GEPHE SUMMARY

Gephebase Gene
THOUSAND-GRAIN WEIGHT 6 (TGW6)

GephelD
GP00001126

Entry Status
Published

Main curator
Martin

PHENOTYPIC CHANGE

Trait Category
Morphology

Trait
Grain yield

Trait State in Taxon A
Oryza sativa - var. japonica Nipponbare

Trait State in Taxon B
Oryza sativa - var. indica Kasalath

Ancestral State
Taxon A

Taxonomic Status
Domesticated

Taxon A

Latin Name
Oryza sativa

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)

NCBI Taxonomy ID
4530

is Taxon A an Infraspecies?
Yes

Taxon A Description
Oryza sativa - var. japonica Nipponbare

Taxon B

Latin Name
Oryza sativa

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)

NCBI Taxonomy ID
4530

is Taxon B an Infraspecies?
Yes

Taxon B Description
Oryza sativa - var. indica Kasalath

GENOTYPIC CHANGE

Generic Gene Name
TGW6

Synonyms
Os06g0623700; OsJ_22021; OSJNBa0029G06.8; OSNPB_060623700

String
39947.LOC_Os06g41850.1

Sequence Similarities
-

GO - Molecular Function
GO:0016844 : strictosidine synthase activity

GO - Biological Process
GO:0009058 : biosynthetic process

GO - Cellular Component
GO:0016020 : membrane
GO:0005783 : endoplasmic reticulum

UniProtKB Oryza sativa subsp. japonica
Q69U01

GenebankID or UniProtKB
BAN15820

Presumptive Null
Yes

Molecular Type
Coding

Aberration Type
Deletion

Deletion Size
1-9 bp

Molecular Details of the Mutation
-1bp at +313 resulting in truncated protein

Experimental Evidence
Linkage Mapping

Main Reference
Loss of function of the IAA-glucose hydrolase gene TGW6 enhances rice grain weight and increases yield. (2013)

Authors
Ishimaru K; Hirotsu N; Madoka Y; Murakami N; Hara N; Onodera H; Kashiwagi T; Ujiie K; Shimizu B; Onishi A; Miyagawa H; Katoh E

Abstract
Increases in the yield of rice, a staple crop for more than half of the global population, are imperative to support rapid population growth. Grain weight is a major determining factor of yield. Here, we report the cloning and functional analysis of THOUSAND-GRAIN WEIGHT 6 (TGW6), a gene from the Indian landrace rice Kasalath. TGW6 encodes a novel protein with indole-3-acetic acid (IAA)-glucose hydrolase activity. In sink organs, the Nipponbare tgw6 allele affects the timing of the transition from the syncytial to the cellular phase by controlling IAA supply and limiting cell number and grain length. Most notably, loss of function of the Kasalath allele enhances grain weight through pleiotropic effects on source organs and leads to significant yield increases. Our findings suggest that TGW6 may be useful for further improvements in yield characteristics in most cultivars.

Additional References

RELATED GEPHE

Related Genes
4 (Chalk5, DEP1, OsCKX2=Gn1a, OsSPL14 / WFP)
Related Haplotypes
No matches found.

COMMENTS

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