

GEPHE SUMMARY

	Gephebase Gene		GepheID
resistance to dieldrin (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=^resistance to dieldrin^#gephebase-summary-title)		GP00002562	
Published	Entry Status	Courtier	Main curator

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=^Xenobiotic resistance (insecticide)^#gephebase-summary-title)		
	Trait State in Taxon A	
Plutella xylostella		
	Trait State in Taxon B	
Plutella xylostella - resistant lab strain		
	Ancestral State	
Taxon A		
	Taxonomic Status	
Experimental Evolution (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=^Experimental Evolution^#gephebase-summary-title)		

Taxon A	Latin Name	Taxon B	Latin Name
Plutella xylostella (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Plutella xylostella^#gephebase-summary-title)		Plutella xylostella (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Plutella xylostella^#gephebase-summary-title)	
	Common Name		Common Name
diamondback moth		diamondback moth	
	Synonyms		Synonyms
diamondback moth; cabbage moth; Plutella xylostella (Linnaeus, 1758); Putella xylostella		diamondback moth; cabbage moth; Plutella xylostella (Linnaeus, 1758); Putella xylostella	
	Rank		Rank
species		species	
	Lineage		Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Amphimesnoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Ditrysia; Yponomeutoidea; Plutellidae; Plutella		cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Amphimesnoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Ditrysia; Yponomeutoidea; Plutellidae; Plutella	
	Parent		Parent
Plutella () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=51654)		Plutella () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=51654)	
	NCBI Taxonomy ID		NCBI Taxonomy ID
51655 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=51655)		51655 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=51655)	
	is Taxon A an Intraspecies?		is Taxon B an Intraspecies?
No		No	

GENOTYPIC CHANGE

	Generic Gene Name		UniProtKB Drosophila melanogaster
Rdl		P25123 (http://www.uniprot.org/uniprot/P25123)	
	Synonyms		GenebankID or UniProtKB
CG10537; CT29555; Dmel\CG10537; DmRdl; DmRDL; gaba; GABA; GABA-R; GABA _r ; GABA[[A]]; GABA[[A]] receptor; GABA[[A]]-R; GABA[[A]]R; LCCH1; Rdl; rdl; RDL		()	
	String		
7227.FBpp0305970 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0305970)			
	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 (https://www.ebi.ac.uk/QuickGO/term/GO:0004890)			
GO:0022851 : GABA-gated chloride ion channel activity (https://www.ebi.ac.uk/QuickGO/term/GO:0022851)			
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

A302(GGC)--> S302(TCC) 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	GCC	TCC	-
Amino-acid	Ala	Ser	302

Main Reference

Investigation of resistance mechanisms to fipronil in diamondback moth (Lepidoptera: Plutellidae). (2006) (<https://pubmed.ncbi.nlm.nih.gov/16813330>)

Authors

Li A; Yang Y; Wu S; Li C; Wu Y

Abstract

The SZ-F strain of *Plutella xylostella* (L.) (Lepidoptera: Plutellidae) was derived from a field-collected strain (SZ) by 20 generations of continuous selection with fipronil. The selection resulted in 300-fold increase in resistance to fipronil, and 3.5- and 6.5-fold cross-resistance to dieldrin and endosulfan, respectively, in the SZ-F strain compared with the unselected SZ strain. Analysis of detoxification enzyme activities and bioassay with synergists indicated that metabolic mechanisms are not important to fipronil resistance of the SZ-F strain and that the fipronil resistance is most likely attributed to target site insensitivity. The genomic DNA fragments flanking the second membrane-spanning region of Rdl gamma-aminobutyric acid (GABA) receptor gene from *P. xylostella*, PxRdl, were cloned and sequenced. A single allele of the PxRdl gene (encoding A302 or allele PxRdl-Ala) was found in both the Roth (susceptible) and SZ strains. In addition to the wild-type allele PxRdl-Ala, the resistant SZ-F strain carried a mutant PxRdl allele with the conserved amino acid replacement A302(GGC)--> S302(TCC) (allele PxRdl-Ser). The mutant PxRdl-Ser allele frequency in the SZ-F strain was 30%. After treatment of 20 mg/l fipronil on the SZ-F strain, the PxRdl-Ser allele frequency in the survivors increased to 57%. High frequency of the PxRdl-Ala allele remaining in the resistant SZ-F strain suggested that the A302S mutation in the PxRdl gene is partially associated with fipronil resistance and that other mutation(s) in the PxRdl gene or other Rdl-like subunit(s) may contribute to fipronil resistance.

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

RELATED GEPHE

10 (ABCC2, Acetylcholinesterase (Ace-1), Chitin synthase 1 (CHS1), CYP6BG1, FMO2, glutamate-gated chloride channel (GluCl), MAP4K4, nAChR, para (kdr), RYR)
(<https://www.gephebase.org/search-criteria/?or+Taxon+ID=~51655~/and+Trait=Xenobiotic+resistance/and+groupHaplotypes=true#gephebase-summary-title>)

Related Genes

No matches found.

Related Haplotypes

EXTERNAL LINKS

COMMENTS