GEPHE SUMMARY

Gephebase Gene
cortex (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^cortex^#gephebase-summary-title)

GepheID
GP00002420

Entry Status
Published

Main curator
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

Latin Name
Junonia coenia (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Junonia coenia^#gephebase-summary-title)

Common Name
buckeye

Synonyms
Precis coenia; buckeye; peacock butterfly; Junonia coenia Hubner, 1822

Rank
species

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

Parent
Junonia (buckeyes) - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 39707)

NCBI Taxonomy ID
39708 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 39708)

is Taxon A an Infraspecies?
No

Taxon B

Latin Name
Junonia coenia (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Junonia coenia^#gephebase-summary-title)

Common Name
buckeye

Synonyms
Precis coenia; buckeye; peacock butterfly; Junonia coenia Hubner, 1822

Rank
species

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

Parent
Junonia (buckeyes) - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 39707)

NCBI Taxonomy ID
39708 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 39708)

is Taxon B an Infraspecies?
No

GENOTYPIC CHANGE

Generic Gene Name
cort

Synonyms
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)

UniProtKB Drosophila melanogaster
Q960N3 (http://www.uniprot.org/uniprot/Q960N3)

GenebankID or UniProtKB
()

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.