GEPHE SUMMARY

Gephebase Gene
pdm3 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^pdm3^#gephebase-summary-title)

GepheID
GP00001400

Entry Status
Published

Main curator
Prigent

PHENOTYPIC CHANGE

Trait Category
Morphology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Morphology^#gephebase-summary-title)

Trait
Coloration (female abdomen) (https://www.gephebase.org/search-criteria?/and+Trait=^Coloration (female abdomen)^#gephebase-summary-title)

Trait State in Taxon A
Drosophila serrata female light form

Trait State in Taxon B
Drosophila serrata female dark form

Ancestral State
Taxon A

Taxonomic Status
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Intraspecific^#gephebase-summary-title)

Taxon A

Latin Name
Drosophila serrata (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Drosophila serrata^#gephebase-summary-title)

Common Name
-

Synonyms
Drosophila serrata Malloch, 1927

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; Acalyptratae; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; montium subgroup; Drosophila serrata species complex

Parent
Drosophila serrata species complex () - (Rank: no rank) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 446045)

NCBI Taxonomy ID
7274 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7274)

is Taxon A an Infraspecies?
No

Taxon B

Latin Name
Drosophila serrata (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Drosophila serrata^#gephebase-summary-title)

Common Name
-

Synonyms
Drosophila serrata Malloch, 1927

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; Acalyptratae; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; montium subgroup; Drosophila serrata species complex

Parent
Drosophila serrata species complex () - (Rank: no rank) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 446045)

NCBI Taxonomy ID
7274 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7274)

is Taxon B an Infraspecies?
No

GENOTYPIC CHANGE

Generic Gene Name
pdm3

Synonyms
BcDNA:AT16994; CG11641; CG14755; CG42698; Dmel\CG42698; Pdm3; Dmel_CG42698

String
-

Sequence Similarities
Belongs to the POU transcription factor family.

GO - Molecular Function
GO:0003700 : DNA-binding transcription factor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0003700)
GO:0003677 : DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0003677)

GO - Biological Process
GO:0007411 : axon guidance (https://www.ebi.ac.uk/QuickGO/term/GO:0007411)
GO:0007409 : axonogenesis (https://www.ebi.ac.uk/QuickGO/term/GO:0007409)

UniProtKB Drosophila melanogaster
A0A0B4LEG2 (http://www.uniprot.org/uniprot/A0A0B4LEG2)

GenebankID or UniProtKB
()

GO:0007608 : sensory perception of smell
(https://www.ebi.ac.uk/QuickGO/term/GO:0007608)
GO:0007412 : axon target recognition
(https://www.ebi.ac.uk/QuickGO/term/GO:0007412)

GO - Cellular Component

GO:0005634 : nucleus (https://www.ebi.ac.uk/QuickGO/term/GO:0005634)

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

Complex Change (https://www.gephebase.org/search-criteria?/and+Aberration Type=^Complex Change^#gephebase-summary-title)

Molecular Details of the Mutation

1st intron variant divergent in length and sequence. Dark haplotype contains four tandem sets of three motifs.

Experimental Evidence

Linkage Mapping (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Linkage Mapping^#gephebase-summary-title)

Main Reference

The pdm3 Locus Is a Hotspot for Recurrent Evolution of Female-Limited Color Dimorphism in Drosophila. (2016) (https://pubmed.ncbi.nlm.nih.gov/27546577)

Authors

Yassin A; Delaney EK; Reddiex AJ; Seher TD; Bastide H; Appleton NC; Lack JB; David JR; Chenoweth SF; Pool JE; Kopp A

Abstract

Sex-limited polymorphisms are an intriguing form of sexual dimorphism that offer unique opportunities to reconstruct the evolutionary changes that decouple male and female traits encoded by a shared genome. We investigated the genetic basis of a Mendelian female-limited color dimorphism (FLCD) that segregates in natural populations of more than 20 species of the Drosophila montium subgroup. In these species, females have alternative abdominal color morphs, light and dark, whereas males have only one color morph in each species. A comprehensive molecular phylogeny of the montium subgroup supports multiple origins of FLCD. Despite this, we mapped FLCD to the same locus in four distantly related species-the transcription factor POU domain motifÂ 3 (pdm3), which acts as a repressor of abdominal pigmentation in D.Â melanogaster. In D.Â serrata, FLCD maps to a structural variant in the first intron of pdm3; however, this variant is not found in the three other species-D.Â kikkawai, D.Â leontia, and D.Â burlai-and sequence analysis strongly suggests the pdm3 alleles responsible for FLCD originated independently at least three times. We propose that cis-regulatory changes in pdm3 form sexually dimorphic and monomorphic alleles that segregate within species and are preserved, at least in one species, by structural variation. Surprisingly, pdm3 has not been implicated in the evolution of sex-specific pigmentation outside the montium subgroup, suggesting that the genetic paths to sexual dimorphism may be constrained within a clade but variable across clades.

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Additional References

RELATED GEPHE

Related Genes

1 (ebony) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^7274^/and+Trait=Coloration/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

@SexualTrait - dominant dark allele. Dark allele may have formed via tandem duplications of a flanking precursor motif