

## GEPHE SUMMARY

<p>cadherin (<a href="https://www.gephebase.org/search-criteria?/and+Gene">https://www.gephebase.org/search-criteria?/and+Gene</a> Gephebase=<sup>^</sup>cadherin<sup>^</sup>#gephebase-summary-title)</p> <p>Published</p>	<p>Gephebase Gene</p> <p>Entry Status</p>	<p>GP00000165</p> <p>Martin</p>	<p>GepheID</p> <p>Main curator</p>
---	---	---------------------------------	------------------------------------

## PHENOTYPIC CHANGE

<p>Physiology (<a href="https://www.gephebase.org/search-criteria?/and+Trait">https://www.gephebase.org/search-criteria?/and+Trait</a> Category=<sup>^</sup>Physiology<sup>^</sup>#gephebase-summary-title)</p> <p>Xenobiotic resistance (insecticide) (<a href="https://www.gephebase.org/search-criteria?/and+Trait">https://www.gephebase.org/search-criteria?/and+Trait</a> =<sup>^</sup>Xenobiotic resistance (insecticide)<sup>^</sup>#gephebase-summary-title)</p> <p>Pectinophora gossypiella - Bt susceptible</p> <p>Pectinophora gossypiella - Bt resistant</p> <p>Taxon A</p> <p>Intraspecific (<a href="https://www.gephebase.org/search-criteria?/and+Taxonomic">https://www.gephebase.org/search-criteria?/and+Taxonomic</a> Status=<sup>^</sup>Intraspecific<sup>^</sup>#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>Pectinophora gossypiella (<a href="https://www.gephebase.org/search-criteria?/and+Taxon">https://www.gephebase.org/search-criteria?/and+Taxon</a> and Synonyms=<sup>^</sup>Pectinophora gossypiella<sup>^</sup>#gephebase-summary-title)</p> <p>Common Name</p> <p>pink bollworm</p> <p>Synonyms</p> <p>pink bollworm; Pectinophora gossypiella (Saunders, 1844); Pectinophora gossypiella</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; Amphiesmenoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Dityrsia; Gelechioidea; Gelechiidae; Pexicoipiinae; Pectinophora</p> <p>Parent</p> <p>Pectinophora () - (Rank: genus) (<a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=13190">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=13190</a>)</p> <p>NCBI Taxonomy ID</p> <p>13191 (<a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=13191">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=13191</a>)</p> <p>is Taxon A an Intraspecies?</p> <p>No</p>	<p>Taxon B</p> <p>Latin Name</p> <p>Pectinophora gossypiella (<a href="https://www.gephebase.org/search-criteria?/and+Taxon">https://www.gephebase.org/search-criteria?/and+Taxon</a> and Synonyms=<sup>^</sup>Pectinophora gossypiella<sup>^</sup>#gephebase-summary-title)</p> <p>Common Name</p> <p>pink bollworm</p> <p>Synonyms</p> <p>pink bollworm; Pectinophora gossypiella (Saunders, 1844); Pectinophora gossypiella</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; Amphiesmenoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Dityrsia; Gelechioidea; Gelechiidae; Pexicoipiinae; Pectinophora</p> <p>Parent</p> <p>Pectinophora () - (Rank: genus) (<a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=13190">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=13190</a>)</p> <p>NCBI Taxonomy ID</p> <p>13191 (<a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=13191">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=13191</a>)</p> <p>is Taxon B an Intraspecies?</p> <p>No</p>
--	---	---	---

## GENOTYPIC CHANGE

<p>BtR</p> <p>-</p> <p>-</p> <p>-</p> <p>GO:0005509 : calcium ion binding (<a href="https://www.ebi.ac.uk/QuickGO/term/GO:0005509">https://www.ebi.ac.uk/QuickGO/term/GO:0005509</a>)</p> <p>GO:0007156 : homophilic cell adhesion via plasma membrane adhesion molecules (<a href="https://www.ebi.ac.uk/QuickGO/term/GO:0007156">https://www.ebi.ac.uk/QuickGO/term/GO:0007156</a>)</p> <p>GO:0016021 : integral component of membrane (<a href="https://www.ebi.ac.uk/QuickGO/term/GO:0016021">https://www.ebi.ac.uk/QuickGO/term/GO:0016021</a>)</p> <p>GO:0005886 : plasma membrane (<a href="https://www.ebi.ac.uk/QuickGO/term/GO:0005886">https://www.ebi.ac.uk/QuickGO/term/GO:0005886</a>)</p>	<p>Generic Gene Name</p> <p>Synonyms</p> <p>String</p> <p>Sequence Similarities</p> <p>GO - Molecular Function</p> <p>GO - Biological Process</p> <p>GO - Cellular Component</p>	<p>UniProtKB Helicoverpa armigera</p> <p>Q19KJ3 (<a href="http://www.uniprot.org/uniprot/Q19KJ3">http://www.uniprot.org/uniprot/Q19KJ3</a>)</p> <p>AFJ52160 (<a href="https://www.ncbi.nlm.nih.gov/nuccore/AFJ52160">https://www.ncbi.nlm.nih.gov/nuccore/AFJ52160</a>)</p>	<p>GenebankID or UniProtKB</p>
--	--	---	--------------------------------

No ([#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Presumptive+Null=))

Presumptive Null

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

Molecular Type

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

Aberration Type

Nonsynonymous

SNP Coding Change

E1266L R1268E and E1270V - whether each mutation has an effect or only one of them is unknown

Molecular Details of the Mutation

Linkage Mapping ([#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=))

Experimental Evidence

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	-	-	-

Main Reference

Diverse genetic basis of field-evolved resistance to Bt cotton in cotton bollworm from China. (2012) (<https://pubmed.ncbi.nlm.nih.gov/22689968>)

Authors

Zhang H; Tian W; Zhao J; Jin L; Yang J; Liu C; Yang Y; Wu S; Wu K; Cui J; Tabashnik BE; Wu Y

Abstract

Evolution of pest resistance reduces the efficacy of insecticidal proteins from *Bacillus thuringiensis* (Bt) used in sprays or in transgenic crops. Although several pests have evolved resistance to Bt crops in the field, information about the genetic basis of field-evolved resistance to Bt crops has been limited. In particular, laboratory-selected resistance to Bt toxin Cry1Ac based on recessive mutations in a gene encoding a toxin-binding cadherin protein has been identified in three major cotton pests, but previous work has not determined if such mutations are associated with field-selected resistance to Bt cotton. Here we show that the most common resistance alleles in field populations of cotton bollworm, *Helicoverpa armigera*, selected with Bt cotton in northern China, had recessive cadherin mutations, including the deletion mutation identified via laboratory selection. However, unlike all previously studied cadherin resistance alleles, one field-selected cadherin resistance allele conferred nonrecessive resistance. We also detected nonrecessive resistance that was not genetically linked with the cadherin locus. In field-selected populations, recessive cadherin alleles accounted for 75-84% of resistance alleles detected. However, most resistance alleles occurred in heterozygotes and 59-94% of resistant individuals carried at least one nonrecessive resistance allele. The results suggest that resistance management strategies must account for diverse resistance alleles in field-selected populations, including nonrecessive alleles.

Additional References

## RELATED GEPHE

Related Genes

1 (ABCA2) ([#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Taxon+ID=))

Related Haplotypes

6 ([#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Gene+Gephebase=))

## EXTERNAL LINKS

## COMMENTS