

GEPHE SUMMARY

RPM1 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase="RPM1">#gephebase-summary-title)	Gephebase Gene GP00001000	GepheID Main curator
Published	Entry Status Martin	

PHENOTYPIC CHANGE

Trait Category
Physiology (https://www.gephebase.org/search-criteria?/and+Trait Category="Physiology">#gephebase-summary-title)
Pathogen resistance (https://www.gephebase.org/search-criteria?/and+Trait=^Pathogen resistance "#gephebase-summary-title)
Trait State in Taxon A
Arabidopsis thaliana sensitive to Pseudomonas syringae pathovar maculicola
Trait State in Taxon B
Arabidopsis thaliana Col-0 resistant to Pseudomonas syringae pathovar maculicola
Ancestral State
Unknown
Taxonomic Status
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status="Intraspecific">#gephebase-summary-title)

Taxon A	Latin Name	Taxon B	Latin Name
Arabidopsis thaliana (#gephebase-summary-title)		Arabidopsis thaliana (#gephebase-summary-title)	
thale cress	Common Name	thale cress	Common Name
thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress	Synonyms	thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress	Synonyms
species	Rank	species	Rank
cellular organisms; Eukaryota; Viriplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelinae; Arabidopsis	Lineage	cellular organisms; Eukaryota; Viriplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelinae; Arabidopsis	Lineage
Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701)	Parent	Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701)	Parent
3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702)	NCBI Taxonomy ID	3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702)	NCBI Taxonomy ID
is Taxon A an Infraspecies?		is Taxon B an Infraspecies?	
No		Yes	
			Taxon B Description
			Arabidopsis thaliana Col-0 (resistant)

GENOTYPIC CHANGE

Generic Gene Name	UniProtKB Arabidopsis thaliana
RPM1	Q39214 (http://www.uniprot.org/uniprot/Q39214)
DISEASE RESISTANCE PROTEIN RPM1; RESISTANCE TO P. SYRINGAE PV MACULICOLA 1; RESISTANCE TO PSEUDOMONAS SYRINGAE 3; RPS3; At3g07040; F17A9.20	GenebankID or UniProtKB X87851 (https://www.ncbi.nlm.nih.gov/nuccore/X87851)
3702.AT3G07040.1 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=3702.AT3G07040.1)	
String	
Belongs to the disease resistance NB-LRR family.	Sequence Similarities
	GO - Molecular Function
GO:0005524 : ATP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005524)	
GO:0000166 : nucleotide binding (https://www.ebi.ac.uk/QuickGO/term/GO:0000166)	

GO:0043531 : ADP binding (<https://www.ebi.ac.uk/QuickGO/term/GO:0043531>)
GO - Biological Process

GO:0009626 : plant-type hypersensitive response
(<https://www.ebi.ac.uk/QuickGO/term/GO:0009626>)

GO - Cellular Component

GO:0005886 : plasma membrane (<https://www.ebi.ac.uk/QuickGO/term/GO:0005886>)

GO:0012505 : endomembrane system

(<https://www.ebi.ac.uk/QuickGO/term/GO:0012505>)

GO:0019897 : extrinsic component of plasma membrane

(<https://www.ebi.ac.uk/QuickGO/term/GO:0019897>)

Presumptive Null

Yes (<https://www.gephebase.org/search-criteria?/and+Presumptive+Null=%27Yes%27#gephebase-summary-title>)

Molecular Type

Gene Loss (<https://www.gephebase.org/search-criteria?/and+Molecular+Type=%27Gene+Loss%27#gephebase-summary-title>)

Aberration Type

Indel (<https://www.gephebase.org/search-criteria?/and+Aberration+Type=%27Indel%27#gephebase-summary-title>)

Indel Size

1-10 kb

Molecular Details of the Mutation

3.7kb indel with a null-state in the sensitive strains

Experimental Evidence

Linkage Mapping (<https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=%27Linkage+Mapping%27#gephebase-summary-title>)

Main Reference

Independent deletions of a pathogen-resistance gene in *Brassica* and *Arabidopsis*. (1998) (<https://pubmed.ncbi.nlm.nih.gov/9861058>)

Authors

Grant MR; McDowell JM; Sharpe AG; de Torres Zabala M; Lydiate DJ; Dangl JL

Abstract

Plant disease resistance (R) genes confer race-specific resistance to pathogens and are genetically defined on the basis of intra-specific functional polymorphism. Little is known about the evolutionary mechanisms that generate this polymorphism. Most R loci examined to date contain alternate alleles and/or linked homologs even in disease-susceptible plant genotypes. In contrast, the resistance to *Pseudomonas syringae* pathovar *maculicola* (RPM1) bacterial resistance gene is completely absent (rpm1-null) in 5/5 *Arabidopsis thaliana* accessions that lack RPM1 function. The rpm1-null locus contains a 98-bp segment of unknown origin in place of the RPM1 gene. We undertook comparative mapping of RPM1 and flanking genes in *Brassica napus* to determine the ancestral state of the RPM1 locus. We cloned two *B. napus* RPM1 homologs encoding hypothetical proteins with approximately 81% amino acid identity to *Arabidopsis* RPM1. Collinearity of genes flanking RPM1 is conserved between *B. napus* and *Arabidopsis*. Surprisingly, we found four additional *B. napus* loci in which the flanking marker synteny is maintained but RPM1 is absent. These *B. napus* rpm1-null loci have no detectable nucleotide similarity to the *Arabidopsis* rpm1-null allele. We conclude that RPM1 evolved before the divergence of the Brassicaceae and has been deleted independently in the *Brassica* and *Arabidopsis* lineages. These results suggest that functional polymorphism at R gene loci can arise from gene deletions.

Additional References

Genome-wide association study of 107 phenotypes in *Arabidopsis thaliana* inbred lines. (2010) (<https://pubmed.ncbi.nlm.nih.gov/20336072>)

Dynamics of disease resistance polymorphism at the Rpm1 locus of *Arabidopsis*. (1999) (<https://pubmed.ncbi.nlm.nih.gov/10458161>)

RELATED GEPHE

Related Genes

20 (ACD6 = ACCELERATED CELL DEATH 6, ERECTA, RAC1, Resistance related Kinase 1 (RKS1), RLM1, RLM2 cluster, RLM3, 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=%273702%27/and+Trait=Pathogen+resistance/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS