

## GEPHE SUMMARY

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

## PHENOTYPIC CHANGE

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

## GENOTYPIC CHANGE

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

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

	Presumptive Null
No ( <a +no^#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Presumptive+Null=">https://www.gephebase.org/search-criteria?/and+Presumptive Null="+No^#gephebase-summary-title</a> )	Molecular Type
Cis-regulatory ( <a +cis-regulatory^#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Molecular+Type=">https://www.gephebase.org/search-criteria?/and+Molecular Type="+Cis-regulatory^#gephebase-summary-title</a> )	Aberration Type
Insertion ( <a +insertion^#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Aberration+Type=">https://www.gephebase.org/search-criteria?/and+Aberration Type="+Insertion^#gephebase-summary-title</a> )	Insertion Size
1-9 bp	
	Molecular Details of the Mutation
insertion of tetranucleotide CACT	
	Experimental Evidence
Candidate Gene ( <a +candidate+gene^#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=">https://www.gephebase.org/search-criteria?/and+Experimental Evidence="+Candidate Gene^#gephebase-summary-title</a> )	Main Reference
Evolution and function of a cis-regulatory module for mesophyll-specific gene expression in the C4 dicot <i>Flaveria trinervia</i> . (2007) ( <a href="https://pubmed.ncbi.nlm.nih.gov/17993624">https://pubmed.ncbi.nlm.nih.gov/17993624</a> )	Authors
Akyildiz M; Gowik U; Engelmann S; Koczor M; Streubel M; Westhoff P	Abstract
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 <i>Flaveria trinervia</i> , the mesophyll-specific expression of the C(4) PEPC gene ( <i>ppcA</i> ) 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 <i>ppcA</i> gene from the C(3) species <i>Flaveria pringlei</i> is not able to direct mesophyll-specific gene expression. The two orthologous MEM1 sequences of <i>F. pringlei</i> and <i>F. trinervia</i> 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 <i>F. trinervia</i> enhances mesophyll expression and concomitantly represses expression in bundle sheath cells and vascular bundles.	Additional References

## RELATED GEPHE

	Related Genes
No matches found.	
	Related Haplotypes
2 ( <a +phosphoenolpyruvate+carboxylase+(pepc)^="" and+taxon+id="+4227^#gephebase-summary-title" href="https://www.gephebase.org/search-criteria?/or+Gene+Gephebase=">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</a> )	

## EXTERNAL LINKS

## COMMENTS