GEPHE SUMMARY

Gephebase Gene
GLABROUS1

GephelD
GP00001242

Entry Status
Published

Main curator
Courtier

PHENOTYPIC CHANGE

Trait Category
Morphology

Trait
Trichome density (leaf)

Trait State in Taxon A
Arabidopsis thaliana haplotype A (28 accessions)

Trait State in Taxon B
Arabidopsis thaliana haplotype B (66 accessions) - Glabrous

Ancestral State
Data not curated

Taxonomic Status
Intraspecific

Taxon A

Latin Name
Arabidopsis thaliana

Common Name
thale cress

Synonyms
thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress

Rank
species

Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis

Parent
Arabidopsis () - (Rank: genus)

NCBI Taxonomy ID
3702

is Taxon A an Infraspecies?
No

Taxon B

Latin Name
Arabidopsis thaliana

Common Name
thale cress

Synonyms
thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress

Rank
species

Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis

Parent
Arabidopsis () - (Rank: genus)

NCBI Taxonomy ID
3702

is Taxon B an Infraspecies?
No

GENOTYPIC CHANGE

Generic Gene Name
GL1

Synonyms
ATGL1; ATMYB0; GL1; GLABRA 1; myb domain protein 0; TRICHOME DIFFERENTIATION PROTEIN GL1; MYB0; At3g27920; K16N12.17

String
3702.AT3G27920.1

Sequence Similarities
-

GO - Molecular Function
GO:0003700 : DNA-binding transcription factor activity
GO:0043565 : sequence-specific DNA binding
GO:0044212 : transcription regulatory region DNA binding
GO:0003677 : DNA binding

GO - Biological Process
GO:0030154 : cell differentiation
GO:0009740 : gibberellic acid mediated signaling pathway
GO:0001708 : cell fate specification

UniProtKB Arabidopsis thaliana
P27900

GenebankID or UniProtKB
ABD65321

GO:0009867 : jasmonic acid mediated signaling pathway
GO:0010026 : trichome differentiation
GO:0032880 : regulation of protein localization
GO:2000039 : regulation of trichome morphogenesis
GO:0048629 : trichome patterning

GO - Cellular Component
GO:0005634 : nucleus

Presumptive Null
No

Molecular Type
Unknown

Aberration Type
Unknown

Molecular Details of the Mutation
high frequency pattern of polymorphism identified in the third exon and 3′ flank

Experimental Evidence
Association Mapping

Main Reference
Trichome distribution in Arabidopsis thaliana and its close relative Arabidopsis lyrata: molecular analysis of the candidate gene GLABROUS1. (2001)

Authors
Hauser MT; Harr B; SchlÃ¶tterer C

Abstract
GLABROUS1 (GL1) belongs to the large family of MYB transcription factors and is known to play a central role in trichome initiation. We studied trichome distribution and the molecular variation of GL1 in 28 A. thaliana accessions. Trichome density on rosette leaves was highly variable among those accessions. On the molecular level, we detected substantial sequence variation in a 3-kb fragment which included the complete coding region of the GL1 locus (pi = 0.01). Phylogenetic analysis of GL1 indicates the presence of two diverged clades among 28 accessions. Using ANOVA, we show that the phenotypic variation in trichome density cannot be explained by the sequence divergence between the two phylogenetic lineages. Sequence analysis of wild-type Arabidopsis thaliana and Arabidopsis lyrata accessions indicates that all amino acid substitutions are located outside of the conserved helix-turn-helix DNA-binding domains R2 and R3. Using plants of A. thaliana and A. lyrata with either naturally occurring or ethyl methane sulfonate--induced glabrous phenotypes, we demonstrate that the last 14 C-terminal amino acids of the GL1 gene have no major impact on the initiation of trichomes.

Additional References
Trichome distribution in Arabidopsis thaliana and its close relative Arabidopsis lyrata: molecular analysis of the candidate gene GLABROUS1. (2001)

RELATED GEPHE

Related Genes
2 (AtMYC1, ETC2)
Related Haplotypes
4

EXTERNAL LINKS

COMMENTS

Based on previous mappings showing the involvement of GL1 locus on trichome density. Mean trichome densities were 10.82 and 13.13 for haplogroups A and B; respectively; yielding a 17.6% difference between groups and accounting for 11% of the trichome density variation observed in the set of 94 lines