

## GEPHE SUMMARY

Dca (=smp-30) ( <a href="https://www.gephebase.org/search-criteria/?and+Gene+Gephebase=%Dca(%=smp-30)%#gephebase-summary-title">https://www.gephebase.org/search-criteria/?and+Gene Gephebase=%Dca(%=smp-30)%#gephebase-summary-title</a> )	Gephebase Gene	GP00000214	GephelD
	Entry Status	Martin	Main curator
Published			

## PHENOTYPIC CHANGE

	Trait Category
Morphology ( <a href="https://www.gephebase.org/search-criteria/?and+Trait+Category=%Morphology%#gephebase-summary-title">https://www.gephebase.org/search-criteria/?and+Trait+Category=%Morphology%#gephebase-summary-title</a> )	Trait
Wing size ( <a href="https://www.gephebase.org/search-criteria/?and+Trait=%Wing+size%#gephebase-summary-title">https://www.gephebase.org/search-criteria/?and+Trait=%Wing+size%#gephebase-summary-title</a> )	Trait State in Taxon A
Drosophila melanogaster	Trait State in Taxon B
Drosophila melanogaster	Ancestral State
Data not curated	Taxonomic Status
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> )	

Taxon A	Latin Name	Taxon B	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> )		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> )	
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; Ephydriodea; 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; Ephydriodea; 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
	is Taxon A an Infraspecies?		is Taxon B an Infraspecies?
No		No	

## GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Drosophila melanogaster
smp-30	Synonyms	Q9VFG5 ( <a href="http://www.uniprot.org/uniprot/Q9VFG5">http://www.uniprot.org/uniprot/Q9VFG5</a> )
CG7390; CT22723; Dca; Dmel CG7390; Smp-30; Dmel_CG7390	String	GenebankID or UniProtKB AE014298 ( <a href="https://www.ncbi.nlm.nih.gov/nucleotide/AE014298">https://www.ncbi.nlm.nih.gov/nucleotide/AE014298</a> )
-	Sequence Similarities	
-	GO - Molecular Function	
GO:0005509 : calcium ion binding ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0005509">https://www.ebi.ac.uk/QuickGO/term/GO:0005509</a> )		
GO:0004341 : gluconolactonase activity ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0004341">https://www.ebi.ac.uk/QuickGO/term/GO:0004341</a> )		
	GO - Biological Process	
GO:0009631 : cold acclimation ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0009631">https://www.ebi.ac.uk/QuickGO/term/GO:0009631</a> )		
GO:0044720 : negative regulation of imaginal disc-derived wing size		

(<https://www.ebi.ac.uk/QuickGO/term/GO:0044720>)

GO:0090256 : regulation of cell proliferation involved in imaginal disc-derived wing

morphogenesis (<https://www.ebi.ac.uk/QuickGO/term/GO:0090256>)

GO - Cellular Component

GO:0005829 : cytosol (<https://www.ebi.ac.uk/QuickGO/term/GO:0005829>)

Presumptive Null

Unknown (<https://www.gephebase.org/search-criteria?/and+Presumptive+Null=^Unknown^#gephebase-summary-title>)

Molecular Type

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

Aberration Type

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

Molecular Details of the Mutation

Non-coding

Experimental Evidence

Candidate Gene (<https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=^Candidate+Gene^#gephebase-summary-title>)

Main Reference

Molecular basis of adaptive shift in body size in *Drosophila melanogaster*: functional and sequence analyses of the Dca gene. (2011) (<https://pubmed.ncbi.nlm.nih.gov/21393605>)

Authors

Lee SF; Chen Y; Varan AK; Wee CW; Rako L; Axford JK; Good RT; Blacket MJ; Reuter C; Partridge L; Hoffmann AA

Abstract

Latitudinal body size clines in animals conforming to Bergmann's rule occur on many continents but isolating their underlying genetic basis remains a challenge. In *Drosophila melanogaster*, the gene Dca accounts for approximately 5-10% of the natural wing size variation (McKechnie SW, Blacket MJ, Song SV, Rako L, Carroll X, Johnson TK, Jensen LT, Lee SF, Wee CW, Hoffmann AA. 2010. A clinally varying promoter polymorphism associated with adaptive variation in wing size in *Drosophila*. *Mol Ecol*. 19:775-784). We present here functional evidence that Dca is a negative regulator of wing size. A significant negative latitudinal cline of Dca gene expression was detected in synchronized third instar larvae. In addition, we clarified the evolutionary history of the three most common Dca promoter alleles (Dca237-1, Dca237-2, and Dca247) and showed that the insertion allele (Dca247), whose frequency increases with latitude, is associated with larger wing centroid size and higher average cell number in male flies. Finally, we showed that the overall linkage disequilibrium (LD) was low in the Dca promoter and that the insertion/deletion polymorphism that defines the Dca alleles was in strong LD with two other upstream sites. Our results provide strong support that Dca is a candidate for climatic adaptation in *D. melanogaster*.

Additional References

A clinally varying promoter polymorphism associated with adaptive variation in wing size in *Drosophila*. (2010) (<https://pubmed.ncbi.nlm.nih.gov/20074315>)

## RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

## EXTERNAL LINKS

## COMMENTS

<http://flybase.org/reports/FBal0266080>