GEPHE SUMMARY

Gephebase Gene
r1 colored1 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^r1 colored1^#gephebase-summary-title)

GepheID
GP00000947

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

Trait State in Taxon A
Zea mays ssp. Mays - white seeds

Trait State in Taxon B
Zea mays ssp. Mays - blue seeds - R-Navajo (R-nj) allele

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. Mays - white seeds

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 - blue seeds - R-Navajo (R-nj) allele

GENOTYPIC CHANGE

Generic Gene Name
Z138B04_Z333J11.11

Synonyms
Z138B04_Z333J11.11

String
-

Sequence Similarities
-

GO - Molecular Function
GO:0046983 : protein dimerization activity (https://www.ebi.ac.uk/QuickGO/term/GO:0046983)

GO - Biological Process
-

GO - Cellular Component
-

UniProtKB Zea mays
Q8S483 (http://www.uniprot.org/uniprot/Q8S483)

GenebankID or UniProtKB
AF466202 (https://www.ncbi.nlm.nih.gov/nuccore/AF466202)

Presumptive Null

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

Molecular Type

Unknown (https://www.gephebase.org/search-criteria?/and+Molecular Type=^Unknown^#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

insertion of transposable element Ac

Experimental Evidence

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

Main Reference

Evolution of anthocyanin biosynthesis in maize kernels: the role of regulatory and enzymatic loci. (1996) (https://pubmed.ncbi.nlm.nih.gov/8807310)

Authors

Hanson MA; Gaut BS; Stec AO; Fuerstenberg SI; Goodman MM; Coe EH; Doebley JF

Abstract

Understanding which genes contribute to evolutionary change and the nature of the alterations in them are fundamental challenges in evolution. We analyzed regulatory and enzymatic genes in the maize anthocyanin pathway as related to the evolution of anthocyanin-pigmented kernels in maize from colorless kernels of its progenitor, teosinte. Genetic tests indicate that teosinte possesses functional alleles at all enzymatic loci. At two regulatory loci, most teosintes possess alleles that encode functional proteins, but ones that are not expressed during kernel development and not capable of activating anthocyanin biosynthesis there. We investigated nucleotide polymorphism at one of the regulatory loci, cl. Several observations suggest that cl has not evolved in a strictly neutral manner, including an exceptionally low level of polymorphism and a biased representation of haplotypes in maize. Curiously, sequence data show that most of our teosinte samples possess a promoter element necessary for the activation of the anthocyanin pathway during kernel development, although genetic tests indicate that teosinte cl alleles are not active during kernel development. Our analyses suggest that the evolution of the purple kernels resulted from changes in cis regulatory elements at regulatory loci and not changes in either regulatory protein function nor the enzymatic loci.

Additional References

Regulatory switch enforced by basic helix-loop-helix and ACT-domain mediated dimerizations of the maize transcription factor R. (2012) (https://pubmed.ncbi.nlm.nih.gov/22778424)

RELATED GEPHE

Related Genes

3 (c1, colored plant 1, pericarp color1 (P1)) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^4577^/and+Trait=Coloration/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

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