GEPHE SUMMARY

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

GepheID
GP00000841

Entry Status
Published

Main curator
Martin

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
Leptinotarsa decemlineata

Trait State in Taxon B
Leptinotarsa decemlineata - 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
Leptinotarsa decemlineata (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Leptinotarsa decemlineata^#gephebase-summary-title)

Common Name
Colorado potato beetle

Synonyms
Leptinotarsa decimlineata; Stilodes decemlineata; Colorado potato beetle; Leptinotarsa decemlineata (Say, 1824)

Rank
species

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Coleoptera; Polyphaga; Cucujiformia; Chrysomeloidea; Chrysomelidae; Chrysomelinae; Doryphorini; Leptinotarsa

Parent
Leptinotarsa () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7538)

NCBI Taxonomy ID
7539 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7539)

is Taxon A an Infraspecies?
No

Taxon B

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

Common Name
Colorado potato beetle

Synonyms
Leptinotarsa decimlineata; Stilodes decemlineata; Colorado potato beetle; Leptinotarsa decemlineata (Say, 1824)

Rank
species

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Coleoptera; Polyphaga; Cucujiformia; Chrysomeloidea; Chrysomelidae; Chrysomelinae; Doryphorini; Leptinotarsa

Parent
Leptinotarsa () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7538)

NCBI Taxonomy ID
7539 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7539)

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

T929N+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	Thr	Asn	929

Main Reference

Diversity and Convergence of Sodium Channel Mutations Involved in Resistance to Pyrethroids. (2013) (https://pubmed.ncbi.nlm.nih.gov/24019556)

Authors

Rinkevich FD; Du Y; Dong K

Abstract

Pyrethroid insecticides target voltage-gated sodium channels, which are critical for electrical signaling in the nervous system. The intensive use of pyrethroids in controlling arthropod pests and disease vectors has led to many instances of pyrethroid resistance around the globe. In the past two decades, studies have identified a large number of sodium channel mutations that are associated with resistance to pyrethroids. The purpose of this review is to summarize both common and unique sodium channel mutations that have been identified in arthropod pests of importance to agriculture or human health. Identification of these mutations provides valuable molecular markers for resistance monitoring in the field and helped the discovery of the elusive pyrethroid receptor site(s) on the sodium channel.

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

T929N+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

Diversity and Convergence of Sodium Channel Mutations Involved in Resistance to Pyrethroids. (2013) (https://pubmed.ncbi.nlm.nih.gov/24019556)

Authors

Rinkevich FD; Du Y; Dong K

Abstract

Pyrethroid insecticides target voltage-gated sodium channels, which are critical for electrical signaling in the nervous system. The intensive use of pyrethroids in controlling arthropod pests and disease vectors has led to many instances of pyrethroid resistance around the globe. In the past two decades, studies have identified a large number of sodium channel mutations that are associated with resistance to pyrethroids. The purpose of this review is to summarize both common and unique sodium channel mutations that have been identified in arthropod pests of importance to agriculture or human health. Identification of these mutations provides valuable molecular markers for resistance monitoring in the field and helped the discovery of the elusive pyrethroid receptor site(s) on the sodium channel.

Additional References

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

RELATED GEPHE

Related Genes

2 (Acetylcholinesterase (Ace-2), Acetylcholinesterase (Ace)) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^7539^/and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

1 (https://www.gephebase.org/search-criteria?/or+Gene Gephebase=^para (kdr)^/and+Taxon ID=^7539^/or+Gene Gephebase=^para (kdr)^/and+Taxon ID=^7539^#gephebase-summary-title)

EXTERNAL LINKS

COMMENTS