GEPHE SUMMARY

Gephebase Gene

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

GepheID

GP00002457

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

Trait State in Taxon A

Spodoptera frugiperda - sensitive

Trait State in Taxon B

Spodoptera frugiperda - resistant

Ancestral State

Data not curated

Taxonomic Status

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

Taxon A

Latin Name

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

Common Name

fall armyworm

Synonyms

fall armyworm; Spodoptera frugiperda (Smith, 1797)

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; Noctuoidea; Noctuidae; Amphipyrinae; Spodoptera

Parent

Spodoptera () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7106)

NCBI Taxonomy ID

7108 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7108)

is Taxon A an Infraspecies?

No

Taxon B

Latin Name

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

Common Name

fall armyworm

Synonyms

fall armyworm; Spodoptera frugiperda (Smith, 1797)

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; Noctuoidea; Noctuidae; Amphipyrinae; Spodoptera

Parent

Spodoptera () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7106)

NCBI Taxonomy ID

7108 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7108)

is Taxon B an Infraspecies?

No

GENOTYPIC CHANGE

Generic Gene Name

GstE2

Synonyms

CG17523; Dmel\CG17523; DmGSTE2; gste2; GSTE2; Dmel_CG17523

String

7227.FBpp0085851 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 7227.FBpp0085851)

Sequence Similarities

-

GO - Molecular Function

GO:0004364 : glutathione transferase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004364)

GO - Biological Process

GO:0006749 : glutathione metabolic process (https://www.ebi.ac.uk/QuickGO/term/GO:0006749)

GO - Cellular Component

UniProtKB Drosophila melanogaster

Q7JYZ9 (http://www.uniprot.org/uniprot/Q7JYZ9)

GenebankID or UniProtKB

()

GO:0005737 : cytoplasm (https://www.ebi.ac.uk/QuickGO/term/GO:0005737)

Presumptive Null

Unknown (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^Unknown^#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

L119F. The resistant allele is more efficient at metabolizing DDT than the susceptible one.

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	Leu	Phe	119

Main Reference

Resistance in the Genus Spodoptera: Key Insect Detoxification Genes. (2021) (https://pubmed.ncbi.nlm.nih.gov/34208014)

Authors

Hilliou F; Chertemps T; MaÃ¯bÃ¨che M; Le Goff G

Abstract

The genus Spodoptera (Lepidoptera: Noctuidae) includes species that are among the most important crop pests in the world. These polyphagous species are able to feed on many plants, including corn, rice and cotton. In addition to their ability to adapt to toxic compounds produced by plants, they have developed resistance to the chemical insecticides used for their control. One of the main mechanisms developed by insects to become resistant involves detoxification enzymes. In this review, we illustrate some examples of the role of major families of detoxification enzymes such as cytochromes P450, carboxyl/cholinesterases, glutathione S-transferases (GST) and transporters such as ATP-binding cassette (ABC) transporters in insecticide resistance. We compare available data for four species, Spodoptera exigua, S. frugiperda, S. littoralis and S. litura. Molecular mechanisms underlying the involvement of these genes in resistance will be described, including the duplication of the CYP9A cluster, over-expression of GST epsilon or point mutations in acetylcholinesterase and ABCC2. This review is not intended to be exhaustive but to highlight the key roles of certain genes.

Additional References

A single mutation in the GSTe2 gene allows tracking of metabolically based insecticide resistance in a major malaria vector. (2014) (https://pubmed.ncbi.nlm.nih.gov/24565444)

RELATED GEPHE

Related Genes

2 (ABCC2, CYP9A) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^7108^/and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS