

## GEPHE SUMMARY

	Gephebase Gene		GepheID
Acetylcholinesterase (Ace-2) ( <a href="https://www.gephebase.org/search-criteria?/and+Gene">https://www.gephebase.org/search-criteria?/and+Gene</a> )		GP00002578	
Gephebase= <sup>^</sup> Acetylcholinesterase (Ace-2) <sup>^</sup> #gephebase-summary-title			Main curator
Published	Entry Status	Courtier	

## 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= <sup>^</sup> Physiology <sup>^</sup> #gephebase-summary-title	Trait		
Xenobiotic resistance (insecticide) ( <a href="https://www.gephebase.org/search-criteria?/and+Trait">https://www.gephebase.org/search-criteria?/and+Trait</a> )			
criteria= <sup>^</sup> Xenobiotic resistance (insecticide) <sup>^</sup> #gephebase-summary-title	Trait State in Taxon A		
Haematobia irritans - sensitive			
	Trait State in Taxon B		
Haematobia irritans - resistant			
	Ancestral State		
Taxon A			
	Taxonomic Status		
Intraspecific ( <a href="https://www.gephebase.org/search-criteria?/and+Taxonomic">https://www.gephebase.org/search-criteria?/and+Taxonomic</a> )			
Status= <sup>^</sup> Intraspecific <sup>^</sup> #gephebase-summary-title			
	Taxon A	Taxon B	
	Latin Name		Latin Name
Haematobia irritans		Haematobia irritans	
( <a href="https://www.gephebase.org/search-criteria?/and+Taxon">https://www.gephebase.org/search-criteria?/and+Taxon</a> and Synonyms= <sup>^</sup> Haematobia irritans <sup>^</sup> #gephebase-summary-title)		( <a href="https://www.gephebase.org/search-criteria?/and+Taxon">https://www.gephebase.org/search-criteria?/and+Taxon</a> and Synonyms= <sup>^</sup> Haematobia irritans <sup>^</sup> #gephebase-summary-title)	
	Common Name		Common Name
horn fly		horn fly	
	Synonyms		Synonyms
Lyperosia irritans; horn fly; Haematobia irritans (Linnaeus, 1758); Haematobia irritans		Lyperosia irritans; horn fly; Haematobia irritans (Linnaeus, 1758); Haematobia irritans	
	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; Diptera; Brachycera; Muscomorpha; Eremoneura; Cyclorrhapha; Schizophora; Calypratae; Muscoidea; Muscidae; Muscinae; Stomoxiyini; Haematobia		cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Diptera; Brachycera; Muscomorpha; Eremoneura; Cyclorrhapha; Schizophora; Calypratae; Muscoidea; Muscidae; Muscinae; Stomoxiyini; Haematobia	
	Parent		Parent
Haematobia () - (Rank: genus)		Haematobia () - (Rank: genus)	
( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7367">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7367</a> )		( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7367">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7367</a> )	
	NCBI Taxonomy ID		NCBI Taxonomy ID
7368		7368	
( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7368">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7368</a> )		( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7368">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7368</a> )	
	is Taxon A an Intraspecies?		is Taxon B an Intraspecies?
No		No	

## GENOTYPIC CHANGE

	Generic Gene Name		UniProtKB Drosophila melanogaster
Ace		P07140 ( <a href="http://www.uniprot.org/uniprot/P07140">http://www.uniprot.org/uniprot/P07140</a> )	
	Synonyms		GenebankID or UniProtKB
AcChE; ace; ACE; ace-2; ache; AchE; AChE; CG17907; CHE; dAChE; dmAChE; DmAChE; Dmel\CG17907; Dm_ace; FBgn0000024; I(3)26; I(3)87Ed		()	
	String		
7227.FBpp0289713			
( <a href="http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0289713">http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0289713</a> )			
	Sequence Similarities		
Belongs to the type-B carboxylesterase/lipase family.			
	GO - Molecular Function		
GO:0042803 : protein homodimerization activity			
( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0042803">https://www.ebi.ac.uk/QuickGO/term/GO:0042803</a> )			
GO:0003990 : acetylcholinesterase activity			
( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0003990">https://www.ebi.ac.uk/QuickGO/term/GO:0003990</a> )			
GO:0004104 : cholinesterase activity ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0004104">https://www.ebi.ac.uk/QuickGO/term/GO:0004104</a> )			

GO:0043199 : sulfate binding (<https://www.ebi.ac.uk/QuickGO/term/GO:0043199>)  
GO - Biological Process

GO:0006581 : acetylcholine catabolic process  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0006581>)  
GO:0001507 : acetylcholine catabolic process in synaptic cleft  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0001507>)  
GO:0007268 : chemical synaptic transmission  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007268>)  
GO:0042426 : choline catabolic process  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0042426>)  
GO:0042331 : phototaxis (<https://www.ebi.ac.uk/QuickGO/term/GO:0042331>)

GO - Cellular Component

GO:0005886 : plasma membrane (<https://www.ebi.ac.uk/QuickGO/term/GO:0005886>)  
GO:0005737 : cytoplasm (<https://www.ebi.ac.uk/QuickGO/term/GO:0005737>)  
GO:0031225 : anchored component of membrane  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0031225>)  
GO:0030054 : cell junction (<https://www.ebi.ac.uk/QuickGO/term/GO:0030054>)  
GO:0043083 : synaptic cleft (<https://www.ebi.ac.uk/QuickGO/term/GO:0043083>)

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

Presumptive Null

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

Molecular Type

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

Aberration Type

Nonsynonymous

SNP Coding Change

G227A

Molecular Details of the Mutation

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

Experimental Evidence

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	Gly	Ala	227

Main Reference

Acetylcholinesterase mutation in diazinon-resistant *Haematobia irritans* (L.) (Diptera: Muscidae). (2008) (<https://pubmed.ncbi.nlm.nih.gov/18472339>)

Authors

Temeyer KB; Li AY; Lohmeyer KH; Chen AC; Olafson PU; Sanson DW; Foil LD

Abstract

Acetylcholinesterase (AChE) cDNA from individual field-collected diazinon-resistant horn flies was amplified by RT-PCR. Sequencing of the amplification products revealed that 8/12 of the diazinon-resistant horn flies contained a point mutation previously associated with resistance to organophosphates in house flies and *Drosophila*, strongly suggesting that this cDNA encodes the AChE that is the target site for organophosphate (OP) pesticide. The point mutation (G262A) resulted in a shift from glycine to alanine in the mature HiAChE amino acid sequence at position 262. Allele-specific PCR and RLFP assays were developed to diagnose the presence or absence of the G262A mutation in individual flies. Use of the allele-specific assays each demonstrated the presence of the G262A mutation in 10 of 12 individual field-collected flies, demonstrating higher sensitivity than direct sequencing of RT-PCR amplification products. The G262A mutation was found in additional fly populations previously characterized as OP-resistant, further supporting that this AChE is the target site for OP pesticide. The allele-specific assay is a useful tool for quantitative assay of the resistance allele in horn fly populations.

Additional References

Genotype to phenotype, the molecular and physiological dimensions of resistance in arthropods. (2015) (<https://pubmed.ncbi.nlm.nih.gov/26047113>)

## RELATED GEPHE

Related Genes

2 (para (kdr), resistance to dieldrin) (<https://www.gephebase.org/search-criteria?/or+Taxon+ID=~7368^/and+Trait=Xenobiotic+resistance/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

No matches found.

## EXTERNAL LINKS

## COMMENTS

