

GEPHE SUMMARY

nAChR (https://www.gephebase.org/search-criteria?/and+GeneGephebase=nAChR#gephebase-summary-title)	Gephebase Gene	GP00002492	GepheID
Published	Entry Status	Courtier	Main curator

PHENOTYPIC CHANGE

Physiology (https://www.gephebase.org/search-criteria?/and+TraitCategory=Physiology#gephebase-summary-title)	Trait Category		
Xenobiotic resistance (insecticide) (https://www.gephebase.org/search-criteria?/and+Trait=Xenobiotic+resistance+(insecticide)#gephebase-summary-title)	Trait		
Aphis gossypii	Trait State in Taxon A		
Aphis gossypii - resistant	Trait State in Taxon B		
Taxon A	Ancestral State		
Intraspecific (https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=Intraspecific#gephebase-summary-title)	Taxonomic Status		
	Taxon A	Taxon B	
Aphis gossypii (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=Aphis+gossypii#gephebase-summary-title)	Latin Name	Aphis gossypii (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=Aphis+gossypii#gephebase-summary-title)	Latin Name
cotton aphid	Common Name	cotton aphid	Common Name
cotton aphid; melon aphid; Aphis gossypii Glover, 1877; Aphis gossypii species	Synonyms	cotton aphid; melon aphid; Aphis gossypii Glover, 1877; Aphis gossypii species	Synonyms
	Rank		Rank
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Paraneoptera; Hemiptera; Sternorrhyncha; Aphidomorpha; Aphidoidea; Aphididae; Aphidinae; Aphidini; Aphis; Aphis	Lineage	cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Paraneoptera; Hemiptera; Sternorrhyncha; Aphidomorpha; Aphidoidea; Aphididae; Aphidinae; Aphidini; Aphis; Aphis	Lineage
Aphis () - (Rank: subgenus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=464929)	Parent	Aphis () - (Rank: subgenus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=464929)	Parent
80765 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=80765)	NCBI Taxonomy ID	80765 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=80765)	NCBI Taxonomy ID
No	is Taxon A an Intraspecies?	No	is Taxon B an Intraspecies?

GENOTYPIC CHANGE

nAChRbeta1	Generic Gene Name	P04755 (http://www.uniprot.org/uniprot/P04755)	UniProtKB Drosophila melanogaster
AChR; AchR64B; AChR64B; Acr64B; AcrD; ard; Ard; ARD; beta 64B; beta1 nAChR; CG11348; CG11348-PA; CG12606; Dbeta1; Dmel\CG11348; nAChR; nAChR-beta64B; nAcR64B; nAcRbeta-64B	Synonyms	()	GenebankID or UniProtKB
7227.FBpp0073155 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0073155)	String		
Belongs to the ligand-gated ion channel (TC 1.A.9) family. Acetylcholine receptor (TC 1.A.9.1) subfamily.	Sequence Similarities		
GO:0004888 : transmembrane signaling receptor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004888)	GO - Molecular Function		
GO:0022848 : acetylcholine-gated cation-selective channel activity (https://www.ebi.ac.uk/QuickGO/term/GO:0022848)			

GO:1904315 : transmitter-gated ion channel activity involved in regulation of postsynaptic membrane potential (<https://www.ebi.ac.uk/QuickGO/term/GO:1904315>)
 GO:0005231 : excitatory extracellular ligand-gated ion channel activity (<https://www.ebi.ac.uk/QuickGO/term/GO:0005231>)
 GO:0030594 : neurotransmitter receptor activity (<https://www.ebi.ac.uk/QuickGO/term/GO:0030594>)

GO - Biological Process

GO:0007165 : signal transduction (<https://www.ebi.ac.uk/QuickGO/term/GO:0007165>)
 GO:0007268 : chemical synaptic transmission (<https://www.ebi.ac.uk/QuickGO/term/GO:0007268>)
 GO:0007271 : synaptic transmission, cholinergic (<https://www.ebi.ac.uk/QuickGO/term/GO:0007271>)
 GO:0034220 : ion transmembrane transport (<https://www.ebi.ac.uk/QuickGO/term/GO:0034220>)
 GO:0050877 : nervous system process (<https://www.ebi.ac.uk/QuickGO/term/GO:0050877>)
 GO:0042391 : regulation of membrane potential (<https://www.ebi.ac.uk/QuickGO/term/GO:0042391>)

GO - Cellular Component

GO:0005887 : integral component of plasma membrane (<https://www.ebi.ac.uk/QuickGO/term/GO:0005887>)
 GO:0043005 : neuron projection (<https://www.ebi.ac.uk/QuickGO/term/GO:0043005>)
 GO:0045211 : postsynaptic membrane (<https://www.ebi.ac.uk/QuickGO/term/GO:0045211>)
 GO:0045202 : synapse (<https://www.ebi.ac.uk/QuickGO/term/GO:0045202>)
 GO:0070161 : anchoring junction (<https://www.ebi.ac.uk/QuickGO/term/GO:0070161>)

No (<https://www.gephebase.org/search-criteria?/and+Presumptive Null=^No^#gephebase-summary-title>) Presumptive Null
 Coding (<https://www.gephebase.org/search-criteria?/and+Molecular Type=^Coding^#gephebase-summary-title>) Molecular Type
 SNP (<https://www.gephebase.org/search-criteria?/and+Aberration Type=^SNP^#gephebase-summary-title>) Aberration Type
 Nonsynonymous SNP Coding Change
 K264E Molecular Details of the Mutation
 Candidate Gene (<https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Candidate Gene^#gephebase-summary-title>) Experimental Evidence

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	Lys	Glu	264

Insecticide resistance and resistance mechanisms in the melon aphid, *Aphis gossypii*, in Shandong, China. (2021) (<https://pubmed.ncbi.nlm.nih.gov/33518055>) Main Reference

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The melon aphid, *Aphis gossypii*, is an important pest of vegetables. Insecticide resistance in *A. gossypii* has increased due to the frequent use of insecticides. We studied the levels and mechanisms of *A. gossypii* resistance to imidacloprid, acetamiprid and lambda-cyhalothrin here. The resistance levels of the three insecticides in 20 populations of *A. gossypii* varied. When compared to the susceptible strain (Lab-SS), there were two moderate resistance (MR) populations and nine low resistance (LR) populations to imidacloprid, respectively, two MR populations and two LR populations to acetamiprid, respectively, and, five MR populations and two LR populations to lambda-cyhalothrin, respectively. Gene mutation detection in the MR level populations showed arginine to threonine substitution (R81T) in three populations and lysine to glutamine substitution (K264E) in the nicotinic acetylcholine receptor (nAChR) \hat{I}^2_1 subunit in one population, respectively. No valine to isoleucine substitution (V62I) was found in the nAChR \hat{I}^2_1 subunit in any of the tested populations. The leucine to phenylalanine substitution (L1014F) in sodium channel \hat{I}^1_{\pm} subunit was found in five MR populations. The relative expression of the CYP6CY13 gene was significantly upregulated in the Daiyue and Shenxian populations. The CYP6CY14 gene was significantly upregulated in Daiyue, Dongchangfu, Shenxian, Mengyin and Anqiu populations. The CYP6CY19 gene was significantly upregulated in the Dongchangfu and Mengyin populations. The relative expressions of the esterase E4 or FE4 genes were significantly upregulated in most of the MR populations. These results provide insight into the current insecticide resistance of *A. gossypii* and may contribute to more effective resistance management strategies.

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Additional References

RELATED GEPHE

Related Genes

3 (Acetylcholinesterase (Ace-1), Acetylcholinesterase (Ace-2), para (kdr)) (<https://www.gephebase.org/search-criteria?/or+Taxon ID=^80765^/and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

1 (<https://www.gephebase.org/search-criteria?/or+Gene Gephebase=^nAChR^/and+Taxon ID=^80765^/or+Gene Gephebase=^nAChR^/and+Taxon ID=^80765^#gephebase-summary-title>)

EXTERNAL LINKS

COMMENTS