

GEPHE SUMMARY

	Gephebase Gene		GepheID
Acetylcholinesterase (Ace-2) (https://www.gephebase.org/search-criteria?/and+Gene)		GP00002583	
Gephebase= [^] Acetylcholinesterase (Ace-2) [^] #gephebase-summary-title			Main curator
Published	Entry Status	Courtier	

PHENOTYPIC CHANGE

	Trait Category	
Physiology (https://www.gephebase.org/search-criteria?/and+Trait)		
Category= [^] Physiology [^] #gephebase-summary-title		
	Trait	
Xenobiotic resistance (insecticide) (https://www.gephebase.org/search-criteria?/and+Trait)		
criteria= [^] Xenobiotic resistance (insecticide) [^] #gephebase-summary-title		
	Trait State in Taxon A	
Cochliomyia hominivorax - sensitive		
	Trait State in Taxon B	
Cochliomyia hominivorax - resistant		
	Ancestral State	
Taxon A		
	Taxonomic Status	
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic)		
Status= [^] Intraspecific [^] #gephebase-summary-title		

Taxon A	Latin Name	Taxon B	Latin Name
Cochliomyia hominivorax (https://www.gephebase.org/search-criteria?/and+Taxon)		Cochliomyia hominivorax (https://www.gephebase.org/search-criteria?/and+Taxon)	
hominivorax [^] #gephebase-summary-title		hominivorax [^] #gephebase-summary-title	
	Common Name		Common Name
primary screw-worm		primary screw-worm	
	Synonyms		Synonyms
primary screw-worm; Cochliomyia hominivorax (Coquerel, 1858)		primary screw-worm; Cochliomyia hominivorax (Coquerel, 1858)	
	Rank		Rank
species		species	
	Lineage		Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Endopterygota; Diptera; Brachycera; Muscomorpha; Eremoneura; Cyclorrhapha; Schizophora; Calypratae; Oestroidea; Calliphoridae; Chrysomyinae; Chrysomyini; Cochliomyia		cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Endopterygota; Diptera; Brachycera; Muscomorpha; Eremoneura; Cyclorrhapha; Schizophora; Calypratae; Oestroidea; Calliphoridae; Chrysomyinae; Chrysomyini; Cochliomyia	
	Parent		Parent
Cochliomyia () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=66360)		Cochliomyia () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=66360)	
	NCBI Taxonomy ID		NCBI Taxonomy ID
115425 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=115425)		115425 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=115425)	
	is Taxon A an Intraspecies?		is Taxon B an Intraspecies?
No		No	

GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Drosophila melanogaster
Ace		P07140 (http://www.uniprot.org/uniprot/P07140)
	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 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0289713)		
	Sequence Similarities	
Belongs to the type-B carboxylesterase/lipase family.		
	GO - Molecular Function	
GO:0042803 : protein homodimerization activity (https://www.ebi.ac.uk/QuickGO/term/GO:0042803)		
GO:0003990 : acetylcholinesterase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0003990)		
GO:0004104 : cholinesterase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004104)		

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

F466Y

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	Phe	Tyr	466

Acetylcholinesterase cDNA sequencing and identification of mutations associated with organophosphate resistance in *Cochliomyia hominivorax* (Diptera: Calliphoridae). (2011)
(<https://pubmed.ncbi.nlm.nih.gov/21159442>)

Main Reference

da Silva NM; de Carvalho RA; de Azeredo-Espin AM

Authors

Altered acetylcholinesterase (AChE) has been identified in numerous arthropod species resistant to organophosphate (OP) and carbamate insecticides. The New World screwworm (NWS) *Cochliomyia hominivorax* (Coquere), one of the most important myiasis-causing flies in the Neotropics, has been controlled mainly by the application of OP insecticides in its current geographical distribution. However, few studies have investigated insecticide resistance in this species. Based on previous studies about mutations conferring OP resistance in related dipteran species, AChE cDNA was sequenced allowing a survey for mutations (I298V, G401A, F466Y) in NWS populations. In addition, the G137D mutation in the carboxylesterase E3 gene, also associated with OP resistance, was analyzed in the same NWS populations. Only 2/135 individuals presented an altered AChE gene (F466Y). In contrast, a high frequency of the G137D mutation in the E3 gene was found in some localities of Brazil and Uruguay, while the mutant allele was not found in Cuba, Venezuela or Colombia. These findings suggest that the alteration in the carboxylesterase E3 gene may be one of the main resistance mechanisms selected in this ectoparasite. The knowledge of the frequency of these resistance-associated mutations in the NWS natural populations may contribute to the selection of appropriate chemicals for control as part of pest management strategies.

Abstract

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Additional References

RELATED GEPHE

1 (esterase isozyme E3) (<https://www.gephebase.org/search-criteria?/or+Taxon+ID=~115425^/and+Trait=Xenobiotic+resistance/and+groupHaplotypes=true#gephebase-summary-title>)

Related Genes

No matches found.

Related Haplotypes

EXTERNAL LINKS

COMMENTS

