

GEPHE SUMMARY

MLO1 (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=MLO1#gephebase-summary-title)	Gephebase Gene	GP00000674	GepheID
Published	Entry Status	Martin	Main curator

PHENOTYPIC CHANGE

Physiology (https://www.gephebase.org/search-criteria?/and+Trait+Category=Physiology#gephebase-summary-title)	Trait Category		
Pathogen resistance (https://www.gephebase.org/search-criteria?/and+Trait=Pathogen+resistance#gephebase-summary-title)	Trait		
Solanum lycopersicum	Trait State in Taxon A		
Solanum lycopersicum	Trait State in Taxon B		
Taxon A	Ancestral State		
Domesticated (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=Domesticated#gephebase-summary-title)	Taxonomic Status		
	Taxon A		Taxon B
Solanum lycopersicum (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=Solanum+lycopersicum#gephebase-summary-title)	Latin Name	Solanum lycopersicum (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=Solanum+lycopersicum#gephebase-summary-title)	Latin Name
tomato	Common Name	tomato	Common Name
Lycopersicon esculentum var. esculentum; Solanum esculentum; Solanum lycopersicum var. humboldtii; tomato; Lycopersicon esculentum Mill.; Solanum esculentum Dunal; Solanum lycopersicum L.; Lycopersicon lycopersicum; Lycopersicum esculentum; Solanum lycopersicon	Synonyms	Lycopersicon esculentum var. esculentum; Solanum esculentum; Solanum lycopersicum var. humboldtii; tomato; Lycopersicon esculentum Mill.; Solanum esculentum Dunal; Solanum lycopersicum L.; Lycopersicon lycopersicum; Lycopersicum esculentum; Solanum lycopersicon	Synonyms
species	Rank	species	Rank
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Solanaceae; Solanoideae; Solanaeae; Solanum; Lycopersicon	Lineage	cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Solanaceae; Solanoideae; Solanaeae; Solanum; Lycopersicon	Lineage
Lycopersicon () - (Rank: subgenus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=49274)	Parent	Lycopersicon () - (Rank: subgenus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=49274)	Parent
4081 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4081)	NCBI Taxonomy ID	4081 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4081)	NCBI Taxonomy ID
No	is Taxon A an Intraspecies?	No	is Taxon B an Intraspecies?

GENOTYPIC CHANGE

MLO	Generic Gene Name	P93766 (http://www.uniprot.org/uniprot/P93766)	UniProtKB Hordeum vulgare
-	Synonyms	AAX77013 (https://www.ncbi.nlm.nih.gov/nuccore/AAX77013)	GenebankID or UniProtKB
-	String		
Belongs to the MLO family.	Sequence Similarities		
GO:0005516 : calmodulin binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005516)	GO - Molecular Function		
GO:0006952 : defense response (https://www.ebi.ac.uk/QuickGO/term/GO:0006952)	GO - Biological Process		
GO:0009607 : response to biotic stimulus (https://www.ebi.ac.uk/QuickGO/term/GO:0009607)	GO - Cellular Component		

GO:0016021 : integral component of membrane
(<https://www.ebi.ac.uk/QuickGO/term/GO:0016021>)

Presumptive Null

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

Molecular Type

Coding ([https://www.gephebase.org/search-criteria?/and+Molecular Type=~Coding^#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Molecular+Type=~Coding^#gephebase-summary-title))

Aberration Type

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

Deletion Size

10-99 bp

Molecular Details of the Mutation

19bp deletion resulting in frameshift

Experimental Evidence

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

Main Reference

Naturally occurring broad-spectrum powdery mildew resistance in a Central American tomato accession is caused by loss of mlo function. (2008) (<https://pubmed.ncbi.nlm.nih.gov/18052880>)

Authors

Bai Y; Pavan S; Zheng Z; Zappel NF; Reinstädler A; Lotti C; De Giovanni C; Ricciardi L; Lindhout P; Visser R; Theres K; Panstruga R

Abstract

The resistant cherry tomato (*Solanum lycopersicum* var. *cerasiforme*) line LC-95, derived from an accession collected in Ecuador, harbors a natural allele (*ol-2*) that confers broad-spectrum and recessively inherited resistance to powdery mildew (*Oidium neolycopersici*). As both the genetic and phytopathological characteristics of *ol-2*-mediated resistance are reminiscent of powdery mildew immunity conferred by loss-of-function *mlo* alleles in barley and *Arabidopsis*, we initiated a candidate-gene approach to clone *Ol-2*. A tomato *Mlo* gene (*SIMlo1*) with high sequence-relatedness to barley *Mlo* and *Arabidopsis AtMLO2* mapped to the chromosomal region harboring the *Ol-2* locus. Complementation experiments using transgenic tomato lines as well as virus-induced gene silencing assays suggested that loss of *SIMlo1* function is responsible for powdery mildew resistance conferred by *ol-2*. In progeny of a cross between a resistant line bearing *ol-2* and the susceptible tomato cultivar *Moneymaker*, a 19-bp deletion disrupting the *SIMlo1* coding region cosegregated with resistance. This polymorphism results in a frameshift and, thus, a truncated nonfunctional *SIMlo1* protein. Our findings reveal the second example of a natural *mlo* mutant that possibly arose post-domestication, suggesting that natural *mlo* alleles might be evolutionarily short-lived due to fitness costs related to loss of *mlo* function.

Additional References

RELATED GEPHE

Related Genes

4 (Cf-2.1 and Cf-2.2, Cf-4/9, Mi1.2, Pto) ([https://www.gephebase.org/search-criteria?/or+Taxon ID=~4081^/and+Trait=Pathogen resistance/and+groupHaplotypes=true#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Taxon+ID=~4081^/and+Trait=Pathogen+resistance/and+groupHaplotypes=true#gephebase-summary-title))

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS