

GEPHE SUMMARY

para (kdr) (<a +para+(kdr)^#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase="+para+(kdr)^#gephebase-summary-title)	Gephebase Gene	GP00002493	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)	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)	Trait		
Tetranychus evansi	Trait State in Taxon A		
Tetranychus evansi - 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)	Taxonomic Status		
	Taxon A	Taxon B	
Tetranychus evansi (<a +tetranychus+evansi^#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Tetranychus+evansi^#gephebase-summary-title)	Latin Name	Tetranychus evansi (<a +tetranychus+evansi^#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Tetranychus+evansi^#gephebase-summary-title)	Latin Name
red spider mite	Common Name	red spider mite	Common Name
two-spotted spider mite; red spider mite; Tetranychus evansi	Synonyms	two-spotted spider mite; red spider mite; Tetranychus evansi	Synonyms
species	Rank	species	Rank
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Chelicerata; Arachnida; Acari; Acariformes; Trombidiformes; Prostigmata; Eleutherengona; Raphignathae; Tetranychoidae; Tetranychidae; Tetranychus	Lineage	cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Chelicerata; Arachnida; Acari; Acariformes; Trombidiformes; Prostigmata; Eleutherengona; Raphignathae; Tetranychoidae; Tetranychidae; Tetranychus	Lineage
Tetranychus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32263)	Parent	Tetranychus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32263)	Parent
178897 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=178897)	NCBI Taxonomy ID	178897 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=178897)	NCBI Taxonomy ID
No	is Taxon A an Intraspecies?	No	is Taxon B an Intraspecies?

GENOTYPIC CHANGE

para	Generic Gene Name	P35500 (http://www.uniprot.org/uniprot/P35500)	UniProtKB Drosophila melanogaster
bas; bss; CG9907; Dmel\CG9907; DmNav; DmNav1; DmNa[[v]]; DmNa[[V]]; DmNa[[v]]1; l(1)14Da; l(1)ESH548; lincRNA.S9469; Nav1; Occl; olfD; par; sbl; sbl-1; Shu; Shudderer	Synonyms	()	GenebankID or UniProtKB
7227.FBpp0303597 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0303597)	String		
Belongs to the sodium channel (TC 1.A.1.10) family. Para subfamily.	Sequence Similarities		
GO:0005509 : calcium ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005509)	GO - Molecular Function		
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>)

Presumptive Null

No ([#gpepbase-summary-title](https://www.gephebase.org/search-criteria?/and+Presumptive+Null+No))

Molecular Type

Coding ([#gpepbase-summary-title](https://www.gephebase.org/search-criteria?/and+Molecular+Type+Coding))

Aberration Type

SNP ([#gpepbase-summary-title](https://www.gephebase.org/search-criteria?/and+Aberration+Type+SNP))

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

M918T - first report of the M918T mutation in the absence of L1014F in any arthropod species.

Experimental Evidence

Linkage Mapping ([#gpepbase-summary-title](https://www.gephebase.org/search-criteria?/and+Experimental+Evidence+Linkage+Mapping))

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

Main Reference

Pyrethroid resistance in the tomato red spider mite, *Tetranychus evansi*, is associated with mutation of the para-type sodium channel. (2011) (<https://pubmed.ncbi.nlm.nih.gov/21432985>)

Authors

Nyoni BN; Gorman K; Mzilahowa T; Williamson MS; Navajas M; Field LM; Bass C

Abstract

The tomato red spider mite, *Tetranychus evansi* (Baker and Pritchard), is a serious pest of solanaceous crops in many African countries. In this study an investigation has been conducted to establish whether mutation of the para-type sodium channel underlies pyrethroid resistance in *T. evansi* strains collected in Southern Malawi.

Two *T. evansi* strains from Malawi showed tolerance to the organophosphate chlorpyrifos and resistance (20-40-fold) to the pyrethroid bifenthrin, but were susceptible to two contemporary acaricides (abamectin and fenpyroximate) in insecticide bioassays. Cloning of a 3.1 kb fragment (domains IIS5 to IVS5) of the *T. evansi* para gene from pyrethroid-resistant and pyrethroid-susceptible strains revealed a single non-synonymous mutation in the resistant strains that results in an amino acid substitution (M918T) within the domain II region of the channel. Although novel to mites, this mutation confers high levels of resistance to pyrethroids in several insect species where it has always been associated with another mutation (L1014F). This is the first report of the M918T mutation in the absence of L1014F in any arthropod species. Diagnostic tools were developed that allow sensitive detection of this mutation in individual mites.

This is the first study of pyrethroid resistance in *T. evansi* and provides contemporary information for resistance management of this pest in Southern Malawi.

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Additional References

RELATED GEPHE

Related Genes

1 (Acetylcholinesterase (Ace-1)) (<https://www.gephebase.org/search-criteria?/or+Taxon+ID+178897#/and+Trait=Xenobiotic+resistance/and+groupHaplotypes=true#gpepbase-summary-title>)

Related Haplotypes

No matches found.

EXTERNAL LINKS

