

GEPHE SUMMARY

cyp6g1 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase= [^] cyp6g1 [^] #gephebase-summary-title)	Gephebase Gene	GP00002019	GepheID
Published	Entry Status	Courtier	Main curator

PHENOTYPIC CHANGE

Physiology (https://www.gephebase.org/search-criteria?/and+Trait Category= [^] Physiology [^] #gephebase-summary-title)	Trait Category		
Xenobiotic resistance (insecticide) (<a href="https://www.gephebase.org/search-criteria?/and+Trait=<sup>^</sup>Xenobiotic resistance (insecticide)<sup>^</sup>#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait=[^]Xenobiotic resistance (insecticide)[^]#gephebase-summary-title)	Trait		
Drosophila simulans - susceptible	Trait State in Taxon A		
Drosophila simulans - resistant	Trait State in Taxon B		
Taxon A	Ancestral State		
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status= [^] Intraspecific [^] #gephebase-summary-title)	Taxonomic Status		
	Taxon A	Taxon B	
Drosophila simulans (<a href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=<sup>^</sup>Drosophila simulans<sup>^</sup>#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=[^]Drosophila simulans[^]#gephebase-summary-title)	Latin Name	Drosophila simulans (<a href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=<sup>^</sup>Drosophila simulans<sup>^</sup>#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=[^]Drosophila simulans[^]#gephebase-summary-title)	Latin Name
-	Common Name	-	Common Name
-	Synonyms	-	Synonyms
species	Rank	species	Rank
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Diptera; Brachycera; Muscomorpha; Eremoneura; Cyclorrhapha; Schizophora; Acalyptratae; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; melanogaster subgroup	Lineage	cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Diptera; Brachycera; Muscomorpha; Eremoneura; Cyclorrhapha; Schizophora; Acalyptratae; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; melanogaster subgroup	Lineage
melanogaster subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351)	Parent	melanogaster subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351)	Parent
7240 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7240)	NCBI Taxonomy ID	7240 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7240)	NCBI Taxonomy ID
No	is Taxon A an Intraspecies?	Yes	is Taxon B an Intraspecies?
		California population	Taxon B Description

GENOTYPIC CHANGE

Cyp6g1	Generic Gene Name	Q9V674 (http://www.uniprot.org/uniprot/Q9V674)	UniProtKB Drosophila melanogaster
6g1; anon-WO03025223.16; anon-WO03025223.17; CG8453; Cyp6-like; cyp6g1; Cyp6G1; CYP6g1; CYP6G1; Cyp6g1; DDT-R; Dmel-Cyp6g1; Dmel\CG8453; RDDT; Rl; Rl[DDT]; Rl[ll]; Rst(2)DDT; CYP6-like	Synonyms	()	GenebankID or UniProtKB
7227.FBpp0087100 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0087100)	String		
Belongs to the cytochrome P450 family.	Sequence Similarities		
GO:0020037 : heme binding (https://www.ebi.ac.uk/QuickGO/term/GO:0020037)	GO - Molecular Function		

GO:0005506 : iron ion binding (<https://www.ebi.ac.uk/QuickGO/term/GO:0005506>)
 GO:0004497 : monooxygenase activity
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0004497>)
 GO:0016705 : oxidoreductase activity, acting on paired donors, with incorporation or
 reduction of molecular oxygen (<https://www.ebi.ac.uk/QuickGO/term/GO:0016705>)
 GO - Biological Process
 GO:0046680 : response to DDT (<https://www.ebi.ac.uk/QuickGO/term/GO:0046680>)
 GO:0017085 : response to insecticide (<https://www.ebi.ac.uk/QuickGO/term/GO:0017085>)
 GO:0046701 : insecticide catabolic process
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0046701>)
 GO:0046689 : response to mercury ion
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0046689>)
 GO:0046683 : response to organophosphorus
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0046683>)

GO - Cellular Component

GO:0005789 : endoplasmic reticulum membrane
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0005789>)
 GO:0031090 : organelle membrane (<https://www.ebi.ac.uk/QuickGO/term/GO:0031090>)

Presumptive Null

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

Molecular Type

Cis-regulatory (<https://www.gephebase.org/search-criteria?/and+Molecular Type=^Cis-regulatory^#gephebase-summary-title>)

Aberration Type

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

Insertion Size

1-10 kb

Molecular Details of the Mutation

insertion of a Doc transposable element around 200 bp upstream of the putative transcription start site - mutation associated with increased expression of the gene

Experimental Evidence

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

Main Reference

Strong selective sweep associated with a transposon insertion in *Drosophila simulans*. (2004) (<https://pubmed.ncbi.nlm.nih.gov/14745026>)

Authors

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Abstract

We know little about several important properties of beneficial mutations, including their mutational origin, their phenotypic effects (e.g., protein structure changes vs. regulatory changes), and the frequency and rapidity with which they become fixed in a population. One signature of the spread of beneficial mutations is the reduction of heterozygosity at linked sites. Here, we present population genetic data from several loci across chromosome arm 2R in *Drosophila simulans*. A 100-kb segment from a freely recombining region of this chromosome shows extremely reduced heterozygosity in a California population sample, yet typical levels of divergence between species, suggesting that at least one episode of strong directional selection has occurred in the region. The 5' flanking sequence of one gene in this region, *Cyp6g1* (a cytochrome P450), is nearly fixed for a Doc transposable element insertion. Presence of the insertion is correlated with increased transcript abundance of *Cyp6g1*, a phenotype previously shown to be associated with insecticide resistance in *Drosophila melanogaster*. Surveys of nucleotide variation in the same genomic region in an African *D. simulans* population revealed no evidence for a high-frequency Doc element and no evidence for reduced polymorphism. These data are consistent with the notion that the Doc element is a geographically restricted beneficial mutation. Data from *D. simulans* *Cyp6g1* are paralleled in many respects by data from its sister species *D. melanogaster*.

Additional References

RELATED GEPHE

Related Genes

1 (resistance to dieldrin) (<https://www.gephebase.org/search-criteria?/or+Taxon ID=^7240^/and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

1 (<https://www.gephebase.org/search-criteria?/or+Gene Gephebase=^cyp6g1^/and+Taxon ID=^7240^/or+Gene Gephebase=^cyp6g1^/and+Taxon ID=^7240^#gephebase-summary-title>)

EXTERNAL LINKS

COMMENTS

@TE @SelectiveSweep

