

GEPHE SUMMARY

DTH2 (#gephebase-summary-title)	Gephebase Gene	GP00000239	GepheID
Published	Entry Status	Martin	Main curator

PHENOTYPIC CHANGE

	Trait Category	Trait	
Physiology (#gephebase-summary-title)			
Flowering time (#gephebase-summary-title)	Trait State in Taxon A		
Oryza sativa - IR24 (indica)	Trait State in Taxon B		
Oryza sativa - Asominori (Aso; japonica) ; adapted to Northern China latitude	Ancestral State		
Taxon A	Taxonomic Status		
Domesticated (#gephebase-summary-title)			
Taxon A	Latin Name	Taxon B	Latin Name
Oryza sativa (#gephebase-summary-title))	Oryza sativa (#gephebase-summary-title))	Oryza sativa (#gephebase-summary-title))	Oryza sativa (#gephebase-summary-title))
rice	Common Name	rice	Common Name
rice; red rice; Oryza sativa L.	Synonyms	rice; red rice; Oryza sativa L.	Synonyms
species	Rank	species	Rank
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Oryzoideae; Oryzeae; Oryzinae; Oryza	Lineage	cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Oryzoideae; Oryzeae; Oryzinae; Oryza	Lineage
Oryza () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4527)	Parent	Oryza () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4527)	Parent
4530 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4530)	NCBI Taxonomy ID	4530 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4530)	NCBI Taxonomy ID
Yes	is Taxon A an Infraspecies?	Yes	is Taxon B an Infraspecies?
Oryza sativa - IR24 (indica)	Taxon A Description	Oryza sativa - Asominori (Aso; japonica) ; adapted to Northern China latitude	Taxon B Description

GENOTYPIC CHANGE

DTH2	Generic Gene Name	UniProtKB Oryza sativa subsp. japonica
DTH2; Os02g0724000; OSNPB_020724000; P0685G12.25	Synonyms	GenebankID or UniProtKB
39947.LOC_Os02g49230.2 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=39947.LOC_Os02g49230.2)	String	0
-	Sequence Similarities	
GO:0008270 : zinc ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0008270)	GO - Molecular Function	
-	GO - Biological Process	
GO:0005634 : nucleus (https://www.ebi.ac.uk/QuickGO/term/GO:0005634)	GO - Cellular Component	

Mutation #1

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
SNP (https://www.gephebase.org/search-criteria/?and+Aberration+Type=%SNP%#gephebase-summary-title)	Aberration Type
Nonsynonymous	SNP Coding Change
Arg9Gly (A/G)	Molecular Details of the Mutation
Linkage Mapping (https://www.gephebase.org/search-criteria/?and+Experimental+Evidence=%Linkage+Mapping%#gephebase-summary-title)	Experimental Evidence

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	Arg	Gly	9

Main Reference
 Association of functional nucleotide polymorphisms at DTH2 with the northward expansion of rice cultivation in Asia. (2013) (<https://pubmed.ncbi.nlm.nih.gov/23388640>)

Authors
 Wu W; Zheng XM; Lu G; Zhong Z; Gao H; Chen L; Wu C; Wang HJ; Wang Q; Zhou K; Wang JL; Wu F; Zhang X; Guo X; Cheng Z; Lei C; Lin Q; Jiang L; Wang H; Ge S; Wan J

Abstract
 Flowering time (i.e., heading date in crops) is an important ecological trait that determines growing seasons and regional adaptability of plants to specific natural environments. Rice (*Oryza sativa* L.) is a short-day plant that originated in the tropics. Increasing evidence suggests that the northward expansion of cultivated rice was accompanied by human selection of the heading date under noninductive long-day (LD) conditions. We report here the molecular cloning and characterization of DTH2 (for Days to heading on chromosome 2), a minor-effect quantitative trait locus that promotes heading under LD conditions. We show that DTH2 encodes a CONSTANS-like protein that promotes heading by inducing the florigen genes Heading date 3a and RICE FLOWERING LOCUS T 1, and it acts independently of the known floral integrators Heading date 1 and Early heading date 1. Moreover, association analysis and transgenic experiments identified two functional nucleotide polymorphisms in DTH2 that correlated with early heading and increased reproductive fitness under natural LD conditions in northern Asia. Our combined population genetics and network analyses suggest that DTH2 likely represents a target of human selection for adaptation to LD conditions during rice domestication and/or improvement, demonstrating an important role of minor-effect quantitative trait loci in crop adaptation and breeding.

Additional References

Mutation #2

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
SNP (https://www.gephebase.org/search-criteria/?and+Aberration+Type=%SNP%#gephebase-summary-title)	Aberration Type
Nonsynonymous	Molecular Details of the Mutation
Tyr319Asp (T/G)	Experimental Evidence
Linkage Mapping (https://www.gephebase.org/search-criteria/?and+Experimental+Evidence=%Linkage+Mapping%#gephebase-summary-title)	

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	Tyr	Asp	319

Main Reference
 Association of functional nucleotide polymorphisms at DTH2 with the northward expansion of rice cultivation in Asia. (2013) (<https://pubmed.ncbi.nlm.nih.gov/23388640>)

Authors
 Wu W; Zheng XM; Lu G; Zhong Z; Gao H; Chen L; Wu C; Wang HJ; Wang Q; Zhou K; Wang JL; Wu F; Zhang X; Guo X; Cheng Z; Lei C; Lin Q; Jiang L; Wang H; Ge S; Wan J

Abstract
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Additional References

RELATED GEPHE

Related Genes

9 (EARLY FLOWERING 3/Hd17, Hd1, Hd6a, PRR37 pseudoresponse regulator protein 37, se5, Early flowering1 (EL1), HEADING DATE 1, Ehd1 (Response regulator), Ghd7)
(<https://www.gephebase.org/search-criteria?/or+Taxon ID=%4530%/and+Trait=Flowering time/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

@SeveralMutationsWithEffect