

## GEPHE SUMMARY

	Gephebase Gene	GephelD
yellow ( <a href="https://www.gephebase.org/search-criteria?/and+GeneGephebase=%22yellow%22#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+GeneGephebase=%22yellow%22#gephebase-summary-title</a> )	GP00001224	Main curator
Published	Entry Status	Martin

## PHENOTYPIC CHANGE

	Trait Category
Morphology ( <a href="https://www.gephebase.org/search-criteria?/and+TraitCategory=%22Morphology%22#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+TraitCategory=%22Morphology%22#gephebase-summary-title</a> )	Trait
Coloration (wing spot) ( <a href="https://www.gephebase.org/search-criteria?/and+Trait=%22Coloration(wing%20spot)%22#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait=%22Coloration(wing%20spot)%22#gephebase-summary-title</a> )	Trait State in Taxon A
Drosophila spp.	Trait State in Taxon B
Drosophila mimetica	Ancestral State
Data not curated	Taxonomic Status
Interspecific ( <a href="https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=%22Interspecific%22#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=%22Interspecific%22#gephebase-summary-title</a> )	

Taxon A	Latin Name	Taxon B	Latin Name
Drosophila ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=%22Drosophila%22#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=%22Drosophila%22#gephebase-summary-title</a> )		Drosophila mimetica ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=%22Drosophila mimetica%22#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=%22Drosophila mimetica%22#gephebase-summary-title</a> )	
Common Name	Synonyms	Common Name	Synonyms
-	-	-	-
Drosophila (Drosophila); Drosophila (Drosophila) Fallen, 1823			
Subgenus	Lineage	Species	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		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; suzuki subgroup	
Parent		Parent	
Drosophila (fruit flies) - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7215">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7215</a> )		suzuki subgroup () - (Rank: species subgroup) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32353">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32353</a> )	
32281 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32281">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32281</a> )	NCBI Taxonomy ID	30038 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=30038">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=30038</a> )	NCBI Taxonomy ID
No	is Taxon A an Infraspecies?	No	is Taxon B an Infraspecies?

## GENOTYPIC CHANGE

y	Generic Gene Name	UniProtKB Drosophila melanogaster
CG3757; Dmel\CG3757; EG:125H10.2; T6; Y	Synonyms	GenebankID or UniProtKB
7227.FBpp0070070 ( <a href="http://string-db.org/newstring_cgi/show_network_section.pl?identifier=7227.FBpp0070070">http://string-db.org/newstring_cgi/show_network_section.pl?identifier=7227.FBpp0070070</a> )	String	CAJ57653 ( <a href="https://www.ncbi.nlm.nih.gov/nucleotide/CAJ57653">https://www.ncbi.nlm.nih.gov/nucleotide/CAJ57653</a> )
Belongs to the major royal jelly protein family.	Sequence Similarities	
-	GO - Molecular Function	
GO:0042438 : melanin biosynthetic process ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0042438">https://www.ebi.ac.uk/QuickGO/term/GO:0042438</a> )	GO - Biological Process	
GO:0048082 : regulation of adult chitin-containing cuticle pigmentation ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0048082">https://www.ebi.ac.uk/QuickGO/term/GO:0048082</a> )		

GO:0048066 : developmental pigmentation ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0048066">https://www.ebi.ac.uk/QuickGO/term/GO:0048066</a> )	
GO:0048067 : cuticle pigmentation ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0048067">https://www.ebi.ac.uk/QuickGO/term/GO:0048067</a> )	
GO:0006583 : melanin biosynthetic process from tyrosine ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0006583">https://www.ebi.ac.uk/QuickGO/term/GO:0006583</a> )	
GO:0048065 : male courtship behavior, veined wing extension ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0048065">https://www.ebi.ac.uk/QuickGO/term/GO:0048065</a> )	
GO:0060179 : male mating behavior ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0060179">https://www.ebi.ac.uk/QuickGO/term/GO:0060179</a> )	
GO - Cellular Component	Presumptive Null
GO:0005737 : cytoplasm ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0005737">https://www.ebi.ac.uk/QuickGO/term/GO:0005737</a> )	Molecular Type
GO:0005576 : extracellular region ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0005576">https://www.ebi.ac.uk/QuickGO/term/GO:0005576</a> )	Aberration Type
GO:0070451 : cell hair ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0070451">https://www.ebi.ac.uk/QuickGO/term/GO:0070451</a> )	Molecular Details of the Mutation
No ( <a href="https://www.gephebase.org/search-criteria?/and+Presumptive Null=^No^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Presumptive Null=^No^#gephebase-summary-title</a> )	Experimental Evidence
Cis-regulatory ( <a href="https://www.gephebase.org/search-criteria?/and+Molecular Type=^Cis-regulatory^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Molecular Type=^Cis-regulatory^#gephebase-summary-title</a> )	Main Reference
Unknown ( <a href="https://www.gephebase.org/search-criteria?/and+Aberration Type=^Unknown^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Aberration Type=^Unknown^#gephebase-summary-title</a> )	Authors
within a 740bp-element	Abstract
Candidate Gene ( <a href="https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Candidate Gene^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Candidate Gene^#gephebase-summary-title</a> )	Additional References
Repeated morphological evolution through cis-regulatory changes in a pleiotropic gene. (2006) ( <a href="https://pubmed.ncbi.nlm.nih.gov/16625197">https://pubmed.ncbi.nlm.nih.gov/16625197</a> )	
Prud'homme B; Gompel N; Rokas A; Kassner VA; Williams TM; Yeh SD; True JR; Carroll SB	
The independent evolution of morphological similarities is widespread. For simple traits, such as overall body colour, repeated transitions by means of mutations in the same gene may be common. However, for more complex traits, the possible genetic paths may be more numerous; the molecular mechanisms underlying their independent origins and the extent to which they are constrained to follow certain genetic paths are largely unknown. Here we show that a male wing pigmentation pattern involved in courtship display has been gained and lost multiple times in a <i>Drosophila</i> clade. Each of the cases we have analysed (two gains and two losses) involved regulatory changes at the pleiotropic pigmentation gene <i>yellow</i> . Losses involved the parallel inactivation of the same cis-regulatory element (CRE), with changes at a few nucleotides sufficient to account for the functional divergence of one element between two sibling species. Surprisingly, two independent gains of wing spots resulted from the co-option of distinct ancestral CREs. These results demonstrate how the functional diversification of the modular CREs of pleiotropic genes contributes to evolutionary novelty and the independent evolution of morphological similarities.	

## RELATED GEPHE

5 (Dat, Dopamine N-acetyltransferase (Dat), ebony, tan, wingless (wg)) ( <a href="https://www.gephebase.org/search-criteria?/or+Taxon ID=^32281^/and+Trait=Coloration/or+Taxon ID=^30038^/and+Trait=Coloration/and+groupHaplotypes=true#gephebase-summary-title">https://www.gephebase.org/search-criteria?/or+Taxon ID=^32281^/and+Trait=Coloration/or+Taxon ID=^30038^/and+Trait=Coloration/and+groupHaplotypes=true#gephebase-summary-title</a> )	Related Genes
3 ( <a href="https://www.gephebase.org/search-criteria?/or+Gene Gephebase=^yellow^/and+Taxon ID=^32281^/or+Gene Gephebase=^yellow^/and+Taxon ID=^30038^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/or+Gene Gephebase=^yellow^/and+Taxon ID=^32281^/or+Gene Gephebase=^yellow^/and+Taxon ID=^30038^#gephebase-summary-title</a> )	Related Haplotypes

## EXTERNAL LINKS

## COMMENTS