

GEPHE SUMMARY

Gephebase Gene		GepheID
MATE1/AltSB/SbMATE (https://www.gephebase.org/search-criteria?/and+Gene Gephebase="MATE1/AltSB/SbMATE"#gephebase-summary-title)	GP00000565	Main curator
Published	Entry Status	Martin

PHENOTYPIC CHANGE

Trait Category		
Physiology (https://www.gephebase.org/search-criteria?/and+Trait Category="Physiology"#gephebase-summary-title)		
Trait		
Metal tolerance (https://www.gephebase.org/search-criteria?/and+Trait="Metal tolerance"#gephebase-summary-title)		
Trait State in Taxon A		
Sorghum bicolor- aluminum-tolerant SC283		
Trait State in Taxon B		
Sorghum bicolor - aluminum-sensitive BR007		
Ancestral State		
Data not curated		
Taxonomic Status		
Domesticated (https://www.gephebase.org/search-criteria?/and+Taxonomic Status="Domesticated"#gephebase-summary-title)		
Taxon A		Taxon B
	Latin Name	Latin Name
Sorghum bicolor (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="Sorghum bicolor"#gephebase-summary-title)	Sorghum bicolor (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="Sorghum bicolor"#gephebase-summary-title)	Sorghum bicolor (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="Sorghum bicolor"#gephebase-summary-title)
	Common Name	Common Name
sorghum	sorghum	sorghum
	Synonyms	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	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	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	Rank
species	species	species
	Lineage	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	cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliopsida; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; PACMAD clade; Panicoideae; Andropogonodae; Andropogoneae; Sorghinae; Sorghum	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	Parent
Sorghum () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4557)	Sorghum () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4557)	Sorghum () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4557)
	NCBI Taxonomy ID	NCBI Taxonomy ID
4558 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4558)	4558 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4558)	4558 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4558)
	is Taxon A an Intraspecies?	is Taxon B an Intraspecies?
Yes	Yes	Yes
	Taxon A Description	Taxon B Description
Sorghum bicolor- aluminum-tolerant SC283	Sorghum bicolor - aluminum-sensitive BR007	

GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB
-	0	
	Synonyms	GenebankID or UniProtKB
-	ABS89149 (https://www.ncbi.nlm.nih.gov/nuccore/ABS89149)	
	String	
-		
	Sequence Similarities	
-		
	GO - Molecular Function	
-		
	GO - Biological Process	
-		
	GO - Cellular Component	

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

Presumptive Null

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

Molecular Type

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

Aberration Type

unknown

Molecular Details of the Mutation

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

Experimental Evidence

A gene in the multidrug and toxic compound extrusion (MATE) family confers aluminum tolerance in sorghum. (2007) (<https://pubmed.ncbi.nlm.nih.gov/17721535>)

Main Reference

Magalhaes JV; Liu J; Guimarães CT; Lana UG; Alves VM; Wang YH; Schaffert RE; Hoekenga OA; Piñeros MA; Shaff JE; Klein PE; Carneiro NP; Coelho CM; Trick HN; Kochian LV

Authors

Abstract

Crop yields are significantly reduced by aluminum toxicity on highly acidic soils, which comprise up to 50% of the world's arable land. Candidate aluminum tolerance proteins include organic acid efflux transporters, with the organic acids forming non-toxic complexes with rhizosphere aluminum. In this study, we used positional cloning to identify the gene encoding a member of the multidrug and toxic compound extrusion (MATE) family, an aluminum-activated citrate transporter, as responsible for the major sorghum (*Sorghum bicolor*) aluminum tolerance locus, Alt(SB). Polymorphisms in regulatory regions of Alt(SB) are likely to contribute to large allelic effects, acting to increase Alt(SB) expression in the root apex of tolerant genotypes. Furthermore, aluminum-inducible Alt(SB) expression is associated with induction of aluminum tolerance via enhanced root citrate exudation. These findings will allow us to identify superior Alt(SB) haplotypes that can be incorporated via molecular breeding and biotechnology into acid soil breeding programs, thus helping to increase crop yields in developing countries where acidic soils predominate.

Additional References

RELATED GEPHE

No matches found.

Related Genes

No matches found.

Related Haplotypes

EXTERNAL LINKS

COMMENTS