

GEPHE SUMMARY

Gephebase Gene
VvMYBA1

Entry Status
Published

GepheID
GP00002099

Main curator
Courtier

PHENOTYPIC CHANGE

Trait Category
Morphology

Trait
Coloration (fruit)

Trait State in Taxon A
Vitis vinifera - white-skinned cultivar Italia

Trait State in Taxon B
Vitis vinifera - pink-skinned cultivar Benitaka

Ancestral State
Taxon A

Taxonomic Status
Domesticated

Taxon A

Latin Name
Vitis vinifera

Common Name
wine grape

Synonyms
Vitis vinifera subsp. vinifera; wine grape; Vitis vinifera L.

Rank
species

Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; rosids incertae sedis; Vitales; Vitaceae; Viteae; Vitis

Parent
Vitis () - (Rank: genus)

NCBI Taxonomy ID
29760

is Taxon A an Intraspecies?
Yes

Taxon A Description
cv. "Italia"

Taxon B

Latin Name
Vitis vinifera

Common Name
wine grape

Synonyms
Vitis vinifera subsp. vinifera; wine grape; Vitis vinifera L.

Rank
species

Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; rosids incertae sedis; Vitales; Vitaceae; Viteae; Vitis

Parent
Vitis () - (Rank: genus)

NCBI Taxonomy ID
29760

is Taxon B an Intraspecies?
Yes

Taxon B Description
cv. "Benitaka"

GENOTYPIC CHANGE

Generic Gene Name
VvmybA1

Synonyms
mybA; MybA3; mybA1; VVMYBA1; VvmybA3; MYBA1; VIT_02s0033g00410

String
29760.VIT_02s0033g00410.t01

Sequence Similarities
-

GO - Molecular Function
GO:0003677 : DNA binding

GO - Biological Process
-

GO - Cellular Component
GO:0005634 : nucleus

Presumptive Null

UniProtKB *Vitis vinifera*
Q6L973

GenebankID or UniProtKB
FN596505

No

Molecular Type

Other

Aberration Type

Deletion

Deletion Size

10-100 kb

Molecular Details of the Mutation

homologous recombination between the non-functional allele of MybA1 and the truncated MybA3 gene at their promoter region, resulting in the recovery of MybA1 genomic integrity (and therefore its transcription) on cv. "Benitaka". The VvmybA1 locus of 'Benitaka' is heterozygous for the VvmybA1a allele (non-functional) and a novel VvmybA1(BEN) allele. VvmybA1(BEN) restores VvmybA1 transcripts.

Experimental Evidence

Candidate Gene

Main Reference

Color recovery in berries of grape (*Vitis vinifera* L.) 'Benitaka', a bud sport of 'Italia', is caused by a novel allele at the VvmybA1 locus. (2009)

Authors

Azuma A; Kobayashi S; Goto-Yamamoto N; Shiraishi M; Mitani N; Yakushiji H; Koshita Y

Abstract

Color mutations in grape berry skin are relatively frequent events, and can be easily seen in the vineyard. Both light-red-skinned 'Ruby Okuyama' and more intense and uniform rosy-skinned 'Benitaka' (*Vitis vinifera* L.) are bud sports of white-skinned 'Italia'. Previously, we reported that 'Ruby Okuyama' was caused by the recovery of VvmybA1 expression, which may have occurred as a result of intra-LTR (long terminal repeat) recombination within a retrotransposon, Gret1. However, the molecular basis of the color recovery in 'Benitaka' has not been elucidated so far. Here, we found that the VvmybA1 locus of 'Benitaka' is heterozygous for the VvmybA1a allele (non-functional) and a novel VvmybA1(BEN) allele, and that VvmybA1(BEN) restored VvmybA1 transcripts. We hypothesized that VvmybA1(BEN) allele was caused by homologous recombination between VvmybA1a and VvmybA3. In addition, the content and composition of anthocyanins in berry skins differed greatly between 'Ruby Okuyama' and 'Benitaka'. The levels of expression of the genes for flavonoid 3',5'-hydroxylase (F3'5'H), O-methyltransferase (OMT), and glutathione-S-transferase (GST) were associated with differences in the anthocyanin content and composition between the two cultivars.

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Additional References

RELATED GEPHE

Related Genes

3 (VvMybA1 VvMybA2 VvMybA3 and VvMybA4, VvMYBA2, VvMYBA3)

Related Haplotypes

5

EXTERNAL LINKS

COMMENTS