GEPHE SUMMARY

Gephebase Gene
phytochrome A-associated F-box protein (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^phytochrome A-associated F-box protein^#gephebase-summary-title)

GepheID
GP00001287

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

Trait State in Taxon A
Solanum pimpinellifolium and pennellii

Trait State in Taxon B
Solanum lycopersicum MoneyMaker and M82

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

Common Name
-

Synonyms
Lycopersicon pimpinellifolium; Solanum pimpinellifolium var. racemigerum; currant tomato; Lycopersicon pimpinellifolium (L.) Mill.; Solanum pimpinellifolium 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; Lycopersicon

Parent
Lycopersicon () - (Rank: subgenus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 49274)

NCBI Taxonomy ID
4084 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4084)

is Taxon A an Infraspecies?
No

Taxon B

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

Common Name
tomato

Synonyms
Lycopersicon esculentum var. esculentum; Solanum esculentum; Solanum lycopersicum var. humboldtii; tomato; Lycopersicon esculentum Mill.; Solanum esculentum Dunal; Solanum lycopersicum L.; Lycopersicon lycopersicum; Lycopersicum esculentum; Solanum lycopersicon

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; Lycopersicon

Parent
Lycopersicon () - (Rank: subgenus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 49274)

NCBI Taxonomy ID
4081 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4081)

is Taxon B an Infraspecies?
Yes

Taxon B Description
Solanum lycopersicum MoneyMaker and M82

GENOTYPIC CHANGE

Generic Gene Name
101247753

Synonyms
-

String
4081.Solyc09g075080.2.1 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=4081.Solyc09g075080.2.1)

Sequence Similarities
-

GO - Molecular Function
-

UniProtKB Solanum lycopersicum
K4CV85 (http://www.uniprot.org/uniprot/K4CV85)

GenebankID or UniProtKB
828008 (https://www.ncbi.nlm.nih.gov/nuccore/828008)

GO - Biological Process

GO:0048366 : leaf development (https://www.ebi.ac.uk/QuickGO/term/GO:0048366)
GO:0048573 : photoperiodism, flowering
(https://www.ebi.ac.uk/QuickGO/term/GO:0048573)
GO:0009585 : red, far-red light phototransduction
(https://www.ebi.ac.uk/QuickGO/term/GO:0009585)
GO:0010099 : regulation of photomorphogenesis
(https://www.ebi.ac.uk/QuickGO/term/GO:0010099)

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

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

Aberration Type

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

Deletion Size

1-9 bp

Molecular Details of the Mutation

3bp deletion in CDS causing a 'K (lysine) loss in the highly conserved C terminus of EID1

Experimental Evidence

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

Main Reference

Domestication selected for deceleration of the circadian clock in cultivated tomato. (2016) (https://pubmed.ncbi.nlm.nih.gov/26569124)

Authors

MÃ¼ller NA; Wijnen CL; Srinivasan A; Ryngajllo M; Ofner I; Lin T; Ranjan A; West D; Maloof JN; Sinha NR; Huang S; Zamir D; JimÃ©nez-GÃ³mez JM

Abstract

The circadian clock is a critical regulator of plant physiology and development, controlling key agricultural traits in crop plants. In addition, natural variation in circadian rhythms is important for local adaptation. However, quantitative modulation of circadian rhythms due to artificial selection has not yet been reported. Here we show that the circadian clock of cultivated tomato (Solanum lycopersicum) has slowed during domestication. Allelic variation of the tomato homolog of the Arabidopsis gene EID1 is responsible for a phase delay. Notably, the genomic region harboring EID1 shows signatures of a selective sweep. We find that the EID1 allele in cultivated tomatoes enhances plant performance specifically under long day photoperiods, suggesting that humans selected slower circadian rhythms to adapt the cultivated species to the long summer days it encountered as it was moved away from the equator.

Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

adaptation to long photoperiods ; another distinct QTL accounts for period elongation ; non-null