GEPHE SUMMARY

Gephebase Gene
DOG1 (DELAY OF GERMINATION 1) (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^DOG1 (DELAY OF GERMINATION 1)^#gephebase-summary-title)

GepheID
GP00001397

Entry Status
Published

Main curator
Arnoult

PHENOTYPIC CHANGE

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

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

Trait State in Taxon A
Various A. Thaliana accessions from Sweden. More or less dormant

Trait State in Taxon B
Various A. Thaliana accessions from Sweden. More or less dormant

Ancestral State
Unknown

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; 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?
Yes

Taxon A Description
Various A. Thaliana accessions from Sweden. More or less dormant

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 B an Infraspecies?
Yes

Taxon B Description
Various A. Thaliana accessions from Sweden. More or less dormant

GENOTYPIC CHANGE

Generic Gene Name
DOG1

Synonyms
ATDOG1; DELAY OF GERMINATION 1; GAAS5; germination ability after storage 5; GLUCOSE SENSING QTL 5; GSQ5; K15I22.3; K15I22_3; At5g45830

String
3702.AT5G45830.1 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 3702.AT5G45830.1)

Sequence Similarities
-

GO - Molecular Function
GO:0043565 : sequence-specific DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0043565)

UniProtKB Arabidopsis thaliana
A0SVK0 (http://www.uniprot.org/uniprot/A0SVK0)

GenebankID or UniProtKB
834623 (https://www.ncbi.nlm.nih.gov/nuccore/834623)

GO - Biological Process

GO:0006351 : transcription, DNA-templated (https://www.ebi.ac.uk/QuickGO/term/GO:0006351)
GO:0009738 : abscisic acid-activated signaling pathway (https://www.ebi.ac.uk/QuickGO/term/GO:0009738)
GO:2000033 : regulation of seed dormancy process (https://www.ebi.ac.uk/QuickGO/term/GO:2000033)
GO:0010162 : seed dormancy process (https://www.ebi.ac.uk/QuickGO/term/GO:0010162)
GO:0010182 : sugar mediated signaling pathway (https://www.ebi.ac.uk/QuickGO/term/GO:0010182)

GO - Cellular Component

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

Presumptive Null

No (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^No^#gephebase-summary-title)

Molecular Type

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

Aberration Type

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

Molecular Details of the Mutation

At least 3 haplotypes defined by 4 SNPs in a putative regulatory region of DOG-1.

Experimental Evidence

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

Main Reference

Multiple alleles at a single locus control seed dormancy in Swedish Arabidopsis. (2016) (https://pubmed.ncbi.nlm.nih.gov/27966430)

Authors

Kerdaffrec E; Filiault DL; Korte A; Sasaki E; Nizhynska V; Seren Ãœ; Nordborg M

Abstract

Seed dormancy is a complex life history trait that determines the timing of germination and is crucial for local adaptation. Genetic studies of dormancy are challenging, because the trait is highly plastic and strongly influenced by the maternal environment. Using a combination of statistical and experimental approaches, we show that multiple alleles at the previously identified dormancy locus DELAY OF GERMINATION1 jointly explain as much as 57% of the variation observed in Swedish Arabidopsis thaliana, but give rise to spurious associations that seriously mislead genome-wide association studies unless modeled correctly. Field experiments confirm that the major alleles affect germination as well as survival under natural conditions, and demonstrate that locally adaptive traits can sometimes be dissected genetically.

Additional References

RELATED GEPHE

Related Genes

2 (D14 (KAI2 paralog), RDO5 REDUCED DORMANCY5) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^3702^/and+Trait=Seed dormancy/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

1 (https://www.gephebase.org/search-criteria?/or+Gene Gephebase=^DOG1 (DELAY OF GERMINATION 1)^/and+Taxon ID=^3702^/or+Gene Gephebase=^DOG1 (DELAY OF GERMINATION 1)^/and+Taxon ID=^3702^#gephebase-summary-title)

EXTERNAL LINKS

COMMENTS