

GEPHE SUMMARY

Pm3 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^Pm3^#gephebase-summary-title)	Gephebase Gene	GP00000899	GephelD
	Entry Status	Courtier	Main curator
Published			

PHENOTYPIC CHANGE

Trait Category			
Physiology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Physiology^#gephebase-summary-title)	Trait		
Pathogen resistance (https://www.gephebase.org/search-criteria?/and+Trait=^Pathogen resistance^#gephebase-summary-title)	Trait State in Taxon A		
Triticum aestivum	Trait State in Taxon B		
Triticum aestivum	Ancestral State		
Data not curated	Taxonomic Status		
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Intraspecific^#gephebase-summary-title)			
Taxon A	Latin Name	Taxon B	Latin Name
Triticum aestivum (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Triticum+aestivum^#gephebase-summary-title)		Triticum aestivum (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Triticum+aestivum^#gephebase-summary-title)	
bread wheat	Common Name	bread wheat	Common Name
	Synonyms		Synonyms
Triticum aestivum subsp. aestivum; Triticum vulgare; bread wheat; Canadian hard winter wheat; common wheat; wheat; Triticum aestivum L.; Triticum vulgare L.; Triticum vulgare Vill., nom. illeg.; Tricum aestivum; Triticum aestivam; Triticum aestivum8		Triticum aestivum subsp. aestivum; Triticum vulgare; bread wheat; Canadian hard winter wheat; common wheat; wheat; Triticum aestivum L.; Triticum vulgare L.; Triticum vulgare Vill., nom. illeg.; Tricum aestivum; Triticum aestivam; Triticum aestivum8	
species	Rank	species	Rank
	Lineage		Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Pooideae; Triticodae; Triticeae; Triticinae; Triticum		cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Pooideae; Triticodae; Triticeae; Triticinae; Triticum	
Triticum () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4564)	Parent	Triticum () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4564)	Parent
4565 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4565)	NCBI Taxonomy ID	4565 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4565)	NCBI Taxonomy ID
No	is Taxon A an Infraspecies?	No	is Taxon B an Infraspecies?

GENOTYPIC CHANGE

PM3	Generic Gene Name	UniProtKB Triticum aestivum
-	Synonyms	GenebankID or UniProtKB
-	String	
-	Sequence Similarities	
Belongs to the disease resistance NB-LRR family.		
GO:0043531 : ADP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0043531)	GO - Molecular Function	
	GO - Biological Process	
-	GO - Cellular Component	
-		Presumptive Null
No (https://www.gephebase.org/search-criteria?/and+Presumptive+Null=^No^#gephebase-summary-title)		

Coding (https://www.gephebase.org/search-criteria?/and+Molecular Type=%5BCoding%5D#gephebase-summary-title)	Molecular Type
SNP (https://www.gephebase.org/search-criteria?/and+Aberration Type=%5BSNP%5D#gephebase-summary-title)	Aberration Type
Nonsynonymous	SNP Coding Change
Various substitution haplotypes - exact causing amino acid change(s) unknown - in hexaploid bread wheat one amino acid change in a solvent-exposed residue of LRR27 (E1334 to V1334) was sufficient to convert the susceptible Pm3CS into a functional resistance allele (Yahiaoui et al., 2006).	Molecular Details of the Mutation
Linkage Mapping (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=%5BLinkage Mapping%5D#gephebase-summary-title)	Experimental Evidence

Taxon A	Taxon B	Position
Codon	-	-
Amino-acid	Glu	Val
		1334

Independent evolution of functional Pm3 resistance genes in wild tetraploid wheat and domesticated bread wheat. (2009) (https://pubmed.ncbi.nlm.nih.gov/18980638)	Main Reference
Yahiaoui N; Kaur N; Keller B	Authors

The Pm3 alleles of cultivated bread wheat confer gene for gene resistance to the powdery mildew fungus. They represent a particular case of plant disease resistance gene evolution, because of their recent origin and possible evolution after the formation of hexaploid wheat. The Pm3 locus is conserved in tetraploid wheat, thereby allowing the comparative evolutionary study of the same resistance locus in a domesticated species and in one of its wild ancestors. We have identified 61 Pm3 allelic sequences from wild and domesticated tetraploid wheat subspecies. The Pm3 sequences corresponded to 24 different haplotypes. They showed low sequence diversity, differing by only a few polymorphic sequence blocks that were further reshuffled between alleles by gene conversion and recombination. Polymorphic sequence blocks are different from the blocks found in functional Pm3 alleles of hexaploid wheat, indicating an independent evolution of the Pm3 loci in the two species. A new functional gene was identified in a wild wheat accession from Syria. This gene, Pm3k, conferred intermediate race-specific resistance to powdery mildew, and consists of a mosaic of gene segments derived from non-functional alleles. This demonstrates that Pm3-based resistance is not very frequent in wild tetraploid wheat, and that the evolution of functional resistance genes occurred independently in wild tetraploid and bread wheat. The Pm3 sequence variability and geographic distribution indicated that diversity was higher in wild emmer wheat from the Levant area, compared with the accessions from Turkey. Further screens for Pm3 functional genes in wild wheat should therefore focus on accessions from the Levant region.

Rapid generation of new powdery mildew resistance genes after wheat domestication. (2006) (https://pubmed.ncbi.nlm.nih.gov/16740148)	Additional References
---	-----------------------

RELATED GEPHE

4 (Lr21, Lr67, Pore-forming toxin-like (PFT), Mla (=Sr33/AetRGA1e)) (https://www.gephebase.org/search-criteria?/or+Taxon ID=%5B4565%5D+and+Trait=Pathogen+resistance/and+groupHaplotypes=true#gephebase-summary-title)	Related Genes
No matches found.	Related Haplotypes

EXTERNAL LINKS

COMMENTS