

GEPHE SUMMARY

	Gephebase Gene		GepheID
Darkener of apricot (Doa) (https://www.gephebase.org/search-criteria?/and+Gene)		GP00002662	
Gephebase="Darkener of apricot (Doa)"#gephebase-summary-title)			Main curator
Published	Entry Status	Courtier	

PHENOTYPIC CHANGE

	Trait Category		
Physiology (https://www.gephebase.org/search-criteria?/and+Trait)			
Category="Physiology"#gephebase-summary-title)	Trait		
Lifespan (https://www.gephebase.org/search-criteria?/and+Trait="Lifespan"#gephebase-summary-title)			
Drosophila melanogaster	Trait State in Taxon A		
Drosophila melanogaster	Trait State in Taxon B		
Data not curated	Ancestral State		
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic)	Taxonomic Status		
Status="Intraspecific"#gephebase-summary-title)			
	Taxon A	Taxon B	
Drosophila melanogaster	Latin Name	Drosophila melanogaster	Latin Name
(<a drosophila+melanogaster"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="Drosophila+melanogaster"#gephebase-summary-title)		(<a drosophila+melanogaster"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="Drosophila+melanogaster"#gephebase-summary-title)	
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)	Parent	melanogaster subgroup () - (Rank: species subgroup)	Parent
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351)	NCBI Taxonomy ID	(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351)	NCBI Taxonomy ID
7227		7227	
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7227)		(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7227)	
No	is Taxon A an Intraspecies?	No	is Taxon B an Intraspecies?

GENOTYPIC CHANGE

Doa	Generic Gene Name	P49762 (http://www.uniprot.org/uniprot/P49762)	UniProtKB Drosophila melanogaster
0844/02; CG1658; CG31049; CG33204; CG33553; CG42320; Dmel\CG42320; doa; DOA; DOA/CLK2; l(3)01705; l(3)S084402; l(3)s2784; Msu	Synonyms	()	GenebankID or UniProtKB
7227.FBpp0289029	String		
(http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0289029)			
Belongs to the protein kinase superfamily. CMGC Ser/Thr protein kinase family. Lammer subfamily.	Sequence Similarities		
GO:0005524 : ATP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005524)	GO - Molecular Function		
GO:0004674 : protein serine/threonine kinase activity			

(<https://www.ebi.ac.uk/QuickGO/term/GO:0004674>)
GO:0004672 : protein kinase activity (<https://www.ebi.ac.uk/QuickGO/term/GO:0004672>)
GO:0004713 : protein tyrosine kinase activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0004713>)
GO:0016301 : kinase activity (<https://www.ebi.ac.uk/QuickGO/term/GO:0016301>)
GO:0106310 : protein serine kinase activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0106310>)
GO:0004712 : protein serine/threonine/tyrosine kinase activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0004712>)

GO - Biological Process

GO:0007399 : nervous system development
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007399>)
GO:0007548 : sex differentiation (<https://www.ebi.ac.uk/QuickGO/term/GO:0007548>)
GO:0006468 : protein phosphorylation
(<https://www.ebi.ac.uk/QuickGO/term/GO:0006468>)
GO:0048749 : compound eye development
(<https://www.ebi.ac.uk/QuickGO/term/GO:0048749>)
GO:0018993 : somatic sex determination
(<https://www.ebi.ac.uk/QuickGO/term/GO:0018993>)
GO:0046777 : protein autophosphorylation
(<https://www.ebi.ac.uk/QuickGO/term/GO:0046777>)
GO:0007601 : visual perception (<https://www.ebi.ac.uk/QuickGO/term/GO:0007601>)
GO:0045752 : positive regulation of Toll signaling pathway
(<https://www.ebi.ac.uk/QuickGO/term/GO:0045752>)
GO:0009306 : protein secretion (<https://www.ebi.ac.uk/QuickGO/term/GO:0009306>)
GO:0010508 : positive regulation of autophagy
(<https://www.ebi.ac.uk/QuickGO/term/GO:0010508>)
GO:0050896 : response to stimulus (<https://www.ebi.ac.uk/QuickGO/term/GO:0050896>)
GO:0007350 : blastoderm segmentation
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007350>)
GO:0042051 : compound eye photoreceptor development
(<https://www.ebi.ac.uk/QuickGO/term/GO:0042051>)
GO:2000255 : negative regulation of male germ cell proliferation
(<https://www.ebi.ac.uk/QuickGO/term/GO:2000255>)
GO:0002225 : positive regulation of antimicrobial peptide production
(<https://www.ebi.ac.uk/QuickGO/term/GO:0002225>)
GO:0000381 : regulation of alternative mRNA splicing, via spliceosome
(<https://www.ebi.ac.uk/QuickGO/term/GO:0000381>)
GO:0043484 : regulation of RNA splicing
(<https://www.ebi.ac.uk/QuickGO/term/GO:0043484>)

GO - Cellular Component

GO:0005737 : cytoplasm (<https://www.ebi.ac.uk/QuickGO/term/GO:0005737>)
GO:0005829 : cytosol (<https://www.ebi.ac.uk/QuickGO/term/GO:0005829>)
GO:0005634 : nucleus (<https://www.ebi.ac.uk/QuickGO/term/GO:0005634>)
GO:0005783 : endoplasmic reticulum
(<https://www.ebi.ac.uk/QuickGO/term/GO:0005783>)

Unknown (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^Unknown^#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
Association Mapping (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Association Mapping^#gephebase-summary-title)	Experimental Evidence
Natural alleles at the Doa locus underpin evolutionary changes in Drosophila lifespan and fecundity. (2022) (https://pubmed.ncbi.nlm.nih.gov/36350205)	Main Reference
Hoedjes KM; Kostic H; Keller L; Flatt T	Authors
'Evolve and resequence' (E&R) studies in Drosophila melanogaster have identified many candidate loci underlying the evolution of ageing and life history, but experiments that validate the effects of such candidates remain rare. In a recent E&R study we have identified several alleles of the LAMMER kinase Darkener of apricot (Doa) as candidates for evolutionary changes in lifespan and fecundity. Here, we use two complementary approaches to confirm a functional role of Doa in life-history evolution. First, we used transgenic RNAi to study the effects of Doa at the whole-gene level. Ubiquitous silencing of expression in adult flies reduced both lifespan and fecundity, indicating pleiotropic effects. Second, to characterize segregating variation at Doa, we examined four candidate single nucleotide polymorphisms (SNPs; Doa-1, -2, -3, -4) using a genetic association approach. Three candidate SNPs had effects that were qualitatively consistent with expectations based on our E&R study: Doa-2 pleiotropically affected both lifespan and late-life fecundity; Doa-1 affected lifespan (but not fecundity); and Doa-4 affected late-life fecundity (but not lifespan). Finally, the last candidate allele (Doa-3) also affected lifespan, but in the opposite direction from predicted.	Abstract
	Additional References

RELATED GEPHE

3 (Catecholamines up, Dopa-decarboxylase, InR) (<https://www.gephebase.org/search-criteria?/or+Taxon ID=^7227^/and+Trait=Lifespan/and+groupHaplotypes=true#gephebase-summary-title>)

Related Genes

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

Four candidate single nucleotide polymorphisms (SNPs; Doa-1 -2 -3 -4) were tested using a genetic association approach. Three candidate SNPs had effects that were qualitatively consistent with expectations based on our E&R study: Doa-2 pleiotropically affected both lifespan and late-life fecundity; Doa-1 affected lifespan (but not fecundity); and Doa-4 affected late-life fecundity (but not lifespan). The last candidate allele (Doa-3) also affected lifespan but in the opposite direction from predicted.