

## GEPHE SUMMARY

**Gephebase Gene**  
Ha\_BtR

**Entry Status**  
Published

**GepheID**  
GP00000429

**Main curator**  
Martin

## PHENOTYPIC CHANGE

**Trait Category**  
Physiology

**Trait**  
Xenobiotic resistance (insecticide; Bt Cry1Ac toxin)

**Trait State in Taxon A**  
Helicoverpa armigera - Bt-Cry1Ac susceptible

**Trait State in Taxon B**  
Helicoverpa armigera - Bt-Cry1Ac resistant

**Ancestral State**  
Taxon A

**Taxonomic Status**  
Intraspecific

### Taxon A

**Latin Name**  
*Helicoverpa armigera*

**Common Name**  
cotton bollworm

**Synonyms**  
Heliothis (*Helicoverpa*) armigera; Heliothis armigera; cotton bollworm; American bollworm; corn ear worm; scarce bordered straw; tobacco budworm; *Helicoverpa armigera* (Hubner, 1808)

**Rank**  
species

**Lineage**  
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Amphimesnoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Ditrysia; Obtectomera; Noctuoidea; Noctuidae; Heliothinae; *Helicoverpa*

**Parent**  
*Helicoverpa* () - (Rank: genus)

**NCBI Taxonomy ID**  
29058

**is Taxon A an Intraspecies?**  
No

### Taxon B

**Latin Name**  
*Helicoverpa armigera*

**Common Name**  
cotton bollworm

**Synonyms**  
Heliothis (*Helicoverpa*) armigera; Heliothis armigera; cotton bollworm; American bollworm; corn ear worm; scarce bordered straw; tobacco budworm; *Helicoverpa armigera* (Hubner, 1808)

**Rank**  
species

**Lineage**  
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Amphimesnoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Ditrysia; Obtectomera; Noctuoidea; Noctuidae; Heliothinae; *Helicoverpa*

**Parent**  
*Helicoverpa* () - (Rank: genus)

**NCBI Taxonomy ID**  
29058

**is Taxon B an Intraspecies?**  
No

## GENOTYPIC CHANGE

**Generic Gene Name**  
ABCA2

**Synonyms**  
-

**String**  
-

**Sequence Similarities**  
-

**GO - Molecular Function**  
GO:0005524 : ATP binding  
GO:0042626 : ATPase activity, coupled to transmembrane movement of substances

**GO - Biological Process**  
-

**GO - Cellular Component**  
GO:0016021 : integral component of membrane

**Presumptive Null**

**UniProtKB *Helicoverpa armigera***  
A0A0S0G7V0

**GenebankID or UniProtKB**

Yes

#### Molecular Type

Coding

#### Aberration Type

Insertion

#### Insertion Size

1-10 kb

#### Molecular Details of the Mutation

Insertion of a LTR retrotransposon

#### Experimental Evidence

Candidate Gene

#### Main Reference

Identification and molecular detection of a deletion mutation responsible for a truncated cadherin of *Helicoverpa armigera*. (2006)

#### Authors

Yang Y; Chen H; Wu S; Yang Y; Xu X; Wu Y

#### Abstract

Cadherins are a class of receptor proteins for *Bacillus thuringiensis* Cry1A toxins. Disruption of a cadherin gene (Ha\_BtR) is associated with Cry1Ac resistance in the cotton bollworm *Helicoverpa armigera* [Xu, X., Yu, L., Wu, Y., 2005. Disruption of a cadherin gene associated with resistance to Cry1Ac delta-endotoxin of *B. thuringiensis* in *H. armigera*. *Appl. Environ. Microbiol.* 71, 948-954]. Determination of the genomic DNA sequences of Ha\_BtR gene showed that the wild type Ha\_BtR coding sequence is comprised of 34 exons. A deletion between Exon 8 and Exon 25 was found to be responsible for a truncated cadherin in the Cry1Ac-resistant GYBT strain of *H. armigera*. The mutant allele of Ha\_BtR (r1) has two possible transcription variants, both of which produce the same truncated protein. A DNA-based detection method specific to the r1 allele was developed. This study will facilitate the monitoring of cadherin mutant frequency in field populations of *H. armigera*.

#### Additional References

Diverse cadherin mutations conferring resistance to *Bacillus thuringiensis* toxin Cry1Ac in *Helicoverpa armigera*. (2010)

## RELATED GEPHE

#### Related Genes

2 (ABCA2, BTR1- Cadherin-like protein)

#### Related Haplotypes

7

## EXTERNAL LINKS

## COMMENTS

@TE Parallelism: repeated loss-of-function