

## GEPHE SUMMARY

	Gephebase Gene		GepheID
resistance to dieldrin ( <a href="https://www.gephebase.org/search-criteria?/and+GeneGephebase=^resistance to dieldrin^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+GeneGephebase=^resistance to dieldrin^#gephebase-summary-title</a> )		GP00002561	
Published	Entry Status	Courtier	Main curator

## PHENOTYPIC CHANGE

	Trait Category	
Physiology ( <a href="https://www.gephebase.org/search-criteria?/and+TraitCategory=^Physiology^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+TraitCategory=^Physiology^#gephebase-summary-title</a> )		
	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	
Laodelphax striatellus		
	Trait State in Taxon B	
Laodelphax striatellus - resistant		
	Ancestral State	
Taxon A		
	Taxonomic Status	
Intraspecific ( <a href="https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=^Intraspecific^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=^Intraspecific^#gephebase-summary-title</a> )		

Taxon A	Latin Name	Taxon B	Latin Name
Laodelphax striatellus ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Laodelphax striatellus^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Laodelphax striatellus^#gephebase-summary-title</a> )		Laodelphax striatellus ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Laodelphax striatellus^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Laodelphax striatellus^#gephebase-summary-title</a> )	
Common Name		Common Name	
small brown planthopper		small brown planthopper	
Synonyms		Synonyms	
Laodelphax striatella; small brown planthopper; Laodelphax striatella (Fallen, 1826); Laodelphax striatellus (Fallen, 1826)		Laodelphax striatella; small brown planthopper; Laodelphax striatella (Fallen, 1826); Laodelphax striatellus (Fallen, 1826)	
Rank		Rank	
species		species	
Lineage		Lineage	
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Paraneoptera; Hemiptera; Auchenorrhyncha; Fulgoroforma; Fulgoroidea; Delphacidae; Criomorphinae; Laodelphax		cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Paraneoptera; Hemiptera; Auchenorrhyncha; Fulgoroforma; Fulgoroidea; Delphacidae; Criomorphinae; Laodelphax	
Parent		Parent	
Laodelphax () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=195882">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=195882</a> )		Laodelphax () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=195882">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=195882</a> )	
NCBI Taxonomy ID		NCBI Taxonomy ID	
195883 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=195883">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=195883</a> )		195883 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=195883">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=195883</a> )	
is Taxon A an Infrappecies?		is Taxon B an Infrappecies?	
No		No	

## GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Drosophila melanogaster
Rdl		P25123 ( <a href="http://www.uniprot.org/uniprot/P25123">http://www.uniprot.org/uniprot/P25123</a> )
	Synonyms	GenebankID or UniProtKB
CG10537; CT29555; Dmel\CG10537; DmRdl; DmRDL; gaba; GABA; GABA-R; GABA <sub>R</sub> ; GABA[[A]]; GABA[[A]] receptor; GABA[[A]]-R; GABA[[A]]R; LCCH1; Rdl; rdl; RDL		()
	String	
7227.FBpp0305970 ( <a href="http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0305970">http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0305970</a> )		
	Sequence Similarities	
Belongs to the ligand-gated ion channel (TC 1.A.9) family. Gamma-aminobutyric acid receptor (TC 1.A.9.5) subfamily.		
	GO - Molecular Function	
GO:0004890 : GABA-A receptor activity ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0004890">https://www.ebi.ac.uk/QuickGO/term/GO:0004890</a> )		
GO:0022851 : GABA-gated chloride ion channel activity ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0022851">https://www.ebi.ac.uk/QuickGO/term/GO:0022851</a> )		

GO:0030594 : neurotransmitter receptor activity  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0030594>)

GO - Biological Process

GO:0007165 : signal transduction (<https://www.ebi.ac.uk/QuickGO/term/GO:0007165>)  
GO:0007268 : chemical synaptic transmission  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007268>)  
GO:0034220 : ion transmembrane transport  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0034220>)  
GO:0042493 : response to drug (<https://www.ebi.ac.uk/QuickGO/term/GO:0042493>)  
GO:0050877 : nervous system process  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0050877>)  
GO:0042391 : regulation of membrane potential  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0042391>)  
GO:0006811 : ion transport (<https://www.ebi.ac.uk/QuickGO/term/GO:0006811>)  
GO:0042048 : olfactory behavior (<https://www.ebi.ac.uk/QuickGO/term/GO:0042048>)  
GO:0030431 : sleep (<https://www.ebi.ac.uk/QuickGO/term/GO:0030431>)  
GO:0009612 : response to mechanical stimulus  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0009612>)  
GO:0002121 : inter-male aggressive behavior  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0002121>)  
GO:0050805 : negative regulation of synaptic transmission  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0050805>)  
GO:0042749 : regulation of circadian sleep/wake cycle  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0042749>)  
GO:0090328 : regulation of olfactory learning  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0090328>)

GO - Cellular Component

GO:0016021 : integral component of membrane  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0016021>)  
GO:0005886 : plasma membrane (<https://www.ebi.ac.uk/QuickGO/term/GO:0005886>)  
GO:0005887 : integral component of plasma membrane  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0005887>)  
GO:0030054 : cell junction (<https://www.ebi.ac.uk/QuickGO/term/GO:0030054>)  
GO:0030425 : dendrite (<https://www.ebi.ac.uk/QuickGO/term/GO:0030425>)  
GO:0043005 : neuron projection (<https://www.ebi.ac.uk/QuickGO/term/GO:0043005>)  
GO:0030424 : axon (<https://www.ebi.ac.uk/QuickGO/term/GO:0030424>)  
GO:0045211 : postsynaptic membrane  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0045211>)  
GO:0045202 : synapse (<https://www.ebi.ac.uk/QuickGO/term/GO:0045202>)  
GO:0034707 : chloride channel complex  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0034707>)  
GO:0032589 : neuron projection membrane  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0032589>)  
GO:0032809 : neuronal cell body membrane  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0032809>)

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  
A301N 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	-	-	-

The A2'N mutation of the RDL gamma-aminobutyric acid receptor conferring fipronil resistance in *Laodelphax striatellus* (Hemiptera: Delphacidae). (2011)  
(<https://pubmed.ncbi.nlm.nih.gov/21510217>) Main Reference

Nakao T; Kawase A; Kinoshita A; Abe R; Hama M; Kawahara N; Hirase K Authors

The planthopper *Laodelphax striatellus* (Fallén) (Hemiptera: Delphacidae) is a serious insect pest of rice, *Oryza sativa* L., and has developed resistance to fipronil in Japan. Sequence analysis of *L. striatellus* RDL gamma-aminobutyric acid (GABA) receptor subunit (LS-RDL) genes from a fipronil-resistant population and a fipronil-susceptible strain identified the A2'N mutation (index number for M2 membrane-spanning region), that was previously implicated in fipronil resistance in the planthopper *Sogatella furcifera* (Horváth) (Hemiptera: Delphacidae). Nineteen of 21 fipronil-resistant *L. striatellus* individuals were genotyped as heterozygous for the A2'N mutation, suggesting that this mutation is associated with fipronil resistance and that most fipronil-resistant *L. striatellus* express wild-type and A2'N mutant LS-RDL simultaneously. To confirm the role of the A2'N mutation of LS-RDL, *Drosophila* Mel-2 cells were transfected with wild-type and A2'N mutant LS-RDL genes, either individually or together. A membrane potential assay showed that fipronil had no inhibitory effect at 10 microM on cells transfected with the A2'N mutant LS-RDL gene with or without the wild-type LS-RDL gene. By contrast, the IC50 value of fipronil for wild-type LS-RDL homomers was 14 nM. These results suggest that the Abstract

A2'N mutation of the RDL GABA receptor subunit confers fipronil resistance in *L. striatellus* as well as *S. furcifera*.

Additional References

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

## RELATED GEPHE

2 (Acetylcholinesterase (Ace-1), CYP6FU1) (<https://www.gephebase.org/search-criteria?/or+Taxon ID=^195883^/and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gephebase-summary-title>)

Related Genes

No matches found.

Related Haplotypes

## EXTERNAL LINKS

## COMMENTS