

Biosafety Clearing-House (BCH)

LIVING MODIFIED ORGANISM (LMO)

BCH-LMO-SCBD-15218-6

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

LAST UPDATED: 06 DEC 2012

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.

 SEM-ØZW2Ø-7
Virus-resistant squash

<https://bch.cbd.int/database/record?documentID=15218>



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

Name

Virus-resistant squash

EN

Transformation event

ZW20

Unique identifier

SEM-ØZW2Ø-7

Developer(s)

- [ORGANIZATION: MONSANTO](#) | [BCH-CON-SCBD-14925-3](#)

ORGANIZATION

Monsanto
800 North Lindbergh Blvd.
St. Louis, MO
63167, United States of America
Phone: + 1 314 694-1000
Fax: +1 314 694-3080
Website: <http://www.monsanto.com>

- [ORGANIZATION: SEMINIS VEGETABLE SEEDS, INC.](#) | [BCH-CON-SCBD-15216-1](#)

ORGANIZATION

Seminis Vegetable Seeds, Inc.
Website: <http://www.seminis.com/>

Description

Squash resistant to infection by Zucchini yellow mosaic potyvirus (ZYMV) and Watermelon mosaic potyvirus 2 (WMV-2) through incorporation of virus-derived sequences that encode the coat proteins (CPs) from both of these viruses.

EN

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-12123-4](#) ORGANISM | CUCURBITA PEPO (PUMPKIN, SQUASHES) |

Crops

Related LMO(s)

[BCH-LMO-SCBD-15217-5](#) | SEM-ØCZW3-2 - Virus-resistant squash | Resistance to antibiotics - Kanamycin Resistance to diseases and pests - Viruses - Mosaic virus - Cucumber mosaic virus (CMV), Watermelon mosaic virus-2 (WMV2), Zucchini yellow mosaic virus (ZYMV)

Characteristics of the modification process

Vector

ZYMV72/WMBN22

EN

Techniques used for the modification

Agrobacterium-mediated DNA transfer

Genetic elements construct

P-35S-CaMV 0.000 kb	CS-cp-WMV2 0.000 kb	T-35S-CaMV 0.000 kb
--	--	--

P-35S-CaMV 0.000 kb	CS-cp-ZYMV 0.000 kb	T-35S-CaMV 0.000 kb
--	--	--

P-35S-CaMV 0.000 kb	CS-nptII-ECOLX 0.000 kb	T-35S-CaMV 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-15025-3](#) ZYMV COAT PROTEIN |

Protein coding sequence | Resistance to diseases and pests (Viruses, Mosaic virus, Zucchini yellow mosaic virus (ZYMV))

[BCH-GENE-SCBD-15024-4](#) WMV-2 COAT PROTEIN |

Protein coding sequence | Resistance to diseases and pests (Viruses, Mosaic virus, Watermelon mosaic virus-2 (WMV2))

[BCH-GENE-SCBD-15001-5](#) NEOMYCIN PHOSPHOTRANSFERASE II | (BACTERIA) |

Protein coding sequence | Resistance to antibiotics (Kanamycin)

[BCH-GENE-SCBD-100287-7](#) CAMV 35S PROMOTER |

Promoter

[BCH-GENE-SCBD-100290-6](#) CAMV 35S TERMINATOR |

Terminator

Notes regarding the genetic elements present in this LMO

The WMV2 CP gene was fused to the 5' intergenic region and the first 48 nucleotides (N-terminus) of the CMV coat protein gene to enhance translation of the transgene mRNA.

The ZYMV CP coding sequence was fused to the CMV 5' untranslated region to enhance translation.

While the gene encoding neomycin phosphotransferase (NPTII) was incorporated into the Ti plasmid vector used for transformation, only plants lacking this gene were selected for commercialization. The gene encoding NPTII is, therefore, not present in the ZW-20 genome. There was no incorporation of plasmid DNA sequences outside of the T-DNA region as verified by Southern blot analysis.

EN

LMO characteristics

Modified traits

Resistance to diseases and pests

Viruses

Mosaic virus

Watermelon mosaic virus-2 (WMV2)

Zucchini yellow mosaic virus (ZYMV)

Resistance to antibiotics

Kanamycin

Common use(s) of the LMO

Food

Additional Information

Additional Information

The ZW20 squash line was developed using recombinant DNA techniques to resist infection by ZYMV and WMV2 by inserting virus-derived sequences that encode the coat proteins (CPs) from each of these viruses. The introduced viral sequences do not result in the formation of any infectious particles, nor does their expression result in any disease pathology.

This transgenic squash exhibits “pathogen-derived resistance” to infection and subsequent disease caused by ZYMV and WMV2 through a process that is related to viral cross-protection. Although the exact mechanism by which the viral protection occurs is unknown, most evidence suggests that expression of viral CP by a plant interferes with one of the first steps in viral replication, uncoating (removal of CP) from the incoming virus. Other modes of action of cross-protection have also been

suggested.

Other relevant website addresses and/or attached documents

[ZW20 - CERA \(English \)](#)

? [SEM-ØZW2Ø-7 - OECD \(English \)](#)

? [ZW20 - APHIS.pdf \(English \)](#)

[BCH-LMO-SCBD-15218-6](#)

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**

413 rue Saint-Jacques, suite 800

Montreal, Québec, H2Y 1N9

Canada

Fax: +1 514 288-6588

Email: secretariat@cbd.int