in a breeding program.

Group VIII, claim(s) 1-5, 13, 42, 45, drawn to a transgenic plant comprising a recombinant polynucleotide encoding the polypeptide of SEQ ID NO:44 and method of using the transgenic plant in a breeding program.

Group IX, claim(s) 1-5, 14, 42, 45, drawn to a transgenic plant comprising a recombinant polynucleotide encoding the polypeptide of SEQ ID NO:460 and method of using the transgenic plant in a breeding program.

Group X, claim(s) 1-5, 15, 42, 45, 50, 59-69, drawn to an isolated or recombinant polynucleotide comprising a nucleotide sequence encoding a polypeptide of SEQ ID NO:286 and a transgenic plant comprising said recombinant polynucleotide and method of using the transgenic plant in a breeding program.

Group XI, claim(s) 1-5, 16, 42, 45, drawn to a transgenic plant comprising a recombinant polynucleotide encoding the polypeptide of SEQ ID NO:120 and method of using the transgenic plant in a breeding program.

Group XII, claim(s) 1-5, 17, 42, 45, drawn to a transgenic plant comprising a recombinant polynucleotide encoding the polypeptide of SEQ ID NO:130 and method of using the transgenic plant in a breeding program.

Group XIII, claim(s) 1-5, 18, 42, 45, drawn to a transgenic plant comprising a recombinant polynucleotide encoding the polypeptide of SEQ ID NO:134 and method of using the transgenic plant in a breeding program.

Group XIV, claim(s) 1-5, 19, 42, 45, 51, 59-69, drawn to an isolated or recombinant polynucleotide comprising a nucleotide sequence encoding a polypeptide of SEQ ID NO:698 and a transgenic plant comprising said recombinant polynucleotide and method of using the transgenic plant in a breeding program.

INTERNATIONAL SEARCH REPORT

PCT/US02/25805

Group XV, claim(s) 1-5, 20, 42, 45, 52, 59-69, drawn to an isolated or recombinant polynucleotide comprising a nucleotide sequence encoding a polypeptide of SEQ ID NO:832 and a transgenic plant comprising said recombinant polynucleotide and method of using the transgenic plant in a breeding program.

Group XVI, claim(s) 1-5, 21, 42, 45, drawn to a transgenic plant comprising a recombinant polynucleotide encoding the polypeptide of SEQ ID NO:580 and method of using the transgenic plant in a breeding program.

Group XVII, claim(s) 1-5, 22, 42, 45, drawn to a transgenic plant comprising a recombinant polynucleotide encoding the polypeptide of SEQ ID NO:612 and method of using the transgenic plant in a breeding program.

Group XVIII, claim(s) 1-5, 23, 42, 45, drawn to a transgenic plant comprising a recombinant polynucleotide encoding the polypeptide of SEQ ID NO:48 and method of using the transgenic plant in a breeding program.

Group XIX, claim(s) 1-5, 24, 42, 45, drawn to a transgenic plant comprising a recombinant polynucleotide encoding the polypeptide of SEQ ID NO:859 and method of using the transgenic plant in a breeding program.

Group XX, claim(s) 1-5, 25, 42, 45, drawn to a transgenic plant comprising a recombinant polynucleotide encoding the polypeptide of SEQ ID NO:801 and method of using the transgenic plant in a breeding program.

Group XXI, claim(s) 1-5, 26, 42, 45, 53, 59-69, drawn to an isolated or recombinant polynucleotide comprising a nucleotide sequence encoding a polypeptide of SEQ ID NO:239 and a transgenic plant comprising said recombinant polynucleotide and method of using the transgenic plant in a breeding program.

Group XXII, claim(s) 1-5, 27, 42, 45, 54, 59-69, drawn to an isolated or recombinant polynucleotide comprising a nucleotide sequence encoding a polypeptide of SEQ ID NO:273 and a transgenic plant comprising said recombinant polynucleotide and method of using the transgenic plant in a breeding program.

Group XXIII, claim(s) 1-5, 28, 42, 45, 55, 59-69, drawn to an isolated or recombinant polynucleotide comprising a nucleotide sequence encoding a polypeptide of SEQ ID NO:557 and a transgenic plant comprising said recombinant polynucleotide and method of using the transgenic plant in a breeding program.

Group XXIV, claim(s) 1-5, 29, 42, 45, drawn to a transgenic plant comprising a recombinant polynucleotide encoding the polypeptide of SEQ ID NO:23 and method of using the transgenic plant in a breeding program.

Group XXV, claim(s) 1-5, 30, 42, 45, drawn to a transgenic plant comprising a recombinant polynucleotide encoding the polypeptide of SEQ ID NO:1119 and method of using the transgenic plant in a breeding program.

Group XXVI, claim(s) 1-5, 31, 42, 45, drawn to a transgenic plant comprising a recombinant polynucleotide encoding the polypeptide of SEQ ID NO:43 and method of using the transgenic plant in a breeding program.

Group XXVII, claim(s) 1-5, 32, 42, 45, drawn to a transgenic plant comprising a recombinant polynucleotide encoding the polypeptide of SEQ ID NO:459 and method of using the transgenic plant in a breeding program.

Group XXVIII, claim(s) 1-5, 33, 42, 45, 56, 59-69, drawn to an isolated or recombinant polynucleotide comprising a nucleotide sequence encoding a polypeptide of SEQ ID NO:285 and a transgenic plant comprising said recombinant polynucleotide and method of using the transgenic plant in a breeding program.

Group XXIX, claim(s) 1-5, 34, 42, 45, drawn to a transgenic plant comprising a recombinant polynucleotide encoding the polypeptide of SEQ ID NO:119 and method of using the transgenic plant in a breeding program.

Group XXX, claim(s) 1-5, 35, 42, 45, drawn to a transgenic plant comprising a recombinant polynucleotide encoding the polypeptide of SEQ ID NO:129 and method of using the transgenic plant in a breeding program.

Group XXXI, claim(s) 1-5, 36, 42, 45, drawn to a transgenic plant comprising a recombinant polynucleotide encoding the polypeptide of SEQ ID NO:133 and method of using the transgenic plant in a breeding program.

Group XXXII, claim(s) 1-5, 37, 42, 45, 57, 59-69, drawn to an isolated or recombinant polynucleotide comprising a nucleotide sequence encoding a polypeptide of SEQ ID NO:697 and a transgenic plant comprising said recombinant polynucleotide and method of using the transgenic plant in a breeding program.

INTERNATIONAL SEARCH REPORT

PCT/US02/25805

Group XXXIII, claim(s) 1-5, 38, 42, 45, 58-69, drawn to an isolated or recombinant polynucleotide comprising a nucleotide sequence encoding a polypeptide of SEQ ID NO:831 and a transgenic plant comprising said recombinant polynucleotide and method of using the transgenic plant in a breeding program.

Group XXXIV, claim(s) 1-5, 39, 42, 45, drawn to a transgenic plant comprising a recombinant polynucleotide encoding the polypeptide of SEQ ID NO:579 and method of using the transgenic plant in a breeding program.

Group XXXV, claim(s) 1-5, 40, 42, 45, drawn to a transgenic plant comprising a recombinant polynucleotide encoding the polypeptide of SEQ ID NO:611 and method of using the transgenic plant in a breeding program.

Group XXXVI, claim(s) 1-5, 41-42, 45, drawn to a transgenic plant comprising a recombinant polynucleotide encoding the polypeptide of SEQ ID NO:47 and method of using the transgenic plant in a breeding program.

The inventions listed as Groups I-XXXVI do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: Applicants' own admitted statement of the prior art "Expression of genes which encode transcription factors that modify expression of endogenous genes, polynucleotides and proteins are well known in the art" (page 19, 1st sentence of 2nd paragraph) and Applicants' genes lack a common structure.

In addition, the claims are not linked by a single technical feature because they are each drawn to products and processes not shared by the other. The technical feature of the isolated nucleic acid of Group I is not shared by any of the other isolated nucleic acids of Groups II-XXXVI.

The technical feature of the isolated nucleic acid of Group II is not shared by any of the other isolated nucleic acids of Groups III-XXXVI.

The technical feature of the isolated nucleic acids of Groups III-XXXVI is not shared by any of the other isolated nucleic acids of Groups IV-XXXVI.