

GEPHE SUMMARY

<p>RYR (#Gephebase-summary-title)</p> <p>Published</p>	<p>Gephebase Gene</p> <p>Entry Status</p>	<p>GP00002605</p> <p>Courtier</p>	<p>GepheID</p> <p>Main curator</p>
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PHENOTYPIC CHANGE

<p>Physiology (#Gephebase-summary-title)</p> <p>Xenobiotic resistance (insecticide ; diamide ; chlorantraniliprole ; flubendiamide) (https://www.gephebase.org/search-criteria?/and+Trait=Xenobiotic+resistance+(insecticide+;+diamide+;+chlorantraniliprole+;+flubendiamide)#Gephebase-summary-title)</p> <p>Plutella xylostella - susceptible</p> <p>Plutella xylostella - resistant individuals from Yunnan in China</p> <p>Taxon A</p> <p>Intraspecific (#Gephebase-summary-title)</p>	<p>Trait Category</p> <p>Trait</p> <p>Trait State in Taxon A</p> <p>Trait State in Taxon B</p> <p>Ancestral State</p> <p>Taxonomic Status</p>	<p>Taxon A</p> <p>Latin Name</p> <p>Plutella xylostella (#Gephebase-summary-title)</p> <p>Common Name</p> <p>diamondback moth</p> <p>Synonyms</p> <p>diamondback moth; cabbage moth; Plutella xylostella (Linnaeus, 1758); Putella xylostella</p> <p>Rank</p> <p>species</p> <p>Lineage</p> <p>cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Amphimesnoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Dityrsia; Yponomeutoidea; Plutellidae; Plutella</p> <p>Parent</p> <p>Plutella () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=51654)</p> <p>NCBI Taxonomy ID</p> <p>51655 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=51655)</p> <p>is Taxon A an Intraspecies?</p> <p>No</p>	<p>Taxon B</p> <p>Latin Name</p> <p>Plutella xylostella (#Gephebase-summary-title)</p> <p>Common Name</p> <p>diamondback moth</p> <p>Synonyms</p> <p>diamondback moth; cabbage moth; Plutella xylostella (Linnaeus, 1758); Putella xylostella</p> <p>Rank</p> <p>species</p> <p>Lineage</p> <p>cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Amphimesnoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Dityrsia; Yponomeutoidea; Plutellidae; Plutella</p> <p>Parent</p> <p>Plutella () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=51654)</p> <p>NCBI Taxonomy ID</p> <p>51655 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=51655)</p> <p>is Taxon B an Intraspecies?</p> <p>No</p>
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GENOTYPIC CHANGE

<p>RyR</p> <p>RyR; CG10844; D-RyR; Dmel\CG10844; DmRyR; DRR; dry; DRY; dRyR; dRyR; dya; I(2)k00424; I(2)k04913; Rya-44F; Rya-r4; rya-r44F; Rya-r44F; Rya-R44F; Rya-r76CD; ryR; RYR; RyRs</p> <p>7227.FBpp0293114 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0293114)</p>	<p>Generic Gene Name</p> <p>Synonyms</p> <p>String</p> <p>Sequence Similarities</p> <p>GO - Molecular Function</p>	<p>UniProtKB Drosophila melanogaster</p> <p>Q24498 (http://www.uniprot.org/uniprot/Q24498)</p> <p>GenebankID or UniProtKB</p> <p>()</p>
<p>Belongs to the ryanodine receptor (TC 1.A.3.1) family.</p> <p>GO:0005509 : calcium ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005509)</p> <p>GO:0048763 : calcium-induced calcium release activity (https://www.ebi.ac.uk/QuickGO/term/GO:0048763)</p> <p>GO:0005219 : ryanodine-sensitive calcium-release channel activity</p>		

(<https://www.ebi.ac.uk/QuickGO/term/GO:0005219>)

GO - Biological Process

GO:0006874 : cellular calcium ion homeostasis

(<https://www.ebi.ac.uk/QuickGO/term/GO:0006874>)

GO:0035206 : regulation of hemocyte proliferation

(<https://www.ebi.ac.uk/QuickGO/term/GO:0035206>)

GO:0006936 : muscle contraction (<https://www.ebi.ac.uk/QuickGO/term/GO:0006936>)

GO:0006816 : calcium ion transport (<https://www.ebi.ac.uk/QuickGO/term/GO:0006816>)

GO:0060047 : heart contraction (<https://www.ebi.ac.uk/QuickGO/term/GO:0060047>)

GO:0072347 : response to anesthetic (<https://www.ebi.ac.uk/QuickGO/term/GO:0072347>)

GO - Cellular Component

GO:0016021 : integral component of membrane

(<https://www.ebi.ac.uk/QuickGO/term/GO:0016021>)

GO:0030659 : cytoplasmic vesicle membrane

(<https://www.ebi.ac.uk/QuickGO/term/GO:0030659>)

GO:0030018 : Z disc (<https://www.ebi.ac.uk/QuickGO/term/GO:0030018>)

GO:0042383 : sarcolemma (<https://www.ebi.ac.uk/QuickGO/term/GO:0042383>)

GO:0033017 : sarcoplasmic reticulum membrane

(<https://www.ebi.ac.uk/QuickGO/term/GO:0033017>)

GO:0005790 : smooth endoplasmic reticulum

(<https://www.ebi.ac.uk/QuickGO/term/GO:0005790>)

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

E1338D Q4594L I4790M)in highly conserved regions of RyR.

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

Novel mutations and mutation combinations of ryanodine receptor in a chlorantraniliprole resistant population of *Plutella xylostella* (L.). (2014) (<https://pubmed.ncbi.nlm.nih.gov/25377064>)

Authors

Guo L; Liang P; Zhou X; Gao X

Abstract

A previous study documented a glycine to glutamic acid mutation (G4946E) in ryanodine receptor (RyR) was highly correlated to diamide insecticide resistance in field populations of *Plutella xylostella* (Lepidoptera: Plutellidae). In this study, a field population collected in Yunnan province, China, exhibited a 2128-fold resistance to chlorantraniliprole. Sequence comparison between resistant and susceptible *P. xylostella* revealed three novel mutations including a glutamic acid to valine substitution (E1338D), a glutamine to leucine substitution (Q4594L) and an isoleucine to methionine substitution (I4790M) in highly conserved regions of RyR. Frequency analysis of all four mutations in this field population showed that the three new mutations showed a high frequency of 100%, while the G4946E had a frequency of 20%. Furthermore, the fluorescent ligand binding assay revealed that the RyR containing multiple mutations displayed a significantly lower affinity to the chlorantraniliprole. The combined results suggested that the co-existence of different combinations of the four mutations was involved in the chlorantraniliprole resistance. An allele-specific PCR based method was developed for the diagnosis of the four mutations in the field populations of *P. xylostella*.

Additional References

RELATED GEPHE

Related Genes

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

Related Haplotypes

3 (<https://www.gephebase.org/search-criteria?/or+Gene Gephebase=~RYR~/and+Taxon ID=~51655~/or+Gene Gephebase=~RYR~/and+Taxon ID=~51655^#gephebase-summary-title>)

EXTERNAL LINKS

COMMENTS

