

# GEPHE SUMMARY

ERECTA ( <a href="https://www.gephebase.org/search-criteria/?and+Gene+Gephebase=%23ERECTA%23gephebase-summary-title">https://www.gephebase.org/search-criteria/?and+Gene Gephebase=%23ERECTA%23gephebase-summary-title</a> )	Gephebase Gene	GP00001244	GepheID
Published	Entry Status	Arnoult	Main curator

## PHENOTYPIC CHANGE

	Trait Category		
Physiology ( <a href="https://www.gephebase.org/search-criteria/?and+Trait+Category=%23Physiology%23gephebase-summary-title">https://www.gephebase.org/search-criteria/?and+Trait+Category=%23Physiology%23gephebase-summary-title</a> )	Trait		
Pathogen resistance (Cucumerina fungus) ( <a href="https://www.gephebase.org/search-criteria/?and+Trait=%23Pathogen+resistance+(Cucumerina+fungus)%23gephebase-summary-title">https://www.gephebase.org/search-criteria/?and+Trait=%23Pathogen+resistance+(Cucumerina+fungus)%23gephebase-summary-title</a> )	Trait State in Taxon A		
Arabidopsis thaliana- Ler0	Trait State in Taxon B		
Arabidopsis thaliana- Cvi	Ancestral State		
Data not curated	Taxonomic Status		
Intraspecific ( <a href="https://www.gephebase.org/search-criteria/?and+Taxonomic+Status=%23Intraspecific%23gephebase-summary-title">https://www.gephebase.org/search-criteria/?and+Taxonomic+Status=%23Intraspecific%23gephebase-summary-title</a> )			
Taxon A		Taxon B	
Arabidopsis thaliana ( <a href="https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=%23Arabidopsis+thaliana%23gephebase-summary-title">https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=%23Arabidopsis+thaliana%23gephebase-summary-title</a> )	Latin Name	Arabidopsis thaliana ( <a href="https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=%23Arabidopsis+thaliana%23gephebase-summary-title">https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=%23Arabidopsis+thaliana%23gephebase-summary-title</a> )	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; Euphylophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelinae; Arabidopsis	Lineage	cellular organisms; Eukaryota; Viriplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphylophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelinae; Arabidopsis	Lineage
Arabidopsis () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3701">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3701</a> )	Parent	Arabidopsis () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3701">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3701</a> )	Parent
3702 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3702">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3702</a> )	NCBI Taxonomy ID	3702 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3702">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3702</a> )	NCBI Taxonomy ID
is Taxon A an Infraspecies?		is Taxon B an Infraspecies?	
Yes	Taxon A Description	Yes	Taxon B Description
Arabidopsis thaliana- Ler0		Arabidopsis thaliana- Cvi	

## GENOTYPIC CHANGE

ERECTA	Generic Gene Name	UniProtKB Arabidopsis thaliana
	Synonyms	Q42371 ( <a href="http://www.uniprot.org/uniprot/Q42371">http://www.uniprot.org/uniprot/Q42371</a> )
ERECTA; QRP1; QUANTITATIVE RESISTANCE TO PLECTOSPHAERELLA 1; T1D16.3; T1D16.3; ER; QR51; TE1; At2g26330		GenebankID or UniProtKB
3702.AT2G26330.1 ( <a href="http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 3702.AT2G26330.1">http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 3702.AT2G26330.1</a> )	String	EF598346 ( <a href="https://www.ncbi.nlm.nih.gov/nuccore/EF598346">https://www.ncbi.nlm.nih.gov/nuccore/EF598346</a> )
Belongs to the protein kinase superfamily. Ser/Thr protein kinase family.	Sequence Similarities	
GO:0005524 : ATP binding ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0005524">https://www.ebi.ac.uk/QuickGO/term/GO:0005524</a> )	GO - Molecular Function	
GO:0005102 : signaling receptor binding ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0005102">https://www.ebi.ac.uk/QuickGO/term/GO:0005102</a> )		

GO:0004674 : protein serine/threonine kinase activity  
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0004674>)  
 GO:0004672 : protein kinase activity (<https://www.ebi.ac.uk/QuickGO/term/GO:0004672>)  
 GO:0042277 : peptide binding (<https://www.ebi.ac.uk/QuickGO/term/GO:0042277>)  
 GO:0033612 : receptor serine/threonine kinase binding  
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0033612>)  
 GO:0019199 : transmembrane receptor protein kinase activity  
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0019199>)

#### GO - Biological Process

GO:0042742 : defense response to bacterium  
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0042742>)  
 GO:0050832 : defense response to fungus  
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0050832>)  
 GO:0046777 : protein autophosphorylation  
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0046777>)  
 GO:0070370 : cellular heat acclimation  
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0070370>)  
 GO:0048281 : inflorescence morphogenesis  
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0048281>)  
 GO:0009965 : leaf morphogenesis (<https://www.ebi.ac.uk/QuickGO/term/GO:0009965>)  
 GO:0010087 : phloem or xylem histogenesis  
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0010087>)  
 GO:0009664 : plant-type cell wall organization  
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0009664>)  
 GO:0009944 : polarity specification of adaxial/abaxial axis  
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0009944>)  
 GO:0030155 : regulation of cell adhesion  
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0030155>)  
 GO:0051302 : regulation of cell division  
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0051302>)  
 GO:0001558 : regulation of cell growth  
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0001558>)  
 GO:1905421 : regulation of plant organ morphogenesis  
 (<https://www.ebi.ac.uk/QuickGO/term/GO:1905421>)  
 GO:0010103 : stomatal complex morphogenesis  
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0010103>)  
 GO:0010148 : transpiration (<https://www.ebi.ac.uk/QuickGO/term/GO:0010148>)

#### GO - Cellular Component

GO:0016021 : integral component of membrane  
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0016021>)  
 GO:0005886 : plasma membrane (<https://www.ebi.ac.uk/QuickGO/term/GO:0005886>)  
 GO:0009506 : plasmodesma (<https://www.ebi.ac.uk/QuickGO/term/GO:0009506>)  
 GO:0005739 : mitochondrion (<https://www.ebi.ac.uk/QuickGO/term/GO:0005739>)

Presumptive Null

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

Molecular Type

Unknown (<https://www.gephebase.org/search-criteria?/and+Molecular+Type=^Unknown^#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

ERECTA receptor-like kinase and heterotrimeric G protein from *Arabidopsis* are required for resistance to the necrotrophic fungus *Plectosphaerella cucumerina*. (2005)  
 (<https://pubmed.ncbi.nlm.nih.gov/15998304>)

Authors

Llorente F; Alonso-Blanco C; Sánchez-Rodríguez C; Jorda L; Molina A

Abstract

*Arabidopsis* resistance to the necrotrophic fungus *Plectosphaerella cucumerina* is complex and depends on the ethylene, jasmonic acid and salicylic acid signaling pathways. A quantitative trait loci (QTL) analysis of resistance to this fungus was performed using two populations of recombinant inbred lines. Three loci QRP1-QRP3 (for Quantitative Resistance to *Plectosphaerella*) were identified and mapped on chromosome 2 (QRP1 and QRP2) and 5 (QRP3). QRP1, the locus showing the strongest effect, was found to correspond to the ERECTA (ER) gene that encodes a receptor-like-kinase (RLK), which has been previously implicated in plant development, and resistance to the bacterium *Ralstonia solanacearum*. The leucine-rich repeat and the kinase domains of ERECTA were specifically required for resistance to *P. cucumerina*, as er mutant alleles impaired in any of these domains showed enhanced susceptibility to this fungus, but not to other virulent pathogens. The involvement of the ER-signaling pathway in resistance to *P. cucumerina* was supported by the fact that three mutants defective in this pathway, elk2, elk5 and elk4 (agb1-1), which encodes the beta-subunit of *Arabidopsis* heterotrimeric G protein, were also impaired in their resistance to this fungus. The putative function of the *Arabidopsis* heterotrimeric G protein in resistance to *P. cucumerina* suggested by the enhanced susceptibility of agb1-1 was corroborated by the demonstration that a null allele (gpa1-4) of the G protein alpha-subunit showed enhanced resistance to this pathogen. Deposition of beta-1,3-glucan callose at infection sites was specifically impaired in er-1 and agb1-1 mutants upon *P. cucumerina* inoculation. Taken together, these data suggest a putative function of ERECTA and heterotrimeric G protein in *P. cucumerina* perception.

Additional References

## RELATED GEPHE

Related Genes

20 (ACD6 = ACCELERATED CELL DEATH 6, 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, WRR4) (<https://www.gephebase.org/search-criteria?/or+Taxon+ID=^3702^/and+Trait=Pathogen>)

resistance/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

1 (<https://www.gephebase.org/search-criteria?/or+Gene Gephebase=^ERECTA^/and+Taxon ID=^3702^/or+Gene Gephebase=^ERECTA^/and+Taxon ID=^3702^#gephebase-summary-title>)

## EXTERNAL LINKS

## COMMENTS

ERECTA not involved in other fungus resistance.