

GEPHE SUMMARY

Gephebase Gene		GepheID
Epithiospecifier protein (ESP) (<a +epithiospecifier+protein+(esp)+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase="+Epithiospecifier+protein+(ESP)+"#gephebase-summary-title)		
Entry Status		Main curator
Published		Martin

PHENOTYPIC CHANGE

Trait #1	Trait Category
Physiology (<a +physiology+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait+Category=">https://www.gephebase.org/search-criteria?/and+Trait+Category="+Physiology+"#gephebase-summary-title)	
Plant secondary metabolite (glucosinolate) (<a +plant+secondary+metabolite+(glucosinolate)+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait="+Plant+secondary+metabolite+(glucosinolate)+"#gephebase-summary-title)	
Trait State in Taxon A	
Arabidopsis thaliana- Ler0	
Trait State in Taxon B	
Arabidopsis thaliana- Col0	

Trait #2	Trait Category
Physiology (<a +physiology+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait+Category=">https://www.gephebase.org/search-criteria?/and+Trait+Category="+Physiology+"#gephebase-summary-title)	
Herbivore resistance (<a +herbivore+resistance+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">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 (<a +intraspecific+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=">https://www.gephebase.org/search-criteria?/and+Taxonomic+Status="+Intraspecific+"#gephebase-summary-title)	
Taxon A	Taxon B
Latin Name	Latin Name
Arabidopsis thaliana (<a +arabidopsis+thaliana+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Arabidopsis+thaliana+"#gephebase-summary-title)	Arabidopsis thaliana (<a +arabidopsis+thaliana+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">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; Pentapetales; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis	cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetales; 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	3702
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=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- Ler0	Arabidopsis thaliana- Col0

GENOTYPIC CHANGE

ESP epithiospecifier protein; EPITHIOSPECIFYING SENESENCE REGULATOR; ESR; F15l1.12; F15l1_12; TASTY; At1g54040 3702.AT1G54040.2 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 3702.AT1G54040.2) - GO:0030234 : enzyme regulator activity (https://www.ebi.ac.uk/QuickGO/term/GO:0030234) GO:0042742 : defense response to bacterium (https://www.ebi.ac.uk/QuickGO/term/GO:0042742) GO:0019762 : glucosinolate catabolic process (https://www.ebi.ac.uk/QuickGO/term/GO:0019762) GO:0010150 : leaf senescence (https://www.ebi.ac.uk/QuickGO/term/GO:0010150) GO:0080028 : nitrile biosynthetic process (https://www.ebi.ac.uk/QuickGO/term/GO:0080028) GO:0009753 : response to jasmonic acid (https://www.ebi.ac.uk/QuickGO/term/GO:0009753) GO:0005829 : cytosol (https://www.ebi.ac.uk/QuickGO/term/GO:0005829) GO:0005634 : nucleus (https://www.ebi.ac.uk/QuickGO/term/GO:0005634)	Generic Gene Name	Q8RY71 (http://www.uniprot.org/uniprot/Q8RY71)	UniProtKB Arabidopsis thaliana
	Synonyms	EU404390 (https://www.ncbi.nlm.nih.gov/nuccore/EU404390)	GenebankID or UniProtKB
	String		
	Sequence Similarities		
	GO - Molecular Function		
	GO - Biological Process		
	GO - Cellular Component		
	Unknown (https://www.gephebase.org/search-criteria?/and+Presumptive Null=~Unknown~#gephebase-summary-title)	Presumptive Null	
	Cis-regulatory (https://www.gephebase.org/search-criteria?/and+Molecular Type=~Cis-regulatory~#gephebase-summary-title)	Molecular Type	
	Unknown (https://www.gephebase.org/search-criteria?/and+Aberration Type=~Unknown~#gephebase-summary-title)	Aberration Type	
Not identified	Molecular Details of the Mutation		
Linkage Mapping (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=~Linkage Mapping~#gephebase-summary-title)	Experimental Evidence		
The Arabidopsis epithiospecifier protein promotes the hydrolysis of glucosinolates to nitriles and influences Trichoplusia ni herbivory. (2001) (https://pubmed.ncbi.nlm.nih.gov/11752388)	Main Reference		
Lambrix V; Reichelt M; Mitchell-Olds T; Kliebenstein DJ; Gershenzon J	Authors		
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 Arabidopsis 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 Brassica napus epithiospecifier protein (ESP), which causes the formation of epithionitriles instead of isothiocyanates during glucosinolate hydrolysis in the seeds of certain Brassicaceae. The heterologously expressed Arabidopsis 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 Trichoplusia ni (the cabbage looper) was found to feed more readily on nitrile-producing than on isothiocyanate-producing Arabidopsis. However, isothiocyanates are frequently used as recognition cues by specialist herbivores, and so the formation of nitriles instead of isothiocyanates may allow Arabidopsis to be less apparent to specialists.	Abstract		
	Additional References		

RELATED GEPHE

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

EXTERNAL LINKS

COMMENTS

