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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
23 February 2006 (23.02.2006)

PCT

(10) International Publication Number
WO 2006/018432 A3

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

(21) International Application Number:
PCT/EP2005/054034

(22) International Filing Date: 16 August 2005 (16.08.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

04103926.4	16 August 2004 (16.08.2004)	EP
60/602,680	19 August 2004 (19.08.2004)	US

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, 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, HU, IE, IS, IT, LT, LU, LV, MC, NL, 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*
— *with sequence listing part of description published separately in electronic form and available upon request from the International Bureau*

(88) Date of publication of the international search report:
27 July 2006

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: PLANTS HAVING IMPROVED GROWTH CHARACTERISTICS AND METHOD FOR MAKING THE SAME

(57) Abstract: The present invention concerns a method for improving the growth characteristics of plants by increasing activity in a plant of an RNA-binding protein or a homologue thereof, wherein said RNA-binding protein or homologue thereof is either: (i) a polypeptide having RNA-binding activity and comprising either 2 or 3 RNA 10 recognition motifs (RRMs) and a motif having at least 75% sequence identity to motif I: PIYEAAVVALPVVVKERLVRILRLGIATRYD and/or a motif having at least 50% sequence identity to motif II: RFDPFTGEPYKFDP; or (ii) an RBP1 polypeptide or homologue thereof having (a) RNA-binding activity; (b) two RRM domains, (c) the following two motifs: (i) KIFVGGL; and (ii) 15 RPRGFGF, allowing for up to three amino acid substitutions and any conservative change in the motifs; and (d) having at least 20% sequence identity to the amino acid represented by SEQ ID NO: 15. The invention also concerns to transgenic plants having introduced therein an RNA-binding protein-encoding nucleic acid or variant thereof, which plants have improved growth characteristics relative to corresponding wild type plants. The present invention also concerns constructs useful in the methods of the invention.

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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2005/054034

A. CLASSIFICATION OF SUBJECT MATTER
C12N15/82 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

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, CHEM ABS 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	MACKNIGHT RICHARD ET AL: "FCA, a gene controlling flowering time in arabidopsis, encodes a protein containing RNA-binding domains" CELL, CELL PRESS, CAMBRIDGE, NA, US, vol. 89, no. 5, 1997, pages 737-745, XP002213706 ISSN: 0092-8674	5-8,18, 28,31,32
Y	* summary, p. 738-739,741-742, figure 2,3 *	1-4,9, 10, 13-17, 19,21, 22,25, 26,30

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[X] Further documents are listed in the continuation of Box C.

[X] 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
11 January 2006	09. 03. 2006

Name and mailing address of the ISA/	Authorized officer
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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2005/054034

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 01/81599 A (UNIVERSIDAD POLITECNICA DE VALENCIA; VICENTE MEANA, OSCAR; ROLDAN MEDI) 1 November 2001 (2001-11-01) * abstract, p. 2:16-13:31, 23:10-26:24, 30:22-29, examples 3,8,9 , claims*	1-10, 13-19, 21,22, 25,26, 28,30-32
Y	WO 03/027299 A (CROPDESIGN NV; DE VEYLDER, LIEVEN; DE PINHO BAROCCO, ROSA, MARIA; MIRO) 3 April 2003 (2003-04-03) * p. 2:16-32, 9:14-11:31,36:9-32, table 1,2 *	1-10, 13-19, 21,22, 25,26, 28,30-32
A	US 6 018 106 A (HUNT ET AL) 25 January 2000 (2000-01-25) * abstract, p. 1:21-5:22, figure 1, claims *	
A	LORKOVIC Z J ET AL: "Genome analysis: RNA recognition motif (RRM) and K homology (KH) domain RNA-binding proteins from the flowering plant Arabidopsis thaliana" NUCLEIC ACIDS RESEARCH, OXFORD UNIVERSITY PRESS, SURREY, GB, vol. 30, no. 3, 1 February 2002 (2002-02-01), pages 623-635, XP002298057 ISSN: 0305-1048	
A	WO 03/085115 A (CROPDESIGN N.V; INZE, DIRK; BROEKAERT, WILLEM) 16 October 2003 (2003-10-16)	

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2005/054034

Box 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 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 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.:

1-10,13-19,21,22,25,26,28,30-32 (partially)

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ 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:

1. claims: 1-10,13-19,21,22,25,26,28,30-32 (partially)

A construct comprising an RNA-binding protein-encoding nucleic acid, said protein having 2 or 3 RRMs and a motif having at least 75% sequence identity to motif I: PYEAAVVALPVVVKERLVRILRLGIATRYD; and subject-matter relating thereto

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2. claims: 1-10,13-19,21,22,25,26,28,30-32 (partially)

A construct comprising an RNA-binding protein-encoding nucleic acid, said protein having 2 or 3 RRMs and a motif having at least 75% sequence identity to motif I: PYEAAVVALPVVVKERLVRILRLGIATRYD and a motif having at least 50% sequence identity to motif II: RFDPFTGEPYKFDF; and subject-matter relating thereto

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3. claims: 1-10,13-19,21,22,25,26,28,30-32 (partially)

A construct comprising an RNA-binding protein-encoding nucleic acid, said protein having 2 or 3 RRMs and a motif having at least 50% sequence identity to motif II: RFDPFTGEPYKFDF; and subject-matter relating thereto

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4. claims: 11,12,20,23,24,27,29 (complete), 1-10,13-18,25,28,30-32 (partially)

This group comprises a very high number of sub-inventions, each of them relating to structurally different RNA binding proteins. In this group the invention first mentioned in the claims corresponds to a construct comprising an RNA-binding protein RBP-1 -encoding nucleic acid, said RBP-1 having a) RNA binding activity b) 2 RRM domains c) motifs KIFVGGL and RPRGFGF d) minimum of 20% sequence identity to the amino acid of SEQ ID No 15; and subject-matter relating thereto

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5. claims: 33-35 (complete)

Use of an RNA-binding protein encoding gene or its variants in modifying growth characteristics of plants

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6. claim: 36 (complete)

Use of an RNA-binding protein or its variant as a molecular marker

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2005/054034

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 0181599 A	01-11-2001	AU 6588901 A	07-11-2001
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