

GEPHE SUMMARY

	Gephebase Gene	GephelD
Reduced height-1 (Rht1) (https://www.gephebase.org/search-criteria/?and+Gene Gephebase=^Reduced height-1 (Rht1)^#gephebase-summary-title)	GP00001728	
	Entry Status	Main curator
Published	Courtier	

PHENOTYPIC CHANGE

	Trait Category
Morphology (https://www.gephebase.org/search-criteria/?and+Trait Category=Morphology^#gephebase-summary-title)	Trait
Plant size (dwarfism) (https://www.gephebase.org/search-criteria/?and+Trait=^Plant size+dwarfism^#gephebase-summary-title)	Trait State in Taxon A
normal height	Trait State in Taxon B
dwarf	Ancestral State
Taxon A	Taxonomic Status

Domesticated ([https://www.gephebase.org/search-criteria/?and+Taxonomic Status=^Domesticated^#gephebase-summary-title](https://www.gephebase.org/search-criteria/?and+Taxonomic+Status=^Domesticated^#gephebase-summary-title))

Taxon A	Latin Name	Taxon B	Latin Name
Helianthus annus (https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=^Helianthus+annus^#gephebase-summary-title)	Common Name	Helianthus annus (https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=^Helianthus+annus^#gephebase-summary-title)	Common Name
common sunflower	Synonyms	common sunflower	Synonyms
common sunflower; Helianthus annuus L.; Helianthus annua; Helianthus annus; Helianthus annuus8	cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; campanulids; Asterales; Asteraceae; Asteroideae; Heliantheae alliance; Heliantheae; Helianthus	cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; campanulids; Asterales; Asteraceae; Asteroideae; Heliantheae alliance; Heliantheae; Helianthus	Rank
species	Rank	species	Rank
Helianthus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4231)	Parent	Helianthus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4231)	Parent
4232 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4232)	NCBI Taxonomy ID	4232 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4232)	NCBI Taxonomy ID
No	is Taxon A an Infraspecies?	Yes	is Taxon B an Infraspecies?
			Taxon B Description

Taxon A	Latin Name	Taxon B	Latin Name
Helianthus annus (https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=^Helianthus+annus^#gephebase-summary-title)	Common Name	Helianthus annus (https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=^Helianthus+annus^#gephebase-summary-title)	Common Name
common sunflower	Synonyms	common sunflower	Synonyms
common sunflower; Helianthus annuus L.; Helianthus annua; Helianthus annus; Helianthus annuus8	cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; campanulids; Asterales; Asteraceae; Asteroideae; Heliantheae alliance; Heliantheae; Helianthus	cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; campanulids; Asterales; Asteraceae; Asteroideae; Heliantheae alliance; Heliantheae; Helianthus	Rank
species	Rank	species	Rank
Helianthus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4231)	Parent	Helianthus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4231)	Parent
4232 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4232)	NCBI Taxonomy ID	4232 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4232)	NCBI Taxonomy ID
No	is Taxon A an Infraspecies?	Yes	is Taxon B an Infraspecies?
			Taxon B Description

GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Zea mays
D8		
-	Synonyms	GenebankID or UniProtKB
4577.GRMZM2G144744_P01 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=4577.GRMZM2G144744_P01)	0	
Belongs to the GRAS family. DELLA subfamily.	Sequence Similarities	
GO:0003700 : DNA-binding transcription factor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0003700)	GO - Molecular Function	
GO:0043565 : sequence-specific DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0043565)		

GO:0003712 : transcription coregulator activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0003712>)

GO - Biological Process

GO:0009740 : gibberellic acid mediated signaling pathway

(<https://www.ebi.ac.uk/QuickGO/term/GO:0009740>)

GO:2000377 : regulation of reactive oxygen species metabolic process

(<https://www.ebi.ac.uk/QuickGO/term/GO:2000377>)

GO:0009737 : response to abscisic acid

(<https://www.ebi.ac.uk/QuickGO/term/GO:0009737>)

GO:2000033 : regulation of seed dormancy process

(<https://www.ebi.ac.uk/QuickGO/term/GO:2000033>)

GO:0042538 : hyperosmotic salinity response

(<https://www.ebi.ac.uk/QuickGO/term/GO:0042538>)

GO:0009867 : jasmonic acid mediated signaling pathway

(<https://www.ebi.ac.uk/QuickGO/term/GO:0009867>)

GO:0009938 : negative regulation of gibberellic acid mediated signaling pathway

(<https://www.ebi.ac.uk/QuickGO/term/GO:0009938>)

GO:0010187 : negative regulation of seed germination

(<https://www.ebi.ac.uk/QuickGO/term/GO:0010187>)

GO:0009723 : response to ethylene (<https://www.ebi.ac.uk/QuickGO/term/GO:0009723>)

GO:0009863 : salicylic acid mediated signaling pathway

(<https://www.ebi.ac.uk/QuickGO/term/GO:0009863>)

GO - Cellular Component

GO:0005634 : nucleus (<https://www.ebi.ac.uk/QuickGO/term/GO:0005634>)

Presumptive Null

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

Molecular Type

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

Aberration Type

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

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

T-to-C transition corresponding to nucleotide positions 143 - the SNP at position 143 converts a leucine residue in a proline within the conserved DELLA motif. This amino acid position corresponds to amino acid position 57 in the full-length amino acid sequence encoded by the *L. sativa* DELLA1 nucleotide sequence of GenBank Accession No. BAG71200.1

Experimental Evidence

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

	Taxon A	Taxon B	Position
Codon	-	-	143
Amino-acid	Pro	Leu	57

Main Reference

Phenotypic characterization, genetic mapping and candidate gene analysis of a source conferring reduced plant height in sunflower. (2013) (<https://pubmed.ncbi.nlm.nih.gov/22972203>)

Authors

Ramos ML; Altieri E; Bulos M; Sala CA

Abstract

Reduced height germplasm has the potential to increase stem strength, standability, and also yields potential of the sunflower crop (*Helianthus annuus* L. var. *macrocarpus* Ckll.). In this study, we report on the inheritance, mapping, phenotypic and molecular characterization of a reduced plant height trait in inbred lines derived from the source DDR. This trait is controlled by a semidominant allele, Rht1, which maps on linkage group 12 of the sunflower public consensus map. Phenotypic effects of this allele include shorter height and internode length, insensitivity to exogenous gibberellin application, normal skotomorphogenetic response, and reduced seed set under self-pollination conditions. This latter effect presumably is related to the reduced pollen viability observed in all DDR-derived lines studied. Rht1 completely cosegregated with a haplotype of the HaDella1 gene sequence. This haplotype consists of a point mutation converting a leucine residue in a proline within the conserved DELLA domain. Taken together, the phenotypic, genetic, and molecular results reported here indicate that Rht1 in sunflower likely encodes an altered DELLA protein. If the DELPA motif of the HaDELLA1 sequence in the Rht1-encoded protein determines by itself the observed reduction in height is a matter that remains to be investigated.

Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

Various mutant alleles (*gai* in *Arabidopsis*; *D8* in maize, and *Rht-B1b/Rht-D1b* in wheat) resembles the phenotypic effect of *Rht1* described here: they act in a genetically dominant fashion and encode active (altered function) mutant products that decrease GA response and thus confer reduced height.