GEPHE SUMMARY

Gephebase Gene
GW7 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^GW7^#gephebase-summary-title)

GepheID
GP00001540

Entry Status
Published

Main curator
Courtier

PHENOTYPIC CHANGE

Trait #1

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

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

Trait State in Taxon A
Indica variety HJX74 with shorter and wider grains of lower quality (?)

Trait State in Taxon B
line TaifengA (TFA) derived from japonica variety Mi31 with slender grains and better grain quality

Trait #2

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

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

Trait State in Taxon A
-

Trait State in Taxon B
-

Ancestral State
Unknown

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
Indica variety HJX74 with shorter and wider grains of lower quality (?)

Taxon B

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 B an Infraspecies?
Yes

Taxon B Description
Rice line TaifengA (TFA) derived from japonica variety Mi31 with slender grains and better grain quality

GENOTYPIC CHANGE

Generic Gene Name

TON1A

Synonyms

T15C9.7; TON1; TONNEAU 1; TONNEAU 1A; At3g55000; F28P10

String

3702.AT3G55000.1 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 3702.AT3G55000.1)

Sequence Similarities

-

GO - Molecular Function

-

GO - Biological Process

GO:0030865 : cortical cytoskeleton organization (https://www.ebi.ac.uk/QuickGO/term/GO:0030865)
GO:0000226 : microtubule cytoskeleton organization (https://www.ebi.ac.uk/QuickGO/term/GO:0000226)
GO:0000913 : preprophase band assembly (https://www.ebi.ac.uk/QuickGO/term/GO:0000913)

GO - Cellular Component

GO:0005886 : plasma membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0005886)
GO:0005737 : cytoplasm (https://www.ebi.ac.uk/QuickGO/term/GO:0005737)
GO:0005938 : cell cortex (https://www.ebi.ac.uk/QuickGO/term/GO:0005938)
GO:0030863 : cortical cytoskeleton (https://www.ebi.ac.uk/QuickGO/term/GO:0030863)
GO:0030981 : cortical microtubule cytoskeleton (https://www.ebi.ac.uk/QuickGO/term/GO:0030981)
GO:0009574 : preprophase band (https://www.ebi.ac.uk/QuickGO/term/GO:0009574)

UniProtKB Arabidopsis thaliana

Q9FQ25 (http://www.uniprot.org/uniprot/Q9FQ25)

GenebankID or UniProtKB

()

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

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

Molecular Details of the Mutation

18 SNPs and 9 indels observed in the promoter region and exon 1 and in particular an 11-bp deletion and 18-bp insertion near GTAC motifs which are normally binded by OsSPL16 repressor (reduced binding increasing transcription)

Experimental Evidence

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

Main Reference

The OsSPL16-GW7 regulatory module determines grain shape and simultaneously improves rice yield and grain quality. (2015) (https://pubmed.ncbi.nlm.nih.gov/26147620)

Authors

Wang S; Li S; Liu Q; Wu K; Zhang J; Wang S; Wang Y; Chen X; Zhang Y; Gao C; Wang F; Huang H; Fu X

Abstract

The deployment of heterosis in the form of hybrid rice varieties has boosted grain yield, but grain quality improvement still remains a challenge. Here we show that a quantitative trait locus for rice grain quality, qGW7, reflects allelic variation of GW7, a gene encoding a TONNEAU1-recruiting motif protein with similarity to C-terminal motifs of the human centrosomal protein CAP350. Upregulation of GW7 expression was correlated with the production of more slender grains, as a result of increased cell division in the longitudinal direction and decreased cell division in the transverse direction. OsSPL16 (GW8), an SBP-domain transcription factor that regulates grain width, bound directly to the GW7 promoter and repressed its expression. The presence of a semidominant GW7(TFA) allele from tropical japonica rice was associated with higher grain quality without the yield penalty imposed by the Basmati gw8 allele. Manipulation of the OsSPL16-GW7 module thus represents a new strategy to simultaneously improve rice yield and grain quality.

Additional References

RELATED GEPHE

Related Genes

3 (GL7, Os07g0603400, OsSPL16) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^4530^/and+Trait=Grain shape/or+Taxon ID=^4530^/and+Trait=Grain quality/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS