

GEPHE SUMMARY

cyp6g1 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase= [^] cyp6g1 [^] #gephebase-summary-title)	Gephebase Gene	GP00002020	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; Acalyptera; 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; Acalyptera; 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?
		Rhone Valley 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[II]; 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 Juan transposable element in the regulatory sequence. The insertion is almost fixed in the Rh[^]ne Valley but barely present in Mayotte - 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

Variation of gene expression associated with colonisation of an anthropized environment: comparison between African and European populations of *Drosophila simulans*. (2013)
(<https://pubmed.ncbi.nlm.nih.gov/24260296>)

Authors

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Abstract

The comparison of transcriptome profiles among populations is a powerful tool for investigating the role of gene expression change in adaptation to new environments. In this study, we use massively parallel sequencing of 3' cDNAs obtained from large samples of adult males, to compare a population of *Drosophila simulans* from a natural reserve within its ancestral range (eastern Africa) with a derived population collected in the strongly anthropized Rh[^]ne valley (France). The goal was to scan for adaptation linked to the invasion of new environments by the species. Among 15,090 genes retained for the analysis, 794 were found to be differentially expressed between the two populations. We observed an increase in expression of reproduction-related genes in eastern Africa, and an even stronger increase in expression of Cytochrome P450, Glutathione transferase and Glucuronosyl transferase genes in the derived population. These three gene families are involved in detoxification processes, which suggests that pesticides are a major environmental pressure for the species in this area. The survey of the *Cyp6g1* upstream region revealed the insertion of a transposable element, Juan, in the regulatory sequence that is almost fixed in the Rh[^]ne Valley, but barely present in Mayotte. This shows that *Cyp6g1* has undergone parallel evolution in derived populations of *D. simulans* as previously shown for *D. melanogaster*. The increasing amount of data produced by comparative population genomics and transcriptomics should permit the identification of additional genes associated with functional divergence among those differentially expressed.

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

