

GEPHE SUMMARY

	Gephebase Gene		GepheID
cadherin (https://www.gephebase.org/search-criteria?/and+GeneGephebase=^cadherin^#gephebase-summary-title)		GP00002450	
	Entry Status	Courtier	Main curator
Published			

PHENOTYPIC CHANGE

	Trait Category		
Physiology (https://www.gephebase.org/search-criteria?/and+TraitCategory=^Physiology^#gephebase-summary-title)		Trait	
Xenobiotic resistance (insecticide; Bt Cry2Ab toxin) (https://www.gephebase.org/search-criteria?/and+Trait=^Xenobiotic resistance (insecticide; Bt Cry2Ab toxin)^#gephebase-summary-title)		Trait State in Taxon A	
Pectinophora gossypiella - Bt-Cry1Ac susceptible		Trait State in Taxon B	
Pectinophora gossypiella - Bt-Cry1Ac resistant lab selected strain		Ancestral State	
Taxon A		Taxonomic Status	
Experimental Evolution (https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=^Experimental Evolution^#gephebase-summary-title)			

Taxon A		Taxon B	
	Latin Name		Latin Name
Pectinophora gossypiella (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Pectinophora gossypiella^#gephebase-summary-title)		Pectinophora gossypiella (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Pectinophora gossypiella^#gephebase-summary-title)	
	Common Name		Common Name
pink bollworm		pink bollworm	
	Synonyms		Synonyms
pink bollworm; Pectinophora gossypiella (Saunders, 1844); Pectinophora gassypiella		pink bollworm; Pectinophora gossypiella (Saunders, 1844); Pectinophora gassypiella	
	Rank		Rank
species		species	
	Lineage		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; Gelechioidea; Gelechiidae; Pexicopiinae; Pectinophora		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; Gelechioidea; Gelechiidae; Pexicopiinae; Pectinophora	
	Parent		Parent
Pectinophora () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=13190)		Pectinophora () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=13190)	
	NCBI Taxonomy ID		NCBI Taxonomy ID
13191 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=13191)		13191 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=13191)	
	is Taxon A an Intraspecies?		is Taxon B an Intraspecies?
No		No	

GENOTYPIC CHANGE

	Generic Gene Name		UniProtKB Helicoverpa zea
-		A0A1B0RHM4 (http://www.uniprot.org/uniprot/A0A1B0RHM4)	
	Synonyms		GenebankID or UniProtKB
-		O	
	String		
-			
	Sequence Similarities		
-			
	GO - Molecular Function		
GO:0005509 : calcium ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005509)			
	GO - Biological Process		
GO:0007156 : homophilic cell adhesion via plasma membrane adhesion molecules (https://www.ebi.ac.uk/QuickGO/term/GO:0007156)			
	GO - Cellular Component		
GO:0016021 : integral component of membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0016021)			

GO:0005886 : plasma membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0005886)	Presumptive Null
Yes (https://www.gephebase.org/search-criteria?/and+Presumptive+Null=^Yes^#gephebase-summary-title)	Molecular Type
Coding (https://www.gephebase.org/search-criteria?/and+Molecular+Type=^Coding^#gephebase-summary-title)	Aberration Type
Deletion (https://www.gephebase.org/search-criteria?/and+Aberration+Type=^Deletion^#gephebase-summary-title)	Deletion Size
10-99 bp	Molecular Details of the Mutation
24-bp deletion in putative exon 21 causing the loss of eight amino acid residues	Experimental Evidence
Candidate Gene (https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=^Candidate+Gene^#gephebase-summary-title)	Main Reference
Three cadherin alleles associated with resistance to <i>Bacillus thuringiensis</i> in pink bollworm. (2003) (https://pubmed.ncbi.nlm.nih.gov/12695565)	Authors
Morin S; Biggs RW; Sisterson MS; Shriver L; Ellers-Kirk C; Higginson D; Holley D; Gahan LJ; Heckel DG; Carri�re Y; Dennehy TJ; Brown JK; Tabashnik BE	Abstract
Evolution of resistance by pests is the main threat to long-term insect control by transgenic crops that produce <i>Bacillus thuringiensis</i> (Bt) toxins. Because inheritance of resistance to the Bt toxins in transgenic crops is typically recessive, DNA-based screening for resistance alleles in heterozygotes is potentially much more efficient than detection of resistant homozygotes with bioassays. Such screening, however, requires knowledge of the resistance alleles in field populations of pests that are associated with survival on Bt crops. Here we report that field populations of pink bollworm (<i>Pectinophora gossypiella</i>), a major cotton pest, harbored three mutant alleles of a cadherin-encoding gene linked with resistance to Bt toxin Cry1Ac and survival on transgenic Bt cotton. Each of the three resistance alleles has a deletion expected to eliminate at least eight amino acids upstream of the putative toxin-binding region of the cadherin protein. Larvae with two resistance alleles in any combination were resistant, whereas those with one or none were susceptible to Cry1Ac. Together with previous evidence, the results reported here identify the cadherin gene as a leading target for DNA-based screening of resistance to Bt crops in lepidopteran pests.	
	Additional References

RELATED GEPHE

1 (ABCA2) (https://www.gephebase.org/search-criteria?/or+Taxon+ID=^13191^/and+Trait=Xenobiotic+resistance/and+groupHaplotypes=true#gephebase-summary-title)	Related Genes
6 (https://www.gephebase.org/search-criteria?/or+Gene+Gephebase=^cadherin^/and+Taxon+ID=^13191^/or+Gene+Gephebase=^cadherin^/and+Taxon+ID=^13191^#gephebase-summary-title)	Related Haplotypes

EXTERNAL LINKS

COMMENTS