GEPHE SUMMARY

Gephebase Gene

VRN1 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^VRN1^#gephebase-summary-title)

GepheID

GP00002105

Entry Status

Published

Main curator

Courtier

PHENOTYPIC CHANGE

Trait Category

Physiology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Physiology^#gephebase-summary-title)

Trait

Flowering time (https://www.gephebase.org/search-criteria?/and+Trait=^Flowering time^#gephebase-summary-title)

Trait State in Taxon A

Triticum turgidum - recessive allele vrn-B1 - winter growth habit

Trait State in Taxon B

Triticum turgidum - dominant allele Vrn-B1 - spring growth habit

Ancestral State

Taxon A

Taxonomic Status

Domesticated (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Domesticated^#gephebase-summary-title)

Taxon A

Latin Name

Triticum turgidum (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Triticum turgidum^#gephebase-summary-title)

Common Name

-

Synonyms

Triticum aethiopicum; English wheat; cone wheat; poulard wheat; rivet wheat; Triticum aethiopicum Jakubz.; Triticum turgidum L.; Triticum turgidum8

Rank

species

Lineage

cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Pooideae; Triticodae; Triticeae; Triticinae; Triticum

Parent

Triticum () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4564)

NCBI Taxonomy ID

4571 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4571)

is Taxon A an Infraspecies?

No

Taxon B

Latin Name

Triticum turgidum (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Triticum turgidum^#gephebase-summary-title)

Common Name

-

Synonyms

Triticum aethiopicum; English wheat; cone wheat; poulard wheat; rivet wheat; Triticum aethiopicum Jakubz.; Triticum turgidum L.; Triticum turgidum8

Rank

species

Lineage

cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Pooideae; Triticodae; Triticeae; Triticinae; Triticum

Parent

Triticum () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4564)

NCBI Taxonomy ID

4571 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4571)

is Taxon B an Infraspecies?

No

GENOTYPIC CHANGE

Generic Gene Name

VRN1

Synonyms

REDUCED VERNALIZATION RESPONSE 1; REM39; REPRODUCTIVE MERISTEM 39; At3g18990; K13E13.10

String

3702.AT3G18990.1 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 3702.AT3G18990.1)

Sequence Similarities

-

GO - Molecular Function

GO:0043565 : sequence-specific DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0043565)
GO:0003677 : DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0003677)

GO - Biological Process

GO:0009909 : regulation of flower development

UniProtKB Arabidopsis thaliana

Q8L3W1 (http://www.uniprot.org/uniprot/Q8L3W1)

GenebankID or UniProtKB

()

(https://www.ebi.ac.uk/QuickGO/term/GO:0009909)
GO:0010048 : vernalization response
(https://www.ebi.ac.uk/QuickGO/term/GO:0010048)

GO - Cellular Component

GO:0005654 : nucleoplasm (https://www.ebi.ac.uk/QuickGO/term/GO:0005654)

Presumptive Null

No (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^No^#gephebase-summary-title)

Molecular Type

Cis-regulatory (https://www.gephebase.org/search-criteria?/and+Molecular Type=^Cis-regulatory^#gephebase-summary-title)

Aberration Type

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

Insertion Size

1-10 kb

Molecular Details of the Mutation

5463-bp insertion in the 5′-UTR region of the Vrn-B1 allele. This insertion is a novel retrotransposon (designated as retrotrans_VRN), which is flanked by a 5-bp target site duplication and contains primer binding site and polypurine tract motifs; a 325-bp long terminal repeat and an open reading frame encoding 1231 amino acids. The insertion of retrotrans_VRN results in expression of Vrn-B1 without vernalization.

Experimental Evidence

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

Main Reference

A Novel Retrotransposon Inserted in the Dominant Vrn-B1 Allele Confers Spring Growth Habit in Tetraploid Wheat (Triticum turgidum L.). (2011)
(https://pubmed.ncbi.nlm.nih.gov/22384375)

Authors

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Abstract

Vernalization genes determine winter/spring growth habit in temperate cereals and play important roles in plant development and environmental adaptation. In wheat (Triticum L. sp.), it was previously shown that allelic variation in the vernalization gene VRN1 was due to deletions or insertions either in the promoter or in the first intron. Here, we report a novel Vrn-B1 allele that has a retrotransposon in its promoter conferring spring growth habit. The VRN-B1 gene was mapped in a doubled haploid population that segregated for winter-spring growth habit but was derived from two spring tetraploid wheat genotypes, the durum wheat (T. turgidum subsp. durum) variety 'Lebsock' and T. turgidum subsp. carthlicum accession PI 94749. Genetic analysis revealed that Lebsock carried the dominant Vrn-A1 and recessive vrn-B1 alleles, whereas PI 94749 had the recessive vrn-A1 and dominant Vrn-B1 alleles. The Vrn-A1 allele in Lebsock was the same as the Vrn-A1c allele previously reported in hexaploid wheat. No differences existed between the vrn-B1 and Vrn-B1 alleles, except that a 5463-bp insertion was detected in the 5′-UTR region of the Vrn-B1 allele. This insertion was a novel retrotransposon (designated as retrotrans_VRN), which was flanked by a 5-bp target site duplication and contained primer binding site and polypurine tract motifs, a 325-bp long terminal repeat, and an open reading frame encoding 1231 amino acids. The insertion of retrotrans_VRN resulted in expression of Vrn-B1 without vernalization. Retrotrans_VRN is prevalent among T. turgidum subsp. carthlicum accessions, less prevalent among T. turgidum subsp. dicoccum accessions, and rarely found in other tetraploid wheat subspecies.

Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

@TE