

GEPHE SUMMARY

Brevis radix (BRX) (https://www.gephebase.org/search-criteria/?and+Gene	Gephebase Gene	GP00001236	GephelD
Gephebase=^Brevis radix (BRX)^#gephebase-summary-title)			Main curator
Published	Entry Status	Arnoult	

PHENOTYPIC CHANGE

Physiology (https://www.gephebase.org/search-criteria/?and+Trait	Trait Category		
Category=^Physiology^#gephebase-summary-title)			
pH tolerance (acidic soil) (https://www.gephebase.org/search-criteria/?and+Trait=pH	Trait		
tolerance (acidic soil)^#gephebase-summary-title)			
Arabidopsis thaliana- Col0	Trait State in Taxon A		
Arabidopsis thaliana Gue-0	Trait State in Taxon B		
Data not curated	Ancestral State		
Intraspecific (https://www.gephebase.org/search-criteria/?and+Taxonomic	Taxonomic Status		
Status=^Intraspecific^#gephebase-summary-title)			
Taxon A		Taxon B	
Arabidopsis thaliana	Latin Name	Arabidopsis thaliana	Latin Name
(https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=Arabidopsis+thaliana #gephebase-summary-title)		(https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=Arabidopsis+thaliana #gephebase-summary-title)	
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; Viriplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphylophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelinae; Arabidopsis	Lineage	cellular organisms; Eukaryota; Viriplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphylophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelinae; Arabidopsis	Lineage
Arabidopsis () - (Rank: genus)	Parent	Arabidopsis () - (Rank: genus)	Parent
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701)	NCBI Taxonomy ID	(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701)	NCBI Taxonomy ID
3702		3702	
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702)	is Taxon A an Infraspecies?	(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702)	is Taxon B an Infraspecies?
Yes	Taxon A Description	Yes	Taxon B Description
Arabidopsis thaliana- Col0		Arabidopsis thaliana Gue-0	

GENOTYPIC CHANGE

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

(<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>)

Molecular Type

Coding (<https://www.gephebase.org/search-criteria?/and+Molecular+Type=^Coding^#gephebase-summary-title>)

Aberration Type

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

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>)

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

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

Main Reference

Gujas B; Alonso-Blanco C; Hardtke CS

Authors

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

No matches found.

Related Genes

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=^Brevis+radix+(BRX)^/and+Taxon+ID=^3702^/or+Gene+Gephebase=^Brevis+radix+(BRX)^/and+Taxon+ID=^3702^#gephebase-summary-title))

Related Haplotypes

EXTERNAL LINKS

COMMENTS

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

