

GEPHE SUMMARY

Gephebase Gene
ERECTA

Entry Status
Published

GepheID
GP00000280

Main curator
Martin

PHENOTYPIC CHANGE

Trait #1

Trait Category
Morphology

Trait
Plant architecture

Trait State in Taxon A
Arabidopsis thaliana - lab and wild ecotype

Trait State in Taxon B
Arabidopsis thaliana - lab and wild ecotype

Trait #2

Trait Category
Morphology

Trait
Leaf architecture

Trait State in Taxon A
-

Trait State in Taxon B
-

Trait #3

Trait Category
Physiology

Trait
Transpiration

Trait State in Taxon A
-

Trait State in Taxon B
-

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; Pentapetales; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis

Parent
Arabidopsis () - (Rank: genus)

NCBI Taxonomy ID

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; Pentapetales; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis

Parent
Arabidopsis () - (Rank: genus)

NCBI Taxonomy ID

3702

is Taxon A an Intraspecies?

No

3702

is Taxon B an Intraspecies?

Yes

Taxon B Description

Arabidopsis thaliana - lab and wild ecotype

GENOTYPIC CHANGE

Generic Gene Name

ERECTA

UniProtKB Arabidopsis thaliana

Q42371

Synonyms

ERECTA; QRP1; QUANTITATIVE RESISTANCE TO PLECTOSPHERELLA 1; T1D16.3; T1D16_3; ER; QRS1; TE1; At2g26330

GenebankID or UniProtKB

EF598346

String

3702.AT2G26330.1

Sequence Similarities

Belongs to the protein kinase superfamily. Ser/Thr protein kinase family.

GO - Molecular Function

GO:0005524 : ATP binding
 GO:0005102 : signaling receptor binding
 GO:0004674 : protein serine/threonine kinase activity
 GO:0004672 : protein kinase activity
 GO:0042277 : peptide binding
 GO:0033612 : receptor serine/threonine kinase binding
 GO:0019199 : transmembrane receptor protein kinase activity

GO - Biological Process

GO:0042742 : defense response to bacterium
 GO:0050832 : defense response to fungus
 GO:0046777 : protein autophosphorylation
 GO:0070370 : cellular heat acclimation
 GO:0048281 : inflorescence morphogenesis
 GO:0009965 : leaf morphogenesis
 GO:0010087 : phloem or xylem histogenesis
 GO:0009664 : plant-type cell wall organization
 GO:0009944 : polarity specification of adaxial/abaxial axis
 GO:0030155 : regulation of cell adhesion
 GO:0051302 : regulation of cell division
 GO:0001558 : regulation of cell growth
 GO:1905421 : regulation of plant organ morphogenesis
 GO:0010103 : stomatal complex morphogenesis
 GO:0010148 : transpiration

GO - Cellular Component

GO:0016021 : integral component of membrane
 GO:0005886 : plasma membrane
 GO:0009506 : plasmodesma
 GO:0005739 : mitochondrion

Presumptive Null

Unknown

Molecular Type

Unknown

Aberration Type

Unknown

Molecular Details of the Mutation

unknown

Experimental Evidence

Linkage Mapping

Main Reference

The ERECTA gene regulates plant transpiration efficiency in Arabidopsis. (2005)

Authors

Masle J; Gilmore SR; Farquhar GD

Abstract

Assimilation of carbon by plants incurs water costs. In the many parts of the world where water is in short supply, plant transpiration efficiency, the ratio of carbon fixation to water loss, is critical to plant survival, crop yield and vegetation dynamics. When challenged by variations in their environment, plants often seem to coordinate photosynthesis and transpiration, but significant genetic variation in transpiration efficiency has been identified both between and within species. This has allowed plant breeders to develop effective selection programmes for the improved transpiration efficiency of crops, after it was demonstrated that carbon isotopic discrimination, Delta, of plant matter was a reliable and sensitive marker negatively related to variation in transpiration efficiency. However, little is known of the genetic controls of transpiration efficiency. Here we report the isolation of a gene that regulates transpiration efficiency, ERECTA. We show that ERECTA, a putative leucine-rich repeat receptor-like kinase (LRR-RLK) known for its effects on inflorescence development, is a major contributor to a locus for Delta on Arabidopsis chromosome 2. Mechanisms include, but are not limited to, effects on stomatal density, epidermal cell expansion, mesophyll cell proliferation and cell-cell contact.

Additional References

Relation among plant growth, carbohydrates and flowering time in the Arabidopsis Landsberg erecta x Kondara recombinant inbred line population. (2010)

RELATED GEPHE

Related Genes

3 (ACS11, AGAMOUS-Like6, phytochrome D (PHYD))

Related Haplotypes

1

EXTERNAL LINKS

COMMENTS