

GEPHE SUMMARY

Gephebase Gene

yellow

Entry Status

Published

GepheID

GP00001222

Main curator

Martin

PHENOTYPIC CHANGE

Trait Category

Morphology

Trait

Coloration (wing spot)

Trait State in Taxon A

Drosophila spp.

Trait State in Taxon B

Drosophila biarmipes

Ancestral State

Taxon A

Taxonomic Status

Interspecific

Taxon A

Latin Name

Drosophila

Common Name

-

Synonyms

Drosophila (*Drosophila*); *Drosophila* (*Drosophila*) Fallen, 1823

Rank

subgenus

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; Acalypratae; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; *Drosophila*

Parent

Drosophila (fruit flies) - (Rank: genus)

NCBI Taxonomy ID

32281

is Taxon A an Intraspecies?

No

Taxon B

Latin Name

Drosophila biarmipes

Common Name

-

Synonyms

-

Rank

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; Acalypratae; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; *Drosophila*; Sophophora; melanogaster group; *suzukii* subgroup

Parent

suzukii subgroup () - (Rank: species subgroup)

NCBI Taxonomy ID

125945

is Taxon B an Intraspecies?

No

GENOTYPIC CHANGE

Generic Gene Name

y

Synonyms

CG3757; Dmel\CG3757; EG:125H10.2; T6; Y

String

7227.FBpp0070070

Sequence Similarities

Belongs to the major royal jelly protein family.

GO - Molecular Function

-

GO - Biological Process

GO:0042438 : melanin biosynthetic process

GO:0048082 : regulation of adult chitin-containing cuticle pigmentation

GO:0048066 : developmental pigmentation

GO:0048067 : cuticle pigmentation

GO:0006583 : melanin biosynthetic process from tyrosine

GO:0048065 : male courtship behavior, veined wing extension

GO:0060179 : male mating behavior

UniProtKB *Drosophila melanogaster*

P09957

GenebankID or UniProtKB

AAW32907

GO - Cellular Component
GO:0005737 : cytoplasm
GO:0005576 : extracellular region
GO:0070451 : cell hair

Presumptive Null

No

Molecular Type

Cis-regulatory

Aberration Type

Unknown

Molecular Details of the Mutation

wing spot activator element; within a 196bp fragment; sequences required for activation in the spot are located within or overlap with bp 425-453

Experimental Evidence

Candidate Gene

Main Reference

Chance caught on the wing: cis-regulatory evolution and the origin of pigment patterns in *Drosophila*. (2005)

Authors

Gompel N; Prud'homme B; Wittkopp PJ; Kassner VA; Carroll SB

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))

Related Haplotypes

3

EXTERNAL LINKS

COMMENTS