GEPHE SUMMARY

Gephebase Gene
teosinte branched 1 (tb1) (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^teosinte branched 1 (tb1)^#gephebase-summary-title)

GepheID
GP00001116

Entry Status
Published

Main curator
Martin

PHENOTYPIC CHANGE

Trait #1

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

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

Trait State in Taxon A
Zea mays ssp. parviglumis and mexicana (teosinthe)

Trait State in Taxon B
Zea mays ssp. mays

Trait #2

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

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

Trait State in Taxon A
-

Trait State in Taxon B
-

Ancestral State
Taxon A

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

Taxon A

Latin Name
Zea mays (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Zea mays^#gephebase-summary-title)

Common Name
-

Synonyms
Zea mays var. japonica; maize; Zea mays L.; Zea mays mays

Rank
species

Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; PACMAD clade; Panicoideae; Andropogonodae; Andropogoneae; Tripsacinae; Zea

Parent
Zea () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4575)

NCBI Taxonomy ID
4577 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4577)

is Taxon A an Infraspecies?
Yes

Taxon A Description
Zea mays ssp. parviglumis and mexicana (teosinthe)

Taxon B

Latin Name
Zea mays (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Zea mays^#gephebase-summary-title)

Common Name
-

Synonyms
Zea mays var. japonica; maize; Zea mays L.; Zea mays mays

Rank
species

Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; PACMAD clade; Panicoideae; Andropogonodae; Andropogoneae; Tripsacinae; Zea

Parent
Zea () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4575)

NCBI Taxonomy ID
4577 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4577)

is Taxon B an Infraspecies?
Yes

Taxon B Description
Zea mays ssp. mays

GENOTYPIC CHANGE

Generic Gene Name

TB1

Synonyms

tb1; Z178A11.18

String

4577.AC233950.1_FGP002 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=4577.AC233950.1_FGP002)

Sequence Similarities

-

GO - Molecular Function

GO:0003700 : DNA-binding transcription factor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0003700)
GO:0043565 : sequence-specific DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0043565)

GO - Biological Process

GO:0007275 : multicellular organism development (https://www.ebi.ac.uk/QuickGO/term/GO:0007275)
GO:2000032 : regulation of secondary shoot formation (https://www.ebi.ac.uk/QuickGO/term/GO:2000032)
GO:0048831 : regulation of shoot system development (https://www.ebi.ac.uk/QuickGO/term/GO:0048831)

GO - Cellular Component

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

UniProtKB Zea mays

Q93WI2 (http://www.uniprot.org/uniprot/Q93WI2)

GenebankID or UniProtKB

U94494 (https://www.ncbi.nlm.nih.gov/nuccore/U94494)

Presumptive Null

No (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^No^#gephebase-summary-title)

Molecular Type

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

Aberration Type

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

Insertion Size

1-10 kb

Molecular Details of the Mutation

Hopscotch TE insertion

Experimental Evidence

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

Main Reference

A distant upstream enhancer at the maize domestication gene tb1 has pleiotropic effects on plant and inflorescent architecture. (2006) (https://pubmed.ncbi.nlm.nih.gov/16642024)

Authors

Clark RM; Wagler TN; Quijada P; Doebley J

Abstract

Although quantitative trait locus (QTL) mapping has been successful in describing the genetic architecture of complex traits, the molecular basis of quantitative variation is less well understood, especially in plants such as maize that have large genome sizes. Regulatory changes at the teosinte branched1 (tb1) gene have been proposed to underlie QTLs of large effect for morphological differences that distinguish maize (Zea mays ssp. mays) from its wild ancestors, the teosintes (Z. mays ssp. parviglumis and mexicana). We used a fine mapping approach to show that intergenic sequences approximately 58-69 kb 5′ to the tb1 cDNA confer pleiotropic effects on Z. mays morphology. Moreover, using an allele-specific expression assay, we found that sequences >41 kb upstream of tb1 act in cis to alter tb1 transcription. Our findings show that the large stretches of noncoding DNA that comprise the majority of many plant genomes can be a source of variation affecting gene expression and quantitative phenotypes.

Additional References

Identification of a functional transposon insertion in the maize domestication gene tb1. (2011) (https://pubmed.ncbi.nlm.nih.gov/21946354)
Evidence for a natural allelic series at the maize domestication locus teosinte branched1. (2012) (https://pubmed.ncbi.nlm.nih.gov/22505628)

RELATED GEPHE

Related Genes

2 (Barren inflorescence2 (BIF2), grassy tillers1) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^4577^/and+Trait=Plant architecture/or+Taxon ID=^4577^/and+Trait=Inflorescence architecture/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

@Pleiotropy