

GEPHE SUMMARY

MLO (https://www.gephebase.org/search-criteria?/and+GeneGephebase=~MLO~#gephebase-summary-title)	Gephebase Gene	GP00000672	GepheID
	Entry Status	Martin	Main curator
	Published		

PHENOTYPIC CHANGE

Physiology (https://www.gephebase.org/search-criteria?/and+TraitCategory=~Physiology~#gephebase-summary-title)		Trait Category	
Pathogen resistance (https://www.gephebase.org/search-criteria?/and+Trait=~Pathogenresistance~#gephebase-summary-title)		Trait	
Hordeum vulgare - susceptible		Trait State in Taxon A	
Hordeum vulgare - Ethiopian origin resistant cultivars		Trait State in Taxon B	
Taxon A		Ancestral State	
Domesticated (https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=~Domesticated~#gephebase-summary-title)		Taxonomic Status	
Taxon A		Taxon B	
Hordeum vulgare (https://www.gephebase.org/search-criteria?/and+TaxonandSynonyms=~Hordeumvulgare~#gephebase-summary-title)		Hordeum vulgare (https://www.gephebase.org/search-criteria?/and+TaxonandSynonyms=~Hordeumvulgare~#gephebase-summary-title)	
-		-	
barley; Hordeum vulgare L.; Horedum vulgare		barley; Hordeum vulgare L.; Horedum vulgare	
species		species	
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Pooideae; Triticodae; Triticeae; Hordeinae; Hordeum		cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Pooideae; Triticodae; Triticeae; Hordeinae; Hordeum	
Hordeum () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4512)		Hordeum () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4512)	
4513 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4513)		4513 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4513)	
No is Taxon A an Intraspecies?		Yes is Taxon B an Intraspecies?	
		Taxon B Description	
		Hordeum vulgare - Ethiopian origin resistant cultivars	

GENOTYPIC CHANGE

MLO		Generic Gene Name		UniProtKB Hordeum vulgare
-		Synonyms		P93766 (http://www.uniprot.org/uniprot/P93766)
-		String		GenebankID or UniProtKB CAB06083 (https://www.ncbi.nlm.nih.gov/nuccore/CAB06083)
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
No (https://www.gephebase.org/search-criteria?/and+Presumptive Null=~No^#gephebase-summary-title)	Molecular Type
Gene Amplification (https://www.gephebase.org/search-criteria?/and+Molecular Type=~Gene Amplification^#gephebase-summary-title)	Aberration Type
Insertion (https://www.gephebase.org/search-criteria?/and+Aberration Type=~Insertion^#gephebase-summary-title)	Insertion Size
1-10 kb	Molecular Details of the Mutation
Tandem array duplication including promoter and partial CDS; resulting in loss-of-function by transcriptional interference	Experimental Evidence
Linkage Mapping (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=~Linkage Mapping^#gephebase-summary-title)	Main Reference
A barley cultivation-associated polymorphism conveys resistance to powdery mildew. (2004) (https://pubmed.ncbi.nlm.nih.gov/15318221)	Authors
Piffanelli P; Ramsay L; Waugh R; Benabdelmouna A; D'Hont A; Hollicher K; JÃrgensen JH; Schulze-Lefert P; Panstruga R	Abstract

Barley (*Hordeum vulgare*) has played a pivotal role in Old World agriculture since its domestication about 10,000 yr ago. Barley plants carrying loss-of-function alleles (mlo) of the Mlo locus are resistant against all known isolates of the widespread powdery mildew fungus. The sole mlo resistance allele recovered so far from a natural habitat, mlo-11, was originally retrieved from Ethiopian landraces and nowadays controls mildew resistance in the majority of cultivated European spring barley elite varieties. Here we use haplotype analysis to show that the mlo-11 allele probably arose once after barley domestication. Resistance in mlo-11 plants is linked to a complex tandem repeat array inserted upstream of the wild-type gene. The repeat units consist of a truncated Mlo gene comprising 3.5 kilobases (kb) of 5'-regulatory sequence plus 1.1 kb of coding sequence. These generate aberrant transcripts that impair the accumulation of both Mlo wild-type transcript and protein. We exploited the meiotic instability of mlo-11 resistance and recovered susceptible revertants in which restoration of Mlo function was accompanied by excision of the repeat array. We infer cis-dependent perturbation of transcription machinery assembly by transcriptional interference in mlo-11 plants as a likely mechanism leading to disease resistance.

Additional References

RELATED GEPHE

3 (Mla1, Mla13, Mla6) (https://www.gephebase.org/search-criteria?/or+Taxon ID=~4513^/and+Trait=Pathogen resistance/and+groupHaplotypes=true#gephebase-summary-title)	Related Genes
No matches found.	Related Haplotypes

EXTERNAL LINKS

COMMENTS