GEPHE SUMMARY

Gephebase Gene

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

GepheID

GP00002600

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 ; bifenazate) (https://www.gephebase.org/search-criteria?/and+Trait=^Xenobiotic resistance (insecticide ; bifenazate)^#gephebase-summary-title)

Trait State in Taxon A

Panonychus citri - sensitive

Trait State in Taxon B

Panonychus citri - resistant to bifenazate

Ancestral State

Taxon A

Taxonomic Status

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

Taxon A

Latin Name

Panonychus citri (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Panonychus citri^#gephebase-summary-title)

Common Name

citrus red mite

Synonyms

citrus red mite; citrus fruit mite; Panonychus citri (McGregor, 1916); Panonnychus citri

Rank

species

Lineage

cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Chelicerata; Arachnida; Acari; Acariformes; Trombidiformes; Prostigmata; Eleutherengona; Raphignathae; Tetranychoidea; Tetranychidae; Panonychus

Parent

Panonychus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 50022)

NCBI Taxonomy ID

50023 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 50023)

is Taxon A an Infraspecies?

No

Taxon B

Latin Name

Panonychus citri (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Panonychus citri^#gephebase-summary-title)

Common Name

citrus red mite

Synonyms

citrus red mite; citrus fruit mite; Panonychus citri (McGregor, 1916); Panonnychus citri

Rank

species

Lineage

cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Chelicerata; Arachnida; Acari; Acariformes; Trombidiformes; Prostigmata; Eleutherengona; Raphignathae; Tetranychoidea; Tetranychidae; Panonychus

Parent

Panonychus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 50022)

NCBI Taxonomy ID

50023 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 50023)

is Taxon B an Infraspecies?

No

GENOTYPIC CHANGE

Generic Gene Name

UQCRFS1

Synonyms

RIP1; RIS1; RISP; UQCR5

String

9606.ENSP00000306397 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=9606.ENSP00000306397)

Sequence Similarities

-

GO - Molecular Function

GO:0046872 : metal ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0046872)
GO:0051537 : 2 iron, 2 sulfur cluster binding (https://www.ebi.ac.uk/QuickGO/term/GO:0051537)
GO:0008121 : ubiquinol-cytochrome-c reductase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0008121)

GO - Biological Process

UniProtKB Homo sapiens

P47985 (http://www.uniprot.org/uniprot/P47985)

GenebankID or UniProtKB

()

GO:0006122 : mitochondrial electron transport, ubiquinol to cytochrome c (https://www.ebi.ac.uk/QuickGO/term/GO:0006122)

GO - Cellular Component

GO:0016021 : integral component of membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0016021)
GO:0005739 : mitochondrion (https://www.ebi.ac.uk/QuickGO/term/GO:0005739)
GO:0005743 : mitochondrial inner membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0005743)
GO:0005751 : mitochondrial respiratory chain complex IV (https://www.ebi.ac.uk/QuickGO/term/GO:0005751)
GO:0005750 : mitochondrial respiratory chain complex III (https://www.ebi.ac.uk/QuickGO/term/GO:0005750)

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

G126S and A133T. These mutations did not always occur in combination.

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	Gly	Ser	126

Main Reference

Parallel evolution of cytochrome b mediated bifenazate resistance in the citrus red mite Panonychus citri. (2011) (https://pubmed.ncbi.nlm.nih.gov/20735493)

Authors

Van Leeuwen T; Van Nieuwenhuyse P; Vanholme B; Dermauw W; Nauen R; Tirry L

Abstract

Bifenazate is a recently developed acaricide that is mainly used to control spider mites on a variety of crops. Although first thought to be a neurotoxin, genetic evidence obtained from bifenazate resistant Tetranychus urticae strains suggested an alternative mode of action as a Qo pocket inhibitor of the mitochondrial complex III. In this study, we reveal how bifenazate resistance in strains of Panonychus citri is maternally inherited and can confer cross-resistance to the known Qo inhibitor acequinocyl. The mitochondrial genome of P. citri was sequenced and Qo pocket mutations were shown to be linked with the resistant trait. Parallel evolution of cytochrome b mediated bifenazate resistance corroborates the alternative mode of action and yet again illustrates that care should be taken when employing Qo inhibitors as crop protection compounds.

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

G126S and A133T. These mutations did not always occur in combination.

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	Ala	Thr	133

Main Reference

Parallel evolution of cytochrome b mediated bifenazate resistance in the citrus red mite Panonychus citri. (2011) (https://pubmed.ncbi.nlm.nih.gov/20735493)

Authors

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Additional References

RELATED GEPHE

Related Genes

1 (PSST) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^50023^/and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

@MitochondrialGene