

GEPHE SUMMARY

CYP81F2 (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=CYP81F2^#gephebase-summary-title)	Gephebase Gene	GP00000212	GepheID
Published	Entry Status	Martin	Main curator

PHENOTYPIC CHANGE

Trait #1	Trait Category
Physiology (https://www.gephebase.org/search-criteria?/and+Trait+Category=Physiology^#gephebase-summary-title)	Trait
Glucosinolate content (https://www.gephebase.org/search-criteria?/and+Trait=Glucosinolate+content^#gephebase-summary-title)	Trait State in Taxon A
Arabidopsis thaliana- Da(1)-12	Trait State in Taxon B
Arabidopsis thaliana- Ei-2	

Trait #2	Trait Category
Physiology (https://www.gephebase.org/search-criteria?/and+Trait+Category=Physiology^#gephebase-summary-title)	Trait
Herbivore resistance (aphids) (https://www.gephebase.org/search-criteria?/and+Trait=Herbivore+resistance+(aphids)^#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	Taxon B
Arabidopsis thaliana (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Arabidopsis+thaliana^#gephebase-summary-title)	Arabidopsis thaliana (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Arabidopsis+thaliana^#gephebase-summary-title)
thale cress	thale cress
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
species	species
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis	cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis
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)
3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702)	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- Da(1)-12	Arabidopsis thaliana- Ei-2

GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Arabidopsis thaliana
CYP81F2	Q9LVD6 (http://www.uniprot.org/uniprot/Q9LVD6)	
	Synonyms	GenebankID or UniProtKB
''cytochrome P450; cytochrome P450; family 81; MJB24.3; MJB24_3; polypeptide 2; polypeptide 2''; subfamily F; IGM1; At5g57220	FM208179 (https://www.ncbi.nlm.nih.gov/nucore/FM208179)	
	String	
3702.AT5G57220.1 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=3702.AT5G57220.1)		
	Sequence Similarities	
Belongs to the cytochrome P450 family.		
	GO - Molecular Function	
GO:0020037 : heme binding (https://www.ebi.ac.uk/QuickGO/term/GO:0020037)		
GO:0005506 : iron ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005506)		
GO:0016709 : oxidoreductase activity, acting on paired donors, with incorporation or reduction of molecular oxygen, NAD(P)H as one donor, and incorporation of one atom of oxygen (https://www.ebi.ac.uk/QuickGO/term/GO:0016709)		
	GO - Biological Process	
GO:0009617 : response to bacterium (https://www.ebi.ac.uk/QuickGO/term/GO:0009617)		
GO:0042742 : defense response to bacterium (https://www.ebi.ac.uk/QuickGO/term/GO:0042742)		
GO:0071456 : cellular response to hypoxia (https://www.ebi.ac.uk/QuickGO/term/GO:0071456)		
GO:0052544 : defense response by callose deposition in cell wall (https://www.ebi.ac.uk/QuickGO/term/GO:0052544)		
GO:0050832 : defense response to fungus (https://www.ebi.ac.uk/QuickGO/term/GO:0050832)		
GO:0002213 : defense response to insect (https://www.ebi.ac.uk/QuickGO/term/GO:0002213)		
GO:0019760 : glucosinolate metabolic process (https://www.ebi.ac.uk/QuickGO/term/GO:0019760)		
GO:0009759 : indole glucosinolate biosynthetic process (https://www.ebi.ac.uk/QuickGO/term/GO:0009759)		
GO:0042343 : indole glucosinolate metabolic process (https://www.ebi.ac.uk/QuickGO/term/GO:0042343)		
GO:0009682 : induced systemic resistance (https://www.ebi.ac.uk/QuickGO/term/GO:0009682)		
	GO - Cellular Component	
GO:0016021 : integral component of membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0016021)		
GO:0016020 : membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0016020)		
		Presumptive Null
Unknown (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^Unknown^#gephebase-summary-title)		
		Molecular Type
Cis-regulatory (https://www.gephebase.org/search-criteria?/and+Molecular Type=^Cis-regulatory^#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
The gene controlling the indole glucosinolate modifier1 quantitative trait locus alters indole glucosinolate structures and aphid resistance in Arabidopsis. (2009) (https://pubmed.ncbi.nlm.nih.gov/19293369)		
		Authors
Pfalz M; Vogel H; Kroymann J		
		Abstract
Glucosinolates are defensive secondary compounds that display large structural diversity in Arabidopsis thaliana and related plants. Much attention has been paid to variation in the biosynthesis of Met-derived aliphatic glucosinolates and its ecological consequences, but little is known about the genes that cause qualitative and quantitative differences in Trp-derived indole glucosinolates. We use a combination of quantitative trait locus (QTL) fine-mapping and microarray-based transcript profiling to identify CYP81F2 (At5g57220), encoding a cytochrome P450 monooxygenase, as the gene underlying Indole Glucosinolate Modifier1 (IGM1), a metabolic QTL for the accumulation of two modified indole glucosinolates, 4-hydroxy-indole-3-yl-methyl and 4-methoxy-indole-3-yl-methyl glucosinolate. We verify CYP81F2 function with two SALK T-DNA insertion lines and show that CYP81F2 catalyzes the conversion of indole-3-yl-methyl to 4-hydroxy-indole-3-yl-methyl glucosinolate. We further show that the IGM1 QTL is largely caused by differences in CYP81F2 expression, which results from a combination of cis- and trans-acting expression QTL different from known regulators of indole glucosinolate biosynthesis. Finally, we elucidate a potential function of CYP81F2 in plant-insect interactions and find that CYP81F2 contributes to defense against the green peach aphid (Myzus persicae) but not to resistance against herbivory by larvae from four lepidopteran species.		
		Additional References

RELATED GEPHE

	Related Genes
5 (ACD6 = ACCELERATED CELL DEATH 6, AOP2, AOP3, MAM1, Epithiospecifier protein (ESP)) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^3702^/and+Trait=Glucosinolate content/or+Taxon ID=^3702^/and+Trait=Herbivore resistance/and+groupHaplotypes=true#gephebase-summary-title)	

No matches found.

EXTERNAL LINKS

COMMENTS