GEPHE SUMMARY

Gephebase Gene
ABCB1 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^ABCB1^#gephebase-summary-title)

GepheID
GP00000007

Entry Status
Published

Main curator
Martin

PHENOTYPIC CHANGE

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

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

Trait State in Taxon A
Sorghum bicolor

Trait State in Taxon B
Sorghum bicolor - dw3 dwarf mutant

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?
Yes

Taxon A Description
Sorghum bicolor

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 - dw3 dwarf mutant

GENOTYPIC CHANGE

Generic Gene Name
ABCB1

Synonyms
ARABIDOPSIS THALIANA P GLYCOPROTEIN1; ATP binding cassette subfamily B1; ATP-binding cassette B1; ATPGP1; P-GLYCOPROTEIN 1; PGP1; T1J8.9; T1J8_9; MDR1; At2g36910

String
3702.AT2G36910.1 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 3702.AT2G36910.1)

Sequence Similarities
Belongs to the ABC transporter superfamily. ABCB family. Multidrug resistance exporter (TC 3.A.1.201) subfamily.

UniProtKB Arabidopsis thaliana
Q9ZR72 (http://www.uniprot.org/uniprot/Q9ZR72)

GenebankID or UniProtKB
()

GO - Molecular Function

GO:0005524 : ATP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005524)
GO:0042626 : ATPase activity, coupled to transmembrane movement of substances (https://www.ebi.ac.uk/QuickGO/term/GO:0042626)
GO:0010329 : auxin efflux transmembrane transporter activity (https://www.ebi.ac.uk/QuickGO/term/GO:0010329)
GO:0010328 : auxin influx transmembrane transporter activity (https://www.ebi.ac.uk/QuickGO/term/GO:0010328)

GO - Biological Process

GO:0043481 : anthocyanin accumulation in tissues in response to UV light (https://www.ebi.ac.uk/QuickGO/term/GO:0043481)
GO:0010315 : auxin efflux (https://www.ebi.ac.uk/QuickGO/term/GO:0010315)
GO:0009926 : auxin polar transport (https://www.ebi.ac.uk/QuickGO/term/GO:0009926)
GO:0009734 : auxin-activated signaling pathway (https://www.ebi.ac.uk/QuickGO/term/GO:0009734)
GO:0009640 : photomorphogenesis (https://www.ebi.ac.uk/QuickGO/term/GO:0009640)
GO:0009958 : positive gravitropism (https://www.ebi.ac.uk/QuickGO/term/GO:0009958)
GO:0008361 : regulation of cell size (https://www.ebi.ac.uk/QuickGO/term/GO:0008361)
GO:0009733 : response to auxin (https://www.ebi.ac.uk/QuickGO/term/GO:0009733)
GO:0009637 : response to blue light (https://www.ebi.ac.uk/QuickGO/term/GO:0009637)
GO:0009624 : response to nematode (https://www.ebi.ac.uk/QuickGO/term/GO:0009624)
GO:0009639 : response to red or far red light (https://www.ebi.ac.uk/QuickGO/term/GO:0009639)
GO:0048443 : stamen development (https://www.ebi.ac.uk/QuickGO/term/GO:0048443)

GO - Cellular Component

GO:0016021 : integral component of membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0016021)
GO:0005886 : plasma membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0005886)
GO:0009506 : plasmodesma (https://www.ebi.ac.uk/QuickGO/term/GO:0009506)

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

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

Insertion Size

100-999 bp

Molecular Details of the Mutation

882bp direct duplication in exon 5 of the dw3 allele driving loss-of-function

Experimental Evidence

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

Main Reference

Loss of an MDR transporter in compact stalks of maize br2 and sorghum dw3 mutants. (2003) (https://pubmed.ncbi.nlm.nih.gov/14526073)

Authors

Multani DS; Briggs SP; Chamberlin MA; Blakeslee JJ; Murphy AS; Johal GS

Abstract

Agriculturally advantageous reduction in plant height is usually achieved by blocking the action or production of gibberellins. Here, we describe a different dwarfing mechanism found in maize brachytic2 (br2) mutants characterized by compact lower stalk internodes. The height reduction in these plants results from the loss of a P-glycoprotein that modulates polar auxin transport in the maize stalk. The sorghum ortholog of br2 is dwarf3 (dw3), an unstable mutant of long-standing commercial interest and concern. A direct duplication within the dw3 gene is responsible for its mutant nature and also for its instability, because it facilitates unequal crossing-over at the locus.

Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS