

GEPHE SUMMARY

Gephebase Gene
fatty acid synthase

Entry Status
Published

GepheID
GP00002063

Main curator
Courtier

PHENOTYPIC CHANGE

Trait #1

Trait Category
Physiology

Trait
Desiccation tolerance

Trait State in Taxon A
D. serrata - relatively desiccation resistant and produces relatively large amounts of mbCHCs

Trait State in Taxon B
D. birchii - desiccation sensitive and produces very low amounts of mbCHCs

Trait #2

Trait Category
Physiology

Trait
Pheromone production (mbCHC)

Trait State in Taxon A
D. serrata - relatively desiccation resistant and produces relatively large amounts of mbCHCs

Trait State in Taxon B
D. birchii - desiccation sensitive and produces very low amounts of mbCHCs

Ancestral State
Unknown

Taxonomic Status
Interspecific

Taxon A

Latin Name
Drosophila serrata

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

Parent
Drosophila serrata species complex () - (Rank: no rank)

NCBI Taxonomy ID
7274

is Taxon A an Intraspecies?
No

Taxon B

Latin Name
Drosophila birchii

Common Name
-

Synonyms
Drosophila birchii Dobzhansky & Mather, 1961

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; montium subgroup; *Drosophila serrata* species complex

Parent
Drosophila serrata species complex () - (Rank: no rank)

NCBI Taxonomy ID
46829

is Taxon B an Intraspecies?
No

GENOTYPIC CHANGE

Generic Gene Name

FASN3

UniProtKB *Drosophila melanogaster*

Q7PLB8

SynonymsCG17374; Dmel\CG17374; DM_7289423; FAS; FASN[CG17374]; FAS[CG17374];
Dmel_LCG17374**GenebankID or UniProtKB****String**

7227.FBpp0297101

Sequence Similarities

-

GO - Molecular Function

GO:0016491 : oxidoreductase activity

GO:0031177 : phosphopantetheine binding

GO:0016788 : hydrolase activity, acting on ester bonds

GO:0004312 : fatty acid synthase activity

GO - Biological Process

GO:0009058 : biosynthetic process

GO - Cellular Component

-

Presumptive Null

No

Molecular Type

Cis-regulatory

Aberration Type

Unknown

Molecular Details of the Mutation

No expression of the gene in *D. birchii*. The coding region of the *D. birchii* gene is intact. Cis-regulatory region tested in reporter assays in *D. melanogaster* - exact causing mutation(s) unknown. RNAi against mFAS/CG17354 in *D. serrata* recapitulates the *D. birchii* phenotype.

Experimental Evidence**Candidate Gene****Main Reference**

A single gene affects both ecological divergence and mate choice in *Drosophila*. (2014)

Authors

Chung H; Loehlin DW; Dufour HD; Vaccaro K; Millar JG; Carroll SB

Abstract

Evolutionary changes in traits involved in both ecological divergence and mate choice may produce reproductive isolation and speciation. However, there are few examples of such dual traits, and the genetic and molecular bases of their evolution have not been identified. We show that methyl-branched cuticular hydrocarbons (mbCHCs) are a dual trait that affects both desiccation resistance and mate choice in *Drosophila serrata*. We identify a fatty acid synthase mFAS (CG3524) responsible for mbCHC production in *Drosophila* and find that expression of mFAS is undetectable in oenocytes (cells that produce CHCs) of a closely related, desiccation-sensitive species, *D. birchii*, due in part to multiple changes in cis-regulatory sequences of mFAS. We suggest that ecologically influenced changes in the production of mbCHCs have contributed to reproductive isolation between the two species.

Additional References**RELATED GEPHE****Related Genes**

No matches found.

Related Haplotypes

No matches found.

COMMENTS

Direction of change unknown but since this is a full loss of expression in oenocytes we can hypothesize that *D. birchii* displays the derived trait.