

GEPHE SUMMARY

	Gephebase Gene	GephelD
Ha_BtR (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^Ha_BtR^#gephebase-summary-title)	GP00000429	Main curator
Published	Entry Status	Martin

PHENOTYPIC CHANGE

Trait Category		
Physiology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Physiology^#gephebase-summary-title)		
Xenobiotic resistance (insecticide; Bt Cry1Ac toxin) (https://www.gephebase.org/search-criteria?/and+Trait=^Xenobiotic+resistance+(insecticide;+Bt+Cry1Ac+toxin)^#gephebase-summary-title)	Trait	
Helicoverpa armigera - Bt-Cry1Ac susceptible	Trait State in Taxon A	
Helicoverpa armigera - Bt-Cry1Ac resistant	Trait State in Taxon B	
Taxon A	Ancestral State	
Taxonomic Status		
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Intraspecific^#gephebase-summary-title)		
Taxon A		Taxon B
Latin Name		Latin Name
Helicoverpa armigera (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Helicoverpa+armigera^#gephebase-summary-title)		Helicoverpa armigera (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Helicoverpa+armigera^#gephebase-summary-title)
Common Name		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)		Heliothis (Helicoverpa) armigera; Heliothis armigera; cotton bollworm; American bollworm; corn ear worm; scarce bordered straw; tobacco budworm; Helicoverpa armigera (Hubner, 1808)
Rank		Rank
species	Lineage	
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Amphiesmenoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Ditrysia; Obtectomera; Noctuoidea; Noctuidae; Heliothinae; Helicoverpa		cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Amphiesmenoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Ditrysia; Obtectomera; Noctuoidea; Noctuidae; Heliothinae; Helicoverpa
Parent		Parent
Helicoverpa () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7112)		Helicoverpa () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7112)
NCBI Taxonomy ID		NCBI Taxonomy ID
29058 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 29058)		29058 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 29058)
No	is Taxon A an Infraspecies?	is Taxon B an Infraspecies?
	No	

GENOTYPIC CHANGE

ABCA2	Generic Gene Name	UniProtKB Helicoverpa armigera
-	Synonyms	AoAoSoG7V0 (http://www.uniprot.org/uniprot/AoAoSoG7V0)
-	String	GenebankID or UniProtKB
-	Sequence Similarities	0
-	GO - Molecular Function	
GO:0005524 : ATP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005524)		
GO:0042626 : ATPase activity, coupled to transmembrane movement of substances (https://www.ebi.ac.uk/QuickGO/term/GO:0042626)		
-	GO - Biological Process	
-		

GO - Cellular Component

GO:0016021 : integral component of membrane

(<https://www.ebi.ac.uk/QuickGO/term/GO:0016021>)

Presumptive Null

Yes (<https://www.gephebase.org/search-criteria?/and+Presumptive+Null=%Yes%#gephebase-summary-title>)

Molecular Type

Coding (<https://www.gephebase.org/search-criteria?/and+Molecular+Type=%Coding%#gephebase-summary-title>)

Aberration Type

Insertion (<https://www.gephebase.org/search-criteria?/and+Aberration+Type=%Insertion%#gephebase-summary-title>)

Insertion Size

1-10 kb

Molecular Details of the Mutation

Insertion of a LTR retrotransposon

Experimental Evidence

Candidate Gene (<https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=%Candidate+Gene%#gephebase-summary-title>)

Main Reference

Identification and molecular detection of a deletion mutation responsible for a truncated cadherin of *Helicoverpa armigera*. (2006) (<https://pubmed.ncbi.nlm.nih.gov/16935222>)

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) (<https://pubmed.ncbi.nlm.nih.gov/20079435>)

RELATED GEPHE

Related Genes

6 (ABCA2, Aminopeptidase N (APN), cadherin, CYP337B3, para (kdr), tetraspanin) (<https://www.gephebase.org/search-criteria?/or+Taxon+ID=%29058%and+Trait=Xenobiotic+resistance/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

7 (https://www.gephebase.org/search-criteria?/or+Gene+Gephebase=%Ha_BtR%and+Taxon+ID=%29058%or+Gene+Gephebase=%Ha_BtR%and+Taxon+ID=%29058%#gephebase-summary-title)

EXTERNAL LINKS

COMMENTS

@TE Parallelism: repeated loss-of-function