GEPHE SUMMARY

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

GepheID
GP00001860

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 - in samples collected from several locations in Central/ Southern England and in the Czech Republic

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

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

GenebankID or UniProtKB
()

(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=^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

L925V

Experimental Evidence

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

	Taxon A	Taxon B	Position
Codon	CTG	GTG	-
Amino-acid	Leu	Val	925

Main Reference

An amino acid substitution (L925V) associated with resistance to pyrethroids in Varroa destructor. (2013) (https://pubmed.ncbi.nlm.nih.gov/24367572)

Authors

GonzÃ¡lez-Cabrera J; Davies TG; Field LM; Kennedy PJ; Williamson MS

Abstract

The Varroa mite, Varroa destructor, is an important pest of honeybees and has played a prominent role in the decline in bee colony numbers over recent years. Although pyrethroids such as tau-fluvalinate and flumethrin can be highly effective in removing the mites from hives, their intensive use has led to many reports of resistance. To investigate the mechanism of resistance in UK Varroa samples, the transmembrane domain regions of the V. destructor voltage-gated sodium channel (the main target site for pyrethroids) were PCR amplified and sequenced from pyrethroid treated/untreated mites collected at several locations in Central/Southern England. A novel amino acid substitution, L925V, was identified that maps to a known hot spot for resistance within the domain IIS5 helix of the channel protein; a region that has also been proposed to form part of the pyrethroid binding site. Using a high throughput diagnostic assay capable of detecting the mutation in individual mites, the L925V substitution was found to correlate well with resistance, being present in all mites that had survived tau-fluvalinate treatment but in only 8 % of control, untreated samples. The potential for using this assay to detect and manage resistance in Varroa-infected hives is discussed.

Additional References

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

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