

GEPHE SUMMARY

esterase type I ( <a +esterase+type+i+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase="+esterase+type+I+"#gephebase-summary-title</a> )	Gephebase Gene	GP00002637	GepheID
Published	Entry Status	Courtier	Main curator

PHENOTYPIC CHANGE

Physiology ( <a +physiology+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait+Category=">https://www.gephebase.org/search-criteria?/and+Trait+Category="+Physiology+"#gephebase-summary-title</a> )	Trait Category		
Xenobiotic resistance (insecticide) ( <a +xenobiotic+resistance+(insecticide)+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait="+Xenobiotic+resistance+(insecticide)+"#gephebase-summary-title</a> )	Trait		
Schizaphis graminum - sensitive	Trait State in Taxon A		
Schizaphis graminum - resistant	Trait State in Taxon B		
Taxon A	Ancestral State		
Intraspecific ( <a +intraspecific+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=">https://www.gephebase.org/search-criteria?/and+Taxonomic+Status="+Intraspecific+"#gephebase-summary-title</a> )	Taxonomic Status		

Taxon A	Latin Name	Taxon B	Latin Name
Schizaphis graminum ( <a +schizaphis+graminum+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Schizaphis+graminum+"#gephebase-summary-title</a> )	Schizaphis graminum ( <a +schizaphis+graminum+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Schizaphis+graminum+"#gephebase-summary-title</a> )	Schizaphis graminum ( <a +schizaphis+graminum+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Schizaphis+graminum+"#gephebase-summary-title</a> )	Schizaphis graminum ( <a +schizaphis+graminum+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Schizaphis+graminum+"#gephebase-summary-title</a> )
greenbug	Common Name	greenbug	Common Name
greenbug	Synonyms	greenbug	Synonyms
species	Rank	species	Rank
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Paraneoptera; Hemiptera; Sternorrhyncha; Aphidomorpha; Aphidoidea; Aphididae; Aphidinae; Aphidini; Schizaphis	Lineage	cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Paraneoptera; Hemiptera; Sternorrhyncha; Aphidomorpha; Aphidoidea; Aphididae; Aphidinae; Aphidini; Schizaphis	Lineage
Schizaphis () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=13261">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=13261</a> )	Parent	Schizaphis () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=13261">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=13261</a> )	Parent
13262 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=13262">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=13262</a> )	NCBI Taxonomy ID	13262 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=13262">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=13262</a> )	NCBI Taxonomy ID
No	is Taxon A an Intraspecies?	No	is Taxon B an Intraspecies?

GENOTYPIC CHANGE

-	Generic Gene Name	P35501 ( <a href="http://www.uniprot.org/uniprot/P35501">http://www.uniprot.org/uniprot/P35501</a> )	UniProtKB Myzus persicae
-	Synonyms	()	GenebankID or UniProtKB
-	String		
-	Sequence Similarities		
Belongs to the type-B carboxylesterase/lipase family.	GO - Molecular Function		
GO:0052689 : carboxylic ester hydrolase activity ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0052689">https://www.ebi.ac.uk/QuickGO/term/GO:0052689</a> )	GO - Biological Process		
-	GO - Cellular Component		
-			Presumptive Null
No ( <a +no+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Presumptive+Null=">https://www.gephebase.org/search-criteria?/and+Presumptive+Null="+No+"#gephebase-summary-title</a> )			Molecular Type

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

Aberration Type

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

Insertion Size

10-100 kb

Molecular Details of the Mutation

The type I esterase is amplified 4- to 8-fold in resistant *S. graminum* and that the amplified sequences contain 5-methylcytosine at MspI/HpaII sites.

Experimental Evidence

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

Main Reference

Amplification and methylation of an esterase gene associated with insecticide-resistance in greenbugs, *Schizaphis graminum* (Rondani) (Homoptera: Aphididae). (1999) (<https://pubmed.ncbi.nlm.nih.gov/10612041>)

Authors

Ono M; Swanson JJ; Field LM; Devonshire AL; Siegfried BD

Abstract

The greenbug aphid, *Schizaphis graminum* (Rondani) has developed resistance to organophosphorus insecticides by the over-production of esterases that have been classified as Type I and Type II. The first twenty N-terminal amino acids of the Type I esterase were determined and used to design an oligonucleotide, which in conjunction with an active site primer derived from conserved sequences of other insect esterases and two internal primers specific for esterases from another aphid species resulted in a 0.85 kb genomic DNA fragment from resistant greenbugs. This was extended by 5' RACE which provided approximately 1.2 kb of the 5' end of the esterase gene. The 5' DNA sequence corresponded to 19 of the 20 known amino acids of the Type I esterase, with the last needing only a one base change (probably resulting from a PCR artifact). Furthermore, the sequence showed very close similarity to the amplified E4/FE4 esterase genes of *Myzus persicae* (Sulzer). A comparison of sequences suggested that the *S. graminum* gene has introns in the same positions as the first two introns of E4/FE4, with the second intron being considerably larger in *S. graminum*. Probing of Southern blots with the 0.85 kb esterase fragment showed that the gene encoding the Type I esterase is amplified 4- to 8-fold in resistant *S. graminum* and that the amplified sequences contain 5-methylcytosine at MspI/HpaII sites, again in agreement with previous findings for *M. persicae* genes.

Additional References

Comparison of esterase gene amplification, gene expression and esterase activity in insecticide susceptible and resistant strains of the brown planthopper, *Nilaparvata lugens* (Stål). (2000) (<https://pubmed.ncbi.nlm.nih.gov/11122475>)

## RELATED GEPHE

No matches found.

Related Genes

No matches found.

Related Haplotypes

## EXTERNAL LINKS

## COMMENTS