



- (51) **International Patent Classification:**
C07H 21/02 (2006.01) C07H 21/04 (2006.01)
- (21) **International Application Number:**
PCT/US2012/021211
- (22) **International Filing Date:**
13 January 2012 (13.01.2012)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
61/436,484 26 January 2011 (26.01.2011) US
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- (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, CL, 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, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, 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, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

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:**
29 November 2012



WO 2012/102877 A3

(54) **Title:** CENTROMERE SEQUENCES DERIVED FROM SUGAR CANE AND MINICHROMOSOMES COMPRISING THE SAME

(57) **Abstract:** The invention is generally related to sugar cane mini-chromosomes containing sugar cane centromere sequences. In addition, the invention provides for methods of generating sugar cane plants transformed with these sugar cane mini-chromosomes. Sugar cane mini-chromosomes with novel compositions and structures are used to transform sugar cane cells which are in turn used to generate sugar cane plants. Methods for generating sugar cane plants include methods for delivering the sugar cane mini-chromosomes into sugar cane cell to transform the cell, methods for selecting the transformed cell, and methods for isolating sugar cane plants transformed with the sugarcane mini-chromosome.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 12/21211

A. CLASSIFICATION OF SUBJECT MATTER IPC(8) - C07H 21/02, C07H 21/04 (2012.01) USPC - 536/23.6, 536/23.1 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) USPC - 536/23.6, 536/23.1		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched USPC - 435/410, 45/419, 800/279, 800/281, 800/282, 800/283, 800/284, 800/289, 800/290		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) PubWEST -- PGPB,USPT,USOC,EPAB,JPAB; Dilaog Classic Files -- 654, 652, 349, 348, 340, 35, 65, 155; USPTO Web Page; Google Scholar; Search terms -- polynucleotide sequence, sugarcance, centromere, repeats, array, minichromosome, vector		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2007/0083945 A1 (BYRUM et al.) 12 April 2007 (12.04.2007) para [0045], [0046], [0049], [0075], [0086], [0122]	1-8, 11, 13, 14, 23, 27
A	Genbank Accession No. EI977095, SB_BBc97-K07.F SB_BBc Sorghum bicolor genomic 5-, genomic survey sequence, 15 May 2007, downloaded from the internet 27 June 2012 < http://www.ncbi.nlm.nih.gov/nucgss/EI977095 >, pages 1-2; pg 1	1-8, 11, 13, 14, 23, 27
A	US 2010/0333235 A1 (MACH et al.) 30 December 2010 (30.12.2010) para [0016], [0017], [0025]	1-8, 11, 13, 14, 23, 27
A	US 2010/0221720 A1 (PEREZ et al.) 02 September 2010 (02.09.2010) para [0022], [0023], [0149], abstract	1-8, 11, 13, 14, 23, 27
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/>		
* 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 application or patent 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 27 June 2012 (27.06.2012)		Date of mailing of the international search report 05 OCT 2012
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. 571-273-3201		Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 12/21211

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.: 9, 10, 12, 15-22, 24-26, 28-43
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:

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: Claims 1-8, 11, 13, 14, 23, 27, drawn to an isolated polynucleotide having identity with SEQ ID NO:7 or which hybridizes thereto.

Group II+: Claims 1-8, 11, 13, 14, 23, 27, drawn to an isolated polynucleotide having identity with any one of SEQ ID NOs: 6, 1, 2, 12, 9, 11, 5, 8, 3, 4, 10 or which hybridizes thereto. If Applicant elects to have this group searched, Applicant must specify the specific polynucleotide sequence(s) to be searched. Each unique polynucleotide constitutes an inventive concept.

---please see continuation on extra 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 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.: 1-8, 11, 13, 14, 23, 27, limited to SEQ ID NO:7

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.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 12/21211

Box No. III Observations where unity of invention is lacking

The inventions listed as Groups I and II+ 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:

The shared technical feature of the inventions listed as Groups I and II+ is the specific polynucleotide recited therein. Significant structural similarities cannot readily be ascertained among the unique polynucleotides. Without significant structural similarities, the polynucleotide do not have a shared special technical feature. In the absence of a shared special technical feature, the inventions lack unity with one another.