GEPHE SUMMARY

Gephebase Gene

DEP1 (DENSE AND ERECT PANICLES 1) (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^DEP1 (DENSE AND ERECT PANICLES 1)^#gephebase-summary-title)

GepheID

GP00001376

Entry Status

Published

Main curator

Prigent

PHENOTYPIC CHANGE

Trait Category

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

Trait

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

Trait State in Taxon A

O. s. indica Nanjing6 ; DEP1 ; highly responsive to nitrogen

Trait State in Taxon B

O. s. japonica Qianzhonglang2 ; Dep1 ; reduced response to nitrogen

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

Common Name

long-grained rice

Synonyms

Oryza sativa (indica cultivar-group); Oryza sativa (indica group); Oryza sativa subsp. indica; long-grained rice; Indian rice; Indica rice; Oryza sativa subsp. indica Kato; Oryza sativa indica; Oryza sativa ssp. indica

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

39946 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 39946)

is Taxon A an Infraspecies?

Yes

Taxon A Description

O. s. indica Nanjing6 ; DEP1 ; highly responsive to nitrogen

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

O. s. japonica Qianzhonglang2 ; Dep1 ; reduced response to nitrogen

GENOTYPIC CHANGE

Generic Gene Name

P0046G12.12-1

Synonyms

DN1; DEP1; pay1; Os09g0441900; OsJ_29530; OSNPB_090441900

String

39947.LOC_Os09g26999.1 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=39947.LOC_Os09g26999.1)

Sequence Similarities

-

GO - Molecular Function

-

GO - Biological Process

UniProtKB Oryza sativa subsp. japonica

Q67UU9 (http://www.uniprot.org/uniprot/Q67UU9)

GenebankID or UniProtKB

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GO:0007186 : G protein-coupled receptor signaling pathway (https://www.ebi.ac.uk/QuickGO/term/GO:0007186)

GO - Cellular Component

GO:0005882 : intermediate filament (https://www.ebi.ac.uk/QuickGO/term/GO:0005882)

Presumptive Null

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

Molecular Type

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

Aberration Type

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

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

p.Cys105Tyr affecting affinity interaction between the GGL domain of DEP1 and RGB1 subunit

Experimental Evidence

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

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	-	-	-

Main Reference

Heterotrimeric G proteins regulate nitrogen-use efficiency in rice. (2014) (https://pubmed.ncbi.nlm.nih.gov/24777451)

Authors

Sun H; Qian Q; Wu K; Luo J; Wang S; Zhang C; Ma Y; Liu Q; Huang X; Yuan Q; Han R; Zhao M; Dong G; Guo L; Zhu X; Gou Z; Wang W; Wu Y; Lin H; Fu X

Abstract

The drive toward more sustainable agriculture has raised the profile of crop plant nutrient-use efficiency. Here we show that a major rice nitrogen-use efficiency quantitative trait locus (qNGR9) is synonymous with the previously identified gene DEP1 (DENSE AND ERECT PANICLES 1). The different DEP1 alleles confer different nitrogen responses, and genetic diversity analysis suggests that DEP1 has been subjected to artificial selection during Oryza sativa spp. japonica rice domestication. The plants carrying the dominant dep1-1 allele exhibit nitrogen-insensitive vegetative growth coupled with increased nitrogen uptake and assimilation, resulting in improved harvest index and grain yield at moderate levels of nitrogen fertilization. The DEP1 protein interacts in vivo with both the GÎ± (RGA1) and GÎ² (RGB1) subunits, and reduced RGA1 or enhanced RGB1 activity inhibits nitrogen responses. We conclude that the plant G protein complex regulates nitrogen signaling and modulation of heterotrimeric G protein activity provides a strategy for environmentally sustainable increases in rice grain yield.

Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS