GEPHE SUMMARY

Gephebase Gene
ds1 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^ds1^#gephebase-summary-title)

GepheID
GP00000238

Entry Status
Published

Main curator
Martin

PHENOTYPIC CHANGE

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

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

Trait State in Taxon A
Sorghum bicolor

Trait State in Taxon B
Sorghum bicolor - resistant

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?
No

GENOTYPIC CHANGE

Generic Gene Name
ds1

Synonyms
-

String
-

Sequence Similarities
Belongs to the protein kinase superfamily. Ser/Thr protein kinase family.

GO - Molecular Function
GO:0005524 : ATP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005524)
GO:0004674 : protein serine/threonine kinase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004674)

GO - Biological Process
-

GO - Cellular Component

UniProtKB Sorghum bicolor
K0IXC4 (http://www.uniprot.org/uniprot/K0IXC4)

GenebankID or UniProtKB
BAM45642 (https://www.ncbi.nlm.nih.gov/nuccore/BAM45642)

GO:0016021 : integral component of membrane
(https://www.ebi.ac.uk/QuickGO/term/GO:0016021)

Presumptive Null

Unknown (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^Unknown^#gephebase-summary-title)

Molecular Type

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

Aberration Type

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

Molecular Details of the Mutation

unknown

Experimental Evidence

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

Main Reference

Positional cloning of ds1, the target leaf spot resistance gene against Bipolaris sorghicola in sorghum. (2011) (https://pubmed.ncbi.nlm.nih.gov/21442410)

Authors

Kawahigashi H; Kasuga S; Ando T; Kanamori H; Wu J; Yonemaru J; Sazuka T; Matsumoto T

Abstract

Target leaf spot is one of the major sorghum diseases in southern Japan and caused by a necrotrophic fungus, Bipolaris sorghicola. Sorghum resistance to target leaf spot is controlled by a single recessive gene (ds1). A high-density genetic map of the ds1 locus was constructed with simple sequence repeat markers using progeny from crosses between a sensitive variety, bmr-6, and a resistant one, SIL-05, which allowed the ds1 gene to be genetically located within a 26-kb region on the short arm of sorghum chromosome 5. The sorghum genome annotation database for BTx623, for which the whole genome sequence was recently published, indicated a candidate gene from the Leucine-Rich Repeat Receptor Kinase family in this region. The candidate protein kinase gene was expressed in susceptible plants but was not expressed or was severely reduced in resistant plants. The expression patterns of ds1 gene and the phenotype of target leaf spot resistance were clearly correlated. Genomic sequences of this region in parental varieties showed a deletion in the promoter region of SIL-05 that could cause reduction of gene expression. We also found two ds1 alleles for resistant phenotypes with a stop codon in the coding region. The results shown here strongly suggest that the loss of function or suppression of the ds1 protein kinase gene leads to resistance to target leaf spot in sorghum.

Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS