

GEPHE SUMMARY

	Gephebase Gene	GephelD
CYC-like HaCYC2c (https://www.gephebase.org/search-criteria/?and+Gene Gephebase=^CYC-like HaCYC2c^#gephebase-summary-title)	GP00000193	Main curator
	Entry Status	Martin
Published		

PHENOTYPIC CHANGE

	Trait Category		
Morphology (https://www.gephebase.org/search-criteria/?and+Trait Category=Morphology^#gephebase-summary-title)	Trait		
Flower morphology (https://www.gephebase.org/search-criteria/?and+Trait=^Flower morphology^#gephebase-summary-title)	Trait State in Taxon A		
Helianthus annuus	Trait State in Taxon B		
Helianthus annuus -double-flowered phenotype	Ancestral State		
Taxon A	Taxonomic Status		
Intraspecific (https://www.gephebase.org/search-criteria/?and+Taxonomic Status=^Intraspecific^#gephebase-summary-title)			
Taxon A	Latin Name	Taxon B	Latin Name
Helianthus annuus (https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=^Helianthus+annuus^#gephebase-summary-title)		Helianthus annuus (https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=^Helianthus+annuus^#gephebase-summary-title)	
common sunflower	Common Name	common sunflower	Common Name
common sunflower; Helianthus annuus L.; Helianthus annua; Helianthus annus; Helianthus annuus8	Synonyms	common sunflower; Helianthus annuus L.; Helianthus annua; Helianthus annus; Helianthus annuus8	Synonyms
species	Rank	species	Rank
cellular organisms; Eukaryota; Viriplantae; Streptophytina; Streptophytina; Embryophytina; Tracheophytina; Euphyllophyta; Spermatophytina; Magnoliophytina; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; campanulids; Asterales; Asteraceae; Asteroideae; Heliantheae alliance; Heliantheae; Helianthus	Lineage	cellular organisms; Eukaryota; Viriplantae; Streptophytina; Streptophytina; Embryophytina; Tracheophytina; Euphyllophyta; Spermatophytina; Magnoliophytina; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; campanulids; Asterales; Asteraceae; Asteroideae; Heliantheae alliance; Heliantheae; Helianthus	Lineage
Helianthus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4231)	Parent	Helianthus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4231)	Parent
4232 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4232)	NCBI Taxonomy ID	4232 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4232)	NCBI Taxonomy ID
No	is Taxon A an Infraspecies?	No	is Taxon B an Infraspecies?

GENOTYPIC CHANGE

CYC	Generic Gene Name	UniProtKB Antirrhinum majus
-	Synonyms	GenebankID or UniProtKB
-	0	
-	String	
-	Sequence Similarities	
-	GO - Molecular Function	
GO:0003700 : DNA-binding transcription factor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0003700)		
GO:0003677 : DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0003677)		
GO:0009908 : flower development (https://www.ebi.ac.uk/QuickGO/term/GO:0009908)	GO - Biological Process	
GO:0048262 : determination of dorsal/ventral asymmetry (https://www.ebi.ac.uk/QuickGO/term/GO:0048262)		
GO:0009799 : specification of symmetry		

(<https://www.ebi.ac.uk/QuickGO/term/GO:0009799>)

GO - Cellular Component

GO:0005634 : nucleus (<https://www.ebi.ac.uk/QuickGO/term/GO:0005634>)

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

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

Insertion Size

100-999 bp

Molecular Details of the Mutation

999bp insertion in promoter

Experimental Evidence

Linkage Mapping (<https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=%Linkage+Mapping%#gephebase-summary-title>)

Main Reference

Genetic analysis of floral symmetry in Van Gogh's sunflowers reveals independent recruitment of CYCLOIDEA genes in the Asteraceae. (2012) (<https://pubmed.ncbi.nlm.nih.gov/22479210>)

Authors

Chapman MA; Tang S; Draeger D; Nambeesan S; Shaffer H; Barb JG; Knapp SJ; Burke JM

Abstract

The genetic basis of floral symmetry is a topic of great interest because of its effect on pollinator behavior and, consequently, plant diversification. The Asteraceae, which is the largest family of flowering plants, is an ideal system in which to study this trait, as many species within the family exhibit a compound inflorescence containing both bilaterally symmetric (i.e., zygomorphic) and radially symmetric (i.e., actinomorphic) florets. In sunflower and related species, the inflorescence is composed of a single whorl of ray florets surrounding multiple whorls of disc florets. We show that in double-flowered (dbl) sunflower mutants (in which disc florets develop bilateral symmetry), such as those captured by Vincent van Gogh in his famous nineteenth-century sunflower paintings, an insertion into the promoter region of a CYCLOIDEA (CYC)-like gene (HaCYC2c) that is normally expressed specifically in WT rays is instead expressed throughout the inflorescence, presumably resulting in the observed loss of actinomorphy. This same gene is mutated in two independent tubular-rayed (tub) mutants, though these mutations involve apparently recent transposon insertions, resulting in little or no expression and radialization of the normally zygomorphic ray florets. Interestingly, a phylogenetic analysis of CYC-like genes from across the family suggests that different paralogs of this fascinating gene family have been independently recruited to specify zygomorphy in different species within the Asteraceae.

Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

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