

GEPHE SUMMARY

	Gephebase Gene		GepheID
RCO-A/B (Reduced Complexity) (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase+RCO-A/B+(Reduced+Complexity)^#gephebase-summary-title)		GP00000962	
	Entry Status	Martin	Main curator
Published			

PHENOTYPIC CHANGE

	Trait Category		
Morphology (https://www.gephebase.org/search-criteria?/and+Trait+Category+Morphology^#gephebase-summary-title)			
	Trait		
Leaf shape (simplification) (https://www.gephebase.org/search-criteria?/and+Trait+Leaf+shape+(simplification)^#gephebase-summary-title)			
	Trait State in Taxon A		
Cardamine hirsuta ; other Arabidopsis			
	Trait State in Taxon B		
Arabidopsis thaliana			
	Ancestral State		
Taxon A			
	Taxonomic Status		
Interspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status+Interspecific^#gephebase-summary-title)			
		Taxon B	
Taxon A			Taxon B
	Latin Name		Latin Name
Arabidopsis (https://www.gephebase.org/search-criteria?/and+Taxon+Synonyms+Arabidopsis^#gephebase-summary-title)		Arabidopsis thaliana (https://www.gephebase.org/search-criteria?/and+Taxon+Synonyms+Arabidopsis+thaliana^#gephebase-summary-title)	
	Common Name		Common Name
-		thale cress	
	Synonyms		Synonyms
Cardaminopsis; Arabidopsis (DC.) Heynh., 1842; Cardaminopsis Hayek		thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress	
	Rank		Rank
genus		species	
	Lineage		Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae		cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis	
	Parent		Parent
Camelineae () - (Rank: tribe) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=980083)		Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701)	
	NCBI Taxonomy ID		NCBI Taxonomy ID
3701 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701)		3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702)	
	is Taxon A an Intraspecies?		is Taxon B an Intraspecies?
No		No	

GENOTYPIC CHANGE

	Generic Gene Name		UniProtKB Cardamine hirsuta
RCO		A0A023NDU4 (http://www.uniprot.org/uniprot/A0A023NDU4)	
	Synonyms		GenebankID or UniProtKB
-		()	
	String		
-			
	Sequence Similarities		
-			
	GO - Molecular Function		
GO:0003700 : DNA-binding transcription factor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0003700)			
GO:0043565 : sequence-specific DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0043565)			
	GO - Biological Process		
-			
	GO - Cellular Component		
GO:0005634 : nucleus (https://www.ebi.ac.uk/QuickGO/term/GO:0005634)			

Yes ([https://www.gephebase.org/search-criteria?/and+Presumptive Null=~Yes^#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Presumptive+Null=~Yes^#gephebase-summary-title))

Presumptive Null

Gene Loss ([https://www.gephebase.org/search-criteria?/and+Molecular Type=~Gene Loss^#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Molecular+Type=~Gene+Loss^#gephebase-summary-title))

Molecular Type

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

Aberration Type

unknown

Deletion Size

Gene deletion

Molecular Details of the Mutation

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

Experimental Evidence

Leaf shape evolution through duplication, regulatory diversification, and loss of a homeobox gene. (2014) (<https://pubmed.ncbi.nlm.nih.gov/24531971>)

Main Reference

Vlad D; Kierzkowski D; Rast M; Vuolo F; Dello Ioio R; Galinha C; Gan X; Hajheidari M; Hay A; Smith RS; Huijser P; Bailey CD; Tsiantis M

Authors

In this work, we investigate morphological differences between *Arabidopsis thaliana*, which has simple leaves, and its relative *Cardamine hirsuta*, which has dissected leaves comprising distinct leaflets. With the use of genetics, interspecific gene transfers, and time-lapse imaging, we show that leaflet development requires the REDUCED COMPLEXITY (RCO) homeodomain protein. RCO functions specifically in leaves, where it sculpts developing leaflets by repressing growth at their flanks. RCO evolved in the Brassicaceae family through gene duplication and was lost in *A. thaliana*, contributing to leaf simplification in this species. Species-specific RCO action with respect to its paralog results from its distinct gene expression pattern in the leaf base. Thus, regulatory evolution coupled with gene duplication and loss generated leaf shape diversity by modifying local growth patterns during organogenesis.

Abstract

Additional References

RELATED GEPHE

No matches found.

Related Genes

No matches found.

Related Haplotypes

EXTERNAL LINKS

COMMENTS

Gene Loss / Trait Loss