

## GEPHE SUMMARY

para (kdr) ( <a +para+(kdr)+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase="+para+(kdr)+"#gephebase-summary-title</a> )	Gephebase Gene	GP00002646	GepheID
Published	Entry Status	Courtier	Main curator

## PHENOTYPIC CHANGE

Physiology ( <a +physiology+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait+Category=">https://www.gephebase.org/search-criteria?/and+Trait+Category="+Physiology+"#gephebase-summary-title</a> )	Trait Category		
Xenobiotic resistance (insecticide) ( <a +xenobiotic+resistance+(insecticide)+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait="+Xenobiotic+resistance+(insecticide)+"#gephebase-summary-title</a> )	Trait		
Aedes albopictus	Trait State in Taxon A		
Aedes albopictus - resistant from China	Trait State in Taxon B		
Taxon A	Ancestral State		
Intraspecific ( <a +intraspecific+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=">https://www.gephebase.org/search-criteria?/and+Taxonomic+Status="+Intraspecific+"#gephebase-summary-title</a> )	Taxonomic Status		
	Taxon A	Taxon B	
Aedes albopictus ( <a +aedes+albopictus+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Aedes+albopictus+"#gephebase-summary-title</a> )	Latin Name	Aedes albopictus ( <a +aedes+albopictus+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Aedes+albopictus+"#gephebase-summary-title</a> )	Latin Name
Asian tiger mosquito	Common Name	Asian tiger mosquito	Common Name
Stegomyia albopicta; Asian tiger mosquito; forest day mosquito; Aedes albopictus (Skuse, 1894)	Synonyms	Stegomyia albopicta; Asian tiger mosquito; forest day mosquito; Aedes albopictus (Skuse, 1894)	Synonyms
species	Rank	species	Rank
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Endopterygota; Diptera; Nematocera; Culicomorpha; Culicoidea; Culicidae; Culicinae; Aedini; Aedes; Stegomyia	Lineage	cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Endopterygota; Diptera; Nematocera; Culicomorpha; Culicoidea; Culicidae; Culicinae; Aedini; Aedes; Stegomyia	Lineage
Stegomyia () - (Rank: subgenus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=53541">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=53541</a> )	Parent	Stegomyia () - (Rank: subgenus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=53541">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=53541</a> )	Parent
7160 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7160">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7160</a> )	NCBI Taxonomy ID	7160 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7160">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7160</a> )	NCBI Taxonomy ID
No	is Taxon A an Infrappecies?	No	is Taxon B an Infrappecies?

## GENOTYPIC CHANGE

para	Generic Gene Name	P35500 ( <a href="http://www.uniprot.org/uniprot/P35500">http://www.uniprot.org/uniprot/P35500</a> )	UniProtKB Drosophila melanogaster
bas; bss; CG9907; Dmel\CG9907; DmNav; DmNav1; DmNa[[v]]; DmNa[[V]]; DmNa[[v]]1; l(1)14Da; l(1)ESHS48; lincRNA.S9469; Nav1; Ocd; olfD; par; sbl; sbl-1; Shu; Shudderer	Synonyms	()	GenebankID or UniProtKB
7227.FBpp0303597 ( <a href="http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0303597">http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0303597</a> )	String		
Belongs to the sodium channel (TC 1.A.1.10) family. Para subfamily.	Sequence Similarities		
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> )	GO - Molecular Function		
GO:0005244 : voltage-gated ion channel activity ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0005244">https://www.ebi.ac.uk/QuickGO/term/GO:0005244</a> )			
GO:0005248 : voltage-gated sodium channel activity ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0005248">https://www.ebi.ac.uk/QuickGO/term/GO:0005248</a> )			

GO:0005272 : sodium channel activity  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0005272>)

GO - Biological Process

GO:0045433 : male courtship behavior, veined wing generated song production  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0045433>)  
GO:0001666 : response to hypoxia (<https://www.ebi.ac.uk/QuickGO/term/GO:0001666>)  
GO:0009612 : response to mechanical stimulus  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0009612>)  
GO:0034765 : regulation of ion transmembrane transport  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0034765>)  
GO:0035725 : sodium ion transmembrane transport  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0035725>)  
GO:0007638 : mechanosensory behavior  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007638>)  
GO:0060078 : regulation of postsynaptic membrane potential  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0060078>)

GO - Cellular Component

GO:0005887 : integral component of plasma membrane  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0005887>)  
GO:0001518 : voltage-gated sodium channel complex  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0001518>)

Presumptive Null

No (<https://www.gephebase.org/search-criteria?/and+Presumptive Null=~No^#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

F1534S

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	Phe	Ser	1534

Main Reference

Knockdown Resistance (kdr) Mutations I1532T and F1534S Were Identified in *Aedes albopictus* Field Populations in Zhejiang Province, Central China. (2021)  
(<https://pubmed.ncbi.nlm.nih.gov/34268140>)

Authors

Wu Y; Liu Q; Qi Y; Wu Y; Ni Q; Chen W; Wang J; Li T; Luo M; Hou J; Gong Z; Sun J

Abstract

*Aedes albopictus* is the only vector that can transmit the dengue virus in Zhejiang Province, central China, and it can develop insecticide resistance due to long-term exposure to pyrethroids. The presence of knockdown resistance (kdr) mutations is one of the mechanisms responsible for pyrethroid resistance, and has been reported in some *Ae. albopictus* populations in southern China. However, little is known about the DNA diversity of the voltage-gated sodium channel (VGSC) gene in *Ae. albopictus* populations in central China. Four *Ae. albopictus* field populations were collected, in Yiwu (YW), Quzhou (QZ), Wenzhou (WZ), and Jiaxing (JX) from Zhejiang Province, central China. The susceptibility of *Ae. albopictus* adults to three pyrethroids (beta-cypermethrin, deltamethrin, and permethrin) was tested using the WHO tube assay, and Kdr mutations were identified via PCR and sequencing. The relationship between kdr mutations and pyrethroid phenotypes was also analyzed. Of the four populations, none was sensitive to any pyrethroid tested, and the YW population showed the strongest pyrethroid resistance. Non-synonymous kdr mutations were detected in codons 1532 and 1534, domain III. At codon 1534, one mutant allele, TCC(S), was detected in the four populations with a frequency of 42.08%, while at codon 1532, one mutant allele, ACC(T), was detected in the JX and QZ populations, with frequencies of 4.22 and 3.03%, respectively. The F1534S mutant allele was positively correlated with both beta-cypermethrin and deltamethrin resistance phenotypes (OR > 1, P < 0.05), whereas the I1532T mutant allele was possibly negatively correlated with beta-cypermethrin, deltamethrin, and permethrin resistance phenotypes (OR < 1, P > 0.05). In conclusion, resistance and resistance mutations regarding to three pyrethroids are already present in the *Ae. Albopictus* populations from Zhejiang, central China, which prompts the need to use non-insecticide-based methods of insect control.

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Additional References

RELATED GEPHE

Related Genes

1 (resistance to dieldrin) (<https://www.gephebase.org/search-criteria?/or+Taxon ID=~7160^/and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

2 ([https://www.gephebase.org/search-criteria?/or+Gene Gephebase=~para \(kdr\)^/and+Taxon ID=~7160^/or+Gene Gephebase=~para \(kdr\)^/and+Taxon ID=~7160^#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Gene Gephebase=~para (kdr)^/and+Taxon ID=~7160^/or+Gene Gephebase=~para (kdr)^/and+Taxon ID=~7160^#gephebase-summary-title))

EXTERNAL LINKS

## COMMENTS