LIVING MODIFIED ORGANISM (LMO)

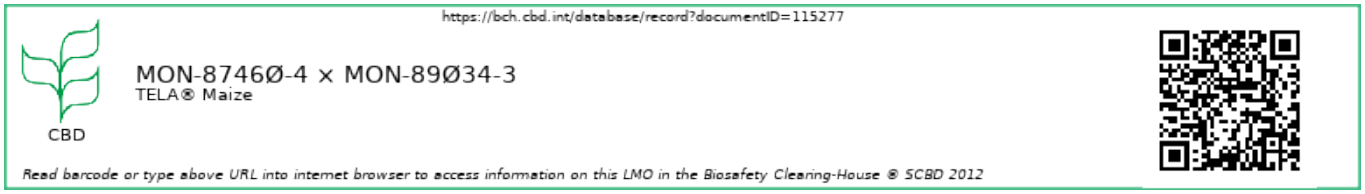
BCH-LMO-SCBD-115277-2

? Decisions on the LMO ? Risk Assessments

LAST UPDATED: 28 OCT 2021

Living Modified Organism identity

The image below identifies the LMO through its unique identifier, trade name and a link to this page of the BCH. Click on it to download a larger image on your computer. For help on how to use it go to the LMO quick-links page.



Name

TELA® Maize | EN

Transformation event

MON 87460 × MON 89034

Unique identifier

MON-87460-4 × MON-89034-3

Developer(s)

- PERSON: BAYER CROP SCIENCE COMPANY | BCH-CON-NG-115273-2

PERSON

Bayer Crop Science Company
P.O. Box 79345-00200 Kenya
Nairobi
Kenya
Phone: +25478 6666087
Email: simonevans.njeru@bayer.com

RELATED ORGANIZATION

- PERSON: AATF AND INSTITUTE OF AGRICULTURAL RESEARCH | BCH-CON-NG-114246-3

PERSON

AATF and Institute of Agricultural Research

ARCN Annex No. 3 Ibrahim Idris Street, Jabi(AATF) Institute of Agricultural Research, Ahmadu Bello University, P.M.B 1044, Zaria, Nigeria.
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RELATED ORGANIZATION

Description

The drought-tolerant, insect-resistant maize (MON 87460 × MON 89034) was obtained through crossing the two maize event products: MON 87460 and MON 89034. The modified maize expresses *Bacillus subtilis* cold shock protein (from MON97460), which confers cold and drought tolerance by enhancing natural abiotic stress responses. The maize also expresses the *Bacillus thuringiensis* insecticidal proteins Cry1A.105 and Cry2Ab2 (from MON 89034), which confer resistance to Lepidoptera pests (particularly fall armyworm and stem borer). Additionally, a selectable marker for kanamycin resistance (*Escherichia coli* neomycin phosphotransferase II) is expected to be present as it was used for selection of transformants during the generation of the parental MON 87460 line.

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Recipient Organism or Parental Organisms

The term “Recipient organism” refers to an organism (either already modified or non-modified) that was subjected to genetic modification, whereas “Parental organisms” refers to those that were involved in cross breeding or cell fusion.

BCH-LMO-SCBD-103066-6 LIVING MODIFIED ORGANISM | MON-8746Ø-4 - DROUGHTGARD™ MAIZE |
Resistance to antibiotics - Kanamycin Tolerance to abiotic stress - Cold / Heat, Drought

BCH-LMO-SCBD-43773-18 LIVING MODIFIED ORGANISM | MON-89Ø34-3 - YIELDGARD™ VT PRO™ |
Resistance to diseases and pests - Insects - Lepidoptera (butterflies and moths)

Characteristics of the modification process

Vector

PV-ZMAP595; PV-ZMIR245

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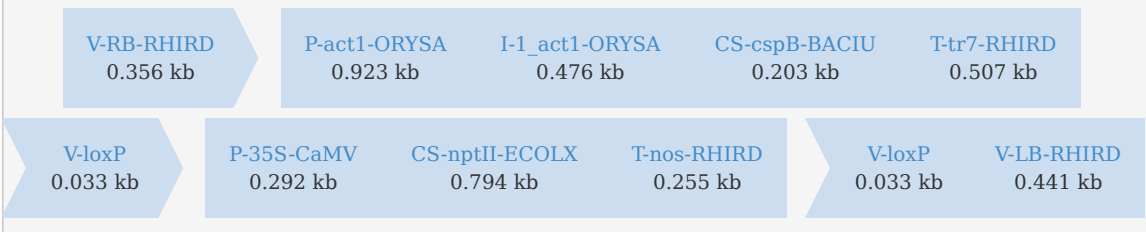
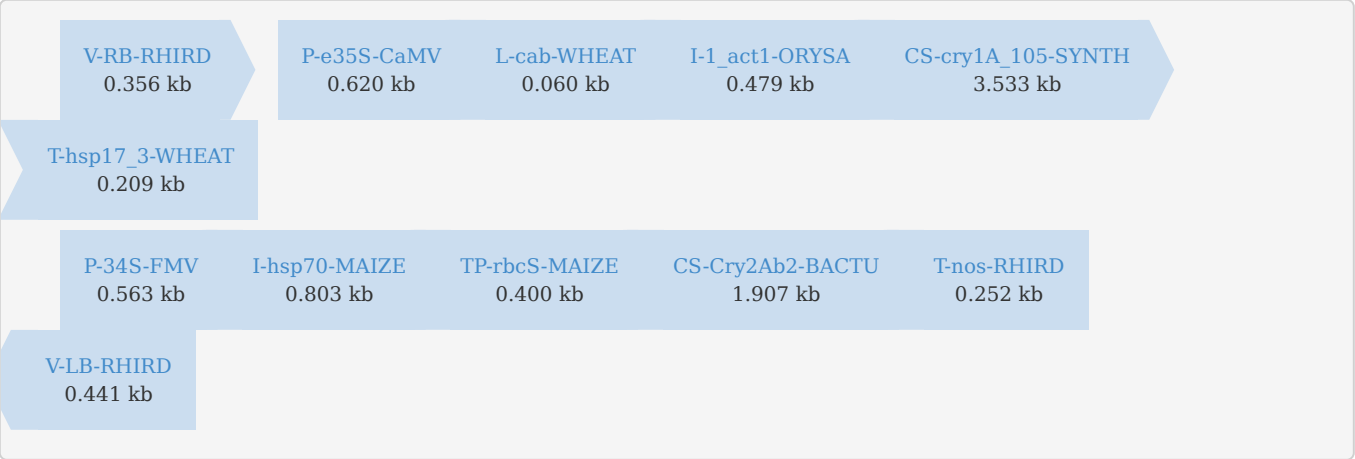
Techniques used for the modification

Cross breeding

Genetic elements construct





Introduced or modified genetic element(s)

Some of these genetic elements may be present as fragments or truncated forms. Please see notes below, where applicable.

BCH-GENE-SCBD-101416-6 TI PLASMID RIGHT BORDER REPEAT
Plasmid vector

BCH-GENE-SCBD-100364-5 RICE ACTIN 1 GENE PROMOTER | (RICE)
Promoter

BCH-GENE-SCBD-100355-6 RICE ACTIN 1, INTRON | (RICE)
Intron

BCH-GENE-SCBD-103065-7 COLD SHOCK PROTEIN GENE
Protein coding sequence | Tolerance to abiotic stress (Cold / Heat, Drought)

BCH-GENE-SCBD-103067-9 TRANSCRIPT 7 GENE 3' UNTRANSLATED REGION
Terminator

BCH-GENE-SCBD-103069-3 LOXP RECOMBINATION SITE
recombination site

BCH-GENE-SCBD-100287-7 CAMV 35S PROMOTER
Promoter

BCH-GENE-SCBD-15001-5 NEOMYCIN PHOSPHOTRANSFERASE II | (BACTERIA)
Protein coding sequence | Resistance to antibiotics (Kanamycin)

BCH-GENE-SCBD-100269-8 NOPALINE SYNTHASE GENE TERMINATOR
Terminator

BCH-GENE-SCBD-101415-9 TI PLASMID LEFT BORDER REPEAT
Plasmid vector

BCH-GENE-SCBD-100354-6 5' UNTRANSLATED LEADER FROM CHLOROPHYLL A/B-BINDING PROTEIN | (WHEAT)
Leader sequence

BCH-GENE-SCBD-43771-9 CRY1A.105 | BACILLUS THURINGIENSIS - BT, BACILLUS, BACTU
Protein coding sequence | Resistance to diseases and pests (Insects, Lepidoptera (butterflies and moths))

BCH-GENE-SCBD-100356-6 HEAT SHOCK PROTEIN 17.3 TERMINATOR | (WHEAT)
Terminator

BCH-GENE-SCBD-101507-5 FMV 34S PROMOTER
Promoter

BCH-GENE-SCBD-100359-7 HSP70 INTRON | (MAIZE, CORN)

Intron

BCH-GENE-SCBD-100360-4 TRANSIT PEPTIDE AND FIRST INTRON OF RUBISCO SSU | (MAIZE, CORN)

Transit signal

BCH-GENE-SCBD-14988-7 CRY2AB2 | BACILLUS THURINGIENSIS - BT, BACILLUS, BACTU

Protein coding sequence | Resistance to diseases and pests (Insects, Lepidoptera (butterflies and moths))

BCH-GENE-SCBD-100366-6 CAMV ENHANCED 35S PROMOTER

Promoter

Notes regarding the genetic elements present in this LMO

Genetic elements introduced from PV-ZMAP595

Two gene cassettes were integrated from this vector.

I. Transcription of *Bacillus subtilis* cold shock protein (*cspB*) begins from the *Oryza sativa* (rice) actin 1 promoter and ends at the *Agrobacterium tumefaciens* 3' untranslated region of transcript 7. Transcript contains the rice actin 1 intron at the 5' end. The intron is expected to enhance gene expression of *cspB*.

II. Transcription of the *Escherichia coli* neomycin phosphotransferase II (*nptII*) is under the control of the *Cauliflower mosaic virus* (CaMV) 35S promoter and the *A. tumefaciens* nopaline synthase terminator (*nos*). The gene cassette is flanked by Bacteriophage P1 locus of cross-over P1 (loxP) sites.

Please note

- The parental line contains a single insertion of the T-DNA from this vector.
- No vector backbone sequence was detected.
- The parental line contains intact genetic cassettes.

Genetic elements introduced from PV-ZMIR245

Two gene cassettes were present in the parental line.

III. Transcription of the *Bacillus thuringiensis* crystal 1A.105 (*cry1A.105*) commences from the CaMV enhanced 35S promoter and terminates at the *Triticum aestivum* (wheat) heat shock protein 17.3 terminator. The transcript contains a rice actin 1 intron and a wheat chlorophyll a/b-binding protein 5' leader for enhanced gene expression.

IV. Transcription of *B. thuringiensis cry2Ab2* is under the control of the Figwort Mosaic Virus 35S promoter and the *A. tumefaciens nos* terminator. *Zea mays* heat shock protein 70 intron and transit peptide form Rubisco small subunit are also present in the transcript at the 5' end for enhanced gene expression and chloroplast targeting, respectively.

Please note

- The *cry2Ab2* coding sequence was optimized for expression in plants.
- An additional *nptII* cassette in reverse orientation was present in the pV-ZMIR245 vector and inserted as a secondary, unlinked T-DNA. During the development of the parental line, selective breeding was done to remove the *nptII* marker, resulting in a marker-free parental line.
- Southern blot analysis confirmed a single insertion and expression of the other T-DNA containing the genetic cassettes mentioned above (III and IV).

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- DNA sequencing indicated that enhanced CaMV promoter did not contain the duplicated enhancer regions.
- No vector backbone was detected in the parental line.

For more information, kindly refer to the parental modified organism records

LMO characteristics

Modified traits

Resistance to diseases and pests
- Insects
  - Lepidoptera (butterflies and moths)

Resistance to antibiotics
- Kanamycin

Tolerance to abiotic stress
- Cold / Heat
- Drought

Selectable marker genes and reporter genes

Common use(s) of the LMO

Food
Feed

Detection method(s)

External link(s)

? MON-89Ø34-3 - EU Reference Laboratory for GM Food and Feed (EURL-GMFF) *(English)*

? MON-8746Ø-4 - EU Reference Laboratory for GM Food and Feed (EURL-GMFF) *(English)*

? GMO Detection Method Database - MON87460 *(English)*

? GMO Detection Method Database - MON89034 *(English)*

Additional Information

Other relevant website addresses and/or attached documents

? EUginius - MON87460 x MON89034 *(English)*

? AATF - TELA Maize project *(English)*

? CIMMYT - TELA Maize project *(English)*

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Further Information

Questions about the Cartagena Protocol on Biosafety or the operation of the Biosafety Clearing-House may be directed to the Secretariat of the

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