GEPHE SUMMARY

Gephebase Gene

ERECTA (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^ERECTA^#gephebase-summary-title)

GepheID

GP00000280

Entry Status

Published

Main curator

Martin

PHENOTYPIC CHANGE

Trait #1

Trait Category

Morphology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Morphology^#gephebase-summary-title)

Trait

Plant architecture (https://www.gephebase.org/search-criteria?/and+Trait=^Plant architecture^#gephebase-summary-title)

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 (https://www.gephebase.org/search-criteria?/and+Trait Category=^Morphology^#gephebase-summary-title)

Trait

Leaf architecture (https://www.gephebase.org/search-criteria?/and+Trait=^Leaf architecture^#gephebase-summary-title)

Trait State in Taxon A

-

Trait State in Taxon B

-

Trait #3

Trait Category

Physiology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Physiology^#gephebase-summary-title)

Trait

Transpiration (https://www.gephebase.org/search-criteria?/and+Trait=^Transpiration^#gephebase-summary-title)

Trait State in Taxon A

-

Trait State in Taxon B

-

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

Arabidopsis thaliana (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Arabidopsis thaliana^#gephebase-summary-title)

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;

Taxon B

Latin Name

Arabidopsis thaliana (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Arabidopsis thaliana^#gephebase-summary-title)

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)
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3701)

NCBI Taxonomy ID

3702
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3702)

is Taxon A an Infraspecies?

No

Camelineae; Arabidopsis

Parent

Arabidopsis () - (Rank: genus)
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3701)

NCBI Taxonomy ID

3702
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3702)

is Taxon B an Infraspecies?

Yes

Taxon B Description

Arabidopsis thaliana - lab and wild ecotype

GENOTYPIC CHANGE

Generic Gene Name

ERECTA

Synonyms

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

String

3702.AT2G26330.1
(http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 3702.AT2G26330.1)

Sequence Similarities

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

GO - Molecular Function

GO:0005524 : ATP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005524)
GO:0005102 : signaling receptor binding
(https://www.ebi.ac.uk/QuickGO/term/GO:0005102)
GO:0004674 : protein serine/threonine kinase activity
(https://www.ebi.ac.uk/QuickGO/term/GO:0004674)
GO:0004672 : protein kinase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004672)
GO:0042277 : peptide binding (https://www.ebi.ac.uk/QuickGO/term/GO:0042277)
GO:0033612 : receptor serine/threonine kinase binding
(https://www.ebi.ac.uk/QuickGO/term/GO:0033612)
GO:0019199 : transmembrane receptor protein kinase activity
(https://www.ebi.ac.uk/QuickGO/term/GO:0019199)

GO - Biological Process

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

GO - Cellular Component

GO:0016021 : integral component of membrane
(https://www.ebi.ac.uk/QuickGO/term/GO:0016021)
GO:0005886 : plasma membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0005886)
GO:0009506 : plasmodesma (https://www.ebi.ac.uk/QuickGO/term/GO:0009506)
GO:0005739 : mitochondrion (https://www.ebi.ac.uk/QuickGO/term/GO:0005739)

UniProtKB Arabidopsis thaliana

Q42371 (http://www.uniprot.org/uniprot/Q42371)

GenebankID or UniProtKB

EF598346 (https://www.ncbi.nlm.nih.gov/nuccore/EF598346)

Presumptive Null

Unknown (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^Unknown^#gephebase-summary-title)

Molecular Type

Unknown (https://www.gephebase.org/search-criteria?/and+Molecular Type=^Unknown^#gephebase-summary-title)

Aberration Type

Unknown (https://www.gephebase.org/search-criteria?/and+Aberration Type=^Unknown^#gephebase-summary-title)

Molecular Details of the Mutation

unknown

Experimental Evidence

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

Main Reference

The ERECTA gene regulates plant transpiration efficiency in Arabidopsis. (2005) (https://pubmed.ncbi.nlm.nih.gov/16007076)

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) (https://pubmed.ncbi.nlm.nih.gov/20374533)
Analysis of natural allelic variation in Arabidopsis using a multiparent recombinant inbred line population. (2011) (https://pubmed.ncbi.nlm.nih.gov/21368205)

RELATED GEPHE

Related Genes

4 (ACS11, AGAMOUS-Like6, ICARUS1, phytochrome D (PHYD)) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^3702^/and+Trait=Plant architecture/or+Taxon ID=^3702^/and+Trait=Leaf architecture/or+Taxon ID=^3702^/and+Trait=Transpiration/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

1 (https://www.gephebase.org/search-criteria?/or+Gene Gephebase=^ERECTA^/and+Taxon ID=^3702^/or+Gene Gephebase=^ERECTA^/and+Taxon ID=^3702^#gephebase-summary-title)

EXTERNAL LINKS

COMMENTS