

## 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> )	GP00001222	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+spot)%22#gephebase-summary-title">https://www.gephebase.org/search-criteria/?and+Trait=%22Coloration(wing+spot)%22#gephebase-summary-title</a> )	Trait State in Taxon A		
Drosophila spp.	Trait State in Taxon B		
Drosophila biarmipes	Ancestral State		
Taxon A	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 biarmipes ( <a href="https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=%22Drosophila+biarmipes%22#gephebase-summary-title">https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=%22Drosophila+biarmipes%22#gephebase-summary-title</a> )	
-	Common Name	-	Common Name
Drosophila (Drosophila); Drosophila (Drosophila) Fallen, 1823	Synonyms	-	Synonyms
subgenus	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	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; suzuki subgroup	Lineage
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> )	Parent	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> )	Parent
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	125945 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=125945">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=125945</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	AAW32907 ( <a href="https://www.ncbi.nlm.nih.gov/nuccore/AAW32907">https://www.ncbi.nlm.nih.gov/nuccore/AAW32907</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%20Null=%27No%27#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Presumptive Null=%27No%27#gephebase-summary-title</a> )	Experimental Evidence
Cis-regulatory ( <a href="https://www.gephebase.org/search-criteria?/and+Molecular%20Type=%27Cis-regulatory%27#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Molecular Type=%27Cis-regulatory%27#gephebase-summary-title</a> )	Main Reference
Unknown ( <a href="https://www.gephebase.org/search-criteria?/and+Aberration%20Type=%27Unknown%27#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Aberration Type=%27Unknown%27#gephebase-summary-title</a> )	Authors
wing spot activator element; within a 196bp fragment; sequences required for activation in the spot are located within or overlap with bp 425-453	Abstract
Candidate Gene ( <a href="https://www.gephebase.org/search-criteria?/and+Experimental%20Evidence=%27Candidate%20Gene%27#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Experimental Evidence=%27Candidate Gene%27#gephebase-summary-title</a> )	Additional References
Chance caught on the wing: cis-regulatory evolution and the origin of pigment patterns in Drosophila. (2005) ( <a href="https://pubmed.ncbi.nlm.nih.gov/15690032">https://pubmed.ncbi.nlm.nih.gov/15690032</a> )	
Gompel N; Prud'homme B; Wittkopp PJ; Kassner VA; Carroll SB	
The gain, loss or modification of morphological traits is generally associated with changes in gene regulation during development. However, the molecular bases underlying these evolutionary changes have remained elusive. Here we identify one of the molecular mechanisms that contributes to the evolutionary gain of a male-specific wing pigmentation spot in <i>Drosophila biarmipes</i> , a species closely related to <i>Drosophila melanogaster</i> . We show that the evolution of this spot involved modifications of an ancestral cis-regulatory element of the yellow pigmentation gene. This element has gained multiple binding sites for transcription factors that are deeply conserved components of the regulatory landscape controlling wing development, including the selector protein Engrailed. The evolutionary stability of components of regulatory landscapes, which can be co-opted by chance mutations in cis-regulatory elements, might explain the repeated evolution of similar morphological patterns, such as wing pigmentation patterns in flies.	

## RELATED GEPHE

5 (Dat, Dopamine N-acetyltransferase (Dat), ebony, tan, wingless (wg)) ( <a href="https://www.gephebase.org/search-criteria?/or+Taxon%20ID=%2732281%27/and+Trait=Coloration/or+Taxon%20ID=%27125945%27/and+Trait=Coloration/and+groupHaplotypes=true#gephebase-summary-title">https://www.gephebase.org/search-criteria?/or+Taxon ID=%2732281%27/and+Trait=Coloration/or+Taxon ID=%27125945%27/and+Trait=Coloration/and+groupHaplotypes=true#gephebase-summary-title</a> )	Related Genes
3 ( <a href="https://www.gephebase.org/search-criteria?/or+Gene%20Gephebase=%27yellow%27/and+Taxon%20ID=%2732281%27/or+Gene%20Gephebase=%27yellow%27/and+Taxon%20ID=%27125945%27#gephebase-summary-title">https://www.gephebase.org/search-criteria?/or+Gene Gephebase=%27yellow%27/and+Taxon ID=%2732281%27/or+Gene Gephebase=%27yellow%27/and+Taxon ID=%27125945%27#gephebase-summary-title</a> )	Related Haplotypes

## EXTERNAL LINKS

## COMMENTS