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(54) Title: METHOD OF MERISTEM EXCISION AND TRANSFORMATION

(57) Abstract: The present invention relates to excision of explant material comprising meristematic tissue from cotton seeds. Methods for tissue preparation, storage, transformation, and selection or identification of transformed plants are disclosed, as are transformable meristem tissues and plants produced by such methods, and apparatus for tissue preparation.

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INTERNATIONAL SEARCH REPORT

International application No PCT/US2008/056411

A. CLASSIFICATION OF SUBJECT MATTER
 INV. C12N15/82 A01H5/00 B02B3/04 B02C4/08

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 AOIH B02B B02C

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 , WPI Data, BIOSIS, EMBASE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No
X	HUSSAIN SYED SARFRAZ ET AL: "Sonication assisted Agrobacterium mediated transformation (SAAT): An alternative method for cotton transformation" PAKISTAN JOURNAL OF BOTANY, vol. 39, no. 1, February 2007 (2007-02), pages 223-230, XP002488640 ISSN: 0556-3321 page 224 ----- -/--	1

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 document but 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	'&' document member of the same patent family
'P*' document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 19 September 2008	Date of mailing of the international search report 02/10/2008
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Name and mailing address of the ISA/ European Patent Office, P B 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx 31651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Bucka, Alexander
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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2008/056411

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category'	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No
X	<p>ARAGAO F J L ET AL: "Germ line genetic transformation in cotton (<i>Gossypium hirsutum</i> L.) by selection of transgenic meristematic cells with a herbicide molecule"</p> <p>PLANT SCIENCE, LIMERICK, IE, vol. 168, no. 5, 1 May 2005 (2005-05-01), pages 1227-1233, XP004807733 ISSN: 0168-9452 page 1228 page 1230</p>	1-31
A	<p>WO 99/20776 A (COTTON INC [US]) 29 April 1999 (1999-04-29) the whole document</p>	1-31
A	<p>LI X ET AL: "Improvement of cotton fiber quality by transforming the <i>acsA</i> and <i>acsB</i> genes into <i>Gossypium hirsutum</i> L. by means of vacuum infiltration"</p> <p>PLANT CELL REPORTS, vol. 22, no. 9, April 2004 (2004-04), pages 691-697, XP002488641 ISSN: 0721-7714 the whole document</p>	1-31
A	<p>CHAUDHARY B ET AL: "Slow desiccation leads to high-frequency shoot recovery from transformed somatic embryos of cotton (<i>Gossypium hirsutum</i> L. cv. Coker 310 FR)."</p> <p>PLANT CELL REPORTS, vol. 21, no. 10, June 2003 (2003-06), pages 955-960, XP002488642 ISSN: 0721-7714 the whole document</p>	1-31
A	<p>HARIS W ET AL.: "Transformation of Cotton (<i>Gossypium hirsutum</i> L.) With Insect Resistant Gene by Particle Bombardment and <i>Agrobacterium</i>"</p> <p>PAKISTAN JOURNAL OF BIOLOGICAL SCIENCES, vol. 1, no. 3, 1998, pages 170-174, XP002488862</p>	1-31

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INTERNATIONAL SEARCH REPORT

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	<p>HEWEZI T ET AL: "DEHYDRATING IMMATURE EMBRYO SPLIT APICES AND REHYDRATING WITH AGROBACTERIUM TUMEFACIENS: A NEW METHOD FOR GENETICALLY TRANSFORMING RECALCITRANT SUNFLOWER"</p> <p>PLANT MOLECULAR BIOLOGY REPORTER, NEW YORK, NY, US, vol. 20, no. 4, 1 December 2002 (2002-12-01), pages 335-345, XP009063925 ISSN: 0735-9640 page 336 - page 337</p> <p>-----</p>	1-31
A	<p>REN-GAO XUE ET AL: "A multi-needle-assisted transformation of soybean cotyledonary node cells"</p> <p>BIOTECHNOLOGY LETTERS, KLUWER ACADEMIC PUBLISHERS, DO, vol. 28, no. 19, 3 August 2006 (2006-08-03), pages 1551-1557, XP019391610 ISSN: 1573-6776 the whole document</p> <p>-----</p>	1-31
A	<p>WANG JINGXUE ET AL: "Maize (Zea mays) genetic transformation by co-cultivating germinating seeds with Agrobacterium tumefaciens"</p> <p>BIOTECHNOLOGY AND APPLIED BIOCHEMISTRY,, vol. 46, no. Part 1, 1 January 2007 (2007-01-01), pages 51-55, XP002488339 the whole document</p> <p>-----</p>	1-31
A	<p>PATNAIK D ET AL: "Agrobacterium-mediated transformation of mature embryos of Triticum aestivum and Triticum durum"</p> <p>CURRENT SCIENCE, XX, XX, vol. 91, no. 3, 10 August 2006 (2006-08-10), pages 307-317, XP003015991 ISSN: 0011-3891 the whole document</p> <p>-----</p>	1-31
X	<p>US 2005/005321 A1 (MARTINELL BRIAN J [US] ET AL) 6 January 2005 (2005-01-06) claims 37-63; figures 3-11</p> <p>-----</p>	32-38
A	<p>WO 99/02267 A (GRAEF DIETER OTTO [DE]) 21 January 1999 (1999-01-21) figures 2,3,5,6</p> <p>-----</p>	32-38
A	<p>EP 0 380 055 A (FERRO SERGIO) 1 August 1990 (1990-08-01) claims 1,2; figures 2,3</p> <p>-----</p>	32-38
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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2008/056411

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 439 399 A (ROBERT HENRY BROWN; W E MOULSDALE AND COMPANY LTD) 5 December 1935 (1935-12-05) figures 1-3 -----	32-38
A	GB 657 644 A (ROBERT CUTHBERTSON CARTER) 26 September 1951 (1951-09-26) figure 4 -----	32-38
A	US 6 422 137 B1 (NAKHEI-NE JAD MOHAMMAD [CA]) 23 July 2002 (2002-07-23) figure 2A -----	32-38

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 allsearchable 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.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- Additional search fees were accompanied by the applicants 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 PCTASA/ 210

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

1. claims: 1-31

A high-throughput method for producing transformed cotton plant tissue comprising:

- a) mechanically disrupting cotton seeds to obtain a plurality of cotton embryonic meristem explants; and
 - b) contacting the explants with a selected DNA sequence to obtain at least a first explant transformed with the selected DNA.
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2. claims: 32-38

An apparatus for high-throughput generation of transformable plant tissue comprising spaced apart rollers comprising secondary grooves for applying a force to seeds passing through the rollers.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2008/056411

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9920776	A	29-04-1999	AU 752717 B2 26-09-2002
			AU 9801998 A 10-05-1999
			CA 2308702 A1 29-04-1999
			EP 1025247 A1 09-08-2000
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