GEPHE SUMMARY

Gephebase Gene

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

GepheID

GP00002652

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

Trait State in Taxon A

Plutella xylostella - sensitive

Trait State in Taxon B

Plutella xylostella - 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

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

Common Name

diamondback moth

Synonyms

diamondback moth; cabbage moth; Plutella xylostella (Linnaeus, 1758); Putella xylostella

Rank

species

Lineage

cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Amphiesmenoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Ditrysia; Yponomeutoidea; Plutellidae; Plutella

Parent

Plutella () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 51654)

NCBI Taxonomy ID

51655 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 51655)

is Taxon A an Infraspecies?

No

Taxon B

Latin Name

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

Common Name

diamondback moth

Synonyms

diamondback moth; cabbage moth; Plutella xylostella (Linnaeus, 1758); Putella xylostella

Rank

species

Lineage

cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Amphiesmenoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Ditrysia; Yponomeutoidea; Plutellidae; Plutella

Parent

Plutella () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 51654)

NCBI Taxonomy ID

51655 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 51655)

is Taxon B an Infraspecies?

No

GENOTYPIC CHANGE

Generic Gene Name

CHRNA6

Synonyms

CHNRA6

String

9606.ENSP00000276410 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 9606.ENSP00000276410)

UniProtKB Homo sapiens

Q15825 (http://www.uniprot.org/uniprot/Q15825)

Sequence Similarities

Belongs to the ligand-gated ion channel (TC 1.A.9) family. Acetylcholine receptor (TC 1.A.9.1) subfamily. Alpha-6/CHRNA6 sub-subfamily.

GenebankID or UniProtKB

()

GO - Molecular Function

GO:0015464 : acetylcholine receptor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0015464)
GO:0022848 : acetylcholine-gated cation-selective channel activity (https://www.ebi.ac.uk/QuickGO/term/GO:0022848)
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: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:0014059 : regulation of dopamine secretion
(https://www.ebi.ac.uk/QuickGO/term/GO:0014059)
GO:0051899 : membrane depolarization
(https://www.ebi.ac.uk/QuickGO/term/GO:0051899)
GO:2000300 : regulation of synaptic vesicle exocytosis
(https://www.ebi.ac.uk/QuickGO/term/GO:2000300)

GO - Cellular Component

GO:0005886 : plasma membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0005886)
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:0045202 : synapse (https://www.ebi.ac.uk/QuickGO/term/GO:0045202)
GO:0005892 : acetylcholine-gated channel complex
(https://www.ebi.ac.uk/QuickGO/term/GO:0005892)
GO:0099055 : integral component of postsynaptic membrane
(https://www.ebi.ac.uk/QuickGO/term/GO:0099055)
GO:0099056 : integral component of presynaptic membrane
(https://www.ebi.ac.uk/QuickGO/term/GO:0099056)
GO:0070161 : anchoring junction (https://www.ebi.ac.uk/QuickGO/term/GO:0070161)
GO:0098691 : dopaminergic synapse (https://www.ebi.ac.uk/QuickGO/term/GO:0098691)

Presumptive Null

Yes (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^Yes^#gephebase-summary-title)

Molecular Type

Coding (https://www.gephebase.org/search-criteria?/and+Molecular Type=^Coding^#gephebase-summary-title)

Aberration Type

Deletion (https://www.gephebase.org/search-criteria?/and+Aberration Type=^Deletion^#gephebase-summary-title)

Deletion Size

-

Molecular Details of the Mutation

transcripts with premature stop codons

Experimental Evidence

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

Main Reference

Transcripts of the nicotinic acetylcholine receptor subunit gene PxylÎ±6 with premature stop codons are associated with spinosad resistance in diamondback moth, Plutella xylostella. (2010) (https://pubmed.ncbi.nlm.nih.gov/20499126)

Authors

Rinkevich FD; Chen M; Shelton AM; Scott JG

Abstract

The cDNA sequence of the Î±6 nicotinic acetylcholine receptor subunit of diamondback moth (Plutella xylostella) was cloned and sequenced. Transcripts were similar between the spinosad-susceptible G88 and Wapio strains. All transcripts from the spinosad-resistant Pearl-Sel strain contained premature stop codons, and most transcripts have not been previously reported. None of these truncated transcripts were seen in the spinosad-susceptible strains. Proteins made from these transcripts would likely have no, or greatly altered, receptor function. An F(2) backcross and spinosad bioassay showed that all spinosad bioassay survivors produced truncated Î±6 transcripts. Thus, it appears that spinosad resistance in diamondback moth is due to a mutation(s) that results in no functional PxylÎ±6 being produced.

Additional References

RELATED GEPHE

Related Genes

10 (ABCC2, Acetylcholinesterase (Ace-1), Chitin synthase 1 (CHS1), CYP6BG1, FMO2, glutamate-gated chloride channel (GluCl), MAP4K4, para (kdr), resistance to dieldrin, RYR) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^51655^/and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

2 (https://www.gephebase.org/search-criteria?/or+Gene Gephebase=^nAChR^/and+Taxon ID=^51655^/or+Gene Gephebase=^nAChR^/and+Taxon ID=^51655^#gephebase-summary-title)

EXTERNAL LINKS

COMMENTS

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