

GEPHE SUMMARY

BvCPSF73-la (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=BvCPSF73-la#gephebase-summary-title)	Gephebase Gene	GP00001411	GepheID
Published	Entry Status	Prigent	Main curator

PHENOTYPIC CHANGE

Physiology (https://www.gephebase.org/search-criteria?/and+Trait+Category=Physiology#gephebase-summary-title)	Trait Category		
Bolting time (https://www.gephebase.org/search-criteria?/and+Trait=Bolting+time#gephebase-summary-title)	Trait		
Biennial sugar beet 93161P regularly bolting after winter	Trait State in Taxon A		
biennial sugar beet BETA1773 never-bolting after winter	Trait State in Taxon B		
Taxon A	Ancestral State		
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=Intraspecific#gephebase-summary-title)	Taxonomic Status		
	Taxon A		Taxon B
Beta vulgaris (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=Beta+vulgaris#gephebase-summary-title)	Latin Name	Beta vulgaris (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=Beta+vulgaris#gephebase-summary-title)	Latin Name
-	Common Name	-	Common Name
Beta altissima; beet; Beta altissima Steud.; Beta vulgaris L.	Synonyms	Beta altissima; beet; Beta altissima Steud.; Beta vulgaris L.	Synonyms
species	Rank	species	Rank
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; Caryophyllales; Chenopodiaceae; Betoideae; Beta	Lineage	cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; Caryophyllales; Chenopodiaceae; Betoideae; Beta	Lineage
Beta () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3554)	Parent	Beta () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3554)	Parent
161934 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=161934)	NCBI Taxonomy ID	161934 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=161934)	NCBI Taxonomy ID
Yes	is Taxon A an Intraspecies?	Yes	is Taxon B an Intraspecies?
Biennial sugar beet 93161P regularly bolting after winter	Taxon A Description	biennial sugar beet BETA1773 never-bolting after winter	Taxon B Description

GENOTYPIC CHANGE

CPSF73-I	Generic Gene Name	Q9C952 (http://www.uniprot.org/uniprot/Q9C952)	UniProtKB Arabidopsis thaliana
cleavage and polyadenylation specificity factor 73-I; T7P1.15; T7P1_15; At1g61010	Synonyms	0	GenebankID or UniProtKB
3702.AT1G61010.1 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=3702.AT1G61010.1)	String		
Belongs to the metallo-beta-lactamase superfamily. RNA-metabolizing metallo-beta-lactamase-like family. INTS11 subfamily.	Sequence Similarities		
GO:0003723 : RNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0003723)	GO - Molecular Function		
GO:0008409 : 5'-3' exonuclease activity (https://www.ebi.ac.uk/QuickGO/term/GO:0008409)			
GO:0004521 : endoribonuclease activity			

(<https://www.ebi.ac.uk/QuickGO/term/GO:0004521>)

GO - Biological Process

GO:0006398 : mRNA 3'-end processing by stem-loop binding and cleavage

(<https://www.ebi.ac.uk/QuickGO/term/GO:0006398>)

GO:0006378 : mRNA polyadenylation

(<https://www.ebi.ac.uk/QuickGO/term/GO:0006378>)

GO:0098789 : pre-mRNA cleavage required for polyadenylation

(<https://www.ebi.ac.uk/QuickGO/term/GO:0098789>)

GO:0031126 : snoRNA 3'-end processing

(<https://www.ebi.ac.uk/QuickGO/term/GO:0031126>)

GO:0034247 : snoRNA splicing (<https://www.ebi.ac.uk/QuickGO/term/GO:0034247>)

GO:0016180 : snRNA processing (<https://www.ebi.ac.uk/QuickGO/term/GO:0016180>)

GO:0006369 : termination of RNA polymerase II transcription

(<https://www.ebi.ac.uk/QuickGO/term/GO:0006369>)

GO - Cellular Component

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

GO:0005847 : mRNA cleavage and polyadenylation specificity factor complex

(<https://www.ebi.ac.uk/QuickGO/term/GO:0005847>)

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

2bp deletion causing a frameshift resulting in a two third truncated protein

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

A Detailed Analysis of the BR Locus Suggests a New Mechanism for Bolting after Winter in Sugar Beet (*Beta vulgaris* L.). (2016) (<https://pubmed.ncbi.nlm.nih.gov/27895650>)

Authors

TrÄnkner C; Lemnian IM; Emrani N; Pfeiffer N; Tiwari SP; Kopisch-Obuch FJ; Vogt SH; MÄ¼ller AE; Schilhabel M; Jung C; Grosse I

Abstract

Sugar beet (*Beta vulgaris* ssp. *vulgaris*) is a biennial, sucrose-storing plant, which is mainly cultivated as a spring crop and harvested in the vegetative stage before winter. For increasing beet yield, over-winter cultivation would be advantageous. However, bolting is induced after winter and drastically reduces yield. Thus, post-winter bolting control is essential for winter beet cultivation. To identify genetic factors controlling bolting after winter, a F population was previously developed by crossing the sugar beet accessions BETA 1773 with reduced bolting tendency and 93161P with complete bolting after winter. For a mapping-by-sequencing analysis, pools of 26 bolting-resistant and 297 bolting F plants were used. Thereby, a single continuous homozygous region of 103 kb was co-localized to the previously published BR QTL for post-winter bolting resistance (Pfeiffer et al., 2014). The BR locus was narrowed down to 11 candidate genes from which a homolog of the Arabidopsis CLEAVAGE AND POLYADENYLATION SPECIFICITY FACTOR 73-I (CPSF73-I) was identified as the most promising candidate. A 2 bp deletion within the BETA 1773 allele of BvCPSF73-Ia results in a truncated protein. However, the null allele of BvCPSF73-Ia might partially be compensated by a second BvCPSF73-Ib gene. This gene is located 954 bp upstream of BvCPSF73-Ia and could be responsible for the incomplete penetrance of the post-winter bolting resistance allele of BETA 1773. This result is an important milestone for breeding winter beets with complete bolting resistance after winter.

Additional References

RELATED GEPHE

No matches found.

Related Genes

No matches found.

Related Haplotypes

EXTERNAL LINKS

COMMENTS