GEPHE SUMMARY

Gephebase Gene
OsSPL13 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^OsSPL13^#gephebase-summary-title)

GepheID
GP00001572

Entry Status
Published

Main curator
Prigent

PHENOTYPIC CHANGE

Trait Category
Morphology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Morphology^#gephebase-summary-title)

Trait
Grain size (https://www.gephebase.org/search-criteria?/and+Trait=^Grain size^#gephebase-summary-title)

Trait State in Taxon A
Rice japonica variety with large grain

Trait State in Taxon B
Rice japonica variety with small grain

Ancestral State
Taxon A

Taxonomic Status
Domesticated (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Domesticated^#gephebase-summary-title)

Taxon A

Latin Name
Oryza sativa (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Oryza sativa^#gephebase-summary-title)

Common Name
rice

Synonyms
rice; red rice; Oryza sativa L.

Rank
species

Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Oryzoideae; Oryzeae; Oryzinae; Oryza

Parent
Oryza () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4527)

NCBI Taxonomy ID
4530 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4530)

is Taxon A an Infraspecies?
Yes

Taxon A Description
Rice japonica variety with large grain

Taxon B

Latin Name
Oryza sativa Japonica Group (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Oryza sativa Japonica Group^#gephebase-summary-title)

Common Name
Japanese rice

Synonyms
Oryza sativa (japonica cultivar-group); Oryza sativa subsp. japonica; Japanese rice; Japonica rice; Oryza sativa (japonica culticar-group); Oryza sativa japonica; Oryza sativa ssp. japonica

Rank
no rank

Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Oryzoideae; Oryzeae; Oryzinae; Oryza; Oryza sativa

Parent
Oryza sativa (rice) - (Rank: species) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4530)

NCBI Taxonomy ID
39947 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 39947)

is Taxon B an Infraspecies?
Yes

Taxon B Description
Rice japonica variety with small grain

GENOTYPIC CHANGE

Generic Gene Name
SPL13

Synonyms
GLW7; SPL13; Os07g0505200; LOC_Os07g32170; P0430F03.47

String
39947.LOC_Os07g32170.1 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=39947.LOC_Os07g32170.1)

Sequence Similarities
-

GO - Molecular Function
GO:0046872 : metal ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0046872)
GO:0003677 : DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0003677)

GO - Biological Process
-

UniProtKB Oryza sativa subsp. japonica
Q6Z461 (http://www.uniprot.org/uniprot/Q6Z461)

GenebankID or UniProtKB
()

GO - Cellular Component

GO:0005634 : nucleus (https://www.ebi.ac.uk/QuickGO/term/GO:0005634)

Presumptive Null

No (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^No^#gephebase-summary-title)

Molecular Type

Cis-regulatory (https://www.gephebase.org/search-criteria?/and+Molecular Type=^Cis-regulatory^#gephebase-summary-title)

Aberration Type

Insertion (https://www.gephebase.org/search-criteria?/and+Aberration Type=^Insertion^#gephebase-summary-title)

Insertion Size

1-9 bp

Molecular Details of the Mutation

a CACTTC tandem repeat sequence in the 5′ UTR is causing reduced expression

Experimental Evidence

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

Main Reference

OsSPL13 controls grain size in cultivated rice. (2016) (https://pubmed.ncbi.nlm.nih.gov/26950093)

Authors

Si L; Chen J; Huang X; Gong H; Luo J; Hou Q; Zhou T; Lu T; Zhu J; Shangguan Y; Chen E; Gong C; Zhao Q; Jing Y; Zhao Y; Li Y; Cui L; Fan D; Lu Y; Weng Q; Wang Y; Zhan Q; Liu K; Wei X; An K; An G; Han B

Abstract

Although genetic diversity has a cardinal role in domestication, abundant natural allelic variations across the rice genome that cause agronomically important differences between diverse varieties have not been fully explored. Here we implement an approach integrating genome-wide association testing with functional analysis on grain size in a diverse rice population. We report that a major quantitative trait locus, GLW7, encoding the plant-specific transcription factor OsSPL13, positively regulates cell size in the grain hull, resulting in enhanced rice grain length and yield. We determine that a tandem-repeat sequence in the 5′ UTR of OsSPL13 alters its expression by affecting transcription and translation and that high expression of OsSPL13 is associated with large grains in tropical japonica rice. Further analysis indicates that the large-grain allele of GLW7 in tropical japonica rice was introgressed from indica varieties under artificial selection. Our study demonstrates that new genes can be effectively identified on the basis of genome-wide association data.

Additional References

RELATED GEPHE

Related Genes

9 (GL3.1, GS3, GS5, GW2, OsPPKL1/qGL3, qSW5, GL7, Os07g0603400, OsSPL16) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^4530^/and+Trait=Grain size/or+Taxon ID=^39947^/and+Trait=Grain size/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

@Introgression - Non-null mutation. Large-grain haplotype in japonica varieties was probably introgressed from indica varieties