

## GEPHE SUMMARY

CYP337B3 ( <a href="https://www.gephebase.org/search-criteria?/and+Gene">https://www.gephebase.org/search-criteria?/and+Gene</a> Gephebase=^CYP337B3^#gephebase-summary-title)	Gephebase Gene	GP00002479	GepheID
	Entry Status	Courtier	Main curator
Published			

## PHENOTYPIC CHANGE

Trait Category	
Physiology ( <a href="https://www.gephebase.org/search-criteria?/and+Trait">https://www.gephebase.org/search-criteria?/and+Trait</a> Category=^Physiology^#gephebase-summary-title)	Trait
Xenobiotic resistance (insecticide; pyrethroid) ( <a href="https://www.gephebase.org/search-criteria?/and+Trait=^Xenobiotic+resistance+(insecticide;+pyrethroid)^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait=^Xenobiotic+resistance+(insecticide;+pyrethroid)^#gephebase-summary-title</a> )	
Helicoverpa armigera - susceptible	Trait State in Taxon A
Helicoverpa armigera - resistant strain from China - allele CYP337B3v2	Trait State in Taxon B
Taxon A	Ancestral State
Taxonomic Status	
Intraspecific ( <a href="https://www.gephebase.org/search-criteria?/and+Taxonomic">https://www.gephebase.org/search-criteria?/and+Taxonomic</a> Status=^Intraspecific^#gephebase-summary-title)	

Taxon A	Latin Name	Taxon B	Latin Name
Helicoverpa armigera ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Helicoverpa+armigera^#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+and+Synonyms=^Helicoverpa+armigera^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Helicoverpa+armigera^#gephebase-summary-title</a> )	
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; Amphiesmenoptera; 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; Amphiesmenoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Ditrysia; Obtectomera; Noctuoidea; Noctuidae; Heliothinae; Helicoverpa	Lineage
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> )	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> )	Parent
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> )	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> )	NCBI Taxonomy ID
No	is Taxon A an Infraspecies?	No	is Taxon B an Infraspecies?

## GENOTYPIC CHANGE

CYP337B3	Generic Gene Name	UniProtKB Helicoverpa armigera A0A0H3V333 ( <a href="http://www.uniprot.org/uniprot/A0A0H3V333">http://www.uniprot.org/uniprot/A0A0H3V333</a> )
-	Synonyms	GenebankID or UniProtKB Helicoverpa armigera
-	String	A0A0H3V333 ( <a href="https://www.ncbi.nlm.nih.gov/nuccore/A0A0H3V333">https://www.ncbi.nlm.nih.gov/nuccore/A0A0H3V333</a> )
Belongs to the cytochrome P450 family.	Sequence Similarities	
	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		

GO - Cellular Component

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

Presumptive Null

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

Molecular Type

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

Aberration Type

Complex Change (<https://www.gepheebase.org/search-criteria?/and+Aberration+Type=^Complex+Change^#gepheebase-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. Sequence analysis revealed a distinct CYP337B3 allele (CYP337B3v2) in the Pakistani population and three distinct alleles in the Chinese populations (CYP337B3v2 CYP337B3v3 CYP337B3v4) that differ from the Australian allele (CYP337B3v1) by a number of synonymous and non-synonymous SNPs in addition to variability of the intron sequence and size. This variation may result from different crossing-over positions during recombination of the CYP337B1 and CYP337B2 parental genes with different alleles of CYP337B1 and CYP337B2 involved in the crossing-over.

Experimental Evidence

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

Main Reference

Variation in P450-mediated fenvalerate resistance levels is not correlated with CYP337B3 genotype in Chinese populations of *Helicoverpa armigera*. (2015)  
(<https://pubmed.ncbi.nlm.nih.gov/00000000.000023>)

Authors

Han Yangchun; Yu Wanting; Zhang Weiqing; Yang Yihua; Walsh Tom; Oakeshott John G; Wu Yidong

Abstract

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

Additional References

## RELATED GEPHE

### Related Genes

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

### Related Haplotypes

7 (<https://www.gepheebase.org/search-criteria?/or+Gene+Gephebase=^CYP337B3^/and+Taxon+ID=^29058^/or+Gene+Gephebase=^CYP337B3^/and+Taxon+ID=^29058^#gepheebase-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*.