GEPHE SUMMARY

Gephebase Gene

ripening inhibitor (rin) = LeMADS-RIN and LeMADS-MC (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^ripening inhibitor (rin) = LeMADS-RIN and LeMADS-MC^#gephebase-summary-title)

Entry Status

Published

GepheID

GP00000990

Main curator

Martin

PHENOTYPIC CHANGE

Trait Category

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

Trait

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

Trait State in Taxon A

Solanum lycopersicum domesticated - Ailsa Craig - Rin/Rin

Trait State in Taxon B

Solanum lycopersicum domesticated - rin/rin

Ancestral State

Taxon A

Taxonomic Status

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

Taxon A

Latin Name

Solanum lycopersicum (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Solanum lycopersicum^#gephebase-summary-title)

Common Name

tomato

Synonyms

Lycopersicon esculentum var. esculentum; Solanum esculentum; Solanum lycopersicum var. humboldtii; tomato; Lycopersicon esculentum Mill.; Solanum esculentum Dunal; Solanum lycopersicum L.; Lycopersicon lycopersicum; Lycopersicum esculentum; Solanum lycopersicon

Rank

species

Lineage

cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Solanaceae; Solanoideae; Solaneae; Solanum; Lycopersicon

Parent

Lycopersicon () - (Rank: subgenus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 49274)

NCBI Taxonomy ID

4081 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4081)

is Taxon A an Infraspecies?

Yes

Taxon A Description

Solanum lycopersicum domesticated - Ailsa Craig - Rin/Rin

Taxon B

Latin Name

Solanum lycopersicum (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Solanum lycopersicum^#gephebase-summary-title)

Common Name

tomato

Synonyms

Lycopersicon esculentum var. esculentum; Solanum esculentum; Solanum lycopersicum var. humboldtii; tomato; Lycopersicon esculentum Mill.; Solanum esculentum Dunal; Solanum lycopersicum L.; Lycopersicon lycopersicum; Lycopersicum esculentum; Solanum lycopersicon

Rank

species

Lineage

cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Solanaceae; Solanoideae; Solaneae; Solanum; Lycopersicon

Parent

Lycopersicon () - (Rank: subgenus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 49274)

NCBI Taxonomy ID

4081 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4081)

is Taxon B an Infraspecies?

Yes

Taxon B Description

Solanum lycopersicum domesticated - rin/rin

GENOTYPIC CHANGE

Generic Gene Name

MADS-RIN

Synonyms

MADS-RIN; LeMADS-RIN; 543708

String

4081.Solyc05g012020.2.1 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 4081.Solyc05g012020.2.1)

Sequence Similarities

-

GO - Molecular Function

GO:0046983 : protein dimerization activity

UniProtKB Solanum lycopersicum

Q8S4L4 (http://www.uniprot.org/uniprot/Q8S4L4)

GenebankID or UniProtKB

AF448522 (https://www.ncbi.nlm.nih.gov/nuccore/AF448522)

(https://www.ebi.ac.uk/QuickGO/term/GO:0046983)
GO:0000977 : RNA polymerase II regulatory region sequence-specific DNA binding
(https://www.ebi.ac.uk/QuickGO/term/GO:0000977)
GO:0043565 : sequence-specific DNA binding
(https://www.ebi.ac.uk/QuickGO/term/GO:0043565)
GO:0008134 : transcription factor binding
(https://www.ebi.ac.uk/QuickGO/term/GO:0008134)
GO:0000982 : transcription factor activity, RNA polymerase II proximal promoter
sequence-specific DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0000982)
GO:0044212 : transcription regulatory region DNA binding
(https://www.ebi.ac.uk/QuickGO/term/GO:0044212)

GO - Biological Process

GO:0007275 : multicellular organism development
(https://www.ebi.ac.uk/QuickGO/term/GO:0007275)
GO:0045944 : positive regulation of transcription by RNA polymerase II
(https://www.ebi.ac.uk/QuickGO/term/GO:0045944)
GO:0048481 : plant ovule development
(https://www.ebi.ac.uk/QuickGO/term/GO:0048481)

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

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

Aberration Type

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

Deletion Size

1-10 kb

Molecular Details of the Mutation

2.6kb deletion of the region located between gene LeMADS-RIN and gene LeMADS-MC; resulting in a chimeric mRNA that contains both LeMADS-RIN and LeMADS-MC coding regions.

Experimental Evidence

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

Main Reference

A MADS-box gene necessary for fruit ripening at the tomato ripening-inhibitor (rin) locus. (2002) (https://pubmed.ncbi.nlm.nih.gov/11951045)

Authors

Vrebalov J; Ruezinsky D; Padmanabhan V; White R; Medrano D; Drake R; Schuch W; Giovannoni J

Abstract

Tomato plants harboring the ripening-inhibitor (rin) mutation yield fruits that fail to ripen. Additionally, rin plants display enlarged sepals and loss of inflorescence determinacy. Positional cloning of the rin locus revealed two tandem MADS-box genes (LeMADS-RIN and LeMADS-MC), whose expression patterns suggested roles in fruit ripening and sepal development, respectively. The rin mutation alters expression of both genes. Gene repression and mutant complementation demonstrate that LeMADS-RIN regulates ripening, whereas LeMADS-MC affects sepal development and inflorescence determinacy. LeMADS-RIN demonstrates an agriculturally important function of plant MADS-box genes and provides molecular insight into nonhormonal (developmental) regulation of ripening.

Additional References

Molecular genetic analysis of the ripening-inhibitor and non-ripening loci of tomato: a first step in genetic map-based cloning of fruit ripening genes. (1995)
(https://pubmed.ncbi.nlm.nih.gov/7651343)

RELATED GEPHE

Related Genes

2 (LeSPL-CNR, PG) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^4081^/and+Trait=Fruit ripening/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS