GEPHE SUMMARY

Gephebase Gene

glutamine synthetase 2 (GS) (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^glutamine synthetase 2 (GS)^#gephebase-summary-title)

Entry Status

Published

GepheID

GP00002405

Main curator

Courtier

PHENOTYPIC CHANGE

Trait Category

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

Trait

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

Trait State in Taxon A

Bombyx mori - local strains

Trait State in Taxon B

Bombyx mori - domesticated strains

Ancestral State

Taxon A

Taxonomic Status

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

Taxon A

Latin Name

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

Common Name

domestic silkworm

Synonyms

domestic silkworm; silk moth; silkworm; Bombyx mori Linnaeus, 1758

Rank

species

Lineage

cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Amphiesmenoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Ditrysia; Obtectomera; Bombycoidea; Bombycidae; Bombycinae; Bombyx

Parent

Bombyx () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7090)

NCBI Taxonomy ID

7091 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7091)

is Taxon A an Infraspecies?

No

Taxon B

Latin Name

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

Common Name

domestic silkworm

Synonyms

domestic silkworm; silk moth; silkworm; Bombyx mori Linnaeus, 1758

Rank

species

Lineage

cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Amphiesmenoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Ditrysia; Obtectomera; Bombycoidea; Bombycidae; Bombycinae; Bombyx

Parent

Bombyx () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7090)

NCBI Taxonomy ID

7091 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7091)

is Taxon B an Infraspecies?

No

GENOTYPIC CHANGE

Generic Gene Name

Gs2

Synonyms

CG1743; Dmel\CG1743; gs-c; gs2; GS2; GsII

String

7227.FBpp0073344 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 7227.FBpp0073344)

Sequence Similarities

Belongs to the glutamine synthetase family.

GO - Molecular Function

GO:0005524 : ATP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005524)
GO:0004356 : glutamate-ammonia ligase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004356)

GO - Biological Process

GO:0006538 : glutamate catabolic process (https://www.ebi.ac.uk/QuickGO/term/GO:0006538)

UniProtKB Drosophila melanogaster

P20478 (http://www.uniprot.org/uniprot/P20478)

GenebankID or UniProtKB

()

GO:0006542 : glutamine biosynthetic process (https://www.ebi.ac.uk/QuickGO/term/GO:0006542)
GO:0045213 : neurotransmitter receptor metabolic process (https://www.ebi.ac.uk/QuickGO/term/GO:0045213)
GO:0007416 : synapse assembly (https://www.ebi.ac.uk/QuickGO/term/GO:0007416)

GO - Cellular Component

GO:0005737 : cytoplasm (https://www.ebi.ac.uk/QuickGO/term/GO:0005737)

Presumptive Null

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

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Experimental Evidence

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

Main Reference

The evolutionary road from wild moth to domestic silkworm. (2018) (https://pubmed.ncbi.nlm.nih.gov/29967484)

Authors

Xiang H; Liu X; Li M; Zhu Y; Wang L; Cui Y; Liu L; Fang G; Qian H; Xu A; Wang W; Zhan S

Abstract

The Silk Road, which derives its name from the trade of silk produced by the domestic silkworm Bombyx mori, was an important episode in the development and interaction of human civilizations. However, the detailed history behind silkworm domestication remains ambiguous, and little is known about the underlying genetics with respect to important aspects of its domestication. Here, we reconstruct the domestication processes and identify selective sweeps by sequencing 137 representative silkworm strains. The results present an evolutionary scenario in which silkworms may have been initially domesticated in China as trimoulting lines, then subjected to independent spreads along the Silk Road that gave rise to the development of most local strains, and further improved for modern silk production in Japan and China, having descended from diverse ancestral sources. We find that genes with key roles in nitrogen and amino acid metabolism may have contributed to the promotion of silk production, and that circadian-related genes are generally selected for their adaptation. We additionally identify associations between several candidate genes and important breeding traits, thereby advancing the applicable value of our resources.

Additional References

High-resolution silkworm pan-genome provides genetic insights into artificial selection and ecological adaptation. (2022) (https://pubmed.ncbi.nlm.nih.gov/36153338)

RELATED GEPHE

Related Genes

6 (asparagine synthetase (AS), E2F1, Fkh, glutamate dehydrogenase (GDH), glutamate synthase (GOGAT), sage) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^7091^/and+Trait=Silk yield/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS