

GEPHE SUMMARY

<p>bHLH2 (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=bHLH2#gephebase-summary-title)</p> <p>Published</p>	<p>Gephebase Gene</p> <p>Entry Status</p>	<p>GP00002078</p> <p>Courtier</p>	<p>GepheID</p> <p>Main curator</p>
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PHENOTYPIC CHANGE

<p>Morphology (https://www.gephebase.org/search-criteria?/and+Trait+Category=Morphology#gephebase-summary-title)</p> <p>Coloration (flower; seed) (https://www.gephebase.org/search-criteria?/and+Trait=Coloration (flower; seed)#gephebase-summary-title)</p> <p>fully purple flowers and dark-brown seeds</p> <p>pale reddish flowers with fine red spots or sectors and ivory seeds with tiny dark brown spots</p> <p>Taxon A</p> <p>Domesticated (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=Domesticated#gephebase-summary-title)</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>Latin Name</p> <p><i>Ipomoea purpurea</i> (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=Ipomoea purpurea#gephebase-summary-title)</p> <p>Common Name</p> <p>common morning-glory</p> <p>Synonyms</p> <p><i>Convolvulus purpureus</i>; <i>Pharbitis purpurea</i>; common morning-glory; <i>Convolvulus purpureus</i> L., 1762; <i>Ipomoea purpurea</i> (L.) Roth, 1787; <i>Pharbitis purpurea</i> (L.) Voigt, 1845; <i>Pharbitis purpurea</i></p> <p>Rank</p> <p>species</p> <p>Lineage</p> <p>cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Convolvulaceae; Ipomoeae; <i>Ipomoea</i></p> <p>Parent</p> <p><i>Ipomoea</i> () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4119)</p> <p>NCBI Taxonomy ID</p> <p>4121 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4121)</p> <p>is Taxon A an Intraspecies?</p> <p>No</p>	<p>Taxon B</p> <p>Latin Name</p> <p><i>Ipomoea purpurea</i> (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=Ipomoea purpurea#gephebase-summary-title)</p> <p>Common Name</p> <p>common morning-glory</p> <p>Synonyms</p> <p><i>Convolvulus purpureus</i>; <i>Pharbitis purpurea</i>; common morning-glory; <i>Convolvulus purpureus</i> L., 1762; <i>Ipomoea purpurea</i> (L.) Roth, 1787; <i>Pharbitis purpurea</i> (L.) Voigt, 1845; <i>Pharbitis purpurea</i></p> <p>Rank</p> <p>species</p> <p>Lineage</p> <p>cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Convolvulaceae; Ipomoeae; <i>Ipomoea</i></p> <p>Parent</p> <p><i>Ipomoea</i> () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4119)</p> <p>NCBI Taxonomy ID</p> <p>4121 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4121)</p> <p>is Taxon B an Intraspecies?</p> <p>Yes</p> <p>Taxon B Description</p> <p>ivs m1 line PR42</p>
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GENOTYPIC CHANGE

<p>BHLH2</p> <p>AtEGL3; ATMYC-2; EGL1; ENHANCER OF GLABRA 3; F24D7.16; F24D7.16; EGL3; EN30; MYC146; At1g63650</p> <p>3702.AT1G63650.3 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=3702.AT1G63650.3)</p> <p>Sequence Similarities</p> <p>-</p> <p>GO:0046983 : protein dimerization activity</p>	<p>Generic Gene Name</p> <p>Synonyms</p> <p>String</p> <p>Sequence Similarities</p> <p>GO - Molecular Function</p>	<p>Q9CAD0 (http://www.uniprot.org/uniprot/Q9CAD0)</p> <p>()</p>	<p>UniProtKB Arabidopsis thaliana</p> <p>GenebankID or UniProtKB</p>
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(<https://www.ebi.ac.uk/QuickGO/term/GO:0046983>)
GO:0003700 : DNA-binding transcription factor activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0003700>)
GO:0003677 : DNA binding (<https://www.ebi.ac.uk/QuickGO/term/GO:0003677>)
GO - Biological Process

GO:0007275 : multicellular organism development
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007275>)
GO:0006355 : regulation of transcription, DNA-templated
(<https://www.ebi.ac.uk/QuickGO/term/GO:0006355>)
GO:0009867 : jasmonic acid mediated signaling pathway
(<https://www.ebi.ac.uk/QuickGO/term/GO:0009867>)
GO:0009957 : epidermal cell fate specification
(<https://www.ebi.ac.uk/QuickGO/term/GO:0009957>)
GO:0010026 : trichome differentiation
(<https://www.ebi.ac.uk/QuickGO/term/GO:0010026>)

GO - Cellular Component

GO:0005634 : nucleus (<https://www.ebi.ac.uk/QuickGO/term/GO:0005634>)

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

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

Insertion Size

1-10 kb

Molecular Details of the Mutation

two copies of 3.9-kb Tip100 integrated into bHLH2 exon 7 and intron 2

Experimental Evidence

Candidate Gene ([https://www.gephebase.org/search-criteria?/and+Experimental Evidence=~Candidate Gene^#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=~Candidate+Gene^#gephebase-summary-title))

Main Reference

A bHLH regulatory gene in the common morning glory, *Ipomoea purpurea*, controls anthocyanin biosynthesis in flowers, proanthocyanidin and phytomelanin pigmentation in seeds, and seed trichome formation. (2007) (<https://pubmed.ncbi.nlm.nih.gov/17270013>)

Authors

Park KI; Ishikawa N; Morita Y; Choi JD; Hoshino A; Iida S

Abstract

The transcriptional regulators for anthocyanin pigmentation include proteins containing R2R3-MYB domains, bHLH domains and conserved WD40 repeats, and their interactions determine the set of genes to be expressed. Spontaneous ivory seed (*ivs*) mutants of *Ipomoea purpurea* displaying pale pigmented flowers and ivory seeds are caused by insertions of DNA transposons into the bHLH2 gene that encodes a bHLH transcriptional regulator. A partial reduction in the expression of all structural genes encoding enzymes for anthocyanin biosynthesis was observed in the young flower buds of these *ivs* mutants. The DFR-B and ANS transcripts were completely abolished in the *ivs* seed coats, whereas the early biosynthetic genes for flavonol biosynthesis remained active. The production and accumulation of both proanthocyanidin and phytomelanin pigments in the ivory seed coats were drastically reduced. Moreover, the unbranched trichomes in the ivory seeds were smaller in size and fewer in number than those in the wild-type dark-brown seeds, and the surface of the epidermis without trichomes in the dark-brown seeds looked rougher, due to the protruding tangential walls, than that in the ivory seeds. Although the *I. purpurea* bHLH2 gene is the most closely related to the petunia AN1 gene, whose mutation is known to confer white flowers and to be deficient in acidification of their vacuoles, the vacuolar alkalization in the epidermal flower limbs of *I. purpurea* *ivs* mutants appears to occur normally. These results are discussed with regard to the function of bHLH transcriptional regulators controlling flower and seed pigmentation as well as other epidermal traits.

Additional References

RELATED GEPHE

Related Genes

3 (Chalcone synthase D (CHS-D), flavonoid 3'-hydroxylase (F3'H), MYB1) ([https://www.gephebase.org/search-criteria?/or+Taxon ID=~4121^/and+Trait=Coloration/and+groupHaplotypes=true#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Taxon+ID=~4121^/and+Trait=Coloration/and+groupHaplotypes=true#gephebase-summary-title))

Related Haplotypes

2 ([https://www.gephebase.org/search-criteria?/or+Gene Gephebase=~bHLH2^/and+Taxon ID=~4121^/or+Gene Gephebase=~bHLH2^/and+Taxon ID=~4121^#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Gene+Gephebase=~bHLH2^/and+Taxon+ID=~4121^/or+Gene+Gephebase=~bHLH2^/and+Taxon+ID=~4121^#gephebase-summary-title))

EXTERNAL LINKS

COMMENTS

@TE - The *I. purpurea* bHLH2 gene is the most closely related to the petunia AN1 gene. *ivs*€m2 seems to be a precursor of *ivs*€m1.

