GEPHE SUMMARY

Gephebase Gene

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

Entry Status

Published

GepheID

GP00001548

Main curator

Prigent

PHENOTYPIC CHANGE

Trait Category

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

Trait

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

Trait State in Taxon A

D. m. malerkotliana with darker male abdominal pigmentation

Trait State in Taxon B

D. m. pallens with light colored male abdominal pigmentation

Ancestral State

Unknown

Taxonomic Status

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

Taxon A

Latin Name

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

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; Acalyptratae; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; ananassae subgroup; bipectinata species complex

Parent

bipectinata species complex () - (Rank: no rank) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 186282)

NCBI Taxonomy ID

30036 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 30036)

is Taxon A an Infraspecies?

Yes

Taxon A Description

D. m. malerkotliana with darker male abdominal pigmentation

Taxon B

Latin Name

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

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; Acalyptratae; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; ananassae subgroup; bipectinata species complex

Parent

bipectinata species complex () - (Rank: no rank) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 186282)

NCBI Taxonomy ID

30036 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 30036)

is Taxon B an Infraspecies?

Yes

Taxon B Description

D. m. pallens with light colored male abdominal pigmentation

GENOTYPIC CHANGE

Generic Gene Name

Abd-B

Synonyms

BX-C; 9; Abd B; abd-B; Abd-b; ABD-B; Abd0B; abdB; Abdb; AbdB; ABDB; AbdB(CA)[[26]]; AbdB-I; AbdB-II; AbdBm; Adb-B; AdbB; bex; CG10291; CG11648; DmAbdB; Dmel\CG11648; Droabdb; DROABDB; FAB; Fab-6; Fab-7; Fab-8; Fab7; iab; IAB 5; iab-5; iab-6; iab-7; Iab-7; iab-8; iab5; IAB5; iab6; iab7; IAB7; iab8; IAB8; iab8.9; iab9; l(3)89Ed; Mc; Mcp; MCP; pH189; Sab; Tab; tuh-3; twig; Uab-5[Sab]

String

7227.FBpp0082826 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 7227.FBpp0082826)

Sequence Similarities

Belongs to the Abd-B homeobox family.

UniProtKB Drosophila melanogaster

P09087 (http://www.uniprot.org/uniprot/P09087)

GenebankID or UniProtKB

()

GO - Molecular Function

GO:0003700 : DNA-binding transcription factor activity
(https://www.ebi.ac.uk/QuickGO/term/GO:0003700)
GO:0000980 : RNA polymerase II distal enhancer sequence-specific DNA binding
(https://www.ebi.ac.uk/QuickGO/term/GO:0000980)
GO:0000976 : transcription regulatory region sequence-specific DNA binding
(https://www.ebi.ac.uk/QuickGO/term/GO:0000976)

GO - Biological Process

GO:0045944 : positive regulation of transcription by RNA polymerase II
(https://www.ebi.ac.uk/QuickGO/term/GO:0045944)
GO:0007507 : heart development (https://www.ebi.ac.uk/QuickGO/term/GO:0007507)
GO:0008584 : male gonad development
(https://www.ebi.ac.uk/QuickGO/term/GO:0008584)
GO:0007548 : sex differentiation (https://www.ebi.ac.uk/QuickGO/term/GO:0007548)
GO:0007621 : negative regulation of female receptivity
(https://www.ebi.ac.uk/QuickGO/term/GO:0007621)
GO:0048071 : sex-specific pigmentation
(https://www.ebi.ac.uk/QuickGO/term/GO:0048071)
GO:0030539 : male genitalia development
(https://www.ebi.ac.uk/QuickGO/term/GO:0030539)
GO:0035215 : genital disc development
(https://www.ebi.ac.uk/QuickGO/term/GO:0035215)
GO:0048066 : developmental pigmentation
(https://www.ebi.ac.uk/QuickGO/term/GO:0048066)
GO:0007486 : imaginal disc-derived female genitalia development
(https://www.ebi.ac.uk/QuickGO/term/GO:0007486)
GO:0035225 : determination of genital disc primordium
(https://www.ebi.ac.uk/QuickGO/term/GO:0035225)
GO:0007431 : salivary gland development
(https://www.ebi.ac.uk/QuickGO/term/GO:0007431)
GO:0035277 : spiracle morphogenesis, open tracheal system
(https://www.ebi.ac.uk/QuickGO/term/GO:0035277)
GO:0007424 : open tracheal system development
(https://www.ebi.ac.uk/QuickGO/term/GO:0007424)
GO:0008354 : germ cell migration (https://www.ebi.ac.uk/QuickGO/term/GO:0008354)
GO:0007494 : midgut development (https://www.ebi.ac.uk/QuickGO/term/GO:0007494)
GO:0035224 : genital disc anterior/posterior pattern formation
(https://www.ebi.ac.uk/QuickGO/term/GO:0035224)
GO:0035263 : genital disc sexually dimorphic development
(https://www.ebi.ac.uk/QuickGO/term/GO:0035263)
GO:0030540 : female genitalia development
(https://www.ebi.ac.uk/QuickGO/term/GO:0030540)
GO:0035261 : external genitalia morphogenesis
(https://www.ebi.ac.uk/QuickGO/term/GO:0035261)
GO:0007506 : gonadal mesoderm development
(https://www.ebi.ac.uk/QuickGO/term/GO:0007506)
GO:0007484 : imaginal disc-derived genitalia development
(https://www.ebi.ac.uk/QuickGO/term/GO:0007484)
GO:0048094 : male pigmentation (https://www.ebi.ac.uk/QuickGO/term/GO:0048094)
GO:0009997 : negative regulation of cardioblast cell fate specification
(https://www.ebi.ac.uk/QuickGO/term/GO:0009997)
GO:0045705 : negative regulation of salivary gland boundary specification
(https://www.ebi.ac.uk/QuickGO/term/GO:0045705)
GO:0045843 : negative regulation of striated muscle tissue development
(https://www.ebi.ac.uk/QuickGO/term/GO:0045843)
GO:0061101 : neuroendocrine cell differentiation
(https://www.ebi.ac.uk/QuickGO/term/GO:0061101)
GO:0007280 : pole cell migration (https://www.ebi.ac.uk/QuickGO/term/GO:0007280)
GO:1902339 : positive regulation of apoptotic process involved in morphogenesis
(https://www.ebi.ac.uk/QuickGO/term/GO:1902339)
GO:0048087 : positive regulation of developmental pigmentation
(https://www.ebi.ac.uk/QuickGO/term/GO:0048087)
GO:0007379 : segment specification (https://www.ebi.ac.uk/QuickGO/term/GO:0007379)
GO:0007385 : specification of segmental identity, abdomen
(https://www.ebi.ac.uk/QuickGO/term/GO:0007385)
GO:0046693 : sperm storage (https://www.ebi.ac.uk/QuickGO/term/GO:0046693)

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

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

Aberration Type

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

Molecular Details of the Mutation

unknown

Experimental Evidence

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

Main Reference

Genetic Convergence in the Evolution of Male-Specific Color Patterns in Drosophila. (2016) (https://pubmed.ncbi.nlm.nih.gov/27546578)

Authors

Signor SA; Liu Y; Rebeiz M; Kopp A

Abstract

Convergent evolution provides a type of natural replication that can be exploited to understand the roles of contingency and constraint in the evolution of phenotypes and the gene networks that control their development. For sex-specific traits, convergence offers the additional opportunity for testing whether the same gene networks follow different evolutionary trends in males versus females. Here, we use an unbiased, systematic mapping approach to compare the genetic basis of evolutionary changes in male-limited pigmentation in several pairs of Drosophila species that represent independent evolutionary transitions. We find strong evidence for repeated recruitment of the same genes to specify similar pigmentation in different species. At one of these genes, ebony, we observe convergent evolution of sexually dimorphic and monomorphic expression through cis-regulatory changes. However, this functional convergence has a different molecular basis in different species, reflecting both parallel fixation of ancestral alleles and independent origin of distinct mutations with similar functional consequences. Our results show that a strong evolutionary constraint at the gene level is compatible with a dominant role of chance at the molecular level.

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Additional References

RELATED GEPHE

Related Genes

2 (ebony, yellow) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^30036^/and+Trait=Coloration/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

@SexualTrait - a second smaller QTL (3R2) including Abdominal-B (Abd-B) and Abd-A. Both Abd-A and Abd-B produced detectable pigmentation phenotype in RNAi experiments