

GEPHE SUMMARY

	Gephebase Gene	GepheID
phosphoenolpyruvate carboxylase (PEPC) (<a +phosphoenolpyruvate+carboxylase+(pepc)+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase="+phosphoenolpyruvate+carboxylase+(PEPC)+"#gephebase-summary-title)	GP00000868	
	Martin	Main curator
	Entry Status	
Published		

PHENOTYPIC CHANGE

	Trait Category		
Physiology (<a +physiology+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait+Category=">https://www.gephebase.org/search-criteria?/and+Trait+Category="+Physiology+"#gephebase-summary-title)		Trait	
C3-C4 photosynthesis (enzymatic properties) (<a +c3-c4+photosynthesis+(enzymatic+properties)+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait="+C3-C4+photosynthesis+(enzymatic+properties)+"#gephebase-summary-title)			
	Trait State in Taxon A		
Flaveria pringlei		Trait State in Taxon B	
Flaveria trinervia			
	Ancestral State		
Taxon A		Taxonomic Status	
Interspecific (<a +interspecific+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=">https://www.gephebase.org/search-criteria?/and+Taxonomic+Status="+Interspecific+"#gephebase-summary-title)			
	Taxon A		Taxon B
	Latin Name		Latin Name
Flaveria pringlei (<a +flaveria+pringlei+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Flaveria+pringlei+"#gephebase-summary-title)		Flaveria trinervia (<a +flaveria+trinervia+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Flaveria+trinervia+"#gephebase-summary-title)	
-	Common Name	-	Common Name
	Synonyms		Synonyms
Flaveria pringlei Gand.		Flaveria australasica; Flaveria australasica Hook.; Flaveria trinervia (Spreng.) C.Mohr	
species	Rank	species	Rank
	Lineage		Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; campanulids; Asterales; Asteraceae; Asteroideae; Heliantheae alliance; Tageteae; Flaveria		cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; campanulids; Asterales; Asteraceae; Asteroideae; Heliantheae alliance; Tageteae; Flaveria	
	Parent		Parent
Flaveria () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4223)		Flaveria () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4223)	
4226	NCBI Taxonomy ID	4227	NCBI Taxonomy ID
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4226)		(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4227)	
	is Taxon A an Intraspecies?		is Taxon B an Intraspecies?
No		No	

GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Flaveria trinervia
PPCA		P30694 (http://www.uniprot.org/uniprot/P30694)
	Synonyms	GenebankID or UniProtKB
-		X61304 (https://www.ncbi.nlm.nih.gov/nuccore/X61304)
	String	
-		
	Sequence Similarities	
Belongs to the PEPCase type 1 family.		
	GO - Molecular Function	
GO:0008964 : phosphoenolpyruvate carboxylase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0008964)		
	GO - Biological Process	
GO:0006099 : tricarboxylic acid cycle (https://www.ebi.ac.uk/QuickGO/term/GO:0006099)		
GO:0009760 : C4 photosynthesis (https://www.ebi.ac.uk/QuickGO/term/GO:0009760)		
GO:0015977 : carbon fixation (https://www.ebi.ac.uk/QuickGO/term/GO:0015977)		

GO:0005737 : cytoplasm (<https://www.ebi.ac.uk/QuickGO/term/GO:0005737>)

No (https://www.gephebase.org/search-criteria?/and+Presumptive Null=~No^#gephebase-summary-title)	Presumptive Null
Cis-regulatory (https://www.gephebase.org/search-criteria?/and+Molecular Type=~Cis-regulatory^#gephebase-summary-title)	Molecular Type
Insertion (https://www.gephebase.org/search-criteria?/and+Aberration Type=~Insertion^#gephebase-summary-title)	Aberration Type
1-9 bp	Insertion Size
insertion of tetranucleotide CACT	Molecular Details of the Mutation
Candidate Gene (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=~Candidate Gene^#gephebase-summary-title)	Experimental Evidence

Evolution and function of a cis-regulatory module for mesophyll-specific gene expression in the C4 dicot Flaveria trinervia. (2007) (https://pubmed.ncbi.nlm.nih.gov/17993624)	Main Reference
Akyildiz M; Gowik U; Engelmann S; Koczor M; Streubel M; Westhoff P	Authors

C(4) photosynthesis presents a sophisticated integration of two complementary cell types, mesophyll and bundle sheath cells. It relies on the differential expression of the genes encoding the component enzymes and transporters of this pathway. The entry enzyme of C(4) photosynthesis, phosphoenolpyruvate carboxylase (PEPC), is found exclusively in mesophyll cells, and the expression of the corresponding gene is regulated at the transcriptional level. In the C(4) dicot Flaveria trinervia, the mesophyll-specific expression of the C(4) PEPC gene (ppcA) depends on a 41-bp segment in the distal promoter region referred to as MEM1 (for mesophyll expression module1). Here, we show that a MEM1 sequence found in the orthologous ppcA gene from the C(3) species Flaveria pringlei is not able to direct mesophyll-specific gene expression. The two orthologous MEM1 sequences of F. pringlei and F. trinervia differ at two positions, a G-to-A exchange and the insertion of the tetranucleotide CACT. Changes at these two positions in the C(3) MEM1 sequence were necessary and sufficient to create a mesophyll-specificity element during C(4) evolution. The MEM1 of F. trinervia enhances mesophyll expression and concomitantly represses expression in bundle sheath cells and vascular bundles.	Abstract
	Additional References

RELATED GEPHE

No matches found.	Related Genes
2 (https://www.gephebase.org/search-criteria?/or+Gene Gephebase=~phosphoenolpyruvate carboxylase (PEPC)^/and+Taxon ID=~4226^/or+Gene Gephebase=~phosphoenolpyruvate carboxylase (PEPC)^/and+Taxon ID=~4227^#gephebase-summary-title)	Related Haplotypes

EXTERNAL LINKS

COMMENTS