

## GEPHE SUMMARY

	Gephebase Gene	GephelD
Acetylcholinesterase (Ace-1) ( <a href="https://www.gephebase.org/search-criteria?/and+Gene">https://www.gephebase.org/search-criteria?/and+Gene</a> Gephebase=^Acetylcholinesterase (Ace-1)^#gephebase-summary-title)	GP00002453	Main curator
	Entry Status	Courtier
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) ( <a href="https://www.gephebase.org/search-criteria?/and+Trait=^Xenobiotic+resistance+(insecticide)^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait=^Xenobiotic+resistance+(insecticide)^#gephebase-summary-title</a> )	Trait State in Taxon A	
Chilo suppressalis - sensitive	Trait State in Taxon B	
Chilo suppressalis - 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=^Intraspecific^#gephebase-summary-title)		
Taxon A	Latin Name	Latin Name
Chilo suppressalis ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Chilo+suppressalis^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Chilo+suppressalis^#gephebase-summary-title</a> )		
striped riceborer	Common Name	
Crambus suppressalis; striped riceborer; Asiatic rice borer; striped rice borer; Chilo suppressalis (Walker, 1863); Chilo suppressalis; Chilo suppressalis	Synonyms	
species	Rank	
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Endopterygota; Amphiesmenoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Ditrysia; Obtectomera; Pyraloidea; Crambidae; Crambinae; Chilo	Lineage	
Chilo () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=168630">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=168630</a> )	Parent	
168631 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=168631">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=168631</a> )	NCBI Taxonomy ID	NCBI Taxonomy ID
No	is Taxon A an Infraspecies?	is Taxon B an Infraspecies?

## GENOTYPIC CHANGE

Ace	Generic Gene Name	UniProtKB Drosophila melanogaster
	Synonyms	GenebankID or UniProtKB
AcChE; ace; ACE; ace-2;ache; AchE; AChE; CG17907; CHE; dAChE; dmAChE; DmAChE; Dmel\CG17907; Dm_ace; FBgn0000024; l(3)26; l(3)87Ed	P07140 ( <a href="http://www.uniprot.org/uniprot/P07140">http://www.uniprot.org/uniprot/P07140</a> )	
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> )	String	
Belongs to the type-B carboxylesterase/lipase family.	Sequence Similarities	
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 - Molecular Function	

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>)

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

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

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

an amino acid mutation A314S in Ch-ace1 (corresponding to A201S in *Torpedo californica* AChE) was consistently associated with the occurrence of resistance

Experimental Evidence

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

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	Ala	Ser	201

Main Reference

Mutation in acetylcholinesterase1 associated with triazophos resistance in rice stem borer, *Chilo suppressalis* (Lepidoptera: Pyralidae). (2009) (<https://pubmed.ncbi.nlm.nih.gov/19028456>)

Authors

Jiang X; Qu M; Denholm I; Fang J; Jiang W; Han Z

Abstract

Two full-length genes encoding different acetylcholinesterases (AChEs), designated as Ch-ace1 and Ch-ace2, were cloned from strains of the rice stem borer (*Chilo suppressalis*) susceptible and resistant to the organophosphate insecticide triazophos. Sequence analysis found an amino acid mutation A314S in Ch-ace1 (corresponding to A201 in *Torpedo californica* AChE) that was consistently associated with the occurrence of resistance. This mutation removed an *MspA1* restriction site from the wild type allele. An assay based on restriction fragment length polymorphism (RFLP) analysis was developed to diagnose A314S genotypes in field populations. Results showed a strong correlation between frequencies of the mutation and phenotypic levels of resistance to triazophos. The assay offers a prospect for rapid monitoring of resistance and assisting with the appropriate choice of insecticide for combating damage caused by *C. suppressalis*.

Additional References

## RELATED GEPHE

Related Genes

1 (RYR) (<https://www.gephebase.org/search-criteria?/or+Taxon+ID=^168631^/and+Trait=Xenobiotic+resistance/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

No matches found.

## EXTERNAL LINKS

## COMMENTS

