GEPHE SUMMARY

Gephebase Gene
Ha_BtR

GephelD
GP00000428

Entry Status
Published

Main curator
Martin

PHENOTYPIC CHANGE

Trait Category
Physiology

Trait
Xenobiotic resistance (insecticide; Bt Cry1Ac toxin)

Trait State in Taxon A
Helicoverpa armigera - Bt-Cry1Ac susceptible

Trait State in Taxon B
Helicoverpa armigera - Bt-Cry1Ac resistant

Ancestral State
Taxon A

Taxonomic Status
Intraspecific

Taxon A

Latin Name
Helicoverpa armigera

Common Name
cotton bollworm

Synonyms
Heliothis (Helicoverpa) armigera; Heliothis armigera; cotton bollworm; American bollworm; corn ear worm; scarce bordered straw; tobacco budworm; Helicoverpa armigera (Hubner, 1808)

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; Obtectomera; Noctuoidea; Noctuidae; Heliothinae; Helicoverpa

Parent
Helicoverpa () - (Rank: genus)

NCBI Taxonomy ID
29058

is Taxon A an Infraspecies?
No

Taxon B

Latin Name
Helicoverpa armigera

Common Name
cotton bollworm

Synonyms
Heliothis (Helicoverpa) armigera; Heliothis armigera; cotton bollworm; American bollworm; corn ear worm; scarce bordered straw; tobacco budworm; Helicoverpa armigera (Hubner, 1808)

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; Obtectomera; Noctuoidea; Noctuidae; Heliothinae; Helicoverpa

Parent
Helicoverpa () - (Rank: genus)

NCBI Taxonomy ID
29058

is Taxon B an Infraspecies?
No

GENOTYPIC CHANGE

Generic Gene Name
ABCA2

Synonyms
-

String
-

Sequence Similarities
-

GO - Molecular Function
GO:0005524 : ATP binding
GO:0042626 : ATPase activity, coupled to transmembrane movement of substances

GO - Biological Process
-

GO - Cellular Component
GO:0016021 : integral component of membrane

Presumptive Null

UniProtKB Helicoverpa armigera
A0A0S0G7V0

GenebankID or UniProtKB

Yes

Molecular Type
Coding

Aberration Type
Insertion

Insertion Size
1-10 kb

Molecular Details of the Mutation
Insertion of a LTR retrotransposon

Experimental Evidence
Candidate Gene

Main Reference
Identification and molecular detection of a deletion mutation responsible for a truncated cadherin of Helicoverpa armigera. (2006)

Authors
Yang Y; Chen H; Wu S; Yang Y; Xu X; Wu Y

Abstract
Cadherins are a class of receptor proteins for Bacillus thuringiensis Cry1A toxins. Disruption of a cadherin gene (Ha_BtR) is associated with Cry1Ac resistance in the cotton bollworm Helicoverpa armigera [Xu, X., Yu, L., Wu, Y., 2005. Disruption of a cadherin gene associated with resistance to Cry1Ac delta-endotoxin of B. thuringiensis in H. armigera. Appl. Environ. Microbiol. 71, 948-954]. Determination of the genomic DNA sequences of Ha_BtR gene showed that the wild type Ha_BtR coding sequence is comprised of 34 exons. A deletion between Exon 8 and Exon 25 was found to be responsible for a truncated cadherin in the Cry1Ac-resistant GYBT strain of H. armigera. The mutant allele of Ha_BtR (r1) has two possible transcription variants, both of which produce the same truncated protein. A DNA-based detection method specific to the r1 allele was developed. This study will facilitate the monitoring of cadherin mutant frequency in field populations of H. armigera.

Additional References
Diverse cadherin mutations conferring resistance to Bacillus thuringiensis toxin Cry1Ac in Helicoverpa armigera. (2010)

RELATED GEPHE

Related Genes
2 (ABCA2, BTR1- Cadherin-like protein)
Related Haplotypes
7

EXTERNAL LINKS

COMMENTS

@TE Parallelism: repeated loss-of-function