GEPHE SUMMARY

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

GepheID
GP00002627

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

Trait State in Taxon A
Chilo suppressalis - susceptible

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

Common Name
striped riceborer

Synonyms
Crambus suppressalis; striped riceborer; Asiatic rice borer; striped rice borer; Chilo suppressalis (Walker, 1863); Chilo supperssalis; Chilo supressalis

Rank
species

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Endopterygota; Amphiesmenoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Ditrysia; Obtectomera; Pyraloidea; Crambidae; Crambinae; Chilo

Parent
Chilo () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 168630)

NCBI Taxonomy ID
168631 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 168631)

is Taxon A an Infraspecies?
No

Taxon B

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

Common Name
striped riceborer

Synonyms
Crambus suppressalis; striped riceborer; Asiatic rice borer; striped rice borer; Chilo suppressalis (Walker, 1863); Chilo supperssalis; Chilo supressalis

Rank
species

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Endopterygota; Amphiesmenoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Ditrysia; Obtectomera; Pyraloidea; Crambidae; Crambinae; Chilo

Parent
Chilo () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 168630)

NCBI Taxonomy ID
168631 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 168631)

is Taxon B an Infraspecies?
No

GENOTYPIC CHANGE

Generic Gene Name
RyR

Synonyms
Ryr; CG10844; D-RyR; Dmel\CG10844; DmRyR; DRR; dry; DRY; dRyr; dRyR; dya; l(2)k00424; l(2)k04913; Rya-44F; Rya-r4; rya-r44F; Rya-r44F; Rya-R44F; Rya-r76CD; ryr; RYR; RyRs

String
7227.FBpp0293114 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 7227.FBpp0293114)

Sequence Similarities
Belongs to the ryanodine receptor (TC 1.A.3.1) family.

GO - Molecular Function
GO:0005509 : calcium ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005509)
GO:0048763 : calcium-induced calcium release activity

UniProtKB Drosophila melanogaster
Q24498 (http://www.uniprot.org/uniprot/Q24498)

GenebankID or UniProtKB
()

(https://www.ebi.ac.uk/QuickGO/term/GO:0048763)
GO:0005219 : ryanodine-sensitive calcium-release channel activity
(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

I4758M

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	Ile	Met	4758

Main Reference

Monitoring and Mechanisms of Chlorantraniliprole Resistance in Chilo suppressalis (Lepidoptera: Crambidae) in China. (2019) (https://pubmed.ncbi.nlm.nih.gov/30715398)

Authors

Wei Y; Yan R; Zhou Q; Qiao L; Zhu G; Chen M

Abstract

Chlorantraniliprole, an anthranilic diamide insecticide, is widely used for controlling lepidopteran pests, because of its high insecticidal activity. However, overuse of chlorantraniliprole has led to the selection of resistance in many insect pests, including Chilo suppressalis (Lepidoptera:Crambidae), one of the most damaging rice pests in China. In this study, resistance levels to chlorantraniliprole for C. suppressalis was surveyed from eight populations of three provinces in China. The levels of resistance were ranged from 34.4-fold to 284.0-fold compared with a susceptible population. Then, a 15402 bp fragment of the full-length cDNA of ryanodine receptor gene (CsRyR) from the XS strain, the highest resistant population, and a 1992 bp fragment of CsRyR cDNA encoding the carboxyl-terminal of CsRyR gene from the other seven populations were sequenced. A common previously identified mutation that was associated with chlorantraniliprole resistance against C. suppressalis, G4910E, was not detected in any of the eight populations in this study. However, another mutation I4758M was found in all seven resistant populations. Furthermore, the relative mRNA expression levels of CsRyR gene in the seven resistant populations were all reduced compared with susceptible strain. Our study provides new insights into the basis of monitoring the development of resistance and the mechanism of resistance to chlorantraniliprole in C. suppressalis.

Additional References

RELATED GEPHE

Related Genes

1 (Acetylcholinesterase (Ace-1)) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^168631^/and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

1 (https://www.gephebase.org/search-criteria?/or+Gene Gephebase=^RYR^/and+Taxon ID=^168631^/or+Gene Gephebase=^RYR^/and+Taxon ID=^168631^#gephebase-summary-title)

EXTERNAL LINKS

COMMENTS