GEPHE SUMMARY

Gephebase Gene
RLM1 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^RLM1^#gephebase-summary-title)

GepheID
GP00000991

Entry Status
Published

Main curator
Martin

PHENOTYPIC CHANGE

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

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

Trait State in Taxon A
Arabidopsis thaliana

Trait State in Taxon B
Arabidopsis thaliana

Ancestral State
Data not curated

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

Taxon A

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

Common Name
thale cress

Synonyms
thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress

Rank
species

Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis

Parent
Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3701)

NCBI Taxonomy ID
3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3702)

is Taxon A an Infraspecies?
No

Taxon B

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

Common Name
thale cress

Synonyms
thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress

Rank
species

Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis

Parent
Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3701)

NCBI Taxonomy ID
3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3702)

is Taxon B an Infraspecies?
No

GENOTYPIC CHANGE

Generic Gene Name
RLM1A

Synonyms
F22C12.17; F22C12_17; RESISTANCE TO LEPTOSPHAERIA MACULANS 1; At1g64070

String
3702.AT1G64070.1 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 3702.AT1G64070.1)

Sequence Similarities
-

GO - Molecular Function
GO:0005524 : ATP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005524)
GO:0043531 : ADP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0043531)

GO - Biological Process
GO:0007165 : signal transduction (https://www.ebi.ac.uk/QuickGO/term/GO:0007165)
GO:0050832 : defense response to fungus (https://www.ebi.ac.uk/QuickGO/term/GO:0050832)

UniProtKB Arabidopsis thaliana
F4I594 (http://www.uniprot.org/uniprot/F4I594)

GenebankID or UniProtKB
OAP13206 (https://www.ncbi.nlm.nih.gov/nuccore/OAP13206)

GO - Cellular Component

-

Presumptive Null

Yes (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^Yes^#gephebase-summary-title)

Molecular Type

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

Aberration Type

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

Molecular Details of the Mutation

Digenic; deletion of gene1 and premature stop codons in gene2

Experimental Evidence

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

Main Reference

Transgressive segregation reveals two Arabidopsis TIR-NB-LRR resistance genes effective against Leptosphaeria maculans, causal agent of blackleg disease. (2006) (https://pubmed.ncbi.nlm.nih.gov/16623885)

Authors

Staal J; Kaliff M; Bohman S; Dixelius C

Abstract

In a cross between the two resistant accessions Col-0 and Ler-0, a 15:1 segregation was found in F2, suggesting the presence of unlinked resistance loci to Leptosphaeria maculans. One hundred Col-4 x Ler-0, and 50 Ler-2 x Cvi-1 recombinant inbred lines, and seven susceptible Ler-0 x Ws-0 F2 progenies were examined to identify the two loci. Resistance in Col-4, Ws-0 and Cvi-1 (RLM1) was mapped to the marker m305 on chromosome 1. Col-4 x Ler-0 and Ler-2 x Cvi-1 mapping populations located RLM2(Ler) on the same arm of chromosome 4. A tight physical location of RLM2 was established through near-isogenic lines. This region was found to correspond to an ancient duplication event between the RLM1 and RLM2 loci. Two independent T-DNA mutants in a TIR-NB-LRR R gene (At1g64070) displayed susceptibility, and L. maculans susceptible mutant phenotypes were confirmed to be allelic for rlm1 in F1 after crosses with susceptible rlm1(Ler)rlm2(Col) plants. Complementation of rlm1(Ler)rlm2(Col) with the genomic Col-0 sequence of At1g64070 conferred resistance. In addition, two T-DNA mutants in a neighbouring homologous TIR-NB-LRR gene (At1g63880) displayed moderate susceptibility to L. maculans. Sequence analysis revealed that At1g64070 was truncated by a premature stop codon, and that At1g63880 was absent in Ler-0. RNA interference confirmed that Ler-0 resistance is dependent on genes structurally related to RLM1. Camalexin was identified as a quantitative co-dominant resistance factor of Col-0 origin, but independent of RLM1. RLM1/RLM2 resistance was, however, found to require RAR1 and partially HSP90.1.

Additional References

RELATED GEPHE

Related Genes

20 (ACD6 = ACCELERATED CELL DEATH 6, ERECTA, RAC1, Resistance related Kinase 1 (RKS1), RLM2 cluster, RLM3, RPM1, RPP1-WsA, RPP1-WsB, RPP1-WsC, RPP13, RPP2A-RPP2B, RPP4, RPP5, RPP8, RPS2, RPS4, RPS5, RRS1, WRR4) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^3702^/and+Trait=Pathogen resistance/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS