

## GEPHE SUMMARY

	Gephebase Gene		GepheID
Brevis radix (BRX) ( <a href="https://www.gephebase.org/search-criteria?/and+Gene">https://www.gephebase.org/search-criteria?/and+Gene</a> )		GP00001236	
Gephebase="Brevis radix (BRX)"#gephebase-summary-title)			Main curator
Published	Entry Status	Arnoult	

## PHENOTYPIC CHANGE

	Trait Category	
Physiology ( <a href="https://www.gephebase.org/search-criteria?/and+Trait">https://www.gephebase.org/search-criteria?/and+Trait</a> )		
Category="Physiology"#gephebase-summary-title)	Trait	
pH tolerance (acidic soil) ( <a href="https://www.gephebase.org/search-criteria?/and+Trait=" ph"="">https://www.gephebase.org/search-criteria?/and+Trait="pH</a> )		
tolerance (acidic soil)"#gephebase-summary-title)	Trait State in Taxon A	
Arabidopsis thaliana- Col0		
	Trait State in Taxon B	
Arabidopsis thaliana Gue-0		
	Ancestral State	
Data not curated		
	Taxonomic Status	
Intraspecific ( <a href="https://www.gephebase.org/search-criteria?/and+Taxonomic">https://www.gephebase.org/search-criteria?/and+Taxonomic</a> )		
Status="Intraspecific"#gephebase-summary-title)		

Taxon A	Latin Name	Taxon B	Latin Name
Arabidopsis thaliana ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon">https://www.gephebase.org/search-criteria?/and+Taxon</a> and Synonyms="Arabidopsis thaliana"#gephebase-summary-title)		Arabidopsis thaliana ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon">https://www.gephebase.org/search-criteria?/and+Taxon</a> and Synonyms="Arabidopsis thaliana"#gephebase-summary-title)	
	Common Name		Common Name
thale cress		thale cress	
	Synonyms		Synonyms
thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress		thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress	
	Rank		Rank
species		species	
	Lineage		Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis		cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis	
	Parent		Parent
Arabidopsis () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701</a> )		Arabidopsis () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701</a> )	
	NCBI Taxonomy ID		NCBI Taxonomy ID
3702 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702</a> )		3702 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702</a> )	
	is Taxon A an Intraspecies?		is Taxon B an Intraspecies?
Yes		Yes	
	Taxon A Description		Taxon B Description
Arabidopsis thaliana- Col0		Arabidopsis thaliana Gue-0	

## GENOTYPIC CHANGE

	Generic Gene Name		UniProtKB Arabidopsis thaliana
BRX		Q17T15 ( <a href="http://www.uniprot.org/uniprot/Q17T15">http://www.uniprot.org/uniprot/Q17T15</a> )	
	Synonyms		GenebankID or UniProtKB
BREVIS RADIX; F5M6.11; F5M6_11; NIP3;1; NLM9; NOD26-like intrinsic protein 3;1; At1g31880		NM_102925 ( <a href="https://www.ncbi.nlm.nih.gov/nuccore/NM_102925">https://www.ncbi.nlm.nih.gov/nuccore/NM_102925</a> )	
	String		
3702.AT1G31880.1 ( <a href="http://string-db.org/newstring.cgi/show_network_section.pl?identifier=3702.AT1G31880.1">http://string-db.org/newstring.cgi/show_network_section.pl?identifier=3702.AT1G31880.1</a> )			
	Sequence Similarities		
Belongs to the BRX family.			
	GO - Molecular Function		
-			
	GO - Biological Process		
GO:0009734 : auxin-activated signaling pathway			

(<https://www.ebi.ac.uk/QuickGO/term/GO:0009734>)  
 GO:0030154 : cell differentiation (<https://www.ebi.ac.uk/QuickGO/term/GO:0030154>)  
 GO:0048364 : root development (<https://www.ebi.ac.uk/QuickGO/term/GO:0048364>)  
 GO:0009736 : cytokinin-activated signaling pathway  
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0009736>)  
 GO:0048527 : lateral root development  
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0048527>)  
 GO:0010088 : phloem development (<https://www.ebi.ac.uk/QuickGO/term/GO:0010088>)  
 GO:2000280 : regulation of root development  
 (<https://www.ebi.ac.uk/QuickGO/term/GO:2000280>)  
 GO:0009737 : response to abscisic acid  
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0009737>)

GO - Cellular Component

GO:0005886 : plasma membrane (<https://www.ebi.ac.uk/QuickGO/term/GO:0005886>)  
 GO:0005634 : nucleus (<https://www.ebi.ac.uk/QuickGO/term/GO:0005634>)

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=))

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=))

Aberration Type

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

SNP Coding Change

Nonsense

Molecular Details of the Mutation

K188\* (stop codon)

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=))

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	-	-	-

Main Reference

Natural Arabidopsis brx loss-of-function alleles confer root adaptation to acidic soil. (2012) (<https://pubmed.ncbi.nlm.nih.gov/23041192>)

Authors

Gujas B; Alonso-Blanco C; Hardtke CS

Abstract

Soil acidification is a major agricultural problem that negatively affects crop yield. Root systems counteract detrimental passive proton influx from acidic soil through increased proton pumping into the apoplast, which is presumably also required for cell elongation and stimulated by auxin. Here, we found an unexpected impact of extracellular pH on auxin activity and cell proliferation rate in the root meristem of two Arabidopsis mutants with impaired auxin perception, *axr3* and *brx*. Surprisingly, neutral to slightly alkaline media rescued their severely reduced root (meristem) growth by stimulating auxin signaling, independent of auxin uptake. The finding that proton pumps are hyperactive in *brx* roots could explain this phenomenon and is consistent with more robust growth and increased fitness of *brx* mutants on overly acidic media or soil. Interestingly, the original *brx* allele was isolated from a natural stock center accession collected from acidic soil. Our discovery of a novel *brx* allele in accessions recently collected from another acidic sampling site demonstrates the existence of independently maintained *brx* loss-of-function alleles in nature and supports the notion that they are advantageous in acidic soil pH conditions, a finding that might be exploited for crop breeding.

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Additional References

## RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

2 ([https://www.gephebase.org/search-criteria?/or+Gene Gephebase="Brevis radix \(BRX\)"/and+Taxon ID="3702"/or+Gene Gephebase="Brevis radix \(BRX\)"/and+Taxon ID="3702"#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Gene Gephebase=))

## EXTERNAL LINKS

## COMMENTS

candidate approach; but heavy mechanistic description of the molecular role of BRX regarding acidification

