

## Biosafety Clearing-House (BCH)

LIVING MODIFIED ORGANISM (LMO)


BCH-LMO-SCBD-108708-2

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

LAST UPDATED: 10 SEP 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.



Barley modified for tolerance to drought and nutrient deficiencies

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=108708>



Name

Barley modified for tolerance to drought and nutrient deficiencies

EN

Transformation event

pEXP:CKX2

Developer(s)

- [ORGANIZATION: PALACKY UNIVERSITY IN OLOMOUC](#) | [BCH-CON-SCBD-108702-1](#)

#### ORGANIZATION

Palacky University in Olomouc  
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Description

The pEXP:CKX2 barley line has been genetically modified by inserting the Arabidopsis thaliana cytokinin dehydrogenase 2 gene under the control of the root-specific promoter derived from the expressed protein gene LOC\_Os04g11040.1 of rice

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Cytokinin dehydrogenases catalyze the irreversible degradation of cytokinins in a single enzymatic step by oxidative side chain cleavage. Cytokinins, which are chemically N6-substituted purine derivatives, are a class of plant hormones that regulate cell division as well as a large number of developmental events in plants. An important trait regulated by cytokinin is the size of the root system.

A reduced cytokinin status in plants (including barley) causes an enhanced root system which might render plants more tolerant to drought and nutrient deficiencies in the soil. Crop yield is often limited by the availability of water and soil-derived mineral nutrients. A larger root system may enable plants to gain access to more water and nutrients and in this way to cope with adverse environmental conditions.

#### 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-12110-5](#) ORGANISM | HORDEUM VULGARE (BARLEY, HORVU) |

Crops

#### Related LMO(s)

[BCH-LMO-SCBD-108704-3](#) | Barley modified for tolerance to drought and nutrient deficiencies | Palacky University in Olomouc | Resistance to antibiotics (Hygromycin), Selectable marker genes and reporter genes, Tolerance to abiotic stress (Drought)

[BCH-LMO-SCBD-108706-3](#) | Barley modified for tolerance to drought and nutrient deficiencies | Palacky University in Olomouc | Resistance to antibiotics (Hygromycin), Selectable marker genes and reporter genes, Tolerance to abiotic stress (Drought)

[BCH-LMO-SCBD-108710-1](#) | Barley modified for tolerance to drought and nutrient deficiencies | Palacky University in Olomouc | Resistance to antibiotics (Hygromycin), Selectable marker genes and reporter genes, Tolerance to abiotic stress (Drought)

### Characteristics of the modification process

#### Vector

pEXP:CKX2

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#### Techniques used for the modification

Agrobacterium-mediated DNA transfer

#### 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-108705-1](#) LOC\_OS04G11040.1 PROMOTER | (RICE) |

Promoter

[BCH-GENE-SCBD-108707-1](#) CYTOKININ DEHYDROGENASE 2 GENE | (THALE CRESS) |

Protein coding sequence | Tolerance to abiotic stress (Drought)

[BCH-GENE-SCBD-100362-7](#) UBIQUITIN GENE PROMOTER | (MAIZE, CORN) |

Promoter

[BCH-GENE-SCBD-14991-8](#) HYGROMYCIN B PHOSPHOTRANSFERASE GENE | (BACTERIA) |

Protein coding sequence | Resistance to antibiotics (Hygromycin),Selectable marker genes and reporter genes

Notes regarding the genetic elements present in this LMO

The transgenic line shows an up to 8-fold higher CKX enzyme activity in roots than the wild type. In contrast, CKX enzyme activity is similar to the control plants in leaves.

The cytokinin dehydrogenase 2 gene is under the control of the root-specific promoter derived from the expressed protein gene LOC\_Os04g11040.1 of rice.

The Hygromycin B phosphotransferase selection marker is under the control of the promoter region from Zea mays polyubiquitin gene.

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## LMO characteristics

Modified traits

Resistance to antibiotics

Hygromycin

Tolerance to abiotic stress

Drought

Selectable marker genes and reporter genes

Common use(s) of the LMO

Research

[BCH-LMO-SCBD-108708-2](#)

## 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.

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on Biological Diversity**

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