

## GEPHE SUMMARY

<p>trehalase (<a href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=~trehalase~#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=~trehalase~#gephebase-summary-title</a>)</p> <p>Published</p>	<p>Gephebase Gene</p> <p>Entry Status</p>	<p>GP00002421</p> <p>Courtier</p>	<p>GepheID</p> <p>Main curator</p>
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## PHENOTYPIC CHANGE

<p>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>)</p> <p>Coloration (wing; seasonal) (<a href="https://www.gephebase.org/search-criteria?/and+Trait=~Coloration+(wing;+seasonal)~#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait=~Coloration (wing; seasonal)~#gephebase-summary-title</a>)</p> <p>Plastic line - the dark red wing phenotype is induced by environmental cues</p> <p>Red line - the dark red wing phenotype is formed irrespective of the external conditions</p> <p>Taxon A</p> <p>Experimental Evolution (<a href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=~Experimental+Evolution~#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=~Experimental Evolution~#gephebase-summary-title</a>)</p>	<p>Trait Category</p> <p>Trait</p> <p>Trait State in Taxon A</p> <p>Trait State in Taxon B</p> <p>Ancestral State</p> <p>Taxonomic Status</p>	<p></p> <p></p> <p></p> <p></p> <p></p> <p></p> <p></p>	<p></p> <p></p> <p></p> <p></p> <p></p> <p></p> <p></p>
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Taxon A	Latin Name	Taxon B	Latin Name
Junonia coenia ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Junonia+coenia~#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Junonia coenia~#gephebase-summary-title</a> )	Junonia coenia	Junonia coenia ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Junonia+coenia~#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Junonia coenia~#gephebase-summary-title</a> )	Junonia coenia
buckeye	buckeye	buckeye	buckeye
Precis coenia; buckeye; peacock butterfly; Junonia coenia Hubner, 1822	Precis coenia; buckeye; peacock butterfly; Junonia coenia Hubner, 1822	Precis coenia; buckeye; peacock butterfly; Junonia coenia Hubner, 1822	Precis coenia; buckeye; peacock butterfly; Junonia coenia Hubner, 1822
species	species	species	species
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Endopterygota; Amphimesmenoptera; 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; Amphimesmenoptera; 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; Amphimesmenoptera; 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; Amphimesmenoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Ditrysia; Obtectomera; Papilionoidea; Nymphalidae; Nymphalinae; Junoniini; Junonia
Junonia (buckeyes) - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=39707">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=39707</a> )	Junonia (buckeyes) - (Rank: genus)	Junonia (buckeyes) - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=39707">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=39707</a> )	Junonia (buckeyes) - (Rank: genus)
39708 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=39708">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=39708</a> )	39708 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=39708">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=39708</a> )	39708 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=39708">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=39708</a> )	39708 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=39708">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=39708</a> )
No	is Taxon A an Intraspecies?	No	is Taxon B an Intraspecies?

## GENOTYPIC CHANGE

<p>Treh</p> <p>Tre; 87D3T; anon-EST:Posey159; anon-sts38; CG9364; Dmel\CG9364; DmTre; ESTS:87D3T; TRE; TREH</p> <p>7227.FBpp0071468 (<a href="http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0071468">http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0071468</a>)</p> <p>Belongs to the glycosyl hydrolase 37 family.</p> <p>GO:0004555 : alpha,alpha-trehalase activity (<a href="https://www.ebi.ac.uk/QuickGO/term/GO:0004555">https://www.ebi.ac.uk/QuickGO/term/GO:0004555</a>)</p> <p>GO:0097150 : neuronal stem cell population maintenance (<a href="https://www.ebi.ac.uk/QuickGO/term/GO:0097150">https://www.ebi.ac.uk/QuickGO/term/GO:0097150</a>)</p>	<p>Generic Gene Name</p> <p>Synonyms</p> <p>String</p> <p>Sequence Similarities</p> <p>GO - Molecular Function</p> <p>GO - Biological Process</p>	<p>UniProtKB Drosophila melanogaster</p> <p>Q9W2M2 (<a href="http://www.uniprot.org/uniprot/Q9W2M2">http://www.uniprot.org/uniprot/Q9W2M2</a>)</p> <p>GenebankID or UniProtKB</p> <p>0</p>
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GO:0005993 : trehalose catabolic process  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0005993>)  
GO:0005991 : trehalose metabolic process  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0005991>)

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

Molecular Details of the Mutation

Increased expression of the trehalase gene in the Red line. 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](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, herfst) ([https://www.gephebase.org/search-criteria?/or+Taxon ID=^39708^/and+Trait=Coloration/and+groupHaplotypes=true#gephebase-summary-title](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.