

GEPHE SUMMARY

Ha_BtR (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase+Ha_BtR+Gephebase-summary-title)	Gephebase Gene	GP00000427	GepheID
Published	Entry Status	Martin	Main curator

PHENOTYPIC CHANGE

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

GENOTYPIC CHANGE

ABCA2	Generic Gene Name	A0A0S0G7V0 (http://www.uniprot.org/uniprot/A0A0S0G7V0)	UniProtKB Helicoverpa armigera
-	Synonyms		GenebankID or UniProtKB
-	String		
-	Sequence Similarities		
-	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:0016021 : integral component of membrane
<https://www.ebi.ac.uk/QuickGO/term/GO:0016021>

Yes (https://www.gephebase.org/search-criteria?/and+Presumptive Null=~Yes^#gephebase-summary-title)	Presumptive Null
Coding (https://www.gephebase.org/search-criteria?/and+Molecular Type=~Coding^#gephebase-summary-title)	Molecular Type
Deletion (https://www.gephebase.org/search-criteria?/and+Aberration Type=~Deletion^#gephebase-summary-title)	Aberration Type
10-100 kb	Deletion Size
10kb deletion	Molecular Details of the Mutation
Candidate Gene (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=~Candidate Gene^#gephebase-summary-title)	Experimental Evidence
Disruption of a cadherin gene associated with resistance to Cry1Ac (Δ)-endotoxin of <i>Bacillus thuringiensis</i> in <i>Helicoverpa armigera</i> . (2005) (https://pubmed.ncbi.nlm.nih.gov/15691952)	Main Reference
Xu X; Yu L; Wu Y	Authors
A laboratory strain (GY) of <i>Helicoverpa armigera</i> (Hubner) was established from surviving larvae collected from transgenic cotton expressing a <i>Bacillus thuringiensis</i> var. <i>kurstaki</i> insecticidal protein (Bt cotton) in Gaoyang County, Hebei Province, People's Republic of China, in 2001. The GYBT strain was derived from the GY strain through 28 generations of selection with activated Cry1Ac delivered by diet surface contamination. When resistance to Cry1Ac in the GYBT strain increased to 564-fold after selection, we detected high levels of cross-resistance to Cry1Aa (103-fold) and Cry1Ab (>46-fold) in the GYBT strain with reference to those in the GY strain. The GYBT strain had a low level of cross-resistance to <i>B. thuringiensis</i> var. <i>kurstaki</i> formulation (Btk) (5-fold) and no cross-resistance to Cry2Aa (1.4-fold). Genetic analysis showed that Cry1Ac resistance in the GYBT strain was controlled by one autosomal and incompletely recessive gene. The cross-resistance pattern and inheritance mode suggest that the Cry1Ac resistance in the GYBT strain of <i>H. armigera</i> belongs to "mode 1," the most common type of lepidopteran resistance to <i>B. thuringiensis</i> toxins. A cadherin gene was cloned and sequenced from both the GY and GYBT strains. Disruption of the cadherin gene by a premature stop codon was associated with a high level of Cry1Ac resistance in <i>H. armigera</i> . Tight linkage between Cry1Ac resistance and the cadherin locus was observed in a backcross analysis. Together with previous evidence found with <i>Heliothis virescens</i> and <i>Pectinophora gossypiella</i> , our results confirmed that the cadherin gene is a preferred target for developing DNA-based monitoring of <i>B. thuringiensis</i> resistance in field populations of lepidopteran pests.	Abstract
Diverse cadherin mutations conferring resistance to <i>Bacillus thuringiensis</i> toxin Cry1Ac in <i>Helicoverpa armigera</i> . (2010) (https://pubmed.ncbi.nlm.nih.gov/20079435)	Additional References
Identification and molecular detection of a deletion mutation responsible for a truncated cadherin of <i>Helicoverpa armigera</i> . (2006) (https://pubmed.ncbi.nlm.nih.gov/16935222)	

RELATED GEPHE

2 (ABCA2, BTR1- Cadherin-like protein) (https://www.gephebase.org/search-criteria?/or+Taxon ID=~29058^/and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gephebase-summary-title)	Related Genes
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)	Related Haplotypes

EXTERNAL LINKS

COMMENTS

Parallelism: repeated loss-of-function