

GEPHE SUMMARY

para (kdr) (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=~para+GP00002501+(kdr)^#gephebase-summary-title)	Gephebase Gene	GepheID
	Entry Status	Courtier
Published		Main curator

PHENOTYPIC CHANGE

Physiology (https://www.gephebase.org/search-criteria?/and+Trait+Category=^Physiology^#gephebase-summary-title)		Trait Category	
Xenobiotic resistance (insecticide) (https://www.gephebase.org/search-criteria?/and+Trait=^Xenobiotic resistance (insecticide)^#gephebase-summary-title)		Trait	
Thrips tabaci		Trait State in Taxon A	
Thrips tabaci - resistant		Trait State in Taxon B	
Taxon A		Ancestral State	
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=^Intraspecific^#gephebase-summary-title)		Taxonomic Status	
Taxon A		Taxon B	
Thrips tabaci (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Thrips tabaci^#gephebase-summary-title)		Thrips tabaci (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Thrips tabaci^#gephebase-summary-title)	
-		-	
Thrips tabaci Lindeman, 1889		Thrips tabaci Lindeman, 1889	
species		species	
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Paraneoptera; Thysanoptera; Terebrantia; Thripodea; Thripidae; Thripinae; Thrips		cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Paraneoptera; Thysanoptera; Terebrantia; Thripodea; Thripidae; Thripinae; Thrips	
Thrips () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=45057)		Thrips () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=45057)	
161014 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=161014)		161014 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=161014)	
is Taxon A an Intraspecies?		is Taxon B an Intraspecies?	
No		No	

GENOTYPIC CHANGE

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

Mutation #1

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

M918L+V1010A

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	Met	Thr	918

Main Reference

Identification of an alternative knockdown resistance (kdr)-like mutation, M918L, and a novel mutation, V1010A, in the Thrips tabaci voltage-gated sodium channel gene. (2014)
(<https://pubmed.ncbi.nlm.nih.gov/23983138>)

Authors

Wu M; Gotoh H; Waters T; Walsh DB; Lavine LC

Abstract

Knockdown resistance (kdr) has been identified as a main mechanism against pyrethroid insecticides in many arthropod pests including in the onion thrips, Thrips tabaci. To characterize and identify pyrethroid-resistance in onion thrips in Washington state, we conducted insecticide bioassays and sequenced a region of the voltage gated sodium channel gene from several different T. tabaci populations.

Field collected Thrips tabaci were found to have large variations in resistance to the pyrethroid insecticide lambda-cyhalothrin. We identified two single nucleotide substitutions in our analysis of a partial sequence of the T. tabaci voltage-gated sodium channel gene. One mutation resulted in the non-synonymous substitution of methionine with leucine (M918L), which is well known to be responsible for super knockdown resistance in some pest species. Another non-synonymous substitution, a valine (GTT) to alanine (GCT) replacement at amino acid 1010 (V1010A) was identified in our study and was associated with lambda-cyhalothrin resistance.

We have characterized a known kdr mutation and identified a novel mutation in the voltage-gated sodium channel gene of Thrips tabaci associated with resistance to lambda-cyhalothrin. This gene region and these mutations are expected to be useful in the development of a diagnostic test to detect kdr resistance in many onion thrips populations.

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Additional References

Molecular biology of insect sodium channels and pyrethroid resistance. (2014) (<https://pubmed.ncbi.nlm.nih.gov/24704279>)

Mutation #2

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

M918T+L1014F

Experimental Evidence

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	Leu	Phe	1014

Identification of an alternative knockdown resistance (kdr)-like mutation, M918L, and a novel mutation, V1010A, in the Thrips tabaci voltage-gated sodium channel gene. (2014) (<https://pubmed.ncbi.nlm.nih.gov/23983138>)

Wu M; Gotoh H; Waters T; Walsh DB; Lavine LC

Knockdown resistance (kdr) has been identified as a main mechanism against pyrethroid insecticides in many arthropod pests including in the onion thrips, Thrips tabaci. To characterize and identify pyrethroid-resistance in onion thrips in Washington state, we conducted insecticide bioassays and sequenced a region of the voltage gated sodium channel gene from several different T. tabaci populations.

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We have characterized a known kdr mutation and identified a novel mutation in the voltage-gated sodium channel gene of Thrips tabaci associated with resistance to lambda-cyhalothrin. This gene region and these mutations are expected to be useful in the development of a diagnostic test to detect kdr resistance in many onion thrips populations.

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Molecular biology of insect sodium channels and pyrethroid resistance. (2014) (<https://pubmed.ncbi.nlm.nih.gov/24704279>)

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

2 ([https://www.gephebase.org/search-criteria?/or+Gene Gephebase=~para \(kdr\)^/and+Taxon ID=~161014~/or+Gene Gephebase=~para \(kdr\)^/and+Taxon ID=~161014~#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Gene Gephebase=~para (kdr)^/and+Taxon ID=~161014~/or+Gene Gephebase=~para (kdr)^/and+Taxon ID=~161014~#gephebase-summary-title))

EXTERNAL LINKS

COMMENTS