

GEPHE SUMMARY

Gephebase Gene		GepheID
Sd1 (=GA20ox-2) (<a +sd1+"(='GA20ox-2)"#gephebase-summary-title"' href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase="+Sd1+"(=GA20ox-2)"#gephebase-summary-title)	GP00001027	
Entry Status		Main curator
Published		Courtier

PHENOTYPIC CHANGE

Trait Category			
Morphology (<a +morphology"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait+Category=">https://www.gephebase.org/search-criteria?/and+Trait+Category="+Morphology"#gephebase-summary-title)		Trait	
Plant size (height) (<a +plant+size+(height)"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait="+Plant+size+(height)"#gephebase-summary-title)		Trait State in Taxon A	
Oryza indica - Kasalath		Trait State in Taxon B	
Oryza sativa japonica - Nipponbare		Ancestral State	
Data not curated		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	
Oryza sativa (<a +oryza+sativa"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Oryza+sativa"#gephebase-summary-title)		Oryza sativa (<a +oryza+sativa"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Oryza+sativa"#gephebase-summary-title)	
Common Name		Common Name	
rice		rice	
Synonyms		Synonyms	
rice; red rice; Oryza sativa L.		rice; red rice; Oryza sativa L.	
Rank		Rank	
species		species	
Lineage		Lineage	
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Oryzoideae; Oryzeae; Oryzinae; Oryza		cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Oryzoideae; Oryzeae; Oryzinae; Oryza	
Parent		Parent	
Oryza () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4527)		Oryza () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4527)	
NCBI Taxonomy ID		NCBI Taxonomy ID	
4530 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4530)		4530 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4530)	
is Taxon A an Intraspecies?		is Taxon B an Intraspecies?	
Yes		Yes	
Taxon A Description		Taxon B Description	
Oryza indica - Kasalath		Oryza sativa japonica - Nipponbare	

GENOTYPIC CHANGE

Generic Gene Name		UniProtKB Oryza sativa subsp. japonica	
GA20OX2		Q0JH50 (http://www.uniprot.org/uniprot/Q0JH50)	
Synonyms		GenebankID or UniProtKB	
sd1; GA20; Sd-1; 20ox2; C20ox2; SD1-2E; Os20ox2; osGA20ox2; SD1; Os01g0883800; LOC_Os01g66100; B1065E10.46		AER45908 (https://www.ncbi.nlm.nih.gov/nuccore/AER45908)	
String			
39947.LOC_Os01g66100.1 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=39947.LOC_Os01g66100.1)			
Sequence Similarities			
Belongs to the iron/ascorbate-dependent oxidoreductase family. GA20OX subfamily.			
GO - Molecular Function			
GO:0046872 : metal ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0046872)			
GO:0051213 : dioxygenase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0051213)			
GO - Biological Process			
-			

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

G100E

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	Gly	Glu	100

Main Reference

Artificial selection for a green revolution gene during japonica rice domestication. (2011) (<https://pubmed.ncbi.nlm.nih.gov/21646530>)

Authors

Asano K; Yamasaki M; Takuno S; Miura K; Katagiri S; Ito T; Doi K; Wu J; Ebana K; Matsumoto T; Innan H; Kitano H; Ashikari M; Matsuoka M

Abstract

The semidwarf phenotype has been extensively selected during modern crop breeding as an agronomically important trait. Introduction of the semidwarf gene, semi-dwarf1 (*sd1*), which encodes a gibberellin biosynthesis enzyme, made significant contributions to the “green revolution” in rice (*Oryza sativa* L.). Here we report that SD1 was involved not only in modern breeding including the green revolution, but also in early steps of rice domestication. We identified two SNPs in *O. sativa* subspecies (*ssp.*) japonica SD1 as functional nucleotide polymorphisms (FNPs) responsible for shorter culm length and low gibberellin biosynthetic activity. Genetic diversity analysis among *O. sativa ssp. japonica* and indica, along with their wild ancestor *O. rufipogon* Griff, revealed that these FNPs clearly differentiate the japonica landrace and *O. rufipogon*. We also found a dramatic reduction in nucleotide diversity around SD1 only in the japonica landrace, not in the indica landrace or *O. rufipogon*. These findings indicate that SD1 has been subjected to artificial selection in rice evolution and that the FNPs participated in japonica domestication, suggesting that ancient humans already used the green revolution gene.

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

SNP Coding Change

R340Q

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	Gln	340

Main Reference

Artificial selection for a green revolution gene during japonica rice domestication. (2011) (<https://pubmed.ncbi.nlm.nih.gov/21646530>)

Authors

Asano K; Yamasaki M; Takuno S; Miura K; Katagiri S; Ito T; Doi K; Wu J; Ebana K; Matsumoto T; Innan H; Kitano H; Ashikari M; Matsuoka M

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Additional References

RELATED GEPHE

No matches found.

Related Genes

Related Haplotypes

4 ([https://www.gephebase.org/search-criteria/?or+Gene Gephebase="Sd1 \(=GA20ox-2\)^/and+Taxon ID="4530^/or+Gene Gephebase="Sd1 \(=GA20ox-2\)^/and+Taxon ID="4530^#gephebase-summary-title](https://www.gephebase.org/search-criteria/?or+Gene+Gephebase=))

EXTERNAL LINKS

COMMENTS