GEPHE SUMMARY

Gephebase Gene

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

GepheID

GP00000006

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

Cenchrus americanus - tall

Trait State in Taxon B

Cenchrus americanus - dwarf

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

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

Common Name

-

Synonyms

Pennisetum americanum; Pennisetum glaucum; Pennisetum typhoides; Pennisetum typhoideum; Setaria glauca; bulrush millet; cattail millet; pearl millet; Cenchrus americanus (L.) Morrone; Pennisetum americanum (L.) Leeke; Pennisetum glaucum (L.) R.Br.; Pennisetum typhoides (Burm.f.) Stapf & C.E.Hubb.; Pennisetum typhoideum Rich.; Setaria glauca (L.) P.Beauv., non auct.; Pennistum glaucum

Rank

species

Lineage

cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; PACMAD clade; Panicoideae; Panicodae; Paniceae; Cenchrinae; Cenchrus

Parent

Cenchrus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4583)

NCBI Taxonomy ID

4543 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4543)

is Taxon A an Infraspecies?

No

Taxon B

Latin Name

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

Common Name

-

Synonyms

Pennisetum americanum; Pennisetum glaucum; Pennisetum typhoides; Pennisetum typhoideum; Setaria glauca; bulrush millet; cattail millet; pearl millet; Cenchrus americanus (L.) Morrone; Pennisetum americanum (L.) Leeke; Pennisetum glaucum (L.) R.Br.; Pennisetum typhoides (Burm.f.) Stapf & C.E.Hubb.; Pennisetum typhoideum Rich.; Setaria glauca (L.) P.Beauv., non auct.; Pennistum glaucum

Rank

species

Lineage

cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; PACMAD clade; Panicoideae; Panicodae; Paniceae; Cenchrinae; Cenchrus

Parent

Cenchrus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4583)

NCBI Taxonomy ID

4543 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4543)

is Taxon B an Infraspecies?

No

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.

GO - Molecular Function

UniProtKB Arabidopsis thaliana

Q9ZR72 (http://www.uniprot.org/uniprot/Q9ZR72)

GenebankID or UniProtKB

()

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

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

Fine-mapping and identification of a candidate gene underlying the d2 dwarfing phenotype in pearl millet, Cenchrus americanus (L.) Morrone. (2013) (https://pubmed.ncbi.nlm.nih.gov/23450459)

Authors

Parvathaneni RK; Jakkula V; Padi FK; Faure S; Nagarajappa N; Pontaroli AC; Wu X; Bennetzen JL; Devos KM

Abstract

Pearl millet is one of the most important subsistence crops grown in India and sub-Saharan Africa. In many cereal crops, reduced height is a key trait for enhancing yield, and dwarf mutants have been extensively used in breeding to reduce yield loss due to lodging under intense management. In pearl millet, the recessive d2 dwarfing gene has been deployed widely in commercial germplasm grown in India, the United States, and Australia. Despite its importance, very little research has gone into determining the identity of the d2 gene. We used comparative information, genetic mapping in two F2 populations representing a total of some 1500 progeny, and haplotype analysis of three tall and three dwarf inbred lines to delineate the d2 region by two genetic markers that, in sorghum, define a region of 410 kb with 40 annotated genes. One of the sorghum genes annotated within this region is ABCB1, which encodes a P-glycoprotein involved in auxin transport. This gene had previously been shown to underlie the economically important dw3 dwarf mutation in sorghum. The cosegregation of ABCB1 with the d2 phenotype, its differential expression in the tall inbred ICMP 451 and the dwarf inbred Tift 23DB, and the similar phenotype of stacked lower internodes in the sorghum dw3 and pearl millet d2 mutants suggest that ABCB1 is a likely candidate for d2.

Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS