

GEPHE SUMMARY

| | | | |
|---|----------------|------------|--------------|
| VRN1 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^VRN1^#gephebase-summary-title) | Gephebase Gene | GP00001183 | GepheID |
| | Entry Status | Martin | Main curator |
| Published | | | |

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 | | |
| Lolium perenne - Veyo | Trait State in Taxon B | | |
| Lolium perenne - Falster | Ancestral State | | |
| Data not curated | Taxonomic Status | | |
| Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Intraspecific^#gephebase-summary-title) | | | |
| Taxon A | | Taxon B | |
| | Latin Name | | Latin Name |
| Lolium perenne (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Lolium+perenne^#gephebase-summary-title) | Lolium perenne (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Lolium+perenne^#gephebase-summary-title) | | |
| - | Common Name | - | Common Name |
| | Synonyms | | Synonyms |
| Festuca perennis; Festuca perennis (L.) Columbus & J.P.Sm., 2010; Lolium vulgare; perennial ryegrass; Lolium perenne L., 1753; Lolium vulgare Host, 1801 | Festuca perennis; Festuca perennis (L.) Columbus & J.P.Sm., 2010; Lolium vulgare; perennial ryegrass; Lolium perenne L., 1753; Lolium vulgare Host, 1801 | | |
| species | Rank | species | Rank |
| | Lineage | | Lineage |
| cellular organisms; Eukaryota; Viridiplanteae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Pooideae; Pooideae; Poeae; Poeae Chloroplast Group 2 (Poeae type); Loliinae; Lolium | cellular organisms; Eukaryota; Viridiplanteae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Pooideae; Pooideae; Poeae; Poeae Chloroplast Group 2 (Poeae type); Loliinae; Lolium | | |
| Lolium () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4520) | Parent | Lolium () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4520) | Parent |
| 4522 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4522) | NCBI Taxonomy ID | 4522 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4522) | NCBI Taxonomy ID |
| Yes | is Taxon A an Infraspecies? | Yes | is Taxon B an Infraspecies? |
| Lolium perenne - Veyo | Taxon A Description | Lolium perenne - Falster | Taxon B Description |

GENOTYPIC CHANGE

| | | |
|---|-------------------------|--|
| VRN1 | Generic Gene Name | UniProtKB Arabidopsis thaliana |
| | Synonyms | GenebankID or UniProtKB |
| REDUCED VERNALIZATION RESPONSE 1; REM39; REPRODUCTIVE MERISTEM 39; At3g18990; K13E13.10 | | AEV22379 (https://www.ncbi.nlm.nih.gov/nuccore/AEV22379) |
| 3702.AT3G18990.1 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=3702.AT3G18990.1) | String | |
| - | Sequence Similarities | |
| GO:0043565 : sequence-specific DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0043565) | GO - Molecular Function | |
| GO:0003677 : DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0003677) | | |

GO - Biological Process

GO:0009909 : regulation of flower development
 (<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 ([#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Presumptive+Null=^No))

Molecular Type

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

Aberration Type

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

Indel Size

1-10 kb

Molecular Details of the Mutation

8.6kb indel in first intron

Experimental Evidence

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

Main Reference

Comparative sequence analysis of VRN1 alleles of *Lolium perenne* with the co-linear regions in barley, wheat, and rice. (2011) (<https://pubmed.ncbi.nlm.nih.gov/22081040>)

Authors

Asp T; Byrne S; Gundlach H; Bruggmann R; Mayer KF; Andersen JR; Xu M; Greve M; Lenk I; LÃ¼bberstedt T

Abstract

Vernalization, a period of low temperature to induce transition from vegetative to reproductive state, is an important environmental stimulus for many cool season grasses. A key gene in the vernalization pathway in grasses is the VRN1 gene. The objective of this study was to identify causative polymorphism(s) at the VRN1 locus in perennial ryegrass (*Lolium perenne*) for variation in vernalization requirement. Two allelic Bacterial Artificial Chromosome clones of the VRN1 locus from the two genotypes Veyo and Falster with contrasting vernalization requirements were identified, sequenced, and characterized. Analysis of the allelic sequences identified an 8.6-kb deletion in the first intron of the VRN1 gene in the Veyo genotype which has low vernalization requirement. This deletion was in a divergent recurrent selection experiment confirmed to be associated with genotypes with low vernalization requirement. The region surrounding the VRN1 locus in perennial ryegrass showed microcolinearity to the corresponding region on chromosome 3 in *Oryza sativa* with conserved gene order and orientation, while the micro-colinearity to the corresponding region in *Triticum monococcum* was less conserved. Our study indicates that the first intron of the VRN1 gene, and in particular the identified 8.6 kb region, is an important regulatory region for vernalization response in perennial ryegrass.

Additional References

RELATED GEPHE

Related Genes

1 (Flowering locus T (LpFT3)) ([#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Taxon+ID=^4522/and+Trait=Flowering+time/and+groupHaplotypes=true))

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS