

GEPHE SUMMARY

	Gephebase Gene	GephelD
D14 (KAI2 paralog) (https://www.gephebase.org/search-criteria/?and+Gene Gephebase=D14 (KAI2 paralog)^#gephebase-summary-title)	GP00000213	Main curator
	Entry Status	Courtier
Published		

PHENOTYPIC CHANGE

	Trait Category	
Physiology (https://www.gephebase.org/search-criteria/?and+Trait Category=Physiology^#gephebase-summary-title)	Trait	
Seed dormancy (strigolactone responsiveness) (https://www.gephebase.org/search-criteria/?and+Trait=^Seed+dormancy+(strigolactone+responsiveness)^#gephebase-summary-title)	Trait State in Taxon A	
Other spermatophytes	Trait State in Taxon B	
Arabidopsis thaliana	Ancestral State	
Taxon A	Taxonomic Status	
Intergeneric or Higher (https://www.gephebase.org/search-criteria/?and+Taxonomic Status=Intergeneric or Higher^#gephebase-summary-title)		
Taxon A		Taxon B
Spermatophyta (https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=Spermatophyta^#gephebase-summary-title)	Latin Name	Latin Name
-	Common Name	Common Name
seed plants	Synonyms	Synonyms
no rank	Rank	Rank
cellular organisms; Eukaryota; Viridiplantae; Streptophytina; Embryophytina; Tracheophytina; Euphyllophyta	Lineage	Lineage
Euphyllophyta () - (Rank: no rank) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 78536)	Parent	Parent
58024 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 58024)	NCBI Taxonomy ID	NCBI Taxonomy ID
No	is Taxon A an Infraspecies?	is Taxon B an Infraspecies?

GENOTYPIC CHANGE

D14	Generic Gene Name	UniProtKB Oryza sativa subsp. japonica
D14; D88; HTD2; Os03g0203200; LOC_Os03g10620	Synonyms	GenebankID or UniProtKB
39947.LOC_Os03g10620.1 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=39947.LOC_Os03g10620.1)	String	0
Belongs to the AB hydrolase superfamily.	Sequence Similarities	
GO:0016787 : hydrolase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0016787)	GO - Molecular Function	
GO:0010223 : secondary shoot formation (https://www.ebi.ac.uk/QuickGO/term/GO:0010223)	GO - Biological Process	
GO:1901601 : strigolactone biosynthetic process		

(<https://www.ebi.ac.uk/QuickGO/term/GO:1901601>)

GO - Cellular Component

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

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

Unknown (<https://www.gephebase.org/search-criteria?/and+Aberration+Type=%Unknown%#gephebase-summary-title>)

Molecular Details of the Mutation

Ligand-binding pocket tuning

Experimental Evidence

Candidate Gene (<https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=%Candidate+Gene%#gephebase-summary-title>)

Main Reference

PLANT EVOLUTION. Convergent evolution of strigolactone perception enabled host detection in parasitic plants. (2015) (<https://pubmed.ncbi.nlm.nih.gov/26228149>)

Authors

Conn CE; Bythell-Douglas R; Neumann D; Yoshida S; Whittington B; Westwood JH; Shirasu K; Bond CS; Dyer KA; Nelson DC

Abstract

Obligate parasitic plants in the Orobanchaceae germinate after sensing plant hormones, strigolactones, exuded from host roots. In *Arabidopsis thaliana*, the $\beta\beta^2$ -hydrolase D14 acts as a strigolactone receptor that controls shoot branching, whereas its ancestral paralog, KAI2, mediates karrikin-specific germination responses. We observed that KAI2, but not D14, is present at higher copy numbers in parasitic species than in nonparasitic relatives. KAI2 paralogs in parasites are distributed into three phylogenetic clades. The fastest-evolving clade, KAI2d, contains the majority of KAI2 paralogs. Homology models predict that the ligand-binding pockets of KAI2d resemble D14. KAI2d transgenes confer strigolactone-specific germination responses to *Arabidopsis thaliana*. Thus, the KAI2 paralogs D14 and KAI2d underwent convergent evolution of strigolactone recognition, respectively enabling developmental responses to strigolactones in angiosperms and host detection in parasites.

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Additional References

RELATED GEPHE

Related Genes

5 (DOG1 (DELAY OF GERMINATION 1), RDO5 REDUCED DORMANCY5, KAI2 paralogs, NCED4, TaPHS1) (<https://www.gephebase.org/search-criteria?/or+TaxonID=%58024%and+Trait=Seed+dormancy/or+TaxonID=%3702%and+Trait=Seed+dormancy/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS