

GEPHE SUMMARY

Gephebase Gene		GepheID
diacylglycerol acyltransferase 1-2 (DGAT1-2) (<a +diacylglycerol+acyltransferase+1-2+(dgat1-2)+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase="+diacylglycerol+acyltransferase+1-2+(DGAT1-2)+"#gephebase-summary-title)		GP00000223
Entry Status		Main curator
Published		Martin

PHENOTYPIC CHANGE

Trait #1	Trait Category
Physiology (<a +physiology+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait+Category=">https://www.gephebase.org/search-criteria?/and+Trait+Category="+Physiology+"#gephebase-summary-title)	
Oil composition (<a +oil+composition+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait="+Oil+composition+"#gephebase-summary-title)	
Zea mays ssp. parviglumis and mexicana (teosinthe)	
Zea mays ssp. Mays	

Trait #2	Trait Category
Physiology (<a +physiology+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait+Category=">https://www.gephebase.org/search-criteria?/and+Trait+Category="+Physiology+"#gephebase-summary-title)	
Oil yield (<a +oil+yield+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait="+Oil+yield+"#gephebase-summary-title)	
-	
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Ancestral State	
Taxon A	
Taxonomic Status	
Domesticated (<a +domesticated+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=">https://www.gephebase.org/search-criteria?/and+Taxonomic+Status="+Domesticated+"#gephebase-summary-title)	
Taxon A	Taxon B
Latin Name	Latin Name
Zea mays (<a +zea+mays+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Zea+mays+"#gephebase-summary-title)	Zea mays (<a +zea+mays+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">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?
Yes	Yes
Taxon A Description	Taxon B Description
Zea mays ssp. parviglumis and mexicana (teosinthe)	Zea mays ssp. Mays

GENOTYPIC CHANGE

DGAT1-2 GRMZM2G169089 -	Generic Gene Name	BOLF77 (http://www.uniprot.org/uniprot/BOLF77)	UniProtKB Zea mays
	Synonyms		GenebankID or UniProtKB
	String	EU039830 (https://www.ncbi.nlm.nih.gov/nuccore/EU039830)	
	Sequence Similarities		
Belongs to the membrane-bound acyltransferase family. Sterol o-acyltransferase subfamily.			
GO - Molecular Function			
GO:0004144 : diacylglycerol O-acyltransferase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004144)			
GO - Biological Process			
GO:0019432 : triglyceride biosynthetic process (https://www.ebi.ac.uk/QuickGO/term/GO:0019432)			
GO - Cellular Component			
GO:0016021 : integral component of membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0016021) GO:0005789 : endoplasmic reticulum membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0005789)			
No (https://www.gephebase.org/search-criteria?/and+Presumptive Null=~No~#gephebase-summary-title)			Presumptive Null
Coding (https://www.gephebase.org/search-criteria?/and+Molecular Type=~Coding~#gephebase-summary-title)			Molecular Type
Deletion (https://www.gephebase.org/search-criteria?/and+Aberration Type=~Deletion~#gephebase-summary-title)			Aberration Type
1-9 bp			Deletion Size
Deletion of amino acid F469			Molecular Details of the Mutation
Linkage Mapping (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=~Linkage Mapping~#gephebase-summary-title)			Experimental Evidence
A phenylalanine in DGAT is a key determinant of oil content and composition in maize. (2008) (https://pubmed.ncbi.nlm.nih.gov/18278045)			Main Reference
Zheng P; Allen WB; Roesler K; Williams ME; Zhang S; Li J; Glassman K; Ranch J; Nubel D; Solawetz W; Bhattramakki D; Llaca V; Deschamps S; Zhong GY; Tarczynski MC; Shen B			Authors
Plant oil is an important renewable resource for biodiesel production and for dietary consumption by humans and livestock. Through genetic mapping of the oil trait in plants, studies have reported multiple quantitative trait loci (QTLs) with small effects, but the molecular basis of oil QTLs remains largely unknown. Here we show that a high-oil QTL (qHO6) affecting maize seed oil and oleic-acid contents encodes an acyl-CoA:diacylglycerol acyltransferase (DGAT1-2), which catalyzes the final step of oil synthesis. We further show that a phenylalanine insertion in DGAT1-2 at position 469 (F469) is responsible for the increased oil and oleic-acid contents. The DGAT1-2 allele with F469 is ancestral, whereas the allele without F469 is a more recent mutant selected by domestication or breeding. Ectopic expression of the high-oil DGAT1-2 allele increases oil and oleic-acid contents by up to 41% and 107%, respectively. This work provides insights into the molecular basis of natural variation of oil and oleic-acid contents in plants and highlights DGAT as a promising target for increasing oil and oleic-acid contents in other crops.			Abstract
			Additional References

RELATED GEPHE

No matches found.	Related Genes
No matches found.	Related Haplotypes

EXTERNAL LINKS

COMMENTS