

## GEPHE SUMMARY

CYP79D15 ( <a href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=CYP79D15#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=CYP79D15#gephebase-summary-title</a> )	Gephebase Gene	GP00000211	GepheID
Published	Entry Status	Martin	Main curator

## PHENOTYPIC CHANGE

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> )	Trait Category		
Toxicity levels (cyanogenic glucoside) ( <a href="https://www.gephebase.org/search-criteria?/and+Trait=Toxicity+levels+(cyanogenic+glucoside)#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait=Toxicity+levels+(cyanogenic+glucoside)#gephebase-summary-title</a> )	Trait		
Trifolium repens - cyanogenic	Trait State in Taxon A		
Trifolium repens - acyanogenic	Trait State in Taxon B		
Taxon A	Ancestral State		
Intraspecific ( <a href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=Intraspecific#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=Intraspecific#gephebase-summary-title</a> )	Taxonomic Status		
	Taxon A		Taxon B
Trifolium repens ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=Trifolium+repens#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=Trifolium+repens#gephebase-summary-title</a> )	Latin Name	Trifolium repens ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=Trifolium+repens#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=Trifolium+repens#gephebase-summary-title</a> )	Latin Name
white clover	Common Name	white clover	Common Name
white clover; creeping white clover; Trifolium repens L.; Triflorum repens	Synonyms	white clover; creeping white clover; Trifolium repens L.; Triflorum repens	Synonyms
species	Rank	species	Rank
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; fabids; Fabales; Fabaceae; Papilionoideae; 50 kb inversion clade; NPAAA clade; Hologalegina; IRL clade; Trifolieae; Trifolium	Lineage	cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; fabids; Fabales; Fabaceae; Papilionoideae; 50 kb inversion clade; NPAAA clade; Hologalegina; IRL clade; Trifolieae; Trifolium	Lineage
Trifolium () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3898">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3898</a> )	Parent	Trifolium () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3898">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3898</a> )	Parent
3899 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3899">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3899</a> )	NCBI Taxonomy ID	3899 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3899">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3899</a> )	NCBI Taxonomy ID
No	is Taxon A an Intraspecies?	No	is Taxon B an Intraspecies?

## GENOTYPIC CHANGE

CYP79D15	Generic Gene Name	B2Y2T9 ( <a href="http://www.uniprot.org/uniprot/B2Y2T9">http://www.uniprot.org/uniprot/B2Y2T9</a> )	UniProtKB Trifolium repens
-	Synonyms	EU370175 ( <a href="https://www.ncbi.nlm.nih.gov/nuccore/EU370175">https://www.ncbi.nlm.nih.gov/nuccore/EU370175</a> )	GenebankID or UniProtKB
-	String		
Belongs to the cytochrome P450 family.	Sequence Similarities		
GO:0020037 : heme binding ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0020037">https://www.ebi.ac.uk/QuickGO/term/GO:0020037</a> )	GO - Molecular Function		
GO:0005506 : iron ion binding ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0005506">https://www.ebi.ac.uk/QuickGO/term/GO:0005506</a> )			
GO:0004497 : monooxygenase activity ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0004497">https://www.ebi.ac.uk/QuickGO/term/GO:0004497</a> )			
GO:0016705 : oxidoreductase activity, acting on paired donors, with incorporation or reduction of molecular oxygen ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0016705">https://www.ebi.ac.uk/QuickGO/term/GO:0016705</a> )			
-	GO - Biological Process		

-	Presumptive Null
Yes ( <a href="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</a> )	Molecular Type
Gene Loss ( <a href="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</a> )	Aberration Type
Deletion ( <a href="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</a> )	Deletion Size
unknown	Molecular Details of the Mutation
Gene deletion	Experimental Evidence
Linkage Mapping ( <a href="https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=~Linkage+Mapping^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Experimental Evidence=~Linkage Mapping^#gephebase-summary-title</a> )	Main Reference
Evidence on the molecular basis of the <i>Ac/ac</i> adaptive cyanogenesis polymorphism in white clover ( <i>Trifolium repens</i> L). (2008) ( <a href="https://pubmed.ncbi.nlm.nih.gov/18458107">https://pubmed.ncbi.nlm.nih.gov/18458107</a> )	Authors
Olsen KM; Hsu SC; Small LL	Abstract
White clover is polymorphic for cyanogenesis, with both cyanogenic and acyanogenic plants occurring in nature. This chemical defense polymorphism is one of the longest-studied and best-documented examples of an adaptive polymorphism in plants. It is controlled by two independently segregating genes: <i>Ac/ac</i> controls the presence/absence of cyanogenic glucosides; and <i>Li/li</i> controls the presence/absence of their hydrolyzing enzyme, linamarase. Whereas <i>Li</i> is well characterized at the molecular level, <i>Ac</i> has remained unidentified. Here we report evidence that <i>Ac</i> corresponds to a gene encoding a cytochrome P450 of the CYP79D protein subfamily (CYP79D15), and we describe the apparent molecular basis of the <i>Ac/ac</i> polymorphism. CYP79D orthologs catalyze the first step in cyanogenic glucoside biosynthesis in other cyanogenic plant species. In white clover, Southern hybridizations indicate that CYP79D15 occurs as a single-copy gene in cyanogenic plants but is absent from the genomes of <i>ac</i> plants. Gene-expression analyses by RT-PCR corroborate this finding. This apparent molecular basis of the <i>Ac/ac</i> polymorphism parallels our previous findings for the <i>Li/li</i> polymorphism, which also arises through the presence/absence of a single-copy gene. The nature of these polymorphisms may reflect white clover's evolutionary origin as an allotetraploid derived from cyanogenic and acyanogenic diploid progenitors.	Additional References
Recurrent gene deletions and the evolution of adaptive cyanogenesis polymorphisms in white clover ( <i>Trifolium repens</i> L.). (2013) ( <a href="https://pubmed.ncbi.nlm.nih.gov/22694056">https://pubmed.ncbi.nlm.nih.gov/22694056</a> )	

## RELATED GEPHE

1 (Linamarase) ( <a href="https://www.gephebase.org/search-criteria?/or+Taxon+ID=~3899^/and+Trait=Toxicity+levels/and+groupHaplotypes=true#gephebase-summary-title">https://www.gephebase.org/search-criteria?/or+Taxon ID=~3899^/and+Trait=Toxicity levels/and+groupHaplotypes=true#gephebase-summary-title</a> )	Related Genes
No matches found.	Related Haplotypes

## EXTERNAL LINKS

## COMMENTS