

GEPHE SUMMARY

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

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- 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+Taxonomic Status=^Intraspecific^#gephebase-summary-title)			
Taxon A		Taxon B	
Arabidopsis thaliana (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Arabidopsis+thaliana^#gephebase-summary-title)	Latin Name	Arabidopsis thaliana (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Arabidopsis+thaliana^#gephebase-summary-title)	Latin Name
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
Yes	is Taxon A an Infraspecies?	Yes	is Taxon B an Infraspecies?
Arabidopsis thaliana- Col0 - resistant	Taxon A Description	Arabidopsis thaliana- Ws3 - sensitive	Taxon B Description

GENOTYPIC CHANGE

ADR2	Generic Gene Name	UniProtKB Arabidopsis thaliana
ACTIVATED DISEASE RESISTANCE 2; ADR2; F13N6.5; F13N6_5; WHITE RUST RESISTANCE 4; WRR4; At1g56510	Synonyms	GenebankID or UniProtKB
3702.AT1G56510.1 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=3702.AT1G56510.1)	String	BT014857 (https://www.ncbi.nlm.nih.gov/nuccore/BT014857)
-	Sequence Similarities	
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 - Molecular Function	
	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