GEPHE SUMMARY

Gephebase Gene

PRR37 pseudoresponse regulator protein 37 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^PRR37 pseudoresponse regulator protein 37^#gephebase-summary-title)

Entry Status

Published

GepheID

GP00000931

Main curator

Martin

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

Sorghum bicolor

Trait State in Taxon B

Sorghum bicolor- ATx623

Ancestral State

Data not curated

Taxonomic Status

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

Taxon A

Latin Name

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

Common Name

sorghum

Synonyms

Andropogon sorghum; Sorghum bicolor subsp. bicolor; Sorghum nervosum; Sorghum saccharatum; Sorghum vulgare; sorghum; broomcorn; milo; Andropogon sorghum (L.) Brot.; Sorghum bicolor (L.) Moench; Sorghum nervosum Besser ex Schult.; Sorghum saccharatum (L.) Moench; Sorghum vulgare Pers.; Sorghum bicolor milo; Sorghum_bicolor

Rank

species

Lineage

cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliopsida; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; PACMAD clade; Panicoideae; Andropogonodae; Andropogoneae; Sorghinae; Sorghum

Parent

Sorghum () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4557)

NCBI Taxonomy ID

4558 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4558)

is Taxon A an Infraspecies?

No

Taxon B

Latin Name

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

Common Name

sorghum

Synonyms

Andropogon sorghum; Sorghum bicolor subsp. bicolor; Sorghum nervosum; Sorghum saccharatum; Sorghum vulgare; sorghum; broomcorn; milo; Andropogon sorghum (L.) Brot.; Sorghum bicolor (L.) Moench; Sorghum nervosum Besser ex Schult.; Sorghum saccharatum (L.) Moench; Sorghum vulgare Pers.; Sorghum bicolor milo; Sorghum_bicolor

Rank

species

Lineage

cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliopsida; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; PACMAD clade; Panicoideae; Andropogonodae; Andropogoneae; Sorghinae; Sorghum

Parent

Sorghum () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4557)

NCBI Taxonomy ID

4558 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4558)

is Taxon B an Infraspecies?

Yes

Taxon B Description

Sorghum bicolor- ATx623

GENOTYPIC CHANGE

Generic Gene Name

PRR37

Synonyms

PRR37; OsPRR37; DTH7; HD2; Os07g0695100; LOC_Os07g49460; P0627E10.21

String

39947.LOC_Os07g49460.1 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=39947.LOC_Os07g49460.1)

Sequence Similarities

Belongs to the ARR-like family.

GO - Molecular Function

-

UniProtKB Oryza sativa subsp. japonica

Q0D3B6 (http://www.uniprot.org/uniprot/Q0D3B6)

GenebankID or UniProtKB

AGN92469 (https://www.ncbi.nlm.nih.gov/nuccore/AGN92469)

GO - Biological Process

GO:0009908 : flower development (https://www.ebi.ac.uk/QuickGO/term/GO:0009908)
GO:0000160 : phosphorelay signal transduction system
(https://www.ebi.ac.uk/QuickGO/term/GO:0000160)
GO:0009585 : red, far-red light phototransduction
(https://www.ebi.ac.uk/QuickGO/term/GO:0009585)
GO:0048579 : negative regulation of long-day photoperiodism, flowering
(https://www.ebi.ac.uk/QuickGO/term/GO:0048579)
GO:0048511 : rhythmic process (https://www.ebi.ac.uk/QuickGO/term/GO:0048511)

GO - Cellular Component

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

Mutation #1

Presumptive Null

Yes (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)

Aberration Type

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

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

K162N + G270*

Experimental Evidence

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

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	Lys	Asn	162

Main Reference

Coincident light and clock regulation of pseudoresponse regulator protein 37 (PRR37) controls photoperiodic flowering in sorghum. (2011) (https://pubmed.ncbi.nlm.nih.gov/21930910)

Authors

Murphy RL; Klein RR; Morishige DT; Brady JA; Rooney WL; Miller FR; Dugas DV; Klein PE; Mullet JE

Abstract

Optimal flowering time is critical to the success of modern agriculture. Sorghum is a short-day tropical species that exhibits substantial photoperiod sensitivity and delayed flowering in long days. Genotypes with reduced photoperiod sensitivity enabled sorghum's utilization as a grain crop in temperate zones worldwide. In the present study, Ma(1), the major repressor of sorghum flowering in long days, was identified as the pseudoresponse regulator protein 37 (PRR37) through positional cloning and analysis of SbPRR37 alleles that modulate flowering time in grain and energy sorghum. Several allelic variants of SbPRR37 were identified in early flowering grain sorghum germplasm that contain unique loss-of-function mutations. We show that in long days SbPRR37 activates expression of the floral inhibitor CONSTANS and represses expression of the floral activators Early Heading Date 1, FLOWERING LOCUS T, Zea mays CENTRORADIALIS 8, and floral induction. Expression of SbPRR37 is light dependent and regulated by the circadian clock, with peaks of RNA abundance in the morning and evening in long days. In short days, the evening-phase expression of SbPRR37 does not occur due to darkness, allowing sorghum to flower in this photoperiod. This study provides insight into an external coincidence mechanism of photoperiodic regulation of flowering time mediated by PRR37 in the short-day grass sorghum and identifies important alleles of SbPRR37 that are critical for the utilization of this tropical grass in temperate zone grain and bioenergy production.

Additional References

Mutation #2

Presumptive Null

Yes (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)

Aberration Type

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

SNP Coding Change

Nonsense

Molecular Details of the Mutation

K162N + G270*

Experimental Evidence

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

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	Gly	STP	270

Main Reference

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Authors

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Additional References

RELATED GEPHE

Related Genes

1 (Heading Date 1 (HD1)) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^4558^/and+Trait=Flowering time/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

2 (https://www.gephebase.org/search-criteria?/or+Gene Gephebase=^PRR37 pseudoresponse regulator protein 37^/and+Taxon ID=^4558^/or+Gene Gephebase=^PRR37 pseudoresponse regulator protein 37^/and+Taxon ID=^4558^#gephebase-summary-title)

EXTERNAL LINKS

COMMENTS