GEPHE SUMMARY

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

GepheID
GP00002494

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
Liriomyza huidobrensis

Trait State in Taxon B
Liriomyza huidobrensis - resistant

Ancestral State
Taxon A

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

Taxon A

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

Common Name
pea leafminer

Synonyms
pea leafminer; Liriomyza huidobrensis (Blanchard, 1926)

Rank
species

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Endopterygota; Diptera; Brachycera; Muscomorpha; Eremoneura; Cyclorrhapha; Schizophora; Acalyptratae; Opomyzoidea; Agromyzidae; Phytomyzinae; Liriomyza

Parent
Liriomyza () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 127403)

NCBI Taxonomy ID
127405 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 127405)

is Taxon A an Infraspecies?
No

Taxon B

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

Common Name
pea leafminer

Synonyms
pea leafminer; Liriomyza huidobrensis (Blanchard, 1926)

Rank
species

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Endopterygota; Diptera; Brachycera; Muscomorpha; Eremoneura; Cyclorrhapha; Schizophora; Acalyptratae; Opomyzoidea; Agromyzidae; Phytomyzinae; Liriomyza

Parent
Liriomyza () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 127403)

NCBI Taxonomy ID
127405 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 127405)

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)

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

GenebankID or UniProtKB
()

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

M918T+L1014F

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

DDT, pyrethrins, pyrethroids and insect sodium channels. (2007) (https://pubmed.ncbi.nlm.nih.gov/17487686)

Authors

Davies TG; Field LM; Usherwood PN; Williamson MS

Abstract

The long term use of many insecticides is continually threatened by the ability of insects to evolve resistance mechanisms that render the chemicals ineffective. Such resistance poses a serious threat to insect pest control both in the UK and worldwide. Resistance may result from either an increase in the ability of the insect to detoxify the insecticide or by changes in the target protein with which the insecticide interacts. DDT, the pyrethrins and the synthetic pyrethroids (the latter currently accounting for around 17% of the world insecticide market), act on the voltage-gated sodium channel proteins found in insect nerve cell membranes. The correct functioning of these channels is essential for normal transmission of nerve impulses and this process is disrupted by binding of the insecticides, leading to paralysis and eventual death. Some insect pest populations have evolved modifications of the sodium channel protein which prevent the binding of the insecticide and result in the insect developing resistance. Here we review some of the work (done at Rothamsted Research and elsewhere) that has led to the identification of specific residues on the sodium channel that may constitute the DDT and pyrethroid binding sites.

Additional References

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

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

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

Main Reference

DDT, pyrethrins, pyrethroids and insect sodium channels. (2007) (https://pubmed.ncbi.nlm.nih.gov/17487686)

Authors

Davies TG; Field LM; Usherwood PN; Williamson MS

Abstract

The long term use of many insecticides is continually threatened by the ability of insects to evolve resistance mechanisms that render the chemicals ineffective. Such resistance poses a serious threat to insect pest control both in the UK and worldwide. Resistance may result from either an increase in the ability of the insect to detoxify the insecticide or by changes in the target protein with which the insecticide interacts. DDT, the pyrethrins and the synthetic pyrethroids (the latter currently accounting for around 17% of the world insecticide market), act on the voltage-gated sodium channel proteins found in insect nerve cell membranes. The correct functioning of these channels is essential for normal transmission of nerve impulses and this process is disrupted by binding of the insecticides, leading to paralysis and eventual death. Some insect pest populations have evolved modifications of the sodium channel protein which prevent the binding of the insecticide and result in the insect developing resistance. Here we review some of the work (done at Rothamsted Research and elsewhere) that has led to the identification of specific residues on the sodium channel that may constitute the DDT and pyrethroid binding sites.

Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS