

## GEPHE SUMMARY

CLH1 ( <a href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=^CLH1^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=^CLH1^#gephebase-summary-title</a> )	Gephebase Gene	GP00001234	GepheID
Published	Entry Status	Arnoult	Main curator

## PHENOTYPIC CHANGE

Physiology ( <a href="https://www.gephebase.org/search-criteria?/and+Trait+Category=^Physiology^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait+Category=^Physiology^#gephebase-summary-title</a> )	Trait Category		
Xenobiotic resistance (fungicide: guazatine) ( <a href="https://www.gephebase.org/search-criteria?/and+Trait=^Xenobiotic+resistance+(fungicide:guazatine)^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait=^Xenobiotic+resistance+(fungicide:guazatine)^#gephebase-summary-title</a> )	Trait		
Arabidopsis thaliana	Trait State in Taxon A		
Arabidopsis thaliana	Trait State in Taxon B		
Data not curated	Ancestral State		
Intraspecific ( <a href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=^Intraspecific^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=^Intraspecific^#gephebase-summary-title</a> )	Taxonomic Status		
	Taxon A		Taxon B
Arabidopsis thaliana ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Arabidopsis+thaliana^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Arabidopsis+thaliana^#gephebase-summary-title</a> )	Latin Name	Arabidopsis thaliana ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Arabidopsis+thaliana^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Arabidopsis+thaliana^#gephebase-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; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis	Lineage	cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; 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
No	is Taxon A an Intraspecies?	No	is Taxon B an Intraspecies?

## GENOTYPIC CHANGE

CLH1	Generic Gene Name	O22527 ( <a href="http://www.uniprot.org/uniprot/O22527">http://www.uniprot.org/uniprot/O22527</a> )	UniProtKB Arabidopsis thaliana
ATCLH1; ATHCOR1; CHLOROPHYLLASE; chlorophyllase 1; COR1; CORONATINE-INDUCED PROTEIN 1; F6F9.28; F6F9_28; COR1; At1g19670	Synonyms	()	GenebankID or UniProtKB
3702.AT1G19670.1 ( <a href="http://string-db.org/newstring.cgi/show_network_section.pl?identifier=3702.AT1G19670.1">http://string-db.org/newstring.cgi/show_network_section.pl?identifier=3702.AT1G19670.1</a> )	String		
Belongs to the AB hydrolase superfamily. Lipase family.	Sequence Similarities		
GO:0047746 : chlorophyllase activity ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0047746">https://www.ebi.ac.uk/QuickGO/term/GO:0047746</a> )	GO - Molecular Function		
GO:0102293 : pheophytinase b activity ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0102293">https://www.ebi.ac.uk/QuickGO/term/GO:0102293</a> )	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:0015996 : chlorophyll catabolic process  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0015996>)

GO - Cellular Component

GO:0005773 : vacuole (<https://www.ebi.ac.uk/QuickGO/term/GO:0005773>)

Presumptive Null

Unknown ([https://www.gephebase.org/search-criteria?/and+Presumptive Null=^Unknown^#gephebase-summary-title](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](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](https://www.gephebase.org/search-criteria?/and+Aberration+Type=^Unknown^#gephebase-summary-title))

Molecular Details of the Mutation

unknown

Experimental Evidence

Association Mapping ([https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Association Mapping^#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=^Association+Mapping^#gephebase-summary-title))

Main Reference

Genome Wide Association Mapping for the Tolerance to the Polyamine Oxidase Inhibitor Guazatine in *Arabidopsis thaliana*. (2016) (<https://pubmed.ncbi.nlm.nih.gov/27092150>)

Authors

Atanasov KE; Barboza-Barquero L; Tiburcio AF; Alcázar R

Abstract

Guazatine is a potent inhibitor of polyamine oxidase (PAO) activity. In agriculture, guazatine is used as non-systemic contact fungicide efficient in the protection of cereals and citrus fruits against disease. The composition of guazatine is complex, mainly constituted by a mixture of synthetic guanidated polyamines (polyaminoguanidines). Here, we have studied the effects from exposure to guazatine in the weed *Arabidopsis thaliana*. We report that micromolar concentrations of guazatine are sufficient to inhibit growth of *Arabidopsis* seedlings and induce chlorosis, whereas germination is barely affected. We observed the occurrence of quantitative variation in the response to guazatine between 107 randomly chosen *Arabidopsis* accessions. This enabled us to undertake genome-wide association (GWA) mapping that identified a locus on chromosome one associated with guazatine tolerance. CHLOROPHYLLASE 1 (CLH1) within this locus was studied as candidate gene, together with its paralog (CLH2). The analysis of independent *clh1-2*, *clh1-3*, *clh2-3*, *clh2-2*, and double *clh1-2 clh2-3* mutant alleles indicated that CLH1 and/or CLH2 loss-of-function or expression down-regulation promote guazatine tolerance in *Arabidopsis*. We report a natural mechanism by which *Arabidopsis* populations can overcome toxicity by the fungicide guazatine.

Additional References

## RELATED GEPHE

Related Genes

1 (HAC1 (=ATQ1)) ([https://www.gephebase.org/search-criteria?/or+Taxon ID=^3702^/and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Taxon+ID=^3702^/and+Trait=Xenobiotic+resistance/and+groupHaplotypes=true#gephebase-summary-title))

Related Haplotypes

No matches found.

## EXTERNAL LINKS

## COMMENTS

CLH2 paralog also involved in the trait variation