

## 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> )		GP00002588	
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		
Ceratitis capitata - sensitive			
	Trait State in Taxon B		
Ceratitis capitata - 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
Ceratitis capitata		Ceratitis capitata	
( <a href="https://www.gephebase.org/search-criteria?/and+Taxon">https://www.gephebase.org/search-criteria?/and+Taxon</a> and Synonyms= <sup>^</sup> Ceratitis capitata <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> Ceratitis capitata <sup>^</sup> #gephebase-summary-title)	
	Common Name		Common Name
Mediterranean fruit fly		Mediterranean fruit fly	
	Synonyms		Synonyms
Mediterranean fruit fly; medfly; Ceratitis capitata (Wiedemann, 1824)		Mediterranean fruit fly; medfly; Ceratitis capitata (Wiedemann, 1824)	
	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; Acalypratae; Tephritoidea; Tephritidae; Dacinae; Ceratitidini; Ceratitis; Ceratitis		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; Acalypratae; Tephritoidea; Tephritidae; Dacinae; Ceratitidini; Ceratitis; Ceratitis	
	Parent		Parent
Ceratitis () - (Rank: subgenus)		Ceratitis () - (Rank: subgenus)	
( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=474492">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=474492</a> )		( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=474492">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=474492</a> )	
	NCBI Taxonomy ID		NCBI Taxonomy ID
7213		7213	
( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7213">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7213</a> )		( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7213">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7213</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

Gly328Ala

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	328

Mechanisms of resistance to malathion in the medfly *Ceratitis capitata*. (2008) (<https://pubmed.ncbi.nlm.nih.gov/18625398>)

Main Reference

Magaña A C; Hernández-Crespo P; Brun-Barale A; Couso-Ferrer F; Bride JM; Castañera P; Feyereisen R; Ortego F

Authors

Target site insensitivity and metabolic resistance mediated by esterases have been previously suggested to be involved in resistance to malathion in a field-derived strain (*W*) of *Ceratitis capitata*. In the present study, we have obtained the coding sequence for acetylcholinesterase (AChE) gene (*Ccace*) of *C. capitata*. An allele of *Ccace* carrying only a point mutation Gly328Ala (Torpedo numbering) adjacent to the glutamate of the catalytic triad was found in individuals of the *W* strain. Adult flies homozygotes for this mutant allele showed reduced AChE activity and less sensitivity to inhibition by malaoxon, showing that target site insensitivity is one of the factors of malathion resistance. In addition, all individuals from the resistant *W* strain showed reduced aliesterase activity, which has been associated with specific malathion resistance in higher Diptera. However, the  $\alpha E7$  gene (*CcalphaE7*), sequenced in susceptible and resistant individuals, did not carry any of the mutations associated with organophosphorus insecticide resistance in other Diptera. Another esterase mechanism, perhaps a carboxylesterase selective for malathion, in addition to mutant AChE, thus contributes to malathion resistance in *C. capitata*.

Abstract

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

Additional References

## RELATED GEPHE

No matches found.

Related Genes

No matches found.

Related Haplotypes

## EXTERNAL LINKS

## COMMENTS

@Parallelism

