

GEPHE SUMMARY

Sd1 (=GA20ox-2) (https://www.gephebase.org/search-criteria?/and+Gene Gephebase='Sd1 (=GA20ox-2)^#gephebase-summary-title)	Generic Gene Name	GP00001027	GephelID
	Entry Status	Courtier	Main curator
Published			

PHENOTYPIC CHANGE

	Trait Category		
Morphology (https://www.gephebase.org/search-criteria?/and+Trait Category='Morphology^#gephebase-summary-title)		Trait	
Plant size (height) (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 (https://www.gephebase.org/search-criteria?/and+Taxonomic Status='Domesticated^#gephebase-summary-title)			
Taxon A	Latin Name	Taxon B	Latin Name
Oryza sativa (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms='Oryza sativa^#gephebase-summary-title)		Oryza sativa (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms='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
	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)	
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 indica - Kasalath	Taxon A Description	Oryza sativa japonica - Nipponbare	Taxon B Description

GENOTYPIC CHANGE

GA20OX2	Generic Gene Name	UniProtKB Oryza sativa subsp. japonica
	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)
39947.LOC_Os01g66100.1 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=39947.LOC_Os01g66100.1)	String	
Belongs to the iron/ascorbate-dependent oxidoreductase family. GA20OX subfamily.	Sequence Similarities	
GO:0046872 : metal ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0046872)	GO - Molecular Function	
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
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Additional References

RELATED GEPHE

Related Genes

No matches found.

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=^Sd1 (=GA20ox-2)^/and+Taxon ID=^4530^/or+Gene Gephebase=^Sd1 (=GA20ox-2)^/and+Taxon ID=^4530^#gephebase-summary-title))

EXTERNAL LINKS

COMMENTS