

## GEPHE SUMMARY

Abdominal-B ( <a href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=^Abdominal-B^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=^Abdominal-B^#gephebase-summary-title</a> )	Gephebase Gene	GP00002021	GepheID
Published	Entry Status	Courtier	Main curator

## PHENOTYPIC CHANGE

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 Category
Coloration (abdomen; male) ( <a href="https://www.gephebase.org/search-criteria?/and+Trait=^Coloration (abdomen; male)^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait=^Coloration (abdomen; male)^#gephebase-summary-title</a> )	Trait
dark posterior male abdomen	Trait State in Taxon A
light posterior male abdomen	Trait State in Taxon B
Taxon A	Ancestral State
Interspecific ( <a href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=^Interspecific^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=^Interspecific^#gephebase-summary-title</a> )	Taxonomic Status

Taxon A	Latin Name	Taxon B	Latin Name
<i>Drosophila yakuba</i> ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Drosophila+yakuba^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Drosophila+yakuba^#gephebase-summary-title</a> )	<i>Drosophila santomea</i> ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Drosophila+santomea^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Drosophila+santomea^#gephebase-summary-title</a> )		
-	Common Name	-	Common Name
	Synonyms		Synonyms
<i>Drosophila yakuba</i> Burla, 1954	Rank	-	Rank
species	Lineage	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; melanogaster subgroup	Parent	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; melanogaster subgroup	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> )	NCBI Taxonomy ID	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> )	NCBI Taxonomy ID
7245 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7245">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7245</a> )		129105 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=129105">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=129105</a> )	
No	is Taxon A an Infrasppecies?	No	is Taxon B an Infrasppecies?

## GENOTYPIC CHANGE

Abd-B	Generic Gene Name	UniProtKB <i>Drosophila melanogaster</i>
	Synonyms	GenebankID or UniProtKB
BX-C; 9; Abd B; abd-B; Abd-b; ABD-B; Abd0B; abdB; Abdb; AbdB; ABDDB; AbdB(CA) [[26]]; AbdB-I; AbdB-II; AbdBm; Adb-B; AdbB; bex; CG10291; CG11648; DmAbdB; Dmel\CG11648; Droabdb; DROABDB; FAB; Fab-6; Fab-7; Fab-8; Fab7; iab; IAB 5; iab-5; iab-6; iab-7; iab-8; iab5; IAB5; iab6; iab7; IAB7; iab8; IAB8; iab8.9; iab9; I(3)89Ed; Mc; Mcp; MCP; pH189; Sab; Tab; tuh-3; twig; Uab-5[Sab]		
7227.FBpp0082826 ( <a href="http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0082826">http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0082826</a> )	String	
	Sequence Similarities	
Belongs to the Abd-B homeobox family.		
	GO - Molecular Function	
GO:0003700 : DNA-binding transcription factor activity		

(<https://www.ebi.ac.uk/QuickGO/term/GO:0003700>)  
GO:000980 : RNA polymerase II distal enhancer sequence-specific DNA binding  
(<https://www.ebi.ac.uk/QuickGO/term/GO:000980>)  
GO:000976 : transcription regulatory region sequence-specific DNA binding  
(<https://www.ebi.ac.uk/QuickGO/term/GO:000976>)

GO - Biological Process

GO:0045944 : positive regulation of transcription by RNA polymerase II  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0045944>)  
GO:0007507 : heart development (<https://www.ebi.ac.uk/QuickGO/term/GO:0007507>)  
GO:0008584 : male gonad development  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0008584>)  
GO:0007548 : sex differentiation (<https://www.ebi.ac.uk/QuickGO/term/GO:0007548>)  
GO:0007621 : negative regulation of female receptivity  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007621>)  
GO:0048071 : sex-specific pigmentation  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0048071>)  
GO:0030539 : male genitalia development  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0030539>)  
GO:0035215 : genital disc development  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0035215>)  
GO:0048066 : developmental pigmentation  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0048066>)  
GO:0007486 : imaginal disc-derived female genitalia development  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007486>)  
GO:0035225 : determination of genital disc primordium  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0035225>)  
GO:0007431 : salivary gland development  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007431>)  
GO:0035277 : spiracle morphogenesis, open tracheal system  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0035277>)  
GO:0007424 : open tracheal system development  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007424>)  
GO:0008354 : germ cell migration (<https://www.ebi.ac.uk/QuickGO/term/GO:0008354>)  
GO:0007494 : midgut development (<https://www.ebi.ac.uk/QuickGO/term/GO:0007494>)  
GO:0035224 : genital disc anterior/posterior pattern formation  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0035224>)  
GO:0035263 : genital disc sexually dimorphic development  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0035263>)  
GO:0030540 : female genitalia development  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0030540>)  
GO:0035261 : external genitalia morphogenesis  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0035261>)  
GO:0007506 : gonadal mesoderm development  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007506>)  
GO:0007484 : imaginal disc-derived genitalia development  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007484>)  
GO:0048094 : male pigmentation (<https://www.ebi.ac.uk/QuickGO/term/GO:0048094>)  
GO:0009997 : negative regulation of cardioblast cell fate specification  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0009997>)  
GO:0045705 : negative regulation of salivary gland boundary specification  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0045705>)  
GO:0045843 : negative regulation of striated muscle tissue development  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0045843>)  
GO:0061101 : neuroendocrine cell differentiation  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0061101>)  
GO:0007280 : pole cell migration (<https://www.ebi.ac.uk/QuickGO/term/GO:0007280>)  
GO:1902339 : positive regulation of apoptotic process involved in morphogenesis  
(<https://www.ebi.ac.uk/QuickGO/term/GO:1902339>)  
GO:0048087 : positive regulation of developmental pigmentation  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0048087>)  
GO:0007379 : segment specification (<https://www.ebi.ac.uk/QuickGO/term/GO:0007379>)  
GO:0007385 : specification of segmental identity, abdomen  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007385>)  
GO:0046693 : sperm storage (<https://www.ebi.ac.uk/QuickGO/term/GO:0046693>)

GO - Cellular Component

GO:0005634 : nucleus (<https://www.ebi.ac.uk/QuickGO/term/GO:0005634>)

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

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=)) Molecular Type

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

change in the iab5 cis-regulatory element (15kb long)- exact causing mutation(s) unknown - decreased AbdB abdominal expression Molecular Details of the Mutation

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=)) Experimental Evidence

Changes throughout a Genetic Network Mask the Contribution of Hox Gene Evolution. (2019) (<https://pubmed.ncbi.nlm.nih.gov/31257142>) Main Reference

Hox genes pattern the anterior-posterior axis of animals and are posited to drive animal body plan evolution, yet their precise role in evolution has been difficult to determine. Here, we identified evolutionary modifications in the Hox gene *Abd-B* that dramatically altered its expression along the body plan of *Drosophila santomea*. *Abd-B* is required for pigmentation in *Drosophila yakuba*, the sister species of *D. santomea*, and changes to *Abd-B* expression would be predicted to make large contributions to the loss of body pigmentation in *D. santomea*. However, manipulating *Abd-B* expression in current-day *D. santomea* does not affect pigmentation. We attribute this epistatic interaction to four other genes within the *D. santomea* pigmentation network, three of which have evolved expression patterns that do not respond to *Abd-B*. Our results demonstrate how body plans may evolve through small evolutionary steps distributed throughout Hox-regulated networks. Polygenicity and epistasis may hinder efforts to identify genes and mechanisms underlying macroevolutionary traits.

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Additional References

## RELATED GEPHE

Related Genes

5 (ebony, pdm3, tan, yellow, bab) (<https://www.gephebase.org/search-criteria?/or+Taxon ID=^7245^/and+Trait=Coloration/or+Taxon ID=^129105^/and+Trait=Coloration/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

No matches found.

## EXTERNAL LINKS

## COMMENTS

@SexualTrait @SeveralMutationsWithEffect