

GEPHE SUMMARY

	Gephebase Gene		GepheID
phytoene synthase (https://www.gephebase.org/search-criteria?/and+Gene Gephebase= [^] phytoene synthase [^] #gephebase-summary-title)		GP00000875	
	Entry Status	Martin	Main curator
Published			

PHENOTYPIC CHANGE

	Trait Category	
Physiology (https://www.gephebase.org/search-criteria?/and+Trait Category= [^] Physiology [^] #gephebase-summary-title)		
	Trait	
Carotenoid content (seed) (<a href="https://www.gephebase.org/search-criteria?/and+Trait=<sup>^</sup>Carotenoid content (seed)<sup>^</sup>#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait=[^]Carotenoid content (seed)[^]#gephebase-summary-title)		
	Trait State in Taxon A	
Zea mays - white		
	Trait State in Taxon B	
Zea mays - yellow orange		
	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	Taxon B	Latin Name
Zea mays (<a href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=<sup>^</sup>Zea mays<sup>^</sup>#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=[^]Zea mays[^]#gephebase-summary-title)	Zea mays (<a href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=<sup>^</sup>Zea mays<sup>^</sup>#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=[^]Zea mays[^]#gephebase-summary-title)	Zea mays (<a href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=<sup>^</sup>Zea mays<sup>^</sup>#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=[^]Zea mays[^]#gephebase-summary-title)	Zea mays (<a href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=<sup>^</sup>Zea mays<sup>^</sup>#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=[^]Zea mays[^]#gephebase-summary-title)
-	Common Name	-	Common Name
	Synonyms		Synonyms
Zea mays var. japonica; maize; Zea mays L.; Zea mays mays		Zea mays var. japonica; maize; Zea mays L.; Zea mays mays	
	Rank		Rank
species		species	
	Lineage		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		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		Parent
Zea () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4575)		Zea () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4575)	
	NCBI Taxonomy ID		NCBI Taxonomy ID
4577 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4577)		4577 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4577)	
	is Taxon A an Intraspecies?		is Taxon B an Intraspecies?
No		No	

GENOTYPIC CHANGE

	Generic Gene Name		UniProtKB Zea mays
PSY1		P49085 (http://www.uniprot.org/uniprot/P49085)	
	Synonyms		GenebankID or UniProtKB
pb1; PSY1; ZmPSY1; GRMZM2G300348; Y1; ZEAMMB73_Zm00001d036345		U32636 (https://www.ncbi.nlm.nih.gov/nuccore/U32636)	
	String		
4577.GRMZM2G300348_P02 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=4577.GRMZM2G300348_P02)			
	Sequence Similarities		
Belongs to the phytoene/squalene synthase family.			
	GO - Molecular Function		
GO:0004310 : farnesyl-diphosphate farnesyltransferase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004310)			
GO:0016767 : geranylgeranyl-diphosphate geranylgeranyltransferase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0016767)			
GO:0046905 : phytoene synthase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0046905)			
GO:0051996 : squalene synthase activity			

(<https://www.ebi.ac.uk/QuickGO/term/GO:0051996>)

GO - Biological Process

GO:0006696 : ergosterol biosynthetic process

(<https://www.ebi.ac.uk/QuickGO/term/GO:0006696>)

GO:0016117 : carotenoid biosynthetic process

(<https://www.ebi.ac.uk/QuickGO/term/GO:0016117>)

GO - Cellular Component

GO:0010287 : plastoglobule (<https://www.ebi.ac.uk/QuickGO/term/GO:0010287>)

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

Not identified

Experimental Evidence

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

Main Reference

Contrasting effects of selection on sequence diversity and linkage disequilibrium at two phytoene synthase loci. (2003) (<https://pubmed.ncbi.nlm.nih.gov/12897253>)

Authors

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Abstract

We investigated the effects of human selection for yellow endosperm color, representing increased carotenoid content, on two maize genes, the Y1 phytoene synthase and PSY2, a putative second phytoene synthase. Multiple polymorphic sites were identified at Y1 and PSY2 in 75 white and yellow maize inbred lines. Many polymorphic sites showed strong association with the endosperm color phenotype at Y1, but no detectable association was found at PSY2. Nucleotide diversity was equivalent for whites and yellows at PSY2 but was 19-fold less in yellows than in whites at Y1, consistent with the white ancestral state of the gene. The strong sequence haplotype conservation within yellows at Y1 and a significant, negative Tajima's D both verified positive selection for yellow endosperm. We propose that two independent gain-of-function events associated with insertions into the promoter of the Y1 gene and upregulation of expression in endosperm have been incorporated into yellow maize.

Additional References

The y1 gene of maize codes for phytoene synthase. (1996) (<https://pubmed.ncbi.nlm.nih.gov/8722797>)

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS