GEPHE SUMMARY

Gephebase Gene

DCAR-032551 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^DCAR-032551^#gephebase-summary-title)

GepheID

GP00001568

Entry Status

Published

Main curator

Prigent

PHENOTYPIC CHANGE

Trait Category

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

Trait

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

Trait State in Taxon A

Wild and cultivated carrot strains with white root

Trait State in Taxon B

Cultivated carrot strain with pigmented root

Ancestral State

Taxon A

Taxonomic Status

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

Taxon A

Latin Name

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

Common Name

carrot

Synonyms

carrot; Queen Anne's lace; carrots; Daucus carota L.

Rank

species

Lineage

cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; campanulids; Apiales; Apiineae; Apiaceae; Apioideae; Scandiceae; Daucinae; Daucus; Daucus sect. Daucus

Parent

Daucus sect. Daucus () - (Rank: species group) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 1873447)

NCBI Taxonomy ID

4039 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4039)

is Taxon A an Infraspecies?

Yes

Taxon A Description

Wild and cultivated carrot strains with white root

Taxon B

Latin Name

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

Common Name

carrot

Synonyms

carrot; Queen Anne's lace; carrots; Daucus carota L.

Rank

species

Lineage

cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; campanulids; Apiales; Apiineae; Apiaceae; Apioideae; Scandiceae; Daucinae; Daucus; Daucus sect. Daucus

Parent

Daucus sect. Daucus () - (Rank: species group) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 1873447)

NCBI Taxonomy ID

4039 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4039)

is Taxon B an Infraspecies?

Yes

Taxon B Description

Cultivated carrot strain with pigmented root

GENOTYPIC CHANGE

Generic Gene Name

DCAR_032551

Synonyms

DCAR_032551

String

-

Sequence Similarities

-

GO - Molecular Function

-

GO - Biological Process

-

GO - Cellular Component

-

UniProtKB Daucus carota subsp. sativus

A0A162A3G8 (http://www.uniprot.org/uniprot/A0A162A3G8)

GenebankID or UniProtKB

()

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

100-999 bp

Molecular Details of the Mutation

A 212-nt insertion in exon 2 that creates a frameshift mutation

Experimental Evidence

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

Main Reference

A high-quality carrot genome assembly provides new insights into carotenoid accumulation and asterid genome evolution. (2016) (https://pubmed.ncbi.nlm.nih.gov/27158781)

Authors

Iorizzo M; Ellison S; Senalik D; Zeng P; Satapoomin P; Huang J; Bowman M; Iovene M; Sanseverino W; Cavagnaro P; Yildiz M; Macko-PodgÃ³rni A; Moranska E; Grzebelus E; Grzebelus D; Ashrafi H; Zheng Z; Cheng S; Spooner D; Van Deynze A; Simon P

Abstract

We report a high-quality chromosome-scale assembly and analysis of the carrot (Daucus carota) genome, the first sequenced genome to include a comparative evolutionary analysis among members of the euasterid II clade. We characterized two new polyploidization events, both occurring after the divergence of carrot from members of the Asterales order, clarifying the evolutionary scenario before and after radiation of the two main asterid clades. Large- and small-scale lineage-specific duplications have contributed to the expansion of gene families, including those with roles in flowering time, defense response, flavor, and pigment accumulation. We identified a candidate gene, DCAR_032551, that conditions carotenoid accumulation (Y) in carrot taproot and is coexpressed with several isoprenoid biosynthetic genes. The primary mechanism regulating carotenoid accumulation in carrot taproot is not at the biosynthetic level. We hypothesize that DCAR_032551 regulates upstream photosystem development and functional processes, including photomorphogenesis and root de-etiolation.

Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

Presumably a null mutation