

GEPHE SUMMARY

	Gephebase Gene	GephelD
ocimene synthase (OS) (https://www.gephebase.org/search-criteria/?and+Gene Gephebase=^ocimene synthase (OS)^#gephebase-summary-title)	GP00002426	Main curator
	Entry Status	Courtier
Published		

PHENOTYPIC CHANGE

Trait Category		Trait	
Physiology (https://www.gephebase.org/search-criteria/?and+Trait Category=^Physiology^#gephebase-summary-title)			
Pheromone production (cuticular hydrocarbons ; beta-ocimene) (https://www.gephebase.org/search-criteria/?and+Trait=^Pheromone+production+(cuticular+hydrocarbons+;+beta-ocimene)^#gephebase-summary-title)		Trait State in Taxon A	
Heliconius melpomene - production of beta-ocimene by male abdomen		Trait State in Taxon B	
Heliconius cydno - no production of beta-ocimene by male abdomen		Ancestral State	
Taxon A			Taxonomic Status
Interspecific (https://www.gephebase.org/search-criteria/?and+Taxonomic+Status=^Interspecific^#gephebase-summary-title)			
Taxon A	Latin Name	Taxon B	Latin Name
Heliconius melpomene (https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=^Heliconius+melpomene^#gephebase-summary-title)		Heliconius cydno (https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=^Heliconius+cydno^#gephebase-summary-title)	
postman butterfly	Common Name	-	Common Name
postman butterfly; common postman; Heliconius melpomene (Linnaeus, 1758)	Synonyms	Heliconius cydno Doubleday, 1847	Synonyms
species	Rank	species	Rank
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Amphiesmenoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Ditrysia; Obtectomera; Papilionoidea; Nymphalidae; Heliconiinae; Heliconiini; Heliconius	Lineage	cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Amphiesmenoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Ditrysia; Obtectomera; Papilionoidea; Nymphalidae; Heliconiinae; Heliconiini; Heliconius	Lineage
Heliconius () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 33416)	Parent	Heliconius () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 33416)	Parent
34740 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 34740)	NCBI Taxonomy ID	33424 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 33424)	NCBI Taxonomy ID
No	is Taxon A an Infraspecies?	No	is Taxon B an Infraspecies?

GENOTYPIC CHANGE

TPS	Generic Gene Name	UniProtKB Matsumurasca onukii A0A7D0AGU9 (http://www.uniprot.org/uniprot/A0A7D0AGU9)
-	Synonyms	GenebankID or UniProtKB 0
-	String	
	Sequence Similarities	
Belongs to the FPP/GGPP synthase family.		
	GO - Molecular Function	
GO:0046872 : metal ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0046872)		
GO:0016787 : hydrolase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0016787)		
	GO - Biological Process	
GO:0008299 : isoprenoid biosynthetic process (https://www.ebi.ac.uk/QuickGO/term/GO:0008299)		
	GO - Cellular Component	

No (#gephebase-summary-title)	Presumptive Null
Coding (#gephebase-summary-title)	Molecular Type
Unknown (#gephebase-summary-title)	Aberration Type
gain of expression - in vitro assay of the protein activity in <i>E. coli</i> - several amino acid changes between the 2 species	Molecular Details of the Mutation
Linkage Mapping (#gephebase-summary-title)	Experimental Evidence
A novel terpene synthase controls differences in anti-aphrodisiac pheromone production between closely related <i>Heliconius</i> butterflies. (2021) (https://pubmed.ncbi.nlm.nih.gov/33465061)	Main Reference
Darragh K; Orteu A; Black D; Byers KJRP; Szczerbowski D; Warren IA; Rastas P; Pinharanda A; Davey JW; Fernanda Garza S; Abondano Almeida D; Merrill RM; McMillan WO; Schulz S; Jiggins CD	Authors
Plants and insects often use the same compounds for chemical communication, but not much is known about the genetics of convergent evolution of chemical signals. The terpene (E)- $\hat{\gamma}$ -ocimene is a common component of floral scent and is also used by the butterfly <i>Heliconius melpomene</i> as an anti-aphrodisiac pheromone. While the biosynthesis of terpenes has been described in plants and microorganisms, few terpene synthases (TPSs) have been identified in insects. Here, we study the recent divergence of 2 species, <i>H. melpomene</i> and <i>Heliconius cydno</i> , which differ in the presence of (E)- $\hat{\gamma}$ -ocimene; combining linkage mapping, gene expression, and functional analyses, we identify 2 novel TPSs. Furthermore, we demonstrate that one, HmelOS, is able to synthesise (E)- $\hat{\gamma}$ -ocimene in vitro. We find no evidence for TPS activity in HcydOS (HmelOS ortholog of <i>H. cydno</i>), suggesting that the loss of (E)- $\hat{\gamma}$ -ocimene in this species is the result of coding, not regulatory, differences. The TPS enzymes we discovered are unrelated to previously described plant and insect TPSs, demonstrating that chemical convergence has independent evolutionary origins.	Abstract
	Additional References

RELATED GEPHE

No matches found.	Related Genes
No matches found.	Related Haplotypes

EXTERNAL LINKS

COMMENTS

@SexualTrait