GEPHE SUMMARY

Gephebase Gene
para (kdr) (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^para (kdr)^#gephebase-summary-title)

GepheID
GP00002549

Entry Status
Published

Main curator
Courtier

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
Varroa destructor -sensitive to pyrethroids

Trait State in Taxon B
Varroa destructor - resistant to pyrethroids

Ancestral State
Taxon A

Taxonomic Status
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Intraspecific^#gephebase-summary-title)

Taxon A

Latin Name
Varroa destructor (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Varroa destructor^#gephebase-summary-title)

Common Name
honeybee mite

Synonyms
honeybee mite; honeybee ectoparasitic mite; Varroa destructor Anderson & Trueman, 2000

Rank
species

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Chelicerata; Arachnida; Acari; Parasitiformes; Mesostigmata; Monogynaspida; Gamasina; Dermanyssoidea; Varroidae; Varroa

Parent
Varroa () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 62624)

NCBI Taxonomy ID
109461 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 109461)

is Taxon A an Infraspecies?
No

Taxon B

Latin Name
Varroa destructor (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Varroa destructor^#gephebase-summary-title)

Common Name
honeybee mite

Synonyms
honeybee mite; honeybee ectoparasitic mite; Varroa destructor Anderson & Trueman, 2000

Rank
species

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Chelicerata; Arachnida; Acari; Parasitiformes; Mesostigmata; Monogynaspida; Gamasina; Dermanyssoidea; Varroidae; Varroa

Parent
Varroa () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 62624)

NCBI Taxonomy ID
109461 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 109461)

is Taxon B an Infraspecies?
No

GENOTYPIC CHANGE

Generic Gene Name
para

Synonyms
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

String
7227.FBpp0303597 (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)

UniProtKB Drosophila melanogaster
P35500 (http://www.uniprot.org/uniprot/P35500)

GenebankID or UniProtKB
()

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=^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

F975L

Experimental Evidence

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

	Taxon A	Taxon B	Position
Codon	TTC	CTC	-
Amino-acid	Phe	Leu	925

Main Reference

Point mutations in the sodium channel gene conferring tau-fluvalinate resistance in Varroa destructor. (2014) (https://pubmed.ncbi.nlm.nih.gov/24243563)

Authors

Hubert J; Nesvorna M; Kamler M; Kopecky J; Tyl J; Titera D; Stara J

Abstract

Sodium channels (SCs) in mites and insects are target sites for pesticides, including pyrethroids. Point mutations in the SC gene have been reported to change the structural conformation of the protein and its sensitivity to pesticides. To find mutations in the SC gene of the mite Varroa destructor (VmNa), the authors analysed the VmNa gene sequences available in GenBank and prepared specific primers for the amplification of two fragments containing the regions coding for (i) the domain II S4-S6 region (bp 2805-3337) and (ii) the domain III S4-3′ terminus region (bp 4737-6500), as determined according to the VmNa cDNA sequence AY259834.

Sensitive and resistant mite populations did not differ in the amino acid sequences of the III S4-3′ terminus VmNa region. However, differences were found in the IIS4-IIS6 fragment. In the resistant population, the mutation C(3004)â€‰â†'â€‰G resulted in the substitution L(1002)â€‰â†'â€‰V (codon ctgâ€‰â†'â€‰gtg) at the position equivalent to that of the housefly L925 in the domain II S5 helix. Additionally, the mutation F(1052)â€‰â†'â€‰L (codon ttcâ€‰â†'â€‰ctc) at the position equivalent to that of the housefly F975 in the domain II P-loop connecting segments S5 and S6 was detected in both the resistant and sensitive populations.

All individuals that survived the tau-fluvalinate treatment in the bioassay harboured the L(1002)â€‰â†'â€‰V mutation combined with the F(1052), while dead individuals from both the sensitive and resistant populations harboured mostly the L(1002) residue and either of the two residues at position 1052.

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Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

3 (https://www.gephebase.org/search-criteria?/or+Gene Gephebase=^para (kdr)^/and+Taxon ID=^109461^/or+Gene Gephebase=^para (kdr)^/and+Taxon ID=^109461^#gephebase-summary-title)

EXTERNAL LINKS

COMMENTS