

GEPHE SUMMARY

	Gephebase Gene		GepheID
WRR4 (https://www.gephebase.org/search-criteria?/and+GeneGephebase=~WRR4^#gephebase-summary-title)		GP00001215	
	Entry Status	Martin	Main curator
Published			

PHENOTYPIC CHANGE

	Trait Category		
Physiology (https://www.gephebase.org/search-criteria?/and+TraitCategory=~Physiology^#gephebase-summary-title)		Trait	
Pathogen resistance (https://www.gephebase.org/search-criteria?/and+Trait=~Pathogenresistance^#gephebase-summary-title)			
	Trait State in Taxon A		
Arabidopsis thaliana- Col0 - resistant		Trait State in Taxon B	
Arabidopsis thaliana- Ws3 - sensitive			
	Ancestral State		
Data not curated		Taxonomic Status	
Intraspecific (https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=~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- Col0 - resistant		Arabidopsis thaliana- Ws3 - sensitive	

GENOTYPIC CHANGE

	Generic Gene Name		UniProtKB Arabidopsis thaliana
ADR2		Q9C7X0 (http://www.uniprot.org/uniprot/Q9C7X0)	
	Synonyms		GenebankID or UniProtKB
ACTIVATED DISEASE RESISTANCE 2; ADR2; F13N6.5; F13N6_5; WHITE RUST RESISTANCE 4; WRR4; At1g56510		BT014857 (https://www.ncbi.nlm.nih.gov/nucore/BT014857)	
	String		
3702.AT1G56510.1 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=3702.AT1G56510.1)			
	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:0009817 : defense response to fungus, incompatible interaction
(<https://www.ebi.ac.uk/QuickGO/term/GO:0009817>)
GO:0034644 : cellular response to UV
(<https://www.ebi.ac.uk/QuickGO/term/GO:0034644>)
GO:0002229 : defense response to oomycetes
(<https://www.ebi.ac.uk/QuickGO/term/GO:0002229>)

GO - Cellular Component

GO:0005737 : cytoplasm (<https://www.ebi.ac.uk/QuickGO/term/GO:0005737>)

Presumptive Null

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

Molecular Type

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

Aberration Type

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

Molecular Details of the Mutation

unknown

Experimental Evidence

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

Main Reference

WRR4 encodes a TIR-NB-LRR protein that confers broad-spectrum white rust resistance in Arabidopsis thaliana to four physiological races of Albugo candida. (2008)
(<https://pubmed.ncbi.nlm.nih.gov/18624640>)

Authors

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Abstract

White blister rust in the Brassicaceae is emerging as a superb model for exploring how plant biodiversity has channeled speciation of biotrophic parasites. The causal agents of white rust across a wide breadth of cruciferous hosts currently are named as variants of a single oomycete species, Albugo candida. The most notable examples include a major group of physiological races that each are economically destructive in a different vegetable or oilseed crop of Brassica juncea (A. candida race 2), B. rapa (race 7), or B. oleracea (race 9); or parasitic on wild crucifers such as Capsella bursa-pastoris (race 4). Arabidopsis thaliana is innately immune to these races of A. candida under natural conditions; however, it commonly hosts its own molecularly distinct subspecies of A. candida (A. candida subsp. arabidopsis). In the laboratory, we have identified several accessions of Arabidopsis thaliana (e.g., Ws-3) that can permit varying degrees of rust development following inoculation with A. candida races 2, 4, and 7, whereas race 9 is universally incompatible in Arabidopsis thaliana and nonrusting resistance is the most prevalent outcome of interactions with the other races. Subtle variation in resistance phenotypes is evident, observed initially with an isolate of A. candida race 4, indicating additional genetic variation. Therefore, we used the race 4 isolate for map-based cloning of the first of many expected white rust resistance (WRR) genes. This gene was designated WRR4 and encodes a cytoplasmic toll-interleukin receptor-like nucleotide-binding leucine-rich repeat receptor-like protein that confers a dominant, broad-spectrum white rust resistance in the Arabidopsis thaliana accession Columbia to representative isolates of A. candida races 2, 4, 7, and 9, as verified by transgenic expression of the Columbia allele in Ws-3. The WRR4 protein requires functional expression of the lipase-like protein EDS1 but not the paralogous protein PAD4, and confers full immunity that masks an underlying nonhypersensitive incompatibility in Columbia to A. candida race 4. This residual incompatibility is independent of functional EDS1.

Additional References

RELATED GEPHE

Related Genes

20 (ACD6 = ACCELERATED CELL DEATH 6, ERECTA, RAC1, Resistance related Kinase 1 (RKS1), RLM1, RLM2 cluster, RLM3, RPM1, RPP1-WsA, RPP1-WsB, RPP1-WsC, RPP13, RPP2A-RPP2B, RPP4, RPP5, RPP8, RPS2, RPS4, RPS5, RRS1) (<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