

GEPHE SUMMARY

Gephebase Gene
 RCO-A/B (Reduced Complexity) ([https://www.gephebase.org/search-criteria?/and+Gene+Gephebase+RCO-A/B+\(Reduced+Complexity\)^#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Gene+Gephebase+RCO-A/B+(Reduced+Complexity)^#gephebase-summary-title)) GP00000962 GepheID
 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](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 A	Latin Name	Taxon B	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	thale cress	Common Name
Cardaminopsis; Arabidopsis (DC.) Heynh., 1842; Cardaminopsis Hayek	Synonyms	thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress	Synonyms
genus	Rank	species	Rank
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae	Lineage	cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis	Lineage
Camelineae () - (Rank: tribe) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=980083)	Parent	Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701)	Parent
3701 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701)	NCBI Taxonomy ID	3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702)	NCBI Taxonomy ID
No	is Taxon A an Intraspecies?	No	is Taxon B an Intraspecies?

GENOTYPIC CHANGE

Generic Gene Name
 RCO A0A023NDU4 (<http://www.uniprot.org/uniprot/A0A023NDU4>) UniProtKB Cardamine hirsuta
 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