## GEPHE SUMMARY

Gephebase Gene
grassy tillers1 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^grassy tillers1^#gephebase-summary-title)

GepheID
GP00000414

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

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

Trait State in Taxon B
Zea mays ssp. mays

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
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. 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
gt1

Synonyms
-

String
-

Sequence Similarities
-

GO - Molecular Function
GO:0043565 : sequence-specific DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0043565)

GO - Biological Process
GO:0006355 : regulation of transcription, DNA-templated (https://www.ebi.ac.uk/QuickGO/term/GO:0006355)
GO:0048450 : floral organ structural organization (https://www.ebi.ac.uk/QuickGO/term/GO:0048450)

UniProtKB Zea mays subsp. mays
G1AQA5 (http://www.uniprot.org/uniprot/G1AQA5)

GenebankID or UniProtKB
AEK51778 (https://www.ncbi.nlm.nih.gov/nuccore/AEK51778)

GO:2000032 : regulation of secondary shoot formation (https://www.ebi.ac.uk/QuickGO/term/GO:2000032)

GO - Cellular Component

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

Presumptive Null

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

Molecular Type

Cis-regulatory (https://www.gephebase.org/search-criteria?/and+Molecular Type=^Cis-regulatory^#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 but narrow 2.7kb interval

Experimental Evidence

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

Main Reference

From many, one: genetic control of prolificacy during maize domestication. (2013) (https://pubmed.ncbi.nlm.nih.gov/23825971)

Authors

Wills DM; Whipple CJ; Takuno S; Kursel LE; Shannon LM; Ross-Ibarra J; Doebley JF

Abstract

A reduction in number and an increase in size of inflorescences is a common aspect of plant domestication. When maize was domesticated from teosinte, the number and arrangement of ears changed dramatically. Teosinte has long lateral branches that bear multiple small ears at their nodes and tassels at their tips. Maize has much shorter lateral branches that are tipped by a single large ear with no additional ears at the branch nodes. To investigate the genetic basis of this difference in prolificacy (the number of ears on a plant), we performed a genome-wide QTL scan. A large effect QTL for prolificacy (prol1.1) was detected on the short arm of chromosome 1 in a location that has previously been shown to influence multiple domestication traits. We fine-mapped prol1.1 to a 2.7 kb "causative region" upstream of the grassy tillers1 (gt1) gene, which encodes a homeodomain leucine zipper transcription factor. Tissue in situ hybridizations reveal that the maize allele of prol1.1 is associated with up-regulation of gt1 expression in the nodal plexus. Given that maize does not initiate secondary ear buds, the expression of gt1 in the nodal plexus in maize may suppress their initiation. Population genetic analyses indicate positive selection on the maize allele of prol1.1, causing a partial sweep that fixed the maize allele throughout most of domesticated maize. This work shows how a subtle cis-regulatory change in tissue specific gene expression altered plant architecture in a way that improved the harvestability of maize.

Additional References

## RELATED GEPHE

Related Genes

2 (Barren inflorescence2 (BIF2), teosinte branched 1 (tb1)) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^4577^/and+Trait=Plant architecture/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

## EXTERNAL LINKS

## COMMENTS