

Biosafety Clearing-House (BCH)

LIVING MODIFIED ORGANISM (LMO)

BCH-LMO-SCBD-14836-7

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

LAST UPDATED: 26 JAN 2015

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.



FLO-Ø7442-5
Moondust™ carnation

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

<https://bch.cbd.int/database/record?documentID=14836>



Name

Moondust™ carnation

EN

Transformation event

11 (7442)

Unique identifier

FLO-Ø7442-5

Developer(s)

- **PERSON:** STEPHEN CHANDLER | [BCH-CON-SCBD-4953-5](#)

PERSON

Stephen Chandler

Cosultant

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RELATED ORGANIZATION

Description

Carnations with modified colour and sulfonylurea herbicide tolerance, produced by inserting two anthocyanin biosynthetic genes from *Petunia hybrida*, dihydroflavonol reductase (dfr)

EN

and Hf1 encoding flavonoid 3',5'-hydroxylase (F3'5'H), whose expression results in a violet/mauve colouration. Tolerance to sulfonyl urea herbicides was produced through the introduction of a chlorsulfuron tolerant version of the acetolactate synthase (ALS) encoding gene from *Nicotiana tabacum*.

Note: No longer available, was sold for about 10 years. Has been replaced by superior varieties

NOTE: This LMO was formerly referred to with the UID FLO-Ø7442-4.

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-4954-7](#) ORGANISM | DIANTHUS CARYOPHYLLUS (CARNATION, DIACA) |
Crops

Related LMO(s)

[BCH-LMO-SCBD-14828-9](#) | FLO-4Ø619-8 - Moonshade™ carnation | Stephen Chandler Changes in quality and/or metabolite content - Pigmentation / Coloration Resistance to herbicides - Chlorsulfuron, Sulfonylurea Selectable marker genes and reporter genes

[BCH-LMO-SCBD-14834-6](#) | FLO-4Ø644-6 - Moonlite™ carnation | Stephen Chandler Changes in quality and/or metabolite content - Pigmentation / Coloration Resistance to herbicides - Chlorsulfuron, Sulfonylurea

[BCH-LMO-SCBD-14837-7](#) | FLO-ØØØ15-3 - Moondust™ carnation | Stephen Chandler Changes in quality and/or metabolite content - Pigmentation / Coloration Resistance to herbicides - Chlorsulfuron, Sulfonylurea

[BCH-LMO-SCBD-14838-7](#) | FLO-ØØØ16-4 - Moondust™ carnation | Stephen Chandler Changes in quality and/or metabolite content - Pigmentation / Coloration Resistance to herbicides - Chlorsulfuron, Sulfonylurea

[BCH-LMO-SCBD-14840-7](#) | FLO-ØØØØ4-1 - Moondust™ carnation | Stephen Chandler Changes in quality and/or metabolite content - Pigmentation / Coloration Resistance to herbicides - Chlorsulfuron, Sulfonylurea

Characteristics of the modification process

Vector

pCGP1470

EN

Techniques used for the modification

Agrobacterium-mediated DNA transfer

Genetic elements construct

P-35S-CaMV
0.000 kb

CS-SuRB-TOBAC
0.000 kb

T-SuRB-TOBAC
0.000 kb

P-CHS 0.000 kb	CS-F35H-PETHY 0.000 kb	T-D8 0.000 kb
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P-mac-1 0.000 kb	CS-DFR-PETHY 0.000 kb	T-mas 0.000 kb
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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-15009-4 DIHYDROFLAVONOL-4-REDUCTASE | (PETUNIA) |

Protein coding sequence | Changes in quality and/or metabolite content (Pigmentation / Coloration)

BCH-GENE-SCBD-15010-3 FLAVONOID 3', 5' HYDROXYLASE GENE | (PETUNIA) |

Protein coding sequence | Changes in quality and/or metabolite content (Pigmentation / Coloration)

BCH-GENE-SCBD-15177-7 ACETOHYDROXY ACID SYNTHASE GENE | (TOBACCO PLANT) |

Protein coding sequence | Resistance to herbicides (Chlorsulfuron, Sulfonylurea)

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

Promoter

BCH-GENE-SCBD-100390-7 ACETOHYDROXY ACID SYNTHASE GENE TERMINATOR | (TOBACCO PLANT) |

Terminator

BCH-GENE-SCBD-103771-1 CHALCONE SYNTHASE GENE PROMOTER | (COMMON SNAPDRAGON, SNAPDRAGON) |

Promoter

BCH-GENE-SCBD-103772-2 D8 GENE TERMINATOR | (PETUNIA) |

Terminator

BCH-GENE-SCBD-103773-1 MAC-1 PROMOTER |

Promoter

BCH-GENE-SCBD-103774-1 MANNOPINE SYNTHASE GENE TERMINATOR |

Terminator

LMO characteristics

Modified traits

Resistance to herbicides
Sulfonylurea
Changes in quality and/or metabolite content
Pigmentation / Coloration

Common use(s) of the LMO

Ornamental

Additional Information

Additional Information

These carnations were developed using recombinant DNA techniques to produce flowers with a

unique violet/mauve colour by introducing two genes from petunia (*Petunia hybrida*) that function together in the biosynthesis of the anthocyanin pigment delphinidin. The transgenic lines were derived from the parent cultivar 'White Unesco', which is a white coloured carnation that was selected for a mutation in the dihydroflavonol reductase (DFR) encoding gene that did not allow for expression of a functional enzyme, and thus did not produce the anthocyanin type pigments that give rise to blue and red coloured flowers. The two genes from *Petunia hybrida* introduced into the transgenic carnation lines included a functional dihydroflavonol reductase encoding gene (*dfr*) and a gene (*hf1*) encoding the enzyme flavonoid 3', 5'-hydroxylase (F3'5'H), a member of the NADPH-Cytochrome P450 reductase family. Expression of the F3'5'H encoding gene allows for the production of blue coloured delphinidin anthocyanin pigments, which are not normally found in carnations.

Tolerance to sulfonyl urea herbicides was produced via the introduction of a chlorsulfuron tolerant version of the acetolactate synthase (ALS) encoding gene from tobacco (SuRB).

Other relevant website addresses and/or attached documents

? [OECD UID Database](#) (*English*)

? [CERA GM Database](#) (*English*)

[BCH-LMO-SCBD-14836-7](#)

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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