

GEPHE SUMMARY

	Gephebase Gene	GephelD
Epithiospecifier protein (ESP) (https://www.gephebase.org/search-criteria/?and+Gene)	GP00000278	
Gephebase=^Epithiospecifier protein (ESP)^#gephebase-summary-title)		Main curator
Published	Entry Status	Martin

PHENOTYPIC CHANGE

Trait #1	Trait Category	Trait
Physiology (https://www.gephebase.org/search-criteria/?and+Trait)		
Category=^Physiology^#gephebase-summary-title)		
Plant secondary metabolite (glucosinolate) (https://www.gephebase.org/search-criteria/?and+Trait=^Plant+secondary+metabolite+(glucosinolate)^#gephebase-summary-title)		Trait
Arabidopsis thaliana- Ler0	Trait State in Taxon A	
Arabidopsis thaliana- Colo	Trait State in Taxon B	

Trait #2	Trait Category	Trait
Physiology (https://www.gephebase.org/search-criteria/?and+Trait)		
Category=^Physiology^#gephebase-summary-title)		
Herbivore resistance (https://www.gephebase.org/search-criteria/?and+Trait=^Herbivore+resistance^#gephebase-summary-title)		Trait
-	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	Latin Name
Arabidopsis thaliana (https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=^Arabidopsis+thaliana^#gephebase-summary-title)		
thale cress	Common Name	Common Name
thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress	Synonyms	Synonyms
species	Rank	Rank
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelinae; Arabidopsis	Lineage	Lineage
Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3701)	Parent	Parent
3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3702)	NCBI Taxonomy ID	NCBI Taxonomy ID
is Taxon A an Infraspecies?		
Yes	Taxon A Description	Taxon B Description
Arabidopsis thaliana- Ler0		Arabidopsis thaliana- Colo

GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Arabidopsis thaliana	
ESP	Q8RY71 (http://www.uniprot.org/uniprot/Q8RY71)		
	Synonyms	GenebankID or UniProtKB	
epithiospecifier protein; EPITHIOSPECIFYING SENESCENCE REGULATOR; ESR; F15l1_12; F15l1_12; TASTY; At1g54040	EU404390 (https://www.ncbi.nlm.nih.gov/nuccore/EU404390)		
	String		
3702.AT1G54040.2 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=3702.AT1G54040.2)			
-	Sequence Similarities		
	GO - Molecular Function		
GO:0030234 : enzyme regulator activity (https://www.ebi.ac.uk/QuickGO/term/GO:0030234)	GO - Biological Process		
GO:0042742 : defense response to bacterium (https://www.ebi.ac.uk/QuickGO/term/GO:0042742)	GO - Cellular Component	Presumptive Null	
GO:0019762 : glucosinolate catabolic process (https://www.ebi.ac.uk/QuickGO/term/GO:0019762)		Molecular Type	
GO:0010150 : leaf senescence (https://www.ebi.ac.uk/QuickGO/term/GO:0010150)		Aberration Type	
GO:0080028 : nitrile biosynthetic process (https://www.ebi.ac.uk/QuickGO/term/GO:0080028)		Molecular Details of the Mutation	
GO:0009753 : response to jasmonic acid (https://www.ebi.ac.uk/QuickGO/term/GO:0009753)		Experimental Evidence	
GO:0005829 : cytosol (https://www.ebi.ac.uk/QuickGO/term/GO:0005829)		Main Reference	
GO:0005634 : nucleus (https://www.ebi.ac.uk/QuickGO/term/GO:0005634)		Authors	
Unknown (https://www.gephbase.org/search-criteria?/and+Presumptive Null=^Unknown^#gephbase-summary-title)		Lambrix V; Reichelt M; Mitchell-Olds T; Kliebenstein DJ; Gershenson J	Abstract
Cis-regulatory (https://www.gephbase.org/search-criteria?/and+Molecular Type=^Cis-regulatory^#gephbase-summary-title)		The Arabidopsis epithiospecifier protein promotes the hydrolysis of glucosinolates to nitriles and influences <i>Trichoplusia ni</i> herbivory. (2001) (https://pubmed.ncbi.nlm.nih.gov/11752388)	
Unknown (https://www.gephbase.org/search-criteria?/and+Aberration Type=^Unknown^#gephbase-summary-title)			
Not identified			
Linkage Mapping (https://www.gephbase.org/search-criteria?/and+Experimental Evidence=^Linkage Mapping^#gephbase-summary-title)			
Glucosinolates are anionic thioglucosides that have become one of the most frequently studied groups of defensive metabolites in plants. When tissue damage occurs, the thioglucoside linkage is hydrolyzed by enzymes known as myrosinases, resulting in the formation of a variety of products that are active against herbivores and pathogens. In an effort to learn more about the molecular genetic and biochemical regulation of glucosinolate hydrolysis product formation, we analyzed leaf samples of 122 <i>Arabidopsis</i> ecotypes. A distinct polymorphism was observed with all ecotypes producing primarily isothiocyanates or primarily nitriles. The ecotypes Columbia (Col) and Landsberg erecta (Ler) differed in their hydrolysis products; therefore, the Col x Ler recombinant inbred lines were used for mapping the genes controlling this polymorphism. The major quantitative trait locus (QTL) affecting nitrile versus isothiocyanate formation was found very close to a gene encoding a homolog of a <i>Brassica napus</i> epithiospecifier protein (ESP), which causes the formation of epithionitriles instead of isothiocyanates during glucosinolate hydrolysis in the seeds of certain Brassicaceae. The heterologously expressed <i>Arabidopsis</i> ESP was able to convert glucosinolates both to epithionitriles and to simple nitriles in the presence of myrosinase, and thus it was more versatile than previously described ESPs. The role of ESP in plant defense is uncertain, because the generalist herbivore <i>Trichoplusia ni</i> (the cabbage looper) was found to feed more readily on nitrile-producing than on isothiocyanate-producing <i>Arabidopsis</i> . However, isothiocyanates are frequently used as recognition cues by specialist herbivores, and so the formation of nitriles instead of isothiocyanates may allow <i>Arabidopsis</i> to be less apparent to specialists.			
			Additional References

RELATED GEPHE

	Related Genes
3 (ACD6 = ACCELERATED CELL DEATH 6, CYP81F2, UDP-glycosyltransferase 89A2) (https://www.gephbase.org/search-criteria?/or+Taxon ID=^3702^/and+Trait=Plant secondary metabolite/or+Taxon ID=^3702^/and+Trait=Herbivore resistance/and+groupHaplotypes=true#gephbase-summary-title)	Related Haplotypes
1 (https://www.gephbase.org/search-criteria?/or+Gene Gephebase=^Epithiospecifier protein (ESP)^/and+Taxon ID=^3702^/or+Gene Gephebase=^Epithiospecifier protein (ESP)^/and+Taxon ID=^3702^#gephbase-summary-title)	

EXTERNAL LINKS

COMMENTS

