

GEPHE SUMMARY

	Gephebase Gene		GepheID
RPP1 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^RPP1^#gephebase-summary-title)		GP00001281	
	Entry Status	Arnoult	Main curator
Published			

PHENOTYPIC CHANGE

	Trait Category		
Physiology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Physiology^#gephebase-summary-title)			
	Trait		
Hybrid incompatibility (https://www.gephebase.org/search-criteria?/and+Trait=^Hybrid incompatibility^#gephebase-summary-title)			
	Trait State in Taxon A		
Arabidopsis thaliana - Ler and Col (Northern Europe) "compatible"			
	Trait State in Taxon B		
Arabidopsis thaliana - Kas-2 (Central Asia) "incompatible" (Hybrids with Ler show a stong growth defect at 14C)			
	Ancestral State		
Unknown			
	Taxonomic Status		
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Intraspecific^#gephebase-summary-title)			
	Taxon A		Taxon B
	Latin Name		Latin Name
Arabidopsis thaliana (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Arabidopsis thaliana^#gephebase-summary-title)		Arabidopsis thaliana (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Arabidopsis thaliana^#gephebase-summary-title)	
	Common Name		Common Name
thale cress		thale cress	
	Synonyms		Synonyms
thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress		thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress	
	Rank		Rank
species		species	
	Lineage		Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis		cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis	
	Parent		Parent
Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701)		Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701)	
	NCBI Taxonomy ID		NCBI Taxonomy ID
3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702)		3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702)	
	is Taxon A an Intraspecies?		is Taxon B an Intraspecies?
Yes		Yes	
	Taxon A Description		Taxon B Description
Arabidopsis thaliana - Ler and Col (Northern Europe) "compatible"		Arabidopsis thaliana - Kas-2 (Central Asia) "incompatible" (Hybrids with Ler show a stong growth defect at 14C)	

GENOTYPIC CHANGE

	Generic Gene Name		UniProtKB Arabidopsis thaliana
RPP1		F4J339 (http://www.uniprot.org/uniprot/F4J339)	
	Synonyms		GenebankID or UniProtKB
cog1; recognition of peronospora parasitica 1; At3g44480; F14L2_30		823573 (https://www.ncbi.nlm.nih.gov/nuccore/823573)	
	String		
3702.AT3G44480.1 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=3702.AT3G44480.1)			
	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:0030275 : LRR domain binding (<https://www.ebi.ac.uk/QuickGO/term/GO:0030275>)
GO - Biological Process

GO:0006952 : defense response (<https://www.ebi.ac.uk/QuickGO/term/GO:0006952>)
GO:0007165 : signal transduction (<https://www.ebi.ac.uk/QuickGO/term/GO:0007165>)
GO:0009817 : defense response to fungus, incompatible interaction
(<https://www.ebi.ac.uk/QuickGO/term/GO:0009817>)
GO:0002239 : response to oomycetes
(<https://www.ebi.ac.uk/QuickGO/term/GO:0002239>)

GO - Cellular Component

GO:0005886 : plasma membrane (<https://www.ebi.ac.uk/QuickGO/term/GO:0005886>)
GO:0000139 : Golgi membrane (<https://www.ebi.ac.uk/QuickGO/term/GO:0000139>)
GO:0005789 : endoplasmic reticulum membrane
(<https://www.ebi.ac.uk/QuickGO/term/GO:0005789>)

No (https://www.gephebase.org/search-criteria?/and+Presumptive Null=~No~#gephebase-summary-title)	Presumptive Null
Unknown (https://www.gephebase.org/search-criteria?/and+Molecular Type=~Unknown~#gephebase-summary-title)	Molecular Type
Complex Change (https://www.gephebase.org/search-criteria?/and+Aberration Type=~Complex Change~#gephebase-summary-title)	Aberration Type
complex	Molecular Details of the Mutation
Linkage Mapping (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=~Linkage Mapping~#gephebase-summary-title)	Experimental Evidence
Analysis of a plant complex resistance gene locus underlying immune-related hybrid incompatibility and its occurrence in nature. (2014) (https://pubmed.ncbi.nlm.nih.gov/25503786)	Main Reference
Alc��azar R; von Reth M; Bautor J; Chae E; Weigel D; Koornneef M; Parker JE	Authors
Mechanisms underlying speciation in plants include detrimental (incompatible) genetic interactions between parental alleles that incur a fitness cost in hybrids. We reported on recessive hybrid incompatibility between an Arabidopsis thaliana strain from Poland, Landsberg erecta (Ler), and many Central Asian A. thaliana strains. The incompatible interaction is determined by a polymorphic cluster of Toll/interleukin-1 receptor-nucleotide binding-leucine rich repeat (TNL) RPP1 (Recognition of Peronospora parasitica1)-like genes in Ler and alleles of the receptor-like kinase Strubbelig Receptor Family 3 (SRF3) in Central Asian strains Kas-2 or Kond, causing temperature-dependent autoimmunity and loss of growth and reproductive fitness. Here, we genetically dissected the RPP1-like Ler locus to determine contributions of individual RPP1-like Ler (R1-R8) genes to the incompatibility. In a neutral background, expression of most RPP1-like Ler genes, except R3, has no effect on growth or pathogen resistance. Incompatibility involves increased R3 expression and engineered R3 overexpression in a neutral background induces dwarfism and sterility. However, no individual RPP1-like Ler gene is sufficient for incompatibility between Ler and Kas-2 or Kond, suggesting that co-action of at least two RPP1-like members underlies this epistatic interaction. We find that the RPP1-like Ler haplotype is frequent and occurs with other Ler RPP1-like alleles in a local population in Gorz��w Wielkopolski (Poland). Only Gorz��w individuals carrying the RPP1-like Ler haplotype are incompatible with Kas-2 and Kond, whereas other RPP1-like alleles in the population are compatible. Therefore, the RPP1-like Ler haplotype has been maintained in genetically different individuals at a single site, allowing exploration of forces shaping the evolution of RPP1-like genes at local and regional population scales.	Abstract
Natural variation at Strubbelig Receptor Kinase 3 drives immune-triggered incompatibilities between Arabidopsis thaliana accessions. (2010) (https://pubmed.ncbi.nlm.nih.gov/21037570)	Additional References

RELATED GEPHE

2 (AT5G41740/AT5G41750, SRF3) (https://www.gephebase.org/search-criteria?/or+Taxon ID=~3702~/and+Trait=Hybrid incompatibility/and+groupHaplotypes=true#gephebase-summary-title)	Related Genes
1 (https://www.gephebase.org/search-criteria?/or+Gene Gephebase=~RPP1~/and+Taxon ID=~3702~/or+Gene Gephebase=~RPP1~/and+Taxon ID=~3702~#gephebase-summary-title)	Related Haplotypes

EXTERNAL LINKS

COMMENTS

Recessive incompatibility trait ; @Epistasis interaction with SRF3. Other RPP-1 like genes are responsible fot the HI.