

GEPHE SUMMARY

B2 (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase+^B2^#gephebase-summary-title)	Gephebase Gene	GP00002058	GepheID
Published	Entry Status	Courtier	Main curator

PHENOTYPIC CHANGE

Morphology (https://www.gephebase.org/search-criteria?/and+Trait+Category+^Morphology^#gephebase-summary-title)	Trait Category		
Coloration (bulb) (https://www.gephebase.org/search-criteria?/and+Trait+^Coloration+(bulb)^#gephebase-summary-title)	Trait		
yellow bulb	Trait State in Taxon A		
white bulb - recessive allele	Trait State in Taxon B		
Taxon A	Ancestral State		
Domesticated (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status+^Domesticated^#gephebase-summary-title)	Taxonomic Status		
	Taxon A	Taxon B	
Allium cepa (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms+^Allium+cepa^#gephebase-summary-title)	Latin Name	Allium cepa (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms+^Allium+cepa^#gephebase-summary-title)	Latin Name
onion	Common Name	onion	Common Name
onion; Allium cepa L.	Synonyms	onion; Allium cepa L.	Synonyms
species	Rank	species	Rank
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliopsida; Mesangiospermae; Liliopsida; Petrosaviidae; Asparagales; Amaryllidaceae; Allioideae; Allieae; Allium	Lineage	cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliopsida; Mesangiospermae; Liliopsida; Petrosaviidae; Asparagales; Amaryllidaceae; Allioideae; Allieae; Allium	Lineage
Allium () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4678)	Parent	Allium () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4678)	Parent
4679 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4679)	NCBI Taxonomy ID	4679 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4679)	NCBI Taxonomy ID
No	is Taxon A an Intraspecies?	No	is Taxon B an Intraspecies?

GENOTYPIC CHANGE

-	Generic Gene Name		UniProtKB
-	Synonyms	0	GenebankID or UniProtKB
-	String	AUG71567 (https://www.ncbi.nlm.nih.gov/nuccore/AUG71567)	
-	Sequence Similarities		
-	GO - Molecular Function		
-	GO - Biological Process		
-	GO - Cellular Component		
Yes (https://www.gephebase.org/search-criteria?/and+Presumptive+Null+^Yes^#gephebase-summary-title)			Presumptive Null
Cis-regulatory (https://www.gephebase.org/search-criteria?/and+Molecular+Type+^Cis-regulatory^#gephebase-summary-title)			Molecular Type
			Aberration Type

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

Insertion Size

100-999 bp

Molecular Details of the Mutation

577-bp insertion of a transposable element named AcWHITE in the 5' upstream region of the white allele of B2. A 8-bp target site duplication (GTTATA AC) and a 7-bp terminal inverted repeat (CAAGGTT) were identified at both ends of this insertion - no SNP detected in the coding region

Experimental Evidence

Linkage Mapping (<https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=~Linkage+Mapping^#gephebase-summary-title>)

Main Reference

Transposition of a non-autonomous DNA transposon in the gene coding for a bHLH transcription factor results in a white bulb color of onions (*Allium cepa* L.). (2019) (<https://pubmed.ncbi.nlm.nih.gov/31637460>)

Authors

Jo C; Kim S

Abstract

A DNA transposon was found in the gene encoding a bHLH transcription factor. Genotypes of the marker tagging this DNA transposon perfectly co-segregated with color phenotypes in large F populations. A combined approach of bulked segregant analysis and RNA-Seq was used to isolate causal gene for C locus controlling white bulb color in onions (*Allium cepa* L.). A total of 114 contigs containing homozygous single nucleotide polymorphisms (SNPs) between white and yellow bulked RNAs were identified. Four of them showed high homologies with loci clustered in the middle of chromosome 5. SNPs in 34 contigs were confirmed by sequencing of PCR products. One of these contigs showed perfect linkage to the C locus in F populations consisting of 2491 individuals. However, genotypes of molecular marker tagging this contig were inconsistent with color phenotypes of diverse breeding lines. A total of 146 contigs showed differential expression between yellow and white bulks. Among them, transcription levels of B2 gene encoding a bHLH transcription factor were significantly reduced in white RNA bulk and F individuals, although there was no SNP in the coding region. Phylogenetic analysis showed that onion B2 was orthologous to bHLH-coding genes regulating anthocyanin biosynthesis pathway in other plant species. Promoter regions of B2 gene were obtained by genome walking and a 577-bp non-autonomous DNA transposon designated as AcWHITE was found in the white allele. Molecular marker tagging AcWHITE showed perfect linkage with the C locus. Marker genotypes of the white allele were detected in some white accessions. However, none of tested red or yellow onions contained AcWHITE insertion, implying that B2 gene was likely to be a causal gene for the C locus.

Additional References

RELATED GEPHE

No matches found.

Related Genes

No matches found.

Related Haplotypes

EXTERNAL LINKS

COMMENTS

@TE @&-No-UniProtKB-curated