

|                                                                                                                                                                                                                                                                     |              |                |              |         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|----------------|--------------|---------|
| desaturase 2 (desat2) ( <a href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=^desaturase+2+(desat2)^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=^desaturase 2 (desat2)^#gephebase-summary-title</a> ) |              | Gephebase Gene | GP00000221   | GepheID |
| Published                                                                                                                                                                                                                                                           | Entry Status | Martin         | Main curator |         |

|                                                                                                                                                                                                                                                                                                                                                                                                                                               |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                               |                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| Physiology ( <a href="https://www.gephebase.org/search-criteria?/and+Trait+Category=~Physiology~#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait+Category=~Physiology~#gephebase-summary-title</a> )                                                                                                                                                                                                            |                             | Trait Category                                                                                                                                                                                                                                                                                                                                                                                                                                |                             |
| Pheromone production ( <a href="https://www.gephebase.org/search-criteria?/and+Trait=~Pheromone+production~#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait=~Pheromone+production~#gephebase-summary-title</a> )                                                                                                                                                                                                |                             | Trait                                                                                                                                                                                                                                                                                                                                                                                                                                         |                             |
| Drosophila melanogaster - African and Caribbean - desat2[7-11HD-low] allele                                                                                                                                                                                                                                                                                                                                                                   |                             | Trait State in Taxon A                                                                                                                                                                                                                                                                                                                                                                                                                        |                             |
| Drosophila melanogaster - other areas - Desat2[5-9HD-low] allele                                                                                                                                                                                                                                                                                                                                                                              |                             | Trait State in Taxon B                                                                                                                                                                                                                                                                                                                                                                                                                        |                             |
| Taxon A                                                                                                                                                                                                                                                                                                                                                                                                                                       |                             | Ancestral State                                                                                                                                                                                                                                                                                                                                                                                                                               |                             |
| Intraspecific ( <a href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=~Intraspecific~#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=~Intraspecific~#gephebase-summary-title</a> )                                                                                                                                                                                               |                             | Taxonomic Status                                                                                                                                                                                                                                                                                                                                                                                                                              |                             |
| Taxon A                                                                                                                                                                                                                                                                                                                                                                                                                                       |                             | Taxon B                                                                                                                                                                                                                                                                                                                                                                                                                                       |                             |
| Drosophila melanogaster ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Drosophila+melanogaster~#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Drosophila+melanogaster~#gephebase-summary-title</a> )                                                                                                                                                             | Latin Name                  | Drosophila melanogaster ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Drosophila+melanogaster~#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Drosophila+melanogaster~#gephebase-summary-title</a> )                                                                                                                                                             | Latin Name                  |
| fruit fly                                                                                                                                                                                                                                                                                                                                                                                                                                     | Common Name                 | fruit fly                                                                                                                                                                                                                                                                                                                                                                                                                                     | Common Name                 |
| Sophophora melanogaster; fruit fly; Drosophila melanogaster Meigen, 1830; Sophophora melanogaster (Meigen, 1830); Drosophila melangaster                                                                                                                                                                                                                                                                                                      | Synonyms                    | Sophophora melanogaster; fruit fly; Drosophila melanogaster Meigen, 1830; Sophophora melanogaster (Meigen, 1830); Drosophila melangaster                                                                                                                                                                                                                                                                                                      | 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; Acalyptratae; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; melanogaster subgroup | 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; melanogaster subgroup | Lineage                     |
| melanogaster subgroup () - (Rank: species subgroup) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351</a> )                                                                                                                                                                                                                                     | Parent                      | melanogaster subgroup () - (Rank: species subgroup) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351</a> )                                                                                                                                                                                                                                     | Parent                      |
| 7227 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7227">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7227</a> )                                                                                                                                                                                                                                                                                      | NCBI Taxonomy ID            | 7227 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7227">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7227</a> )                                                                                                                                                                                                                                                                                      | NCBI Taxonomy ID            |
| No                                                                                                                                                                                                                                                                                                                                                                                                                                            | is Taxon A an Intraspecies? | No                                                                                                                                                                                                                                                                                                                                                                                                                                            | is Taxon B an Intraspecies? |

|                                                                                                                                                                                                                     |                         |                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------|
| Desat2                                                                                                                                                                                                              | Generic Gene Name       | UniProtKB Drosophila melanogaster                                                                                      |
|                                                                                                                                                                                                                     | Synonyms                | Q9VG68 ( <a href="http://www.uniprot.org/uniprot/Q9VG68">http://www.uniprot.org/uniprot/Q9VG68</a> )                   |
| 7-11HD; CG5925; desat; desat-2; desat2; desat2/Fad; Dmel\CG5925; ds2; Fad; desat 2; Dmel_CG5925                                                                                                                     |                         | GenebankID or UniProtKB                                                                                                |
|                                                                                                                                                                                                                     | String                  | AB055100 ( <a href="https://www.ncbi.nlm.nih.gov/nuccore/AB055100">https://www.ncbi.nlm.nih.gov/nuccore/AB055100</a> ) |
| 7227.FBpp0082064<br>( <a href="http://string-db.org/newstring_cgi/show_network_section.pl?identifier=7227.FBpp0082064">http://string-db.org/newstring_cgi/show_network_section.pl?identifier=7227.FBpp0082064</a> ) |                         |                                                                                                                        |
|                                                                                                                                                                                                                     | Sequence Similarities   |                                                                                                                        |
| Belongs to the fatty acid desaturase type 1 family.                                                                                                                                                                 |                         |                                                                                                                        |
|                                                                                                                                                                                                                     | GO - Molecular Function |                                                                                                                        |
| GO:0005506 : iron ion binding ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0005506">https://www.ebi.ac.uk/QuickGO/term/GO:0005506</a> )                                                                         |                         |                                                                                                                        |
| GO:0004768 : stearoyl-CoA 9-desaturase activity<br>( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0004768">https://www.ebi.ac.uk/QuickGO/term/GO:0004768</a> )                                                    |                         |                                                                                                                        |

GO - Biological Process

GO:0006636 : unsaturated fatty acid biosynthetic process  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0006636>)

GO - Cellular Component

GO:0016021 : integral component of membrane  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0016021>)  
GO:0005789 : endoplasmic reticulum membrane  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0005789>)

Presumptive Null

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

Molecular Type

Cis-regulatory ([https://www.gephebase.org/search-criteria?/and+Molecular Type=`Cis-regulatory`#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Molecular+Type=))

Aberration Type

Deletion ([https://www.gephebase.org/search-criteria?/and+Aberration Type=`Deletion`#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Aberration+Type=))

Deletion Size

10-99 bp

Molecular Details of the Mutation

16bp deletion about 150bp upstream of transcription start site

Experimental Evidence

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

Main Reference

The nucleotide changes governing cuticular hydrocarbon variation and their evolution in *Drosophila melanogaster*. (2001) (<https://pubmed.ncbi.nlm.nih.gov/11259658>)

Authors

Takahashi A; Tsaor SC; Coyne JA; Wu CI

Abstract

The cuticular hydrocarbon (CH) pheromones in *Drosophila melanogaster* exhibit strong geographic variation. African and Caribbean populations have a high ratio of 5,9 heptacosadiene/7,11 heptacosadiene (the "High" CH type), whereas populations from all other areas have a low ratio ("Low" CH type). Based on previous genetic mapping, DNA markers were developed that localized the genetic basis of this CH polymorphism to within a 13-kb region. We then carried out a hierarchical search for diagnostic nucleotide sites starting with four lines, and increasing to 24 and 43 lines from a worldwide collection. Within the 13-kb region, only one variable site shows a complete concordance with the CH phenotype. This is a 16-bp deletion in the 5' region of a desaturase gene (*desat2*) that was recently suggested to be responsible for the CH polymorphism on the basis of its expression [Dallerac, R., Labeur, C., Jallon, J.-M., Knipple, D. C., Roelofs, W. L. & Wicker-Thomas, C. (2000) *Proc. Natl. Acad. Sci.* 97, 9449--9454]. The cosmopolitan Low type is derived from the ancestral High type, and DNA sequence variations suggest that the former spread worldwide with the aid of positive selection. Whether this CH variation could be a component of the sexual isolation between Zimbabwe and other cosmopolitan populations remains an interesting and unresolved question.

Additional References

A delta 9 desaturase gene with a different substrate specificity is responsible for the cuticular diene hydrocarbon polymorphism in *Drosophila melanogaster*. (2000)  
(<https://pubmed.ncbi.nlm.nih.gov/10920187>)

RELATED GEPHE

Related Genes

1 (*desatF*) ([https://www.gephebase.org/search-criteria?/or+Taxon ID=`7227`/and+Trait=Pheromone production/and+groupHaplotypes=true#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Taxon+ID=))

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

@SexualTrait - The cosmopolitan *desat2*[5-9HD-low] allele is derived from the ancestral *desat2*[7-11HD-low] allele and has spread worldwide. - <http://flybase.org/reports/FBal0095912.html> - <http://flybase.org/reports/FBal0147210.html> - <http://flybase.org/reports/FBal0230316>