

## GEPHE SUMMARY

yellow ( <a +yellow+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase="+yellow+"#gephebase-summary-title</a> )	Gephebase Gene	GP00001223	GepheID
Published	Entry Status	Martin	Main curator

## PHENOTYPIC CHANGE

Morphology ( <a +morphology+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait+Category=">https://www.gephebase.org/search-criteria?/and+Trait+Category="+Morphology+"#gephebase-summary-title</a> )	Trait Category		
Coloration (wing spot) ( <a +coloration+(wing+spot)+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait="+Coloration+(wing+spot)+"#gephebase-summary-title</a> )	Trait		
Drosophila spp.	Trait State in Taxon A		
Drosophila biarmipes	Trait State in Taxon B		
Taxon A	Ancestral State		
Interspecific ( <a +interspecific+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=">https://www.gephebase.org/search-criteria?/and+Taxonomic+Status="+Interspecific+"#gephebase-summary-title</a> )	Taxonomic Status		
	Taxon A	Taxon B	
Drosophila ( <a +drosophila+biarmipes+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Drosophila+biarmipes+"#gephebase-summary-title</a> )	Latin Name	Drosophila biarmipes ( <a +drosophila+biarmipes+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Drosophila+biarmipes+"#gephebase-summary-title</a> )	Latin Name
-	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; Acalyptera; 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; Acalyptera; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; suzukii 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	suzukii 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
	is Taxon A an Intraspecies?		is Taxon B an Intraspecies?
No		No	

## GENOTYPIC CHANGE

y	Generic Gene Name	UniProtKB Drosophila melanogaster
CG3757; Dmel\CG3757; EG:125H10.2; T6; Y	Synonyms	P09957 ( <a href="http://www.uniprot.org/uniprot/P09957">http://www.uniprot.org/uniprot/P09957</a> ) GenebankID or UniProtKB AAW32907 ( <a href="https://www.ncbi.nlm.nih.gov/nuccore/AAW32907">https://www.ncbi.nlm.nih.gov/nuccore/AAW32907</a> )
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	
Belongs to the major royal jelly protein family.	Sequence Similarities	
-	GO - Molecular Function	
	GO - Biological Process	
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: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  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0048066>)  
GO:0048067 : cuticle pigmentation (<https://www.ebi.ac.uk/QuickGO/term/GO:0048067>)  
GO:0006583 : melanin biosynthetic process from tyrosine  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0006583>)  
GO:0048065 : male courtship behavior, veined wing extension  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0048065>)  
GO:0060179 : male mating behavior (<https://www.ebi.ac.uk/QuickGO/term/GO:0060179>)  
GO - Cellular Component  
GO:0005737 : cytoplasm (<https://www.ebi.ac.uk/QuickGO/term/GO:0005737>)  
GO:0005576 : extracellular region (<https://www.ebi.ac.uk/QuickGO/term/GO:0005576>)  
GO:0070451 : cell hair (<https://www.ebi.ac.uk/QuickGO/term/GO:0070451>)

Presumptive Null

No ([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))

Molecular Type

Cis-regulatory ([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))

Aberration Type

Unknown ([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))

Molecular Details of the Mutation

wing spot repressor element; within a 675-bp fragment;

Experimental Evidence

Candidate Gene ([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))

Main Reference

Chance caught on the wing: cis-regulatory evolution and the origin of pigment patterns in *Drosophila*. (2005) (<https://pubmed.ncbi.nlm.nih.gov/15690032>)

Authors

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Abstract

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 *Drosophila biarmipes*, a species closely related to *Drosophila melanogaster*. 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.

Additional References

## RELATED GEPHE

Related Genes

5 (Dat, Dopamine N-acetyltransferase (Dat), ebony, tan, wingless (wg)) ([https://www.gephebase.org/search-criteria?/or+Taxon ID=32281+and+Trait=Coloration+or+Taxon ID=125945+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+125945+and+Trait+Coloration+and+groupHaplotypes=true#Gephebase-summary-title))

Related Haplotypes

3 ([https://www.gephebase.org/search-criteria?/or+Gene Gephebase=yellow+and+Taxon ID=32281+or+Gene Gephebase=yellow+and+Taxon ID=125945+Gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Gene+Gephebase+yellow+and+Taxon+ID+32281+or+Gene+Gephebase+yellow+and+Taxon+ID+125945+Gephebase-summary-title))

## EXTERNAL LINKS

## COMMENTS