

GEPHE SUMMARY

Gephebase Gene

btr1

Entry Status

Published

GepheID

GP00001445

Main curator

Prigent

PHENOTYPIC CHANGE

Trait Category

Physiology

Trait

Seed shattering (grain dispersal ; retention)

Trait State in Taxon A

Wild barley with grain falling at maturity brittle form - cultivar Azumamugi (AZ) with wild type Brt1 allele

Trait State in Taxon B

barley with grain retained on the inflorescence at maturity non-brittle form - cultivar Kanto Nakate Gold (KNG)

Ancestral State

Taxon A

Taxonomic Status

Domesticated

Taxon A

Latin Name

Hordeum vulgare

Common Name

-

Synonyms

barley; *Hordeum vulgare* L.; *Horedum vulgare*

Rank

species

Lineage

cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Pooideae; Triticoideae; Triticeae; Hordeinae; *Hordeum*

Parent

Hordeum () - (Rank: genus)

NCBI Taxonomy ID

4513

is Taxon A an Intraspecies?

Yes

Taxon A Description

Wild barley with grain falling at maturity brittle form - cultivar Azumamugi (AZ) with wild type Brt1 allele

Taxon B

Latin Name

Hordeum vulgare subsp. *vulgare*

Common Name

domesticated barley

Synonyms

Hordeum sativum; *Hordeum vulgare* var. *nudum*; *Hordeum vulgare* var. *vulgare*; domesticated barley; two-rowed barley; *Hordeum sativum* Jess.; *Hordeum vulgare* var. *nudum* Spenn.

Rank

subspecies

Lineage

cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Pooideae; Triticoideae; Triticeae; Hordeinae; *Hordeum*; *Hordeum vulgare*

Parent

Hordeum vulgare () - (Rank: species)

NCBI Taxonomy ID

112509

is Taxon B an Intraspecies?

Yes

Taxon B Description

Barley with grain retained on the inflorescence at maturity non-brittle form - cultivar Kanto Nakate Gold (KNG)

GENOTYPIC CHANGE

Generic Gene Name

BTR1

Synonyms

Btr1

String

-

Sequence Similarities

-

GO - Molecular Function

-

GO - Biological Process

-

UniProtKB *Hordeum vulgare* subsp. *vulgare*

A0A0K1RJT0

GenebankID or UniProtKB

KR813535

GO - Cellular Component

-

Presumptive Null

Yes

Molecular Type

Coding

Aberration Type

Deletion

Deletion Size

1-9 bp

Molecular Details of the Mutation

1bp deletion at position 202 inducing a frameshift

Experimental Evidence

Linkage Mapping

Main Reference

Evolution of the Grain Dispersal System in Barley. (2015)

Authors

Pourkheirandish M; Hensel G; Kilian B; Senthil N; Chen G; Sameri M; Azhaguvél P; Sakuma S; Dhanagond S; Sharma R; Mascher M; Himmelbach A; Gottwald S; Nair SK; Tagiri A; Yukuhiro F; Nagamura Y; Kanamori H; Matsumoto T; Willcox G; Middleton CP; Wicker T; Walther A; Waugh R; Fincher GB; Stein N; Kümlehn J; Sato K; Komatsuda T

Abstract

About 12,000 years ago in the Near East, humans began the transition from hunter-gathering to agriculture-based societies. Barley was a founder crop in this process, and the most important steps in its domestication were mutations in two adjacent, dominant, and complementary genes, through which grains were retained on the inflorescence at maturity, enabling effective harvesting. Independent recessive mutations in each of these genes caused cell wall thickening in a highly specific grain "disarticulation zone," converting the brittle floral axis (the rachis) of the wild-type into a tough, non-brittle form that promoted grain retention. By tracing the evolutionary history of allelic variation in both genes, we conclude that spatially and temporally independent selections of germplasm with a non-brittle rachis were made during the domestication of barley by farmers in the southern and northern regions of the Levant, actions that made a major contribution to the emergence of early agrarian societies.

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Additional References

RELATED GEPHE

Related Genes

1 (btr2)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS