

GEPHE SUMMARY

Abdominal-B (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=^Abdominal-B^#gephebase-summary-title)	Gephebase Gene	GP00001548	GepheID
Published	Entry Status	Prigent	Main curator

PHENOTYPIC CHANGE

Morphology (https://www.gephebase.org/search-criteria?/and+Trait+Category=^Morphology^#gephebase-summary-title)	Trait Category
Coloration (male-specific) (https://www.gephebase.org/search-criteria?/and+Trait=^Coloration (male-specific)^#gephebase-summary-title)	Trait
D. m. malerkotliana with darker male abdominal pigmentation	Trait State in Taxon A
D. m. pallens with light colored male abdominal pigmentation	Trait State in Taxon B
Unknown	Ancestral State
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=^Intraspecific^#gephebase-summary-title)	Taxonomic Status

Taxon A	Latin Name	Taxon B	Latin Name
Drosophila malerkotliana (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Drosophila+malerkotliana^#gephebase-summary-title)	Drosophila malerkotliana (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Drosophila+malerkotliana^#gephebase-summary-title)	Drosophila malerkotliana (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Drosophila+malerkotliana^#gephebase-summary-title)	Drosophila malerkotliana (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Drosophila+malerkotliana^#gephebase-summary-title)
-	Common Name	-	Common Name
-	Synonyms	-	Synonyms
species	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; Sophophora; melanogaster group; ananassae subgroup; bipectinata species complex	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; ananassae subgroup; bipectinata species complex	Lineage
bipectinata species complex () - (Rank: no rank) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=186282)	Parent	bipectinata species complex () - (Rank: no rank) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=186282)	Parent
30036 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=30036)	NCBI Taxonomy ID	30036 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=30036)	NCBI Taxonomy ID
Yes	is Taxon A an Intraspecies?	Yes	is Taxon B an Intraspecies?
D. m. malerkotliana with darker male abdominal pigmentation	Taxon A Description	D. m. pallens with light colored male abdominal pigmentation	Taxon B Description

GENOTYPIC CHANGE

Abd-B	Generic Gene Name	UniProtKB Drosophila melanogaster
BX-C; 9; Abd B; abd-B; Abd-b; ABD-B; Abd0B; abdB; Abdb; AbdB; ABD-B; 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-8; iab5; IAB5; iab6; iab7; IAB7; iab8; IAB8; iab8.9; iab9; I(3)89Ed; Mc; Mcp; MCP; pH189; Sab; Tab; tuh-3; twig; Uab-5[Sab]	Synonyms	GenebankID or UniProtKB
7227.FBpp0082826 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0082826)	String	
Belongs to the Abd-B homeobox family.	Sequence Similarities	

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)

No (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^No^#gephebase-summary-title) Presumptive Null

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

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

unknown Molecular Details of the Mutation

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

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](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