

## GEPHE SUMMARY

CYP337B3 ( <a href="https://www.gephebase.org/search-criteria?/and+GeneGephebase=CYP337B3#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+GeneGephebase=CYP337B3#gephebase-summary-title</a> )	Gephebase Gene	GP00002478	GepheID
Published	Entry Status	Courtier	Main curator

## PHENOTYPIC CHANGE

Physiology ( <a href="https://www.gephebase.org/search-criteria?/and+TraitCategory=Physiology#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+TraitCategory=Physiology#gephebase-summary-title</a> )	Trait Category		
Xenobiotic resistance (insecticide; pyrethroid) ( <a href="https://www.gephebase.org/search-criteria?/and+Trait=Xenobiotic%20resistance%20(insecticide;pyrethroid)#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait=Xenobiotic resistance (insecticide; pyrethroid)#gephebase-summary-title</a> )	Trait		
Helicoverpa armigera - susceptible	Trait State in Taxon A		
Helicoverpa armigera - resistant strain from Pakistan	Trait State in Taxon B		
	Ancestral State		
Taxon A	Taxonomic Status		
Intraspecific ( <a href="https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=Intraspecific#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=Intraspecific#gephebase-summary-title</a> )			
	Taxon A		Taxon B
	Latin Name		Latin Name
Helicoverpa armigera ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon%20and%20Synonyms=Helicoverpa%20armigera#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=Helicoverpa armigera#gephebase-summary-title</a> )		Helicoverpa armigera ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon%20and%20Synonyms=Helicoverpa%20armigera#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=Helicoverpa armigera#gephebase-summary-title</a> )	
	Common Name		Common Name
cotton bollworm		cotton bollworm	
	Synonyms		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		species	
	Lineage		Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Amphimesenoptera; 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; Amphimesenoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Ditrysia; Obtectomera; Noctuoidea; Noctuidae; Heliothinae; Helicoverpa	
	Parent		Parent
Helicoverpa () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7112">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7112</a> )		Helicoverpa () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7112">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7112</a> )	
	NCBI Taxonomy ID		NCBI Taxonomy ID
29058 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=29058">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=29058</a> )		29058 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=29058">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=29058</a> )	
	is Taxon A an Intraspecies?		is Taxon B an Intraspecies?
No		No	

## GENOTYPIC CHANGE

CYP337B3	Generic Gene Name	UniProtKB Helicoverpa armigera
-	Synonyms	A0A0H3V333 ( <a href="http://www.uniprot.org/uniprot/A0A0H3V333">http://www.uniprot.org/uniprot/A0A0H3V333</a> ) GenebankID or UniProtKB Helicoverpa armigera
-	String	A0A0H3V333 ( <a href="https://www.ncbi.nlm.nih.gov/nucleotide/A0A0H3V333">https://www.ncbi.nlm.nih.gov/nucleotide/A0A0H3V333</a> )
	Sequence Similarities	
Belongs to the cytochrome P450 family.		
	GO - Molecular Function	
GO:0020037 : heme binding ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0020037">https://www.ebi.ac.uk/QuickGO/term/GO:0020037</a> )		
GO:0005506 : iron ion binding ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0005506">https://www.ebi.ac.uk/QuickGO/term/GO:0005506</a> )		
GO:0004497 : monooxygenase activity ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0004497">https://www.ebi.ac.uk/QuickGO/term/GO:0004497</a> )		
GO:0016705 : oxidoreductase activity, acting on paired donors, with incorporation or		

reduction of molecular oxygen (<https://www.ebi.ac.uk/QuickGO/term/GO:0016705>)  
GO - Biological Process

-  
GO - Cellular Component

GO:0005789 : endoplasmic reticulum membrane  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0005789>)

Presumptive Null

No (<https://www.gephebase.org/search-criteria?/and+Presumptive Null=^No^#gephebase-summary-title>)

Molecular Type

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

Aberration Type

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

Molecular Details of the Mutation

The P450 chimeric gene CYP337B3 arose from unequal crossing-over between two parental P450 genes CYP337B2 and CYP337B1 . CYP337B3 can metabolize pyrethroids in vitro. Neither parental enzyme has the ability to metabolize pyrethroids in vitro. The Pakistani and the Australian CYP337B3 alleles differ by 18 synonymous and three nonsynonymous SNPs and additionally in the length and sequence of the intron.

Experimental Evidence

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

Main Reference

An independent occurrence of the chimeric P450 enzyme CYP337B3 of *Helicoverpa armigera* confers cypermethrin resistance in Pakistan . (2014 )  
(<https://pubmed.ncbi.nlm.nih.gov/00000000.000022>)

Authors

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Abstract

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Additional References

Multiple recombination events between two cytochrome P450 loci contribute to global pyrethroid resistance in *Helicoverpa armigera*. (2018) (<https://pubmed.ncbi.nlm.nih.gov/30383872>)

## RELATED GEPHE

Related Genes

6 (ABCA2, Aminopeptidase N (APN), cadherin, Ha\_BtR, 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=^CYP337B3^/and+Taxon ID=^29058^/or+Gene Gephebase=^CYP337B3^/and+Taxon ID=^29058^#gephebase-summary-title>)

## EXTERNAL LINKS

## COMMENTS

@Parallelism - Resistance to pyrethroids as a result from the formation of a chimeric P450 gene CYP337B3 has arisen multiple times during evolution of the cotton bollworm *H. armigera*.