GEPHE SUMMARY

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

GepheID
GP00002498

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
Aphis gossypii

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

Common Name
cotton aphid

Synonyms
cotton aphid; melon aphid; Aphis gossypii Glover, 1877; Aphis gossyppi

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; Aphidini; Aphis; Aphis

Parent
Aphis () - (Rank: subgenus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 464929)

NCBI Taxonomy ID
80765 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 80765)

is Taxon A an Infraspecies?
No

Taxon B

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

Common Name
cotton aphid

Synonyms
cotton aphid; melon aphid; Aphis gossypii Glover, 1877; Aphis gossyppi

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; Aphidini; Aphis; Aphis

Parent
Aphis () - (Rank: subgenus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 464929)

NCBI Taxonomy ID
80765 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 80765)

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

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	-	-	-
Amino-acid	-	-	-

Main Reference

Insecticide resistance traits differ among and within host races in Aphis gossypii. (2010) (https://pubmed.ncbi.nlm.nih.gov/19908228)

Authors

Carletto J; Martin T; Vanlerberghe-Masutti F; BrÃ©vault T

Abstract

The polyphagous cotton-melon aphid Aphis gossypii Glover is structured into geographically widespread host races comprising a few clones specialised on Cucurbitaceae, cotton, eggplant or pepper. To assess insecticide resistance among and within host races, leaf disc bioassays were conducted on aphid clones collected from Cucurbitaceae (genotypes C4 and C9), cotton (genotypes Burk and Ivo), eggplant (genotype Auber) and pepper (genotype PsP4). Molecular diagnostic (PCR-RFLP) and enzyme assays were also performed to detect the basic mechanisms underlying insecticide resistance.

All six clones were susceptible to acetamiprid (neonicotinoid) or carbosulfan (carbamate). Conversely, all clones were resistant to dimethoate (organophosphate) (RF = 4.1-38.1) and carried mutation S431F in the acetylcholinesterase gene. Auber, PsP4 and Burk also carried mutation A302S in this gene, which possibly conferred moderate resistance (RF = 3.7-6.8) to profenofos and monocrotophos (organophosphates). Auber and Burk were highly resistant (RF = 41.2 and 473 respectively) to cypermethrin (pyrethroid). This resistance was likely associated with point mutation super-kdr (M918L) in the voltage-gated sodium channel gene (para gene) or metabolic detoxification mediated by esterase and oxidase enzymes.

Multiple resistance to a broad range of insecticides and multiple mechanisms of resistance in some clones could explain to some extent the low genetic diversity observed within A. gossypii host races.

Additional References

RELATED GEPHE

Related Genes

3 (Acetylcholinesterase (Ace-1), Acetylcholinesterase (Ace-2), nAChR) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^80765^/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=^80765^/or+Gene Gephebase=^para (kdr)^/and+Taxon ID=^80765^#gephebase-summary-title)

EXTERNAL LINKS

COMMENTS