

GEPHE SUMMARY

opsin - rhodopsin (LWS) ( <a href="https://www.gephebase.org/search-criteria?/and+Gene">https://www.gephebase.org/search-criteria?/and+Gene</a> )		Gephebase Gene	GP00000777	GepheID
Gephebase="opsin - rhodopsin (LWS)"#gephebase-summary-title)				Main curator
Published		Entry Status	Courtier	

PHENOTYPIC CHANGE

Physiology ( <a href="https://www.gephebase.org/search-criteria?/and+Trait">https://www.gephebase.org/search-criteria?/and+Trait</a> )		Trait Category		
Category="Physiology"#gephebase-summary-title)				
Color vision (blue shift) ( <a color"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait="Color</a> )		Trait		
vision (blue shift)"#gephebase-summary-title)				
Pundamilia pundamilia- blue-gray male color		Trait State in Taxon A		
Pundamilia nyererei- yellow-red male color		Trait State in Taxon B		
Data not curated		Ancestral State		
Intraspecific ( <a href="https://www.gephebase.org/search-criteria?/and+Taxonomic">https://www.gephebase.org/search-criteria?/and+Taxonomic</a> )		Taxonomic Status		
Status="Intraspecific"#gephebase-summary-title)				

Taxon A		Taxon B	
	Latin Name		Latin Name
Pundamilia pundamilia	Pundamilia pundamilia	Pundamilia pundamilia	Pundamilia pundamilia
( <a href="https://www.gephebase.org/search-criteria?/and+Taxon">https://www.gephebase.org/search-criteria?/and+Taxon</a> and Synonyms="Pundamilia	( <a href="https://www.gephebase.org/search-criteria?/and+Taxon">https://www.gephebase.org/search-criteria?/and+Taxon</a> and Synonyms="Pundamilia	( <a href="https://www.gephebase.org/search-criteria?/and+Taxon">https://www.gephebase.org/search-criteria?/and+Taxon</a> and Synonyms="Pundamilia	( <a href="https://www.gephebase.org/search-criteria?/and+Taxon">https://www.gephebase.org/search-criteria?/and+Taxon</a> and Synonyms="Pundamilia
pundamilia"#gephebase-summary-title)	pundamilia"#gephebase-summary-title)	pundamilia"#gephebase-summary-title)	pundamilia"#gephebase-summary-title)
-	Common Name	-	Common Name
	Synonyms		Synonyms
Pundamilia pundamilia Seehausen & Bouton, 1998	Pundamilia pundamilia Seehausen & Bouton, 1998	Pundamilia pundamilia Seehausen & Bouton, 1998	Pundamilia pundamilia Seehausen & Bouton, 1998
species	Rank	species	Rank
	Lineage		Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia;	cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia;	cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia;	cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia;
Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Actinopterygii;	Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Actinopterygii;	Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Actinopterygii;	Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Actinopterygii;
Actinopteri; Neopterygii; Teleostei; Osteoglossocephalai; Clupecocephala;	Actinopteri; Neopterygii; Teleostei; Osteoglossocephalai; Clupecocephala;	Actinopteri; Neopterygii; Teleostei; Osteoglossocephalai; Clupecocephala;	Actinopteri; Neopterygii; Teleostei; Osteoglossocephalai; Clupecocephala;
Euteleosteoromorpha; Neoteleostei; Eurypterygia; Ctenosquamata; Acanthomorpha;	Euteleosteoromorpha; Neoteleostei; Eurypterygia; Ctenosquamata; Acanthomorpha;	Euteleosteoromorpha; Neoteleostei; Eurypterygia; Ctenosquamata; Acanthomorpha;	Euteleosteoromorpha; Neoteleostei; Eurypterygia; Ctenosquamata; Acanthomorpha;
Euacanthomorpha; Percomorphaceae; Ovalentaria; Cichlomorphae; Cichliformes;	Euacanthomorpha; Percomorphaceae; Ovalentaria; Cichlomorphae; Cichliformes;	Euacanthomorpha; Percomorphaceae; Ovalentaria; Cichlomorphae; Cichliformes;	Euacanthomorpha; Percomorphaceae; Ovalentaria; Cichlomorphae; Cichliformes;
Cichlidae; African cichlids; Pseudocrenilabrinae; Haplochromini; Pundamilia	Cichlidae; African cichlids; Pseudocrenilabrinae; Haplochromini; Pundamilia	Cichlidae; African cichlids; Pseudocrenilabrinae; Haplochromini; Pundamilia	Cichlidae; African cichlids; Pseudocrenilabrinae; Haplochromini; Pundamilia
	Parent		Parent
Pundamilia () - (Rank: genus)	Pundamilia () - (Rank: genus)	Pundamilia () - (Rank: genus)	Pundamilia () - (Rank: genus)
( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=195936">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=195936</a> )	( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=195936">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=195936</a> )	( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=195936">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=195936</a> )	( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=195936">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=195936</a> )
	NCBI Taxonomy ID		NCBI Taxonomy ID
195937	195937	195937	195937
( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=195937">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=195937</a> )	( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=195937">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=195937</a> )	( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=195937">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=195937</a> )	( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=195937">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=195937</a> )
	is Taxon A an Infrappecies?		is Taxon B an Infrappecies?
No	No	No	No

GENOTYPIC CHANGE

OPN1LW	Generic Gene Name	P04000 ( <a href="http://www.uniprot.org/uniprot/P04000">http://www.uniprot.org/uniprot/P04000</a> )	UniProtKB Homo sapiens
RCP	Synonyms	AAW34328 ( <a href="https://www.ncbi.nlm.nih.gov/nuccore/AAW34328">https://www.ncbi.nlm.nih.gov/nuccore/AAW34328</a> )	GenebankID or UniProtKB
9606.ENSPP00000358967	String		
( <a href="http://string-db.org/newstring_cgi/show_network_section.pl?identifier=9606.ENSPP00000358967">http://string-db.org/newstring_cgi/show_network_section.pl?identifier=9606.ENSPP00000358967</a> )			
	Sequence Similarities		
Belongs to the G-protein coupled receptor 1 family. Opsin subfamily.			
	GO - Molecular Function		
GO:0008020 : G protein-coupled photoreceptor activity			
( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0008020">https://www.ebi.ac.uk/QuickGO/term/GO:0008020</a> )			
GO:0009881 : photoreceptor activity ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0009881">https://www.ebi.ac.uk/QuickGO/term/GO:0009881</a> )			
	GO - Biological Process		
GO:0007165 : signal transduction ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0007165">https://www.ebi.ac.uk/QuickGO/term/GO:0007165</a> )			

GO:0007186 : G protein-coupled receptor signaling pathway  
 (https://www.ebi.ac.uk/QuickGO/term/GO:0007186)  
 GO:0001523 : retinoid metabolic process  
 (https://www.ebi.ac.uk/QuickGO/term/GO:0001523)  
 GO:0018298 : protein-chromophore linkage  
 (https://www.ebi.ac.uk/QuickGO/term/GO:0018298)  
 GO:0007601 : visual perception (https://www.ebi.ac.uk/QuickGO/term/GO:0007601)  
 GO:0071482 : cellular response to light stimulus  
 (https://www.ebi.ac.uk/QuickGO/term/GO:0071482)  
 GO:0007602 : phototransduction (https://www.ebi.ac.uk/QuickGO/term/GO:0007602)  
 GO:0032467 : positive regulation of cytokinesis  
 (https://www.ebi.ac.uk/QuickGO/term/GO:0032467)

GO - Cellular Component

GO:0005887 : integral component of plasma membrane  
 (https://www.ebi.ac.uk/QuickGO/term/GO:0005887)  
 GO:0001750 : photoreceptor outer segment  
 (https://www.ebi.ac.uk/QuickGO/term/GO:0001750)  
 GO:0097381 : photoreceptor disc membrane  
 (https://www.ebi.ac.uk/QuickGO/term/GO:0097381)

Mutation #1

No (https://www.gephebase.org/search-criteria?/and+Presumptive Null=~No~#gephebase-summary-title) Presumptive Null  
 Coding (https://www.gephebase.org/search-criteria?/and+Molecular Type=~Coding~#gephebase-summary-title) Molecular Type  
 SNP (https://www.gephebase.org/search-criteria?/and+Aberration Type=~SNP~#gephebase-summary-title) Aberration Type  
 Nonsynonymous SNP Coding Change  
 Y219F; A233T; C277I (human LWS/MWS numbering system) Molecular Details of the Mutation  
 Candidate Gene (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=~Candidate Gene~#gephebase-summary-title) Experimental Evidence

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	Tyr	Phe	219

Speciation through sensory drive in cichlid fish. (2008) (https://pubmed.ncbi.nlm.nih.gov/18833272) Main Reference  
 Seehausen O; Terai Y; Magalhaes IS; Carleton KL; Mrosso HD; Miyagi R; van der Sluijs I; Schneider MV; Maan ME; Tachida H; Imai H; Okada N Authors  
 Theoretically, divergent selection on sensory systems can cause speciation through sensory drive. However, empirical evidence is rare and incomplete. Here we demonstrate sensory drive speciation within island populations of cichlid fish. We identify the ecological and molecular basis of divergent evolution in the cichlid visual system, demonstrate associated divergence in male colouration and female preferences, and show subsequent differentiation at neutral loci, indicating reproductive isolation. Evidence is replicated in several pairs of sympatric populations and species. Variation in the slope of the environmental gradients explains variation in the progress towards speciation: speciation occurs on all but the steepest gradients. This is the most complete demonstration so far of speciation through sensory drive without geographical isolation. Our results also provide a mechanistic explanation for the collapse of cichlid fish species diversity during the anthropogenic eutrophication of Lake Victoria. Abstract  
Additional References

Mutation #2

No (https://www.gephebase.org/search-criteria?/and+Presumptive Null=~No~#gephebase-summary-title) Presumptive Null  
 Coding (https://www.gephebase.org/search-criteria?/and+Molecular Type=~Coding~#gephebase-summary-title) Molecular Type  
 SNP (https://www.gephebase.org/search-criteria?/and+Aberration Type=~SNP~#gephebase-summary-title) Aberration Type  
 Nonsynonymous SNP Coding Change  
 Y219F; A233T; C277I (human LWS/MWS numbering system) Molecular Details of the Mutation  
 Candidate Gene (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=~Candidate Gene~#gephebase-summary-title) Experimental Evidence

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	Ala	Thr	233

Speciation through sensory drive in cichlid fish. (2008) (<https://pubmed.ncbi.nlm.nih.gov/18833272>)

Main Reference

Seehausen O; Terai Y; Magalhaes IS; Carleton KL; Mrosso HD; Miyagi R; van der Sluijs I; Schneider MV; Maan ME; Tachida H; Imai H; Okada N

Authors

Theoretically, divergent selection on sensory systems can cause speciation through sensory drive. However, empirical evidence is rare and incomplete. Here we demonstrate sensory drive speciation within island populations of cichlid fish. We identify the ecological and molecular basis of divergent evolution in the cichlid visual system, demonstrate associated divergence in male colouration and female preferences, and show subsequent differentiation at neutral loci, indicating reproductive isolation. Evidence is replicated in several pairs of sympatric populations and species. Variation in the slope of the environmental gradients explains variation in the progress towards speciation: speciation occurs on all but the steepest gradients. This is the most complete demonstration so far of speciation through sensory drive without geographical isolation. Our results also provide a mechanistic explanation for the collapse of cichlid fish species diversity during the anthropogenic eutrophication of Lake Victoria.

Abstract

Additional References

Mutation #3

Presumptive Null

No (<https://www.gephebase.org/search-criteria?/and+Presumptive Null=^No^#gephebase-summary-title>)

Molecular Type

Coding (<https://www.gephebase.org/search-criteria?/and+Molecular Type=^Coding^#gephebase-summary-title>)

Aberration Type

SNP (<https://www.gephebase.org/search-criteria?/and+Aberration Type=^SNP^#gephebase-summary-title>)

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

Y219F; A233T; C277I (human LWS/MWS numbering system)

Experimental Evidence

Candidate Gene (<https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Candidate Gene^#gephebase-summary-title>)

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	Cys	Ile	277

Main Reference

Speciation through sensory drive in cichlid fish. (2008) (<https://pubmed.ncbi.nlm.nih.gov/18833272>)

Authors

Seehausen O; Terai Y; Magalhaes IS; Carleton KL; Mrosso HD; Miyagi R; van der Sluijs I; Schneider MV; Maan ME; Tachida H; Imai H; Okada N

Abstract

Theoretically, divergent selection on sensory systems can cause speciation through sensory drive. However, empirical evidence is rare and incomplete. Here we demonstrate sensory drive speciation within island populations of cichlid fish. We identify the ecological and molecular basis of divergent evolution in the cichlid visual system, demonstrate associated divergence in male colouration and female preferences, and show subsequent differentiation at neutral loci, indicating reproductive isolation. Evidence is replicated in several pairs of sympatric populations and species. Variation in the slope of the environmental gradients explains variation in the progress towards speciation: speciation occurs on all but the steepest gradients. This is the most complete demonstration so far of speciation through sensory drive without geographical isolation. Our results also provide a mechanistic explanation for the collapse of cichlid fish species diversity during the anthropogenic eutrophication of Lake Victoria.

Additional References

## RELATED GEPHE

No matches found.

Related Genes

No matches found.

Related Haplotypes

## EXTERNAL LINKS

## COMMENTS

@SeveralMutationsWithEffect C277I is due to 2 nucleotide changes @TwoNucleotideChangesInSameCodon

