GEPHE SUMMARY

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

GepheID
GP00001866

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
Myzus persicae

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

Common Name
green peach aphid

Synonyms
Myzus (Nectarosiphon) persicae; green peach aphid; peach-potato aphid; Myzus persicae (Sulzer, 1776); Myzus persiceae

Rank
species

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Paraneoptera; Hemiptera; Sternorrhyncha; Aphidomorpha; Aphidoidea; Aphididae; Aphidinae; Macrosiphini; Myzus

Parent
Myzus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 13163)

NCBI Taxonomy ID
13164 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 13164)

is Taxon A an Infraspecies?
No

Taxon B

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

Common Name
green peach aphid

Synonyms
Myzus (Nectarosiphon) persicae; green peach aphid; peach-potato aphid; Myzus persicae (Sulzer, 1776); Myzus persiceae

Rank
species

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Paraneoptera; Hemiptera; Sternorrhyncha; Aphidomorpha; Aphidoidea; Aphididae; Aphidinae; Macrosiphini; Myzus

Parent
Myzus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 13163)

NCBI Taxonomy ID
13164 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 13164)

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
CAM98294 (https://www.ncbi.nlm.nih.gov/nuccore/CAM98294)

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 (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

M918L

Experimental Evidence

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

	Taxon A	Taxon B	Position
Codon	ATG	CTG	-
Amino-acid	Met	Leu	918

Main Reference

Presence and impact of allelic variations of two alternative s-kdr mutations, M918T and M918L, in the voltage-gated sodium channel of the green peach aphid Myzus persicae. (2015) (https://pubmed.ncbi.nlm.nih.gov/25346186)

Authors

Panini M; Anaclerio M; Puggioni V; Stagnati L; Nauen R; Mazzoni E

Abstract

Pyrethroids have been widely employed in order to control several agricultural pests, including Myzus persicae. Target-site resistance is the main mechanism that confers insensitivity to this class of compounds, and the most common amino acid substitutions are kdr (L1014F) and s-kdr (M918T), but recently another mutation in the s-kdr locus (M918L) has been described in French and Korean populations of M. persicae.

Molecular analysis of several Italian populations of M. persicae by pyrosequencing revealed the presence of the new s-kdr mutation (M918L) in different forms. It was found in two different nucleotide polymorphisms (a/t or a/c substitution), in heterozygous or homozygous status, and also in combination with the classic kdr and s-kdr. Bioassays on populations carrying the M918L mutation show that it strongly affects pyrethroid efficacy, particularly of type II pyrethroids such as lambda-cyhalothrin, while it has no effect against DDT.

This work provides more information about the new s-kdr M918L mutation in M. persicae, describing a more complicated situation arising from the possible combination with the classic L1014F and M918T. Our data open new questions concerning the origin of these new genotypes with different combinations of target-site mutations, and also their possible influence on control strategies.

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Additional References

Detecting the presence of target-site resistance to neonicotinoids and pyrethroids in Italian populations of Myzus persicae. (2014) (https://pubmed.ncbi.nlm.nih.gov/23963887)

RELATED GEPHE

Related Genes

8 (acetyl-CoA carboxylase (ACC), Acetylcholinesterase (Ace-1), CYP6CY3, CYP6CY3-CYP6CY4, esterase E4, esterase FE4, nAChR, resistance to dieldrin)
(https://www.gephebase.org/search-criteria?/or+Taxon ID=^13164^/and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

7 (https://www.gephebase.org/search-criteria?/or+Gene Gephebase=^para (kdr)^/and+Taxon ID=^13164^/or+Gene Gephebase=^para (kdr)^/and+Taxon ID=^13164^#gephebase-summary-title)

EXTERNAL LINKS

COMMENTS

The same amino acid change is also found in M. persicae populations via another nucleotide change