

GEPHE SUMMARY

Gephebase Gene
ebony

Entry Status
Published

GepheID
GP00001545

Main curator
Prigent

PHENOTYPIC CHANGE

Trait Category
Morphology

Trait
Coloration (male-specific)

Trait State in Taxon A
D. p. nigrens with darker male abdominal pigmentation

Trait State in Taxon B
D. p. pseudoananassae with light colored male abdominal pigmentation

Ancestral State
Unknown

Taxonomic Status
Intraspecific

	Taxon A	Taxon B
Latin Name	<i>Drosophila pseudoananassae</i>	<i>Drosophila pseudoananassae</i>
Common Name	-	-
Synonyms	-	-
Rank	species	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; Acalytratae; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; ananassae subgroup; bipectinata species complex	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; Acalytratae; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; ananassae subgroup; bipectinata species complex
Parent	bipectinata species complex () - (Rank: no rank)	bipectinata species complex () - (Rank: no rank)
NCBI Taxonomy ID	65964	65964
is Taxon A an Intraspecies?	Yes	Yes
Taxon A Description	D. p. nigrens with darker male abdominal pigmentation	D. p. pseudoananassae with light colored male abdominal pigmentation

GENOTYPIC CHANGE

Generic Gene Name
e

Synonyms
ebony; CG3331

String
-

Sequence Similarities
-

GO - Molecular Function
GO:0000036 : acyl carrier activity
GO:0003833 : beta-alanyl-dopamine synthase activity
GO:0031177 : phosphopantetheine binding

GO - Biological Process
GO:0048085 : adult chitin-containing cuticle pigmentation
GO:0042417 : dopamine metabolic process

UniProtKB Drosophila melanogaster
O76858

GenebankID or UniProtKB

GO:0007623 : circadian rhythm
GO:0048082 : regulation of adult chitin-containing cuticle pigmentation
GO:0048066 : developmental pigmentation
GO:0043042 : amino acid adenylation by nonribosomal peptide synthase
GO:0007593 : chitin-based cuticle sclerotization
GO:0048067 : cuticle pigmentation
GO:0001692 : histamine metabolic process
GO:0045475 : locomotor rhythm
GO:0006583 : melanin biosynthetic process from tyrosine
GO:0048022 : negative regulation of melanin biosynthetic process
GO:0042440 : pigment metabolic process

GO - Cellular Component
GO:0005737 : cytoplasm

Presumptive Null
No

Molecular Type
Cis-regulatory

Aberration Type
Unknown

Molecular Details of the Mutation
unknown

Experimental Evidence
Linkage Mapping

Main Reference
[Genetic Convergence in the Evolution of Male-Specific Color Patterns in Drosophila. \(2016\)](#)

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
No matches found.
Related Haplotypes
No matches found.

COMMENTS

@SexualTrait - A large QTL on 3R (3R1) including *ebony*; *ebony* is not expressed in segments that are completely black in darker species while it is expressed in a wider pattern in light colored taxa. The causative mutation has not been identified yet. Involvement of *ebony* demonstrated by RNAi experiments and evidence of cis-regulatory differences by sequencing of transcript in F1 hybrid