

	Gephebase Gene	GepheID
Chit beta-GlcNAcase (https://www.gephebase.org/search-criteria?/and+GeneGephebase~Chit beta-GlcNAcase~#gephebase-summary-title)	GP00002401	
	Entry Status	Courtier
Published		Main curator

Physiology (#gephebase-summary-title)		Trait Category	
Silk fineness (#gephebase-summary-title)		Trait	
Bombyx mori - coarse silk		Trait State in Taxon A	
Bombyx mori - fine silk		Trait State in Taxon B	
Taxon A		Ancestral State	
Domesticated (#gephebase-summary-title)		Taxonomic Status	
Taxon A		Taxon B	
Bombyx mori (#gephebase-summary-title)	Latin Name	Bombyx mori (#gephebase-summary-title)	Latin Name
domestic silkworm	Common Name	domestic silkworm	Common Name
domestic silkworm; silk moth; silkworm; Bombyx mori Linnaeus, 1758	Synonyms	domestic silkworm; silk moth; silkworm; Bombyx mori Linnaeus, 1758	Synonyms
species	Rank	species	Rank
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	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	Lineage
Bombyx () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7090)	Parent	Bombyx () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7090)	Parent
7091 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7091)	NCBI Taxonomy ID	7091 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7091)	NCBI Taxonomy ID
is Taxon A an Intraspecies?		is Taxon B an Intraspecies?	
Yes		Yes	
Xiafang strain, Qiubai strain	Taxon A Description	Suxiu strain, Chunfeng strain	Taxon B Description

-	Generic Gene Name	P49010 (http://www.uniprot.org/uniprot/P49010)	UniProtKB Bombyx mori
-	Synonyms		GenebankID or UniProtKB Bombyx mori
-	String	P49010 (https://www.ncbi.nlm.nih.gov/nuccore/P49010)	
7091.BGIBMGA005899-TA (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7091.BGIBMGA005899-TA)			
Sequence Similarities			
Belongs to the glycosyl hydrolase 20 family.			
GO - Molecular Function			
GO:0004563 : beta-N-acetylhexosaminidase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004563)			
GO:0102148 : N-acetyl-beta-D-galactosaminidase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0102148)			

GO:0006032 : chitin catabolic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0006032>)
GO:0000272 : polysaccharide catabolic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0000272>)

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Presumptive Null

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

Molecular Type

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

Aberration Type

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

Molecular Details of the Mutation

BmChit 1²-GlcNAcase gene is expressed at a significantly higher level in fine silk strains (Suxiu, Chunfeng) compared to coarse silk strains. CRISPR-cas9 mediated knockout of the BmChit 1²-GlcNAcase gene produced coarser silk.

Experimental Evidence

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

Main Reference

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

Authors

Tong X; Han MJ; Lu K; Tai S; Liang S; Liu Y; Hu H; Shen J; Long A; Zhan C; Ding X; Liu S; Gao Q; Zhang B; Zhou L; Tan D; Yuan Y; Guo N; Li YH; Wu Z; Liu L; Li C; Lu Y; Gai T; Zhang Y; Yang R; Qian H; Liu Y; Luo J; Zheng L; Lou J; Peng Y; Zuo W; Song J; He S; Wu S; Zou Y; Zhou L; Cheng L; Tang Y; Cheng G; Yuan L; He W; Xu J; Fu T; Xiao Y; Lei T; Xu A; Yin Y; Wang J; Monteiro A; Westhof E; Lu C; Tian Z; Wang W; Xiang Z; Dai F

Abstract

The silkworm *Bombyx mori* is an important economic insect for producing silk, the “queen of fabrics”. The currently available genomes limit the understanding of its genetic diversity and the discovery of valuable alleles for breeding. Here, we deeply re-sequence 1,078 silkworms and assemble long-read genomes for 545 representatives. We construct a high-resolution pan-genome dataset representing almost the entire genomic content in the silkworm. We find that the silkworm population harbors a high density of genomic variants and identify 7308 new genes, 4260 (22%) core genes, and 3,432,266 non-redundant structure variations (SVs). We reveal hundreds of genes and SVs that may contribute to the artificial selection (domestication and breeding) of silkworm. Further, we focus on four genes responsible, respectively, for two economic (silk yield and silk fineness) and two ecologically adaptive traits (egg diapause and aposematic coloration). Taken together, our population-scale genomic resources will promote functional genomics studies and breeding improvement for silkworm.

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Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS