

GEPHE SUMMARY

	Gephebase Gene	GephelD
cortex (#gephebase-summary-title)	GP00002420	
	Entry Status	Main curator
Published	Courtier	

PHENOTYPIC CHANGE

	Trait Category
Morphology (#gephebase-summary-title)	Trait
Coloration (wing; seasonal) (<a ?and+taxonomicstatus='^Experimental+Evolution"' href="https://www.gephebase.org/search-criteria/?and+Trait=^Coloration+(wing;+seasonal)#gephebase-summary-title)</td><td>Trait State in Taxon A</td></tr> <tr> <td>Plastic line - the dark red wing phenotype is induced by environmental cues</td><td>Trait State in Taxon B</td></tr> <tr> <td>Red line - the dark red wing phenotype is formed irrespective of the external conditions</td><td>Ancestral State</td></tr> <tr> <td>Taxon A</td><td>Taxonomic Status</td></tr> <tr> <td>Experimental Evolution (#gephebase-summary-title)	

Taxon A	Latin Name	Taxon B	Latin Name
Junonia coenia (#gephebase-summary-title))		Junonia coenia (#gephebase-summary-title))	
Common Name		Common Name	
buckeye		buckeye	
Synonyms		Synonyms	
Precis coenia; buckeye; peacock butterfly; Junonia coenia Hubner, 1822		Precis coenia; buckeye; peacock butterfly; Junonia coenia Hubner, 1822	
Rank		Rank	
species		species	
Lineage		Lineage	
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Endopterygota; Amphiesmenoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Ditrysia; Obtectomera; Papilionoidea; Nymphalidae; Nymphalinae; Junoniini; Junonia		cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Endopterygota; Amphiesmenoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Ditrysia; Obtectomera; Papilionoidea; Nymphalidae; Nymphalinae; Junoniini; Junonia	
Parent		Parent	
Junonia (buckeyes) - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=39707)		Junonia (buckeyes) - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=39707)	
NCBI Taxonomy ID		NCBI Taxonomy ID	
39708 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=39708)		39708 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=39708)	
is Taxon A an Infraspecies?		is Taxon B an Infraspecies?	
No		No	

GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Drosophila melanogaster
cort		
	Synonyms	GenebankID or UniProtKB
CG11330; cor; Cort; Dmel\CG11330	String	
7227.FBpp0078949 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=7227.FBpp0078949)		
	Sequence Similarities	
Belongs to the WD repeat CORT family.		
	GO - Molecular Function	
GO:0010997 : anaphase-promoting complex binding (https://www.ebi.ac.uk/QuickGO/term/GO:0010997)		
GO:0097027 : ubiquitin-protein transferase activator activity (https://www.ebi.ac.uk/QuickGO/term/GO:0097027)		
	GO - Biological Process	
GO:0048477 : oogenesis (https://www.ebi.ac.uk/QuickGO/term/GO:0048477)		

GO:0045143 : homologous chromosome segregation
(<https://www.ebi.ac.uk/QuickGO/term/GO:0045143>)
GO:0031145 : anaphase-promoting complex-dependent catabolic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0031145>)
GO:0007349 : cellularization (<https://www.ebi.ac.uk/QuickGO/term/GO:0007349>)
GO:0007343 : egg activation (<https://www.ebi.ac.uk/QuickGO/term/GO:0007343>)
GO:0007144 : female meiosis I (<https://www.ebi.ac.uk/QuickGO/term/GO:0007144>)
GO:0007147 : female meiosis II (<https://www.ebi.ac.uk/QuickGO/term/GO:0007147>)
GO:0007143 : female meiotic nuclear division
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007143>)
GO:0007279 : pole cell formation (<https://www.ebi.ac.uk/QuickGO/term/GO:0007279>)
GO:1905786 : positive regulation of anaphase-promoting complex-dependent catabolic process (<https://www.ebi.ac.uk/QuickGO/term/GO:1905786>)
GO:1904668 : positive regulation of ubiquitin protein ligase activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:1904668>)

GO - Cellular Component

GO:0005737 : cytoplasm (<https://www.ebi.ac.uk/QuickGO/term/GO:0005737>)

Presumptive Null

No (<https://www.gephebase.org/search-criteria?/and+Presumptive+Null=^No^#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

No variation in coding region. Strong association with cis-regulatory SNP.

Experimental Evidence

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

Main Reference

Genomic architecture of a genetically assimilated seasonal color pattern. (2020) (<https://pubmed.ncbi.nlm.nih.gov/33154142>)

Authors

van der Burg KRL; Lewis JJ; Brack BJ; Fandino RA; Mazo-Vargas A; Reed RD

Abstract

Developmental plasticity allows genomes to encode multiple distinct phenotypes that can be differentially manifested in response to environmental cues. Alternative plastic phenotypes can be selected through a process called genetic assimilation, although the mechanisms are still poorly understood. We assimilated a seasonal wing color phenotype in a naturally plastic population of butterflies (*Junonia coenia*) and characterized three responsible genes. Endocrine assays and chromatin accessibility and conformation analyses showed that the transition of wing coloration from an environmentally determined trait to a predominantly genetic trait occurred through selection for regulatory alleles of downstream wing-patterning genes. This mode of genetic evolution is likely favored by selection because it allows tissue- and trait-specific tuning of reaction norms without affecting core cue detection or transduction mechanisms.

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Additional References

RELATED GEPHE

Related Genes

2 (herfst, trehalase) (<https://www.gephebase.org/search-criteria?/or+Taxon+ID=^39708^/and+Trait=Coloration/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

@Parallelism @GxE The two color morphs of *Junonia coenia*, light tan and dark red, depend on day length and temperature.