GEPHE SUMMARY

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

GepheID
GP00002416

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 ; leaf mimicry ; camouflage) (https://www.gephebase.org/search-criteria?/and+Trait=^Coloration (wing ; leaf mimicry ; camouflage)^#gephebase-summary-title)

Trait State in Taxon A
scrambled form

Trait State in Taxon B
rippled form

Ancestral State
Taxon A

Taxonomic Status
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Intraspecific^#gephebase-summary-title)

Taxon A

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

Common Name
orange oakleaf

Synonyms
Kallima inachus eucerca; orange oakleaf; dead leaf; dead leaf butterfly; Kallima inachus (Boisduval, 1846); Kallima inachis

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; Kallimini; Kallima

Parent
Kallima () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 127345)

NCBI Taxonomy ID
311037 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 311037)

is Taxon A an Infraspecies?
Yes

Taxon A Description
Kallima inachus - scrambled morph

Taxon B

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

Common Name
orange oakleaf

Synonyms
Kallima inachus eucerca; orange oakleaf; dead leaf; dead leaf butterfly; Kallima inachus (Boisduval, 1846); Kallima inachis

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; Kallimini; Kallima

Parent
Kallima () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 127345)

NCBI Taxonomy ID
311037 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 311037)

is Taxon B an Infraspecies?
Yes

Taxon B Description
Kallima inachus - rippled morph

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)

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

GenebankID or UniProtKB
()

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

Large inversion and many mutations in the large inverted region.

Experimental Evidence

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

Main Reference

The evolution and diversification of oakleaf butterflies. (2022) (https://pubmed.ncbi.nlm.nih.gov/35926506)

Authors

Wang S; Teng D; Li X; Yang P; Da W; Zhang Y; Zhang Y; Liu G; Zhang X; Wan W; Dong Z; Wang D; Huang S; Jiang Z; Wang Q; Lohman DJ; Wu Y; Zhang L; Jia F; Westerman E; Zhang L; Wang W; Zhang W

Abstract

Oakleaf butterflies in the genus Kallima have a polymorphic wing phenotype, enabling these insects to masquerade as dead leaves. This iconic example of protective resemblance provides an interesting evolutionary paradigm that can be employed to study biodiversity. We integrated multi-omic data analyses and functional validation to infer the evolutionary history of Kallima species and investigate the genetic basis of their variable leaf wing patterns. We find that Kallima butterflies diversified in the eastern Himalayas and dispersed to East and Southeast Asia. Moreover, we find that leaf wing polymorphism is controlled by the wing patterning gene cortex, which has been maintained in Kallima by long-term balancing selection. Our results provide macroevolutionary and microevolutionary insights into a model species originating from a mountain ecosystem.

Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

3 (https://www.gephebase.org/search-criteria?/or+Gene Gephebase=^cortex^/and+Taxon ID=^311037^/or+Gene Gephebase=^cortex^/and+Taxon ID=^311037^#gephebase-summary-title)

EXTERNAL LINKS

COMMENTS

@Parallelism - There are at least 5 distinct cortex haplotypes associated with 5 wing morphs. These diverse haplotypes are also found in closely related species of Kallima butterflies, suggesting that the balanced polymorphism has been maintained over millions of years. @Inversion