

GEPHE SUMMARY

para (kdr) (#gephebase-summary-title)	Gephebase Gene	GP00002539	GepheID
Published	Entry Status	Courtier	Main curator

PHENOTYPIC CHANGE

Trait Category			
Physiology (#gephebase-summary-title)	Trait		
Xenobiotic resistance (insecticide) (#gephebase-summary-title)	Trait State in Taxon A		
Culex pipiens	Trait State in Taxon B		
Culex pipiens - resistant	Ancestral State		
Taxon A	Taxonomic Status		
Intraspecific (#gephebase-summary-title)			
Taxon A		Taxon B	
Culex pipiens	Latin Name	Culex pipiens	Latin Name
(#gephebase-summary-title)		(#gephebase-summary-title)	
northern house mosquito	Common Name	northern house mosquito	Common Name
Culex agilis; Culex autogenicus; Culex azoriensis; Culex bicolor; Culex bifurcatus; Culex calcitrans; Culex calloti; Culex comitatus; Culex consobrinus; Culex dipseticus; Culex disjunctus; Culex doliorum; Culex domesticus; Culex erectus; Culex fasciatus; Culex haematophagus; Culex longefurcatus; Culex luteus; Culex marginalis; Culex melanorhinus; Culex meridionalis; Culex osakaensis; Culex pallipes; Culex phytophagus; Culex quasimodestus; Culex rufinus; Culex rufus; Culex sternopunctatus; Culex thoracicus; Culex torridus; Culex trifurcatus; Culex unistriatus; Culex varioannulatus; northern house mosquito; Culex pipiens Linnaeus, 1758	Synonyms	Culex agilis; Culex autogenicus; Culex azoriensis; Culex bicolor; Culex bifurcatus; Culex calcitrans; Culex calloti; Culex comitatus; Culex consobrinus; Culex dipseticus; Culex disjunctus; Culex doliorum; Culex domesticus; Culex erectus; Culex fasciatus; Culex haematophagus; Culex longefurcatus; Culex luteus; Culex marginalis; Culex melanorhinus; Culex meridionalis; Culex osakaensis; Culex pallipes; Culex phytophagus; Culex quasimodestus; Culex rufinus; Culex rufus; Culex sternopunctatus; Culex thoracicus; Culex torridus; Culex trifurcatus; Culex unistriatus; Culex varioannulatus; northern house mosquito; Culex pipiens Linnaeus, 1758	
species	Rank	species	Rank
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Diptera; Nematocera; Culicomorpha; Culicoidea; Culicidae; Culicinae; Culicini; Culex; Culex pipiens complex	Lineage	cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Diptera; Nematocera; Culicomorpha; Culicoidea; Culicidae; Culicinae; Culicini; Culex; Culex pipiens complex	Lineage
Culex pipiens complex () - (Rank: no rank)	Parent	Culex pipiens complex () - (Rank: no rank)	Parent
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 518105)	NCBI Taxonomy ID	(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 518105)	NCBI Taxonomy ID
7175		7175	
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7175)	is Taxon A an Infraspecies?	(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7175)	is Taxon B an Infraspecies?
No		No	

GENOTYPIC CHANGE

para	Generic Gene Name	UniProtKB Drosophila melanogaster
	Synonyms	P35500 (http://www.uniprot.org/uniprot/P35500)
bas; bss; CG9907; Dmel\CG9907; DmNav; DmNav1; DmNa[[v]]; DmNa[[V]]; DmNa[[v]]; I(1)14Da; I(1)ESHS48; lincRNA.S9469; Nav1; Ocd; olfD; par; sbl; sbl-1; Shu; Shudderer		GenebankID or UniProtKB
7227.FBpp0303597 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 7227.FBpp0303597)	String	AAS89995 (https://www.ncbi.nlm.nih.gov/nuccore/AAS89995)
Belongs to the sodium channel (TC 1.A.1.10) family. Para subfamily.	Sequence Similarities	

GO - Molecular Function

GO:0005509 : calcium ion binding (<https://www.ebi.ac.uk/QuickGO/term/GO:0005509>)
 GO:0005244 : voltage-gated ion channel activity
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0005244>)
 GO:0005248 : voltage-gated sodium channel activity
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0005248>)
 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=%22No%22#gephebase-summary-title>)

Molecular Type

Coding (<https://www.gephebase.org/search-criteria/?and+Molecular+Type=%22Coding%22#gephebase-summary-title>)

Aberration Type

SNP (<https://www.gephebase.org/search-criteria/?and+Aberration+Type=%22SNP%22#gephebase-summary-title>)

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

L1014C

Experimental Evidence

Candidate Gene (<https://www.gephebase.org/search-criteria/?and+Experimental+Evidence=%22Candidate+Gene%22#gephebase-summary-title>)

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

Main Reference

Detection and widespread distribution of sodium channel alleles characteristic of insecticide resistance in *Culex pipiens* complex mosquitoes in China. (2012)
 (<https://pubmed.ncbi.nlm.nih.gov/22070231>)

Authors

Wang ZM; Li CX; Xing D; Yu YH; Liu N; Xue RD; Dong YD; Zhao TY

Abstract

Culex pipiens complex mosquitoes are widely distributed throughout China and are known to be important disease vectors. Two pyrethroid resistance associated mutations have been identified in *Cx. pipiens* complex (Diptera: Culicidae), but there is little information on the diversity and distribution of kdr alleles in pyrethroid resistance in *Cx. pipiens* complex mosquitoes in China. In the present study, we report on a modified three tube allele-specific (AS)-PCR method for detecting the 1014F and 1014S alleles. The new technique was applied to identify the distribution of the two alleles in natural *Cx. pipiens* complex populations in China. The results confirmed that the new method is both sensitive and specific. The 1014F allele was found in all 14 of the field populations tested (frequency ranged from 6.8 to 76.2%) and the 1014S allele was found in almost two-thirds (frequency from 2.4 to 28.6%), indicating that the genotypes known to be associated with pyrethroid resistance are widespread in China. The resistance-associated alleles were more common in southern Chinese sampling sites than in northern sites. The coexistence of the two resistant mutations in individual mosquitoes was also observed in five of the field populations. Two alternative mutations within the L1014 codon were identified in *Culex pipiens molestus* Forskal, 1775, including a non-synonymous mutation resulting in a 1014C substitution.

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Additional References

Molecular biology of insect sodium channels and pyrethroid resistance. (2014) (<https://pubmed.ncbi.nlm.nih.gov/24704279>)

RELATED GEPHE

Related Genes

5 (Acetylcholinesterase (Ace-1), Cpm1, esterase A8 and B8, esterase B4, esterase B5) (<https://www.gephebase.org/search-criteria/?or+Taxon+ID=%227175%22+and+Trait=Xenobiotic+resistance+and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

2 ([https://www.gephebase.org/search-criteria/?or+Gene+Gephebase=%22para+\(kdr\)%22+and+Taxon+ID=%227175%22+or+Gene+Gephebase=%22para+\(kdr\)%22+and+Taxon+ID=%227175%22#gephebase-summary-title](https://www.gephebase.org/search-criteria/?or+Gene+Gephebase=%22para+(kdr)%22+and+Taxon+ID=%227175%22+or+Gene+Gephebase=%22para+(kdr)%22+and+Taxon+ID=%227175%22#gephebase-summary-title))

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