

GEPHE SUMMARY

Gephebase Gene
Beta-glucosidase6 (BGLU6)

Entry Status
Published

GepheID
GP00001263

Main curator
Courtier

PHENOTYPIC CHANGE

Trait Category
Physiology

Trait
Resistance to UV irradiation (flavonol glycosylation)

Trait State in Taxon A
Arabidopsis thaliana- Ler0

Trait State in Taxon B
Arabidopsis thaliana- Van0

Ancestral State
Taxon A

Taxonomic Status
Intraspecific

Taxon A

Latin Name
Arabidopsis thaliana

Common Name
thale cress

Synonyms
thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress

Rank
species

Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis

Parent
Arabidopsis () - (Rank: genus)

NCBI Taxonomy ID
3702

is Taxon A an Intraspecies?
Yes

Taxon A Description
Arabidopsis thaliana- Ler0

Taxon B

Latin Name
Arabidopsis thaliana

Common Name
thale cress

Synonyms
thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress

Rank
species

Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis

Parent
Arabidopsis () - (Rank: genus)

NCBI Taxonomy ID
3702

is Taxon B an Intraspecies?
Yes

Taxon B Description
Arabidopsis thaliana- Van0

GENOTYPIC CHANGE

Generic Gene Name
BGLU6

Synonyms
beta glucosidase 6; T13D8.16; T13D8_16; At1g60270

String
3702.AT1G60270.1

Sequence Similarities
Belongs to the glycosyl hydrolase 1 family.

GO - Molecular Function
GO:0008422 : beta-glucosidase activity
GO:0102483 : scopolin beta-glucosidase activity

GO - Biological Process
GO:0005975 : carbohydrate metabolic process

GO - Cellular Component
-

UniProtKB Arabidopsis thaliana
Q682B4

GenebankID or UniProtKB
3767579

Presumptive Null

Yes

Molecular Type

Coding

Aberration Type

SNP

SNP Coding Change

-

Molecular Details of the Mutation

T-> A of a splice site at position 168

Experimental Evidence

Linkage Mapping

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	-	-	-

Main Reference

Natural variation in flavonol accumulation in Arabidopsis is determined by the flavonol glucosyltransferase BGLU6. (2016)

Authors

Ishihara H; Tohge T; Viehöver 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)

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

4

EXTERNAL LINKS

COMMENTS

@Splicing - vast gene region previously detected in two QTL papers; QTL + mapping