

GEPHE SUMMARY

Lr21 (https://www.gephebase.org/search-criteria?/and+GeneGephebase=Lr21#gephebase-summary-title)	Gephebase Gene	GP00000551	GepheID
	Entry Status	Courtier	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	
Triticum aestivum - Wichita		Trait State in Taxon A	
Triticum aestivum - Fielder		Trait State in Taxon B	
Data not curated		Ancestral State	
Domesticated (https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=Domesticated#gephebase-summary-title)		Taxonomic Status	
Taxon A		Taxon B	
Triticum aestivum (https://www.gephebase.org/search-criteria?/and+TaxonandSynonyms=Triticumaestivum#gephebase-summary-title)		Triticum aestivum (https://www.gephebase.org/search-criteria?/and+TaxonandSynonyms=Triticumaestivum#gephebase-summary-title)	
bread wheat		bread wheat	
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		species	
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)		Triticum () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4564)	
4565 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4565)		4565 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4565)	
Yes		Yes	
Triticum aestivum - Wichita		Triticum aestivum - Fielder	

GENOTYPIC CHANGE

Generic Gene Name		UniProtKB Triticum aestivum
C51D17 (http://www.uniprot.org/uniprot/C51D17)		
Synonyms		GenebankID or UniProtKB
FJ876280 (https://www.ncbi.nlm.nih.gov/nuccore/FJ876280)		
String		
Sequence Similarities		
Belongs to the disease resistance NB-LRR family.		
GO - Molecular Function		
GO:0043531 : ADP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0043531)		
GO - Biological Process		
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
Coding (https://www.gephebase.org/search-criteria?/and+Molecular Type=~Coding^#gephebase-summary-title)	Aberration Type
Complex Change (https://www.gephebase.org/search-criteria?/and+Aberration Type=~Complex Change^#gephebase-summary-title)	Molecular Details of the Mutation
Novel pathogen specificity resulting from chimerism of the parental alleles after intragenic recombination	Experimental Evidence
Linkage Mapping (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=~Linkage Mapping^#gephebase-summary-title)	Main Reference
Evolution of new disease specificity at a simple resistance locus in a crop-weed complex: reconstitution of the Lr21 gene in wheat. (2009) (https://pubmed.ncbi.nlm.nih.gov/19364806)	Authors
Huang L; Brooks S; Li W; Fellers J; Nelson JC; Gill B	Abstract
The wheat leaf-rust resistance gene Lr21 was first identified in an Iranian accession of goatgrass, <i>Aegilops tauschii</i> Coss., the D-genome donor of hexaploid bread wheat, and was introgressed into modern wheat cultivars by breeding. To elucidate the origin of the gene, we analyzed sequences of Lr21 and lr21 alleles from 24 wheat cultivars and 25 accessions of <i>Ae. tauschii</i> collected along the Caspian Sea in Iran and Azerbaijan. Three basic nonfunctional lr21 haplotypes, H1, H2, and H3, were identified. Lr21 was found to be a chimera of H1 and H2, which were found only in wheat. We attempted to reconstitute a functional Lr21 allele by crossing the cultivars Fielder (H1) and Wichita (H2). Rust inoculation of 5876 F(2) progeny revealed a single resistant plant that proved to carry the H1H2 haplotype, a result attributed to intragenic recombination. These findings reflect how plants balance the penalty and the necessity of a resistance gene and suggest that plants can reuse “dead” alleles to generate new disease-resistance specificity, leading to a “death-recycle” model of plant-resistance gene evolution at simple loci. We suggest that selection pressure in crop-weed complexes contributes to this process.	
	Additional References

RELATED GEPHE

4 (Lr67, Pm3, Pore-forming toxin-like (PFT), Mla (=Sr33/AetRGA1e)) (https://www.gephebase.org/search-criteria?/or+Taxon ID=~4565^/and+Trait=Pathogen resistance/and+groupHaplotypes=true#gephebase-summary-title)	Related Genes
No matches found.	Related Haplotypes

EXTERNAL LINKS

COMMENTS

@Introgression