## GEPHE SUMMARY

Gephebase Gene
StCDF1 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^StCDF1^#gephebase-summary-title)

GepheID
GP00001079

Entry Status
Published

Main curator
Martin

## PHENOTYPIC CHANGE

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

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

Trait State in Taxon A
Solanum tuberosum - wild

Trait State in Taxon B
Solanum tuberosum - domesticated

Ancestral State
Taxon A

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

### Taxon A

Latin Name
Solanum tuberosum (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Solanum tuberosum^#gephebase-summary-title)

Common Name
potato

Synonyms
Solanum tuberosum subsp. tuberosum; potato; potatoes; Solanum tuberosum L.

Rank
species

Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Solanaceae; Solanoideae; Solaneae; Solanum

Parent
Solanum () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4107 )

NCBI Taxonomy ID
4113 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4113 )

is Taxon A an Infraspecies?
No

### Taxon B

Latin Name
Solanum tuberosum (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Solanum tuberosum^#gephebase-summary-title)

Common Name
potato

Synonyms
Solanum tuberosum subsp. tuberosum; potato; potatoes; Solanum tuberosum L.

Rank
species

Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Solanaceae; Solanoideae; Solaneae; Solanum

Parent
Solanum () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4107 )

NCBI Taxonomy ID
4113 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4113 )

is Taxon B an Infraspecies?
No

## GENOTYPIC CHANGE

Generic Gene Name
CDF1

Synonyms
cycling DOF factor 1; K19B1.4; K19B1_4; DOF5.5; At5g62430; MMI9.24

String
3702.AT5G62430.1 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 3702.AT5G62430.1 )

Sequence Similarities
-

GO - Molecular Function
GO:0003700 : DNA-binding transcription factor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0003700)
GO:0043565 : sequence-specific DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0043565)
GO:0046872 : metal ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0046872)
GO:0003677 : DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0003677)
GO:0000978 : RNA polymerase II proximal promoter sequence-specific DNA binding

UniProtKB Arabidopsis thaliana
Q8W1E3 (http://www.uniprot.org/uniprot/Q8W1E3)

GenebankID or UniProtKB
AGF33077 (https://www.ncbi.nlm.nih.gov/nuccore/AGF33077)

(https://www.ebi.ac.uk/QuickGO/term/GO:0000978)
GO:0001210 : transcriptional repressor activity, metal ion regulated sequence-specific DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0001210)

GO - Biological Process

GO:0006355 : regulation of transcription, DNA-templated (https://www.ebi.ac.uk/QuickGO/term/GO:0006355)
GO:0010228 : vegetative to reproductive phase transition of meristem (https://www.ebi.ac.uk/QuickGO/term/GO:0010228)
GO:0045892 : negative regulation of transcription, DNA-templated (https://www.ebi.ac.uk/QuickGO/term/GO:0045892)
GO:0009908 : flower development (https://www.ebi.ac.uk/QuickGO/term/GO:0009908)
GO:0048510 : regulation of timing of transition from vegetative to reproductive phase (https://www.ebi.ac.uk/QuickGO/term/GO:0048510)
GO:0009658 : chloroplast organization (https://www.ebi.ac.uk/QuickGO/term/GO:0009658)

GO - Cellular Component

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

Presumptive Null

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

Molecular Type

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

Aberration Type

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

Insertion Size

1-9 bp

Molecular Details of the Mutation

+7bp insertion resulting in frameshift and truncated protein

Experimental Evidence

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

Main Reference

Naturally occurring allele diversity allows potato cultivation in northern latitudes. (2013) (https://pubmed.ncbi.nlm.nih.gov/23467094)

Authors

Kloosterman B; Abelenda JA; Gomez Mdel M; Oortwijn M; de Boer JM; Kowitwanich K; Horvath BM; van Eck HJ; Smaczniak C; Prat S; Visser RG; Bachem CW

Abstract

Potato (Solanum tuberosum L.) originates from the Andes and evolved short-day-dependent tuber formation as a vegetative propagation strategy. Here we describe the identification of a central regulator underlying a major-effect quantitative trait locus for plant maturity and initiation of tuber development. We show that this gene belongs to the family of DOF (DNA-binding with one finger) transcription factors and regulates tuberization and plant life cycle length, by acting as a mediator between the circadian clock and the StSP6A mobile tuberization signal. We also show that natural allelic variants evade post-translational light regulation, allowing cultivation outside the geographical centre of origin of potato. Potato is a member of the Solanaceae family and is one of the world's most important food crops. This annual plant originates from the Andean regions of South America. Potato develops tubers from underground stems called stolons. Its equatorial origin makes potato essentially short-day dependent for tuberization and potato will not make tubers in the long-day conditions of spring and summer in the northern latitudes. When introduced in temperate zones, wild material will form tubers in the course of the autumnal shortening of day-length. Thus, one of the first selected traits in potato leading to a European potato type is likely to have been long-day acclimation for tuberization. Potato breeders can exploit the naturally occurring variation in tuberization onset and life cycle length, allowing varietal breeding for different latitudes, harvest times and markets.

Additional References

## RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

1 (https://www.gephebase.org/search-criteria?/or+Gene Gephebase=^StCDF1^/and+Taxon ID=^4113^/or+Gene Gephebase=^StCDF1^/and+Taxon ID=^4113^#gephebase-summary-title)

## EXTERNAL LINKS

## COMMENTS