GEPHE SUMMARY

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

GepheID
GP00002555

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
Thrips palmi

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

Common Name
-

Synonyms
Thrips palmi Karny, 1925

Rank
species

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Paraneoptera; Thysanoptera; Terebrantia; Thripoidea; Thripidae; Thripinae; Thrips

Parent
Thrips () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 45057)

NCBI Taxonomy ID
161013 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 161013)

is Taxon A an Infraspecies?
No

Taxon B

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

Common Name
-

Synonyms
Thrips palmi Karny, 1925

Rank
species

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Paraneoptera; Thysanoptera; Terebrantia; Thripoidea; Thripidae; Thripinae; Thrips

Parent
Thrips () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 45057)

NCBI Taxonomy ID
161013 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 161013)

is Taxon B an Infraspecies?
No

GENOTYPIC CHANGE

Generic Gene Name
nAChRbeta1

Synonyms
AChR; AchR64B; AChR64B; Acr64B; AcrD; ard; Ard; ARD; beta 64B; beta1 nAChR; CG11348; CG11348-PA; CG12606; Dbeta1; Dmel\CG11348; nAChR; nAChR-beta64B; nAcR64B; nAcRbeta-64B

String
7227.FBpp0073155 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 7227.FBpp0073155)

Sequence Similarities
Belongs to the ligand-gated ion channel (TC 1.A.9) family. Acetylcholine receptor (TC 1.A.9.1) subfamily.

GO - Molecular Function
GO:0004888 : transmembrane signaling receptor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004888)
GO:0022848 : acetylcholine-gated cation-selective channel activity (https://www.ebi.ac.uk/QuickGO/term/GO:0022848)

UniProtKB Drosophila melanogaster
P04755 (http://www.uniprot.org/uniprot/P04755)

GenebankID or UniProtKB
()

GO:1904315 : transmitter-gated ion channel activity involved in regulation of postsynaptic membrane potential (https://www.ebi.ac.uk/QuickGO/term/GO:1904315)
GO:0005231 : excitatory extracellular ligand-gated ion channel activity (https://www.ebi.ac.uk/QuickGO/term/GO:0005231)
GO:0030594 : neurotransmitter receptor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0030594)

GO - Biological Process

GO:0007165 : signal transduction (https://www.ebi.ac.uk/QuickGO/term/GO:0007165)
GO:0007268 : chemical synaptic transmission (https://www.ebi.ac.uk/QuickGO/term/GO:0007268)
GO:0007271 : synaptic transmission, cholinergic (https://www.ebi.ac.uk/QuickGO/term/GO:0007271)
GO:0034220 : ion transmembrane transport (https://www.ebi.ac.uk/QuickGO/term/GO:0034220)
GO:0050877 : nervous system process (https://www.ebi.ac.uk/QuickGO/term/GO:0050877)
GO:0042391 : regulation of membrane potential (https://www.ebi.ac.uk/QuickGO/term/GO:0042391)

GO - Cellular Component

GO:0005887 : integral component of plasma membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0005887)
GO:0043005 : neuron projection (https://www.ebi.ac.uk/QuickGO/term/GO:0043005)
GO:0045211 : postsynaptic membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0045211)
GO:0045202 : synapse (https://www.ebi.ac.uk/QuickGO/term/GO:0045202)
GO:0070161 : anchoring junction (https://www.ebi.ac.uk/QuickGO/term/GO:0070161)

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

G275E in nAchR alpha 6 due to a single nucleotide change

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

Spinosad resistance of melon thrips, Thrips palmi, is conferred by G275E mutation in Î±6 subunit of nicotinic acetylcholine receptor and cytochrome P450 detoxification. (2014) (https://pubmed.ncbi.nlm.nih.gov/24974117)

Authors

Bao WX; Narai Y; Nakano A; Kaneda T; Murai T; Sonoda S

Abstract

To examine the resistance mechanisms of Thrips palmi against spinosad, we cloned partial nucleotide sequences of the nicotinic acetylcholine receptor Î±6 subunit (TPÎ±6) gene from susceptible (OK) and resistant (TS1 and TS5) strains and compared the deduced amino acid sequences among the three strains. The OK, TS1, and TS5 strains respectively showed LC50 values of 3.4mg/L, 2838.5mg/L, and 6655.5mg/L. The deduced amino acid sequence of TPÎ±6 gene showed 96% identity with that of Frankliniella occidentalis. Comparison of the deduced amino acid sequences of TPÎ±6 gene among the three strains showed that the TS1 and TS5 strains had a resistant amino acid, Glu, at amino acid position 275. On the other hand, a susceptible amino acid, Gly, was encoded at the corresponding amino acid position for the OK strain. The synergist, piperonyl butoxide, respectively caused 1.1-fold , 5.8-fold , and 9.0-fold decreases in the resistance ratios of the OK, TS1, and TS5 strains. These results suggest that spinosad resistance of T. palmi is conferred by reduced sensitivity of TPÎ±6 and cytochrome P450-mediated detoxification.

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Additional References

Genotype to phenotype, the molecular and physiological dimensions of resistance in arthropods. (2015) (https://pubmed.ncbi.nlm.nih.gov/26047113)

RELATED GEPHE

Related Genes

1 (para (kdr)) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^161013^/and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS