

GEPHE SUMMARY

	Gephebase Gene	GepheID
Beta-glucosidase6 (BGLU6) (<a +beta-glucosidase6+(bglu6)+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase="+Beta-glucosidase6+(BGLU6)+"#gephebase-summary-title)	GP00001266	
	Entry Status	Main curator
Published	Courtier	

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		
Resistance to UV irradiation (flavonol glycosylation) (<a +resistance+to+uv+irradiation+(flavonol+glycosylation)+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait="+Resistance+to+UV+irradiation+(flavonol+glycosylation)+"#gephebase-summary-title)			
	Trait State in Taxon A		
Arabidopsis thaliana- Ler0			
	Trait State in Taxon B		
Arabidopsis thaliana- Bor-4; Se-0; Uod-1; and Zdr-1			
	Ancestral State		
Taxon A			
	Taxonomic Status		
Intraspecific (<a +intraspecific+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=">https://www.gephebase.org/search-criteria?/and+Taxonomic+Status="+Intraspecific+"#gephebase-summary-title)			
Taxon A		Taxon B	
	Latin Name		Latin Name
Arabidopsis thaliana (<a +arabidopsis+thaliana+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Arabidopsis+thaliana+"#gephebase-summary-title)		Arabidopsis thaliana (<a +arabidopsis+thaliana+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Arabidopsis+thaliana+"#gephebase-summary-title)	
	Common Name		Common Name
thale cress		thale cress	
	Synonyms		Synonyms
thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress		thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress	
	Rank		Rank
species		species	
	Lineage		Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetales; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis		cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetales; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis	
	Parent		Parent
Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701)		Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701)	
	NCBI Taxonomy ID		NCBI Taxonomy ID
3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702)		3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702)	
	is Taxon A an Infrappecies?		is Taxon B an Infrappecies?
Yes		Yes	
	Taxon A Description		Taxon B Description
Arabidopsis thaliana- Ler0		Arabidopsis thaliana- Bor-4; Se-0; Uod-1; and Zdr-1	

GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Arabidopsis thaliana
BGLU6		Q682B4 (http://www.uniprot.org/uniprot/Q682B4)
	Synonyms	GenebankID or UniProtKB
beta glucosidase 6; T13D8.16; T13D8_16; At1g60270		3767579 (https://www.ncbi.nlm.nih.gov/nuccore/3767579)
	String	
3702.AT1G60270.1 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=3702.AT1G60270.1)		
	Sequence Similarities	
Belongs to the glycosyl hydrolase 1 family.		
	GO - Molecular Function	
GO:0008422 : beta-glucosidase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0008422)		
GO:0102483 : scopolin beta-glucosidase activity		

(<https://www.ebi.ac.uk/QuickGO/term/GO:0102483>)

GO - Biological Process

GO:0005975 : carbohydrate metabolic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0005975>)

GO - Cellular Component

-

Presumptive Null

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))

Molecular Type

Coding ([https://www.gephebase.org/search-criteria?/and+Molecular Type=~Coding~#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Molecular+Type=~Coding~#gephebase-summary-title))

Aberration 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))

Deletion Size

1-9 bp

Molecular Details of the Mutation

A deletion of one nucleotide in the seventh exon (BGLU6 CDS position 678) results in a premature stop codon in the accessions Bor-4, Se-0, Uod-1, and Zdr-1. premature stop codon

Experimental Evidence

Linkage Mapping ([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))

Main Reference

Natural variation in flavonol accumulation in Arabidopsis is determined by the flavonol glucosyltransferase BGLU6. (2016) (<https://pubmed.ncbi.nlm.nih.gov/26717955>)

Authors

Ishihara H; Tohge T; ViehÄqver P; Fernie AR; Weisshaar B; Stracke R

Abstract

Flavonols are colourless secondary metabolites, primarily regarded as UV-protection pigments that are deposited in plants in their glycosylated forms. The glycosylation of flavonols is mainly catalysed by UDP-sugar-dependent glycosyltransferases (UGTs). Although the structures of flavonol glycosides accumulating in Arabidopsis thaliana are known, many genes involved in the flavonol glycosylation pathway are yet to be discovered. The flavonol glycoside profiles of seedlings from 81 naturally occurring A. thaliana accessions were screened using high performance thin layer chromatography. A qualitative variation in flavonol 3-O-gentiobioside 7-O-rhamnoside (F3GG7R) content was identified. Ler – Col-0 recombinant inbred line mapping and whole genome association mapping led to the identification of a glycoside hydrolase family 1-type gene, At1g60270/BGLU6, that encodes a homolog of acyl-glucose-dependent glycosyltransferases involved in the glycosylation of anthocyanins, possibly localized in the cytoplasm, and that is co-expressed with genes linked to phenylpropanoid biosynthesis. A causal single nucleotide polymorphism introducing a premature stop codon in non-producer accessions was found to be absent in the producers. Several other naturally occurring loss-of-function alleles were also identified. Two independent bglu6 T-DNA insertion mutants from the producer accessions showed loss of F3GG7R. Furthermore, bglu6 mutant lines complemented with the genomic Ler BGLU6 gene confirmed that BGLU6 is essential for production of F3GGR7. We have thus identified an accession-specific gene that causes a qualitative difference in flavonol glycoside accumulation in A. thaliana strains. This gene encodes a flavonol 3-O-glucoside: 6â€³-O-glucosyltransferase that does not belong to the large canonical family of flavonol glycosyltransferases that use UDP-conjugates as the activated sugar donor substrate.

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Additional References

The genetics of plant metabolism. (2006) (<https://pubmed.ncbi.nlm.nih.gov/16751770>)

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

4 ([https://www.gephebase.org/search-criteria?/or+Gene Gephebase=~Beta-glucosidase6 \(BGLU6\)~/and+Taxon ID=~3702~/or+Gene Gephebase=~Beta-glucosidase6 \(BGLU6\)~/and+Taxon ID=~3702~#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Gene+Gephebase=~Beta-glucosidase6+(BGLU6)~/and+Taxon+ID=~3702~/or+Gene+Gephebase=~Beta-glucosidase6+(BGLU6)~/and+Taxon+ID=~3702~#gephebase-summary-title))

EXTERNAL LINKS

COMMENTS

Vast gene region previously detected in two QTL papers; QTL + mapping