

GEPHE SUMMARY

	Gephebase Gene	GephelD
ACD6 = ACCELERATED CELL DEATH 6 (https://www.gephebase.org/search-criteria/?and+Gene Gephebase=^ACD6)	GP00000025	Main curator
6^#gephebase-summary-title)	Martin	
	Entry Status	
Published		

PHENOTYPIC CHANGE

Trait #1	Trait Category	
Physiology (https://www.gephebase.org/search-criteria/?and+Trait Category=^Physiology^#gephebase-summary-title)	Trait	
Plant size (https://www.gephebase.org/search-criteria/?and+Trait=^Plant size^#gephebase-summary-title)	Trait State in Taxon A	
Arabidopsis thaliana	Trait State in Taxon B	
Arabidopsis thaliana		

Trait #2	Trait Category	
Physiology (https://www.gephebase.org/search-criteria/?and+Trait Category=^Physiology^#gephebase-summary-title)	Trait	
Pathogen resistance (plant microbes) (https://www.gephebase.org/search-criteria/?and+Trait=^Pathogen resistance (plant microbes)^#gephebase-summary-title)	Trait State in Taxon A	
-	Trait State in Taxon B	
-		

Trait #3	Trait Category	
Physiology (https://www.gephebase.org/search-criteria/?and+Trait Category=^Physiology^#gephebase-summary-title)	Trait	
Herbivore resistance (https://www.gephebase.org/search-criteria/?and+Trait=^Herbivore resistance^#gephebase-summary-title)	Trait State in Taxon A	
-	Trait State in Taxon B	
-		

	Ancestral State	
Data not curated	Taxonomic Status	
Intraspecific (https://www.gephebase.org/search-criteria/?and+Taxonomic Status=^Intraspecific^#gephebase-summary-title)		
Taxon A	Latin Name	Taxon B
Arabidopsis thaliana (https://www.gephebase.org/search-criteria/?and+Taxon and Synonyms=^Arabidopsis thaliana^#gephebase-summary-title)	Common Name	Latin Name
thale cress	Synonyms	Arabidopsis thaliana (https://www.gephebase.org/search-criteria/?and+Taxon and Synonyms=^Arabidopsis thaliana^#gephebase-summary-title)
thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress	Rank	Common Name
species	Lineage	Synonyms
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta;		Rank
		Lineage
		cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta;

Tracheophyta; Euphylophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelinae; Arabidopsis

Parent

Arabidopsis () - (Rank: genus)

(<https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701>)

3702

(<https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702>)

is Taxon A an Infraspecies?

No

Tracheophyta; Euphylophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelinae; Arabidopsis

Parent

Arabidopsis () - (Rank: genus)

(<https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701>)

NCBI Taxonomy ID

3702

(<https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702>)

is Taxon B an Infraspecies?

No

GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Arabidopsis thaliana
ACD6	Synonyms	Q8LPS2 (http://www.uniprot.org/uniprot/Q8LPS2)
ACCELERATED CELL DEATH 6; DL3240W; FCAALL.190; At4g14400; dl3240w	String	GenebankID or UniProtKB CP002687 (https://www.ncbi.nlm.nih.gov/nuccore/CP002687)
3702.AT4G14400.1 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=3702.AT4G14400.1)	Sequence Similarities	
-	GO - Molecular Function	
-	GO - Biological Process	
GO:0008219 : cell death (https://www.ebi.ac.uk/QuickGO/term/GO:0008219)		
GO:0071446 : cellular response to salicylic acid stimulus (https://www.ebi.ac.uk/QuickGO/term/GO:0071446)		
GO:0009816 : defense response to bacterium, incompatible interaction (https://www.ebi.ac.uk/QuickGO/term/GO:0009816)		
GO:1900426 : positive regulation of defense response to bacterium (https://www.ebi.ac.uk/QuickGO/term/GO:1900426)		
GO:1902290 : positive regulation of defense response to oomycetes (https://www.ebi.ac.uk/QuickGO/term/GO:1902290)		
GO:0016567 : protein ubiquitination (https://www.ebi.ac.uk/QuickGO/term/GO:0016567)		
GO:1900150 : regulation of defense response to fungus (https://www.ebi.ac.uk/QuickGO/term/GO:1900150)		
GO:2000031 : regulation of salicylic acid mediated signaling pathway (https://www.ebi.ac.uk/QuickGO/term/GO:2000031)		
GO:0009617 : response to bacterium (https://www.ebi.ac.uk/QuickGO/term/GO:0009617)		
GO:0050826 : response to freezing (https://www.ebi.ac.uk/QuickGO/term/GO:0050826)		
GO:0009416 : response to light stimulus (https://www.ebi.ac.uk/QuickGO/term/GO:0009416)		
GO:0009751 : response to salicylic acid (https://www.ebi.ac.uk/QuickGO/term/GO:0009751)		
GO:0009615 : response to virus (https://www.ebi.ac.uk/QuickGO/term/GO:0009615)		
GO - Cellular Component		
GO:0016020 : membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0016020)		
GO:0005887 : integral component of plasma membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0005887)		
GO:0030176 : integral component of endoplasmic reticulum membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0030176)		
Unknown (https://www.gephbase.org/search-criteria/?and+Presumptive+Null=^Unknown^#gephbase-summary-title)		Presumptive Null
Coding (https://www.gephbase.org/search-criteria/?and+Molecular+Type=^Coding^#gephbase-summary-title)		Molecular Type
Unknown (https://www.gephbase.org/search-criteria/?and+Aberration+Type=^Unknown^#gephbase-summary-title)		Aberration Type
Various		Molecular Details of the Mutation
Linkage Mapping (https://www.gephbase.org/search-criteria/?and+Experimental+Evidence=^Linkage+Mapping^#gephbase-summary-title)		Experimental Evidence
Natural allelic variation underlying a major fitness trade-off in <i>Arabidopsis thaliana</i> . (2010) (https://pubmed.ncbi.nlm.nih.gov/20520716)		Main Reference
Todesco M; Balasubramanian S; Hu TT; Traw MB; Horton M; Epple P; Kuhns C; Sureshkumar S; Schwartz C; Lanz C; Laitinen RA; Huang Y; Chory J; Lipka V; Borevitz JO; Dangl JL; Bergelson J; Nordborg M; Weigel D		Authors
Plants can defend themselves against a wide array of enemies, from microbes to large animals, yet there is great variability in the effectiveness of such defences, both within and between species. Some of this variation can be explained by conflicting pressures from pathogens with different modes of attack. A second explanation comes from an evolutionary 'tug of war', in which pathogens adapt to evade detection, until the plant has evolved new recognition capabilities for pathogen invasion. If selection is, however, sufficiently strong, susceptible hosts should remain rare. That this is not the case is best explained by costs incurred from constitutive defences in a pest-free environment. Using a combination of forward genetics and genome-wide association analyses, we demonstrate that allelic diversity at a single locus, ACCELERATED CELL DEATH 6 (ACD6), underpins marked pleiotropic differences in both vegetative growth and resistance to microbial infection and herbivory among natural <i>Arabidopsis thaliana</i> strains. A hyperactive ACD6 allele, compared to the reference allele, strongly enhances resistance to a broad range of		Abstract

pathogens from different phyla, but at the same time slows the production of new leaves and greatly reduces the biomass of mature leaves. This allele segregates at intermediate frequency both throughout the worldwide range of *A. thaliana* and within local populations, consistent with this allele providing substantial fitness benefits despite its marked impact on growth.

Additional References

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

RELATED GEPHE

Related Genes
24 (AtGA20ox1 (=GA5=Sdi), CYP81F2, Epithiospecifier protein (ESP), 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, WRR4, phytochrome D (PHYD)) (<https://www.gephebase.org/search-criteria?/or+TaxonID=%3702%and+Trait=Plant%20size/or+TaxonID=%3702%and+Trait=Pathogen%20resistance/or+TaxonID=%3702%and+Trait=Herbivore%20resistance/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

@Pleiotropy @GxE