

## Biosafety Clearing-House (BCH)

LIVING MODIFIED ORGANISM (LMO)


BCH-LMO-SCBD-43630-9

[? Decisions on the LMO ? Risk Assessments](#)

LAST UPDATED: 20 FEB 2018

### 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.



**SYN-IR604-5 X MON-00021-9**  
Agrisure™ RW Rootworm-Protected Roundup Ready™ maize

CBD

<https://bch.cbd.int/database/record?documentID=43630>



Read barcode or type above URL into internet browser to access information on this LMO in the Biosafety Clearing-House © SCBD 2012

Name

Agrisure™ RW Rootworm-Protected Roundup Ready™ maize

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Transformation event

MIR604 x GA21

Unique identifier

SYN-IR604-5 x MON-00021-9

Developer(s)

- **ORGANIZATION:** SYNGENTA CROP PROTECTION AG | [BCH-CON-SCBD-43629-1](#)

#### ORGANIZATION

Syngenta Crop Protection AG  
Schwarzwaldallee 215  
Basel  
CH 4058 , Switzerland  
Phone: +41 61 323-1111  
Website: <http://www.syngenta.com>

Description

SYN-IR604-5xMON-00021-9 has stacked insect resistant and herbicide tolerant maize produced by conventional cross breeding of two genetically engineered parental varieties (MIR604 and GA21).

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The parental MIR604 maize variety (OECD unique identifier SYN-IR604-5) was genetically

modified by introducing the cry3A gene from *Bacillus thuringiensis* ssp. *kumamotoensis*, which codes for a Bt-toxin (Cry3A) and confers resistance to western corn rootworm (*Diabrotica virgifera virgifera*), northern corn rootworm (*Diabrotica longicornis barberi*) and other related coleopteran species. Expression of the *pmi* gene in MIR604 from the bacterium *Escherichia coli* allows this line to use mannose as a carbon source through production of the PMI protein, and is used as a selectable marker.

The parental GA21 line (OECD unique identifier MON-00021-9) was created by modifying the endogenous maize *epsps* gene through site-directed mutagenesis, such that its encoded enzyme was insensitive to inactivation by glyphosate, and inserting it into the inbred AT maize variety. The modified maize GA21 line permits farmers to use glyphosate-containing herbicides for weed control in the cultivation of maize.

### 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-ORGA-SCBD-246-6** ORGANISM | ZEA MAYS (MAIZE, CORN, MAIZE) |

Crops

**BCH-LMO-SCBD-15105-12** LIVING MODIFIED ORGANISM | SYN-IR604-5 - AGRISURE™ RW ROOTWORM-PROTECTED MAIZE |

Mannose tolerance Resistance to diseases and pests - Insects - Coleoptera (beetles) - Western corn rootworm (*Diabrotica virgifera*) Selectable marker genes and reporter genes

**BCH-LMO-SCBD-14794-18** LIVING MODIFIED ORGANISM | MON-00021-9 - ROUNDUP READY™ MAIZE |

Resistance to herbicides - Glyphosate

## Characteristics of the modification process

### Vector

pZM26 and pDPG434

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### Techniques used for the modification

Cross breeding

### Genetic elements construct

P-act1-ORYSA 1.370 kb	I-1_act1-ORYSA 0.000 kb	TP-OPT 0.370 kb	CS-epsps-MAIZE 1.340 kb	T-nos-RHIRD 0.240 kb
P-MTL-MAIZE 0.000 kb	CS-mCry3A 0.000 kb	T-nos-RHIRD 0.000 kb		
P-ubi1-MAIZE 0.000 kb	I-1_ubi1-MAIZE 0.000 kb	CS-pmi-ECOLX 0.000 kb	T-nos-RHIRD 0.000 kb	

### 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-15003-7** PHOSPHOMANNOSE ISOMERASE GENE | (BACTERIA) |

Protein coding sequence | Mannose tolerance,Selectable marker genes and reporter genes

**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-101419-4** OPTIMIZED TRANSIT PEPTIDE |

Transit signal

**BCH-GENE-SCBD-100269-8** NOPALINE SYNTHASE GENE TERMINATOR |

Terminator

**BCH-GENE-SCBD-103881-2** METALLOTHIONEIN-LIKE GENE PROMOTER | (MAIZE, CORN) |

Promoter

**BCH-GENE-SCBD-100362-7** UBIQUITIN GENE PROMOTER | (MAIZE, CORN) |

Promoter

**BCH-GENE-SCBD-103627-5** UBIQUITIN INTRON 1 | (MAIZE, CORN) |

Intron

**BCH-GENE-SCBD-43634-3** MCRY3A | BACILLUS THURINGIENSIS - BT, BACILLUS, BACTU |

Protein coding sequence | Resistance to diseases and pests (Insects, Coleoptera (beetles), Western corn rootworm (Diabrotica virgifera))

**BCH-GENE-SCBD-46333-8** 5-ENOLPYRUVYLSHIKIMATE-3-PHOSPHATE SYNTHASE | (MAIZE, CORN) |

Protein coding sequence | Resistance to herbicides (Glyphosate)

Notes regarding the genetic elements present in this LMO

Inserted genes (MIR604):

1) cry3A-gene from Bacillus thuringiensis ssp. kumamotoensis. This gene codes for a Bt-toxin, which confers resistance to western corn rootworm (Diabrotica virgifera virgifera), northern corn rootworm (Diabrotica longicornis barberi) and other related coleopteran species.

2) Marker gene pmi-gene from the bacterium Escherichia coli. The LMO plant harboring this gene expresses a marker protein, PMI, that allows the plant to utilise mannose as a carbon source, acting as a selectable marker.

Inserted gene (GA21):

m epsps. This is a mutated form of the epsps gene derived from maize (Zea mays). The cp4 epsps gene encodes for a version of EPSPS that is highly tolerant to inhibition by glyphosate.

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**LMO characteristics**

Modified traits

Resistance to diseases and pests

Insects

Coleoptera (beetles)

Resistance to herbicides

Glyphosate  
Selectable marker genes and reporter genes  
Other  
Mannose tolerance

Common use(s) of the LMO

Food

## Detection method(s)

External link(s)

- ? [SYN-IR604-5 - EU Reference Laboratory for GM Food and Feed \(EURL-GMFF\)](#) ( *English* )
- ? [MON-00021-9 - EU Reference Laboratory for GM Food and Feed \(EURL-GMFF\)](#) ( *English* )

## Additional Information

Additional Information

This plant is a product of traditional plant breeding, and therefore is not automatically subject to regulation in all jurisdictions as are transgenic plants resulting from recombinant DNA technologies. Certain jurisdictions may request notification in advance of the release of a stacked hybrid, or may request information to conduct an environmental and food safety assessment.

Other relevant website addresses and/or attached documents

- ? [SYN-IR604-5 x MON 00021-9 - GMO Compass](#) ( *English* )
- ? [MIR604xGA21\\_application\\_food\\_feed.pdf](#) ( *English* )

[BCH-LMO-SCBD-43630-9](#)

## 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 Convention on Biological Diversity.

### Secretariat of the Convention on Biological Diversity

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