The present invention relates generally to the field of molecular biology and concerns a method for enhancing various economically important yield-related traits in plants. More specifically, the present invention concerns a method for enhancing yield-related traits in plants by modulating expression in a plant of a nucleic acid encoding a Yield Enhancing Protein (YEP). The YEP is selected from a Vacuolar Processing Enzyme (VPE) or a CCAI-like polypeptide or a SAP-like polypeptide or a Seed YP Promoting Factor 1 (SYPFI) polypeptide or Ribulose-1,5-bisphosphate carboxylase/oxygenase (RuBisCO) activase (RCA) polypeptide. The present invention also concerns plants having modulated expression of a nucleic acid encoding such a YEP, which plants have enhanced yield-related traits relative to control plants. The invention also provides hitherto unknown YEP-encoding nucleic acids, and constructs comprising the same, useful in performing the methods of the invention.
A. CLASSIFICATION OF SUBJECT MATTER

 INV. C12N15/82 C12N15/55 C12N9/50 C12N9/64 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 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, WPI Data, BIOSIS, EMBASE, Sequence Search

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
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<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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Further documents are listed in the continuation of Box C.

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

See patent family annex.

"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

21 April 2008

Date of mailing of the international search report

21/07/2008

Name and mailing address of the ISA/
European Patent Office, P.B. 5818 Palentiaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax; (+31-70) 340-3016

Authorized officer

Oderwald, Harald

Form PCT/ISA/210 (second sheet) (April 2005)
<table>
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<td>wo 02/16655 A2 (SCRIPPS RESEARCH INST [US] ; SYNGENTA PARTICIPATIONS AG [CH] ; HARPER JE) 28 February 2002 (2002-02-28) see SEQ ID NO: 1485 page 2, line 15 - page 6, line 8; claims 121-123, 129 page 8, line 31 - page 9, line 31 page 11, line 20 - page 13, line 20 page 15, line 3 - line 20 page 34, line 9 - page 44, line 22 page 56, line 14 - page 59, line 18 page 65, line 21 - page 75, line 4</td>
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<td>EP 1 033 405 A (CERES INC [US]) 6 September 2000 (2000-09-06) see SEQ ID NO: 37409 and 37410 page 1 - page 26 ; claims</td>
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Form PCT/ISA/218 (continuation of second sheet) (April 2005)
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. [X] Claims Nos.: 26 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:
   see FURTHER INFORMATION sheet PCT/ISA/210

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).

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. [X] 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.:

1-27 (all partially)

Remark on Protest

The additional search fees were accompanied by the applicant's protest and, where applicable, the

The 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.
Continuation of Box II.2

Claims Nos.: 26

The present claim 26 relates to an extremely large number of possible compounds/products. Support and disclosure in the sense of Article 6 and 5 PCT is to be found for none of these compounds/products claimed. The non-compliance with the substantive provisions is to such an extent, that no search could be performed (PCT Guidelines 9.19 and 9.23).

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.2), should the problems which led to the Article 17(2)PCT declaration be overcome.
This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

Invention 1: 1-27 (all partially)

Methods for enhancing yield-related traits in plants comprising a vacuolar processing enzyme (VPE) as shown in SEQ ID NO: 149 and 150. Nucleic acids, polypeptide comprising said VPE. Plants, harvestable parts of plants, methods for the production of transgenic plants, use of said nucleic acid in increasing yield.

Inventions 2-28: claims 1-27 (all partially)

same as invention 1, but comprising polynucleotide and polypeptide sequences in the order given in table B1, i.e. invention 2 comprises SEQ ID NO: 151 and 152,..., invention 28 comprises SEQ ID NO: 203 and 204.

Invention 29: claims 28-46 (all partially)

A method for enhancing seed yield-related traits in plants comprising a CCA1-like protein as shown in SEQ ID NO: 1 and 2. Constructs and uses, plants, harvestable parts of plants, methods for the production of transgenic plants, use of said CCA1-like protein in enhancing seed yield.

Inventions 30-98: claims 28-46 (all partially)

same as invention 29, but comprising polynucleotide and polypeptide sequences in the order given in table A, i.e. invention 30 comprises SEQ ID NO: 3 and 4,..., invention 98 comprises SEQ ID NO: 139 and 140.

Invention 99: claims 47-72 (all partially)

Methods for enhancing yield-related traits in plants comprising a SAP-like polypeptide as shown in SEQ ID NO: 210 and 211. Nucleic acids and constructs, polypeptide comprising said SAP. Plants, harvestable parts of plants, methods for the production of transgenic plants, use of said nucleic acid in increasing yield.

Inventions 100-113: claims 47-72 (all partially)

same as invention 99, but comprising polynucleotide and polypeptide sequences in the order given in table C1, i.e. invention 100 comprises SEQ ID NO: 212 and 213,..., invention 113 comprises SEQ ID NO: 238 and 239.
Invention 114: claims 73-94 (all partially)

Methods for enhancing yield-related traits in plants comprising a SYPF1 polypeptide as shown in SEQ ID NO: 321 and 322. Constructs comprising said SYPF1. Plants, harvestable parts of plants, methods for the production of transgenic plants, use of said nucleic acid in increasing yield.

Inventions 115-134: claims 73-94 (all partially)

same as invention 114, but comprising polynucleotide and polypeptide sequences in the order given in table E1, i.e.

invention 115 comprises SEQ ID NO: 323 and 324, ...

invention 134 comprises SEQ ID NO: 342.

Invention 135: claims 95-124 (all partially)

Methods for enhancing yield-related traits in plants comprising a RCA polypeptide as shown in SEQ ID NO: 250 and 251. Constructs comprising said RCA. Plants, harvestable parts of plants, methods for the production of transgenic plants, use of RCA in increasing yield.

Inventions 136-166: claims 95-124 (all partially)

same as invention 135, but comprising polynucleotide and polypeptide sequences in the order given in table D1, i.e.

invention 136 comprises SEQ ID NO: 252 and 253, ...

invention 166 comprises SEQ ID NO: 319 and 320.
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