

GEPHE SUMMARY

	Gephebase Gene	GephelD
herfst (https://www.gephebase.org/search-criteria/?and+Gene Gephebase=^herfst^#gephebase-summary-title)	GP00002422	Main curator
Published	Entry Status	Courtier

PHENOTYPIC CHANGE

	Trait Category	
Morphology (https://www.gephebase.org/search-criteria/?and+Trait Category=^Morphology^#gephebase-summary-title)	Trait	
Coloration (wing; seasonal) (https://www.gephebase.org/search-criteria/?and+Trait=^Coloration+(wing;+seasonal)^#gephebase-summary-title)	Trait State in Taxon A	
Plastic line - the dark red wing phenotype is induced by environmental cues	Trait State in Taxon B	
Red line - the dark red wing phenotype is formed irrespective of the external conditions	Ancestral State	
Taxon A	Taxonomic Status	
Experimental Evolution (https://www.gephebase.org/search-criteria/?and+Taxonomic Status=^Experimental Evolution^#gephebase-summary-title)		
Taxon A		Taxon B
	Latin Name	Latin Name
Junonia coenia (https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=^Junonia+coenia^#gephebase-summary-title)	Junonia coenia (https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=^Junonia+coenia^#gephebase-summary-title)	
buckeye	Common Name	Common Name
Precis coenia; buckeye; peacock butterfly; Junonia coenia Hubner, 1822	Synonyms	Synonyms
species	Rank	Rank
	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
Junonia (buckeyes) - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=39707)	Parent	Parent
39708 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=39708)	NCBI Taxonomy ID	NCBI Taxonomy ID
	is Taxon A an Infraspecies?	is Taxon B an Infraspecies?
No		

GENOTYPIC CHANGE

rk	Generic Gene Name	UniProtKB Drosophila melanogaster
BG:DS00180.13; CG8930; CT25644; DLGR-2; dlgr2; DLGr2; dlgr2/rk; Dmel\CG8930; lgr2; Lgr2; LGR2; Rk; rk/CG8930; Dmel_CG8930	Synonyms	GenebankID or UniProtKB
7227.FBpp0080183 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=7227.FBpp0080183)	String	
Belongs to the G-protein coupled receptor 1 family.	Sequence Similarities	
GO:0008528 : G protein-coupled peptide receptor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0008528)	GO - Molecular Function	
GO:0008188 : neuropeptide receptor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0008188)		
GO:0016500 : protein-hormone receptor activity		

(<https://www.ebi.ac.uk/QuickGO/term/GO:0016500>)

GO - Biological Process

GO:0009755 : hormone-mediated signaling pathway

(<https://www.ebi.ac.uk/QuickGO/term/GO:0009755>)

GO:0007186 : G protein-coupled receptor signaling pathway

(<https://www.ebi.ac.uk/QuickGO/term/GO:0007186>)

GO:0007298 : border follicle cell migration

(<https://www.ebi.ac.uk/QuickGO/term/GO:0007298>)

GO:0001837 : epithelial to mesenchymal transition

(<https://www.ebi.ac.uk/QuickGO/term/GO:0001837>)

GO:0007189 : adenylate cyclase-activating G protein-coupled receptor signaling pathway

(<https://www.ebi.ac.uk/QuickGO/term/GO:0007189>)

GO:0036335 : intestinal stem cell homeostasis

(<https://www.ebi.ac.uk/QuickGO/term/GO:0036335>)

GO:0007218 : neuropeptide signaling pathway

(<https://www.ebi.ac.uk/QuickGO/term/GO:0007218>)

GO:0007190 : activation of adenylate cyclase activity

(<https://www.ebi.ac.uk/QuickGO/term/GO:0007190>)

GO:0030709 : border follicle cell delamination

(<https://www.ebi.ac.uk/QuickGO/term/GO:0030709>)

GO:0007564 : regulation of chitin-based cuticle tanning

(<https://www.ebi.ac.uk/QuickGO/term/GO:0007564>)

GO - Cellular Component

GO:0016021 : integral component of membrane

(<https://www.ebi.ac.uk/QuickGO/term/GO:0016021>)

GO:0005887 : integral component of plasma membrane

(<https://www.ebi.ac.uk/QuickGO/term/GO:0005887>)

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. CRISPR mutant clones for the herfst gene display light tan scales.

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 (cortex, 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.

