

GEPHE SUMMARY

SCR (<a +scr+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase="+SCR+"#gephebase-summary-title)	Gephebase Gene	GP00001271	GepheID
Published	Entry Status	Arnoult	Main curator

PHENOTYPIC CHANGE

Physiology (<a +physiology+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait+Category=">https://www.gephebase.org/search-criteria?/and+Trait+Category="+Physiology+"#gephebase-summary-title)	Trait Category		
Self-incompatibility (loss) (<a +self-incompatibility+(loss)+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait="+Self-incompatibility+(loss)+"#gephebase-summary-title)	Trait		
Arabidopsis thaliana- Wei1	Trait State in Taxon A		
Arabidopsis thaliana- Wei1 * mutant	Trait State in Taxon B		
Taxon A	Ancestral State		
Intraspecific (<a +intraspecific+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=">https://www.gephebase.org/search-criteria?/and+Taxonomic+Status="+Intraspecific+"#gephebase-summary-title)	Taxonomic Status		
	Taxon A		Taxon B
Arabidopsis thaliana (<a +arabidopsis+thaliana+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Arabidopsis+thaliana+"#gephebase-summary-title)	Latin Name	Arabidopsis thaliana (<a +arabidopsis+thaliana+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Arabidopsis+thaliana+"#gephebase-summary-title)	Latin Name
thale cress	Common Name	thale cress	Common Name
thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis...thaliana; Arbisopsis thaliana; thale kress	Synonyms	thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis...thaliana; Arbisopsis thaliana; thale kress	Synonyms
species	Rank	species	Rank
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis	Lineage	cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis	Lineage
Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701)	Parent	Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701)	Parent
3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702)	NCBI Taxonomy ID	3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702)	NCBI Taxonomy ID
Yes	is Taxon A an Intraspecies?	Yes	is Taxon B an Intraspecies?
Arabidopsis thaliana- Wei1	Taxon A Description	Arabidopsis thaliana- Wei1 * mutant	Taxon B Description

GENOTYPIC CHANGE

SCRA	Generic Gene Name	P0CG07 (http://www.uniprot.org/uniprot/P0CG07)	UniProtKB Arabidopsis thaliana
SCR1; SP11; At4g21364; T6K22	Synonyms	0	GenebankID or UniProtKB
-	String		
Belongs to the DEFL family.	Sequence Similarities		
-	GO - Molecular Function		
GO:0007165 : signal transduction (https://www.ebi.ac.uk/QuickGO/term/GO:0007165)	GO - Biological Process		
GO:0060320 : rejection of self pollen (https://www.ebi.ac.uk/QuickGO/term/GO:0060320)	GO - Cellular Component		

GO:0005576 : extracellular region (<https://www.ebi.ac.uk/QuickGO/term/GO:0005576>)

Presumptive Null

Yes ([https://www.gephebase.org/search-criteria?/and+Presumptive Null=^Yes^#gephebase-summary-title](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](https://www.gephebase.org/search-criteria?/and+Molecular+Type=^Coding^#gephebase-summary-title))

Aberration Type

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

Inversion Size

100-999 bp

Molecular Details of the Mutation

213 bp inversion causing premature stop

Experimental Evidence

Candidate Gene ([https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Candidate Gene^#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=^Candidate+Gene^#gephebase-summary-title))

Main Reference

Evolution of self-compatibility in *Arabidopsis* by a mutation in the male specificity gene. (2010) (<https://pubmed.ncbi.nlm.nih.gov/20400945>)

Authors

Tsuchimatsu T; Suwabe K; Shimizu-Inatsugi R; Isokawa S; Pavlidis P; StÅrdler T; Suzuki G; Takayama S; Watanabe M; Shimizu KK

Abstract

Ever since Darwin’s pioneering research, the evolution of self-fertilisation (selfing) has been regarded as one of the most prevalent evolutionary transitions in flowering plants. A major mechanism to prevent selfing is the self-incompatibility (SI) recognition system, which consists of male and female specificity genes at the S-locus and SI modifier genes. Under conditions that favour selfing, mutations disabling the male recognition component are predicted to enjoy a relative advantage over those disabling the female component, because male mutations would increase through both pollen and seeds whereas female mutations would increase only through seeds. Despite many studies on the genetic basis of loss of SI in the predominantly selfing plant *Arabidopsis thaliana*, it remains unknown whether selfing arose through mutations in the female specificity gene (S-receptor kinase, SRK), male specificity gene (S-locus cysteine-rich protein, SCR; also known as S-locus protein 11, SP11) or modifier genes, and whether any of them rose to high frequency across large geographic regions. Here we report that a disruptive 213-base-pair (bp) inversion in the SCR gene (or its derivative haplotypes with deletions encompassing the entire SCR-A and a large portion of SRK-A) is found in 95% of European accessions, which contrasts with the genome-wide pattern of polymorphism in European *A. thaliana*. Importantly, interspecific crossings using *Arabidopsis halleri* as a pollen donor reveal that some *A. thaliana* accessions, including Wei-1, retain the female SI reaction, suggesting that all female components including SRK are still functional. Moreover, when the 213-bp inversion in SCR was inverted and expressed in transgenic Wei-1 plants, the functional SCR restored the SI reaction. The inversion within SCR is the first mutation disrupting SI shown to be nearly fixed in geographically wide samples, and its prevalence is consistent with theoretical predictions regarding the evolutionary advantage of mutations in male components.

Additional References

Independent origins of self-compatibility in *Arabidopsis thaliana*. (2008) (<https://pubmed.ncbi.nlm.nih.gov/18179433>)

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

Complex allele swapping experiments while crossing to *Halleri* reveals that 213bp inversion in SRC is responsible for selfing incompatibility loss. Ref 18179433 shows that other parallel (unresolved) genetic walks happened. Null mutation