

## GEPHE SUMMARY

	Gephebase Gene	GephelD
para (kdr) ( <a href="https://www.gephebase.org/search-criteria?/and+Gene Gephebase='para (kdr)'#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Gene Gephebase='para (kdr)'#gephebase-summary-title</a> )	GP00000830	Main curator
Published	Entry Status	Martin

## PHENOTYPIC CHANGE

	Trait Category		
Taxon A	Trait	Taxon B	Latin Name
Cydia pomonella	Trait State in Taxon A	Cydia pomonella	( <a href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms='Cydia pomonella'#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms='Cydia pomonella'#gephebase-summary-title</a> )
Cydia pomonella - resistant	Trait State in Taxon B	Cydia pomonella	( <a href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms='Cydia pomonella'#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms='Cydia pomonella'#gephebase-summary-title</a> )
Taxon A	Ancestral State	Taxon B	Latin Name
Intraspecific ( <a href="https://www.gephebase.org/search-criteria?/and+Taxonomic Status='Intraspecific'#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxonomic Status='Intraspecific'#gephebase-summary-title</a> )	Taxonomic Status	Cydia pomonella	( <a href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms='Cydia pomonella'#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms='Cydia pomonella'#gephebase-summary-title</a> )
Taxon A	Common Name	Taxon B	Common Name
Cydia pomonella	codling moth	Cydia pomonella	codling moth
Taxon A	Synonyms	Taxon B	Synonyms
codling moth; Cydia pomonella (Linnaeus, 1758)		codling moth; Cydia pomonella (Linnaeus, 1758)	
Taxon A	Rank	Taxon B	Rank
species		species	
Taxon A	Lineage	Taxon B	Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Amphiesmenoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Ditrysia; Apoditrysia; Tortricoidea; Tortricidae; Olethreutinae; Grapholitini; Cydia		cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Amphiesmenoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Ditrysia; Apoditrysia; Tortricoidea; Tortricidae; Olethreutinae; Grapholitini; Cydia	
Taxon A	Parent	Taxon B	Parent
Cydia () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 82599">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 82599</a> )		Cydia () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 82599">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 82599</a> )	
82600 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 82600">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 82600</a> )	NCBI Taxonomy ID	82600 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 82600">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 82600</a> )	NCBI Taxonomy ID
No	is Taxon A an Infraspecies?	No	is Taxon B an Infraspecies?

## GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Drosophila melanogaster
para	Synonyms	GenebankID or UniProtKB
bas; bss; CG9907; Dmel\CG9907; DmNav; DmNav1; DmNa[[v]]; DmNa[[V]]; DmNa[[v]]; I(1)14Da; I(1)ESHS48; lincRNA.S9469; Nav1; Ocd; olfD; par; sbl; sbl-1; Shu; Shudderer	P35500 ( <a href="http://www.uniprot.org/uniprot/P35500">http://www.uniprot.org/uniprot/P35500</a> )	0
7227.FBpp0303597 ( <a href="http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 7227.FBpp0303597">http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 7227.FBpp0303597</a> )	String	
	Sequence Similarities	
Belongs to the sodium channel (TC 1.A.1.10) family. Para subfamily.	GO - Molecular Function	
GO:0005509 : calcium ion binding ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0005509">https://www.ebi.ac.uk/QuickGO/term/GO:0005509</a> )		
GO:0005244 : voltage-gated ion channel activity ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0005244">https://www.ebi.ac.uk/QuickGO/term/GO:0005244</a> )		
GO:0005248 : voltage-gated sodium channel activity ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0005248">https://www.ebi.ac.uk/QuickGO/term/GO:0005248</a> )		

GO:0005272 : sodium channel activity

(<https://www.ebi.ac.uk/QuickGO/term/GO:0005272>)

GO - Biological Process

GO:0045433 : male courtship behavior, veined wing generated song production

(<https://www.ebi.ac.uk/QuickGO/term/GO:0045433>)

GO:0001666 : response to hypoxia (<https://www.ebi.ac.uk/QuickGO/term/GO:0001666>)

GO:0009612 : response to mechanical stimulus

(<https://www.ebi.ac.uk/QuickGO/term/GO:0009612>)

GO:0034765 : regulation of ion transmembrane transport

(<https://www.ebi.ac.uk/QuickGO/term/GO:0034765>)

GO:0035725 : sodium ion transmembrane transport

(<https://www.ebi.ac.uk/QuickGO/term/GO:0035725>)

GO:0007638 : mechanosensory behavior

(<https://www.ebi.ac.uk/QuickGO/term/GO:0007638>)

GO:0060078 : regulation of postsynaptic membrane potential

(<https://www.ebi.ac.uk/QuickGO/term/GO:0060078>)

GO - Cellular Component

GO:0005887 : integral component of plasma membrane

(<https://www.ebi.ac.uk/QuickGO/term/GO:0005887>)

GO:0001518 : voltage-gated sodium channel complex

(<https://www.ebi.ac.uk/QuickGO/term/GO:0001518>)

Presumptive Null

No (<https://www.gephebase.org/search-criteria?/and+Presumptive+Null=%27No%27#gephebase-summary-title>)

Molecular Type

Coding (<https://www.gephebase.org/search-criteria?/and+Molecular+Type=%27Coding%27#gephebase-summary-title>)

Aberration Type

SNP (<https://www.gephebase.org/search-criteria?/and+Aberration+Type=%27SNP%27#gephebase-summary-title>)

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

L1014F

Experimental Evidence

Candidate Gene (<https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=%27Candidate+Gene%27#gephebase-summary-title>)

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	-	-	-

Main Reference

Involvement of a sodium channel mutation in pyrethroid resistance in *Cydia pomonella* L, and development of a diagnostic test. (2005) (<https://pubmed.ncbi.nlm.nih.gov/15657957>)

Authors

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Abstract

Populations of the codling moth, *Cydia pomonella* L (Lepidoptera, Tortricidae) have developed resistance to several classes of insecticide such as benzoylureas, juvenile hormone analogues, ecdysone agonists and pyrethroids, but the corresponding resistance mechanisms have not been extensively studied. Knockdown resistance (kdr) to pyrethroid insecticides has been associated with point mutations in the para sodium channel gene in a great variety of insect pest species. We have studied two susceptible strains (S and Sv) and two resistant strains (Rt and Rv) of *C. pomonella* that exhibited 4- and 80-fold resistance ratios to deltamethrin, respectively. The region of the voltage-dependent sodium channel gene which includes the position where kdr and super-kdr mutations have been found in *Musca domestica* L was amplified. The kdr mutation, a leucine-to-phenylalanine replacement at position 1014, was found only in the Rv strain. In contrast, the super-kdr mutation, a methionine-to-threonine replacement at position 918, was not detected in any *C. pomonella* strain. These data allowed us to develop a PCR-based diagnostic test (PASA) to monitor the frequency of the kdr mutation in natural populations of *C. pomonella* in order to define appropriate insecticide treatments in orchards.

Additional References

Multiple origins of the sodium channel kdr mutations in codling moth populations. (2012) (<https://pubmed.ncbi.nlm.nih.gov/22912889>)

## RELATED GEPHE

Related Genes

1 (Acetylcholinesterase (Ace-1)) (<https://www.gephebase.org/search-criteria?/or+Taxon+ID=%2782600%27/and+Trait=Xenobiotic+resistance/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

No matches found.

## EXTERNAL LINKS

## COMMENTS

The mutation likely appeared several times in different haplotypes.