

GEPHE SUMMARY

EPSPS (https://www.gephebase.org/search-criteria?/and+Gene Gephebase= [^] EPSPS [^] #gephebase-summary-title)	Gephebase Gene	GP00001887	GepheID
Published	Entry Status	Courtier	Main curator

PHENOTYPIC CHANGE

Physiology (https://www.gephebase.org/search-criteria?/and+Trait Category= [^] Physiology [^] #gephebase-summary-title)	Trait Category		
Xenobiotic resistance (herbicides; glyphosate) (<a href="https://www.gephebase.org/search-criteria?/and+Trait=<sup>^</sup>Xenobiotic resistance (herbicides; glyphosate)<sup>^</sup>#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait=[^]Xenobiotic resistance (herbicides; glyphosate)[^]#gephebase-summary-title)	Trait		
Amaranthus spinosus - sensitive	Trait State in Taxon A		
Amaranthus spinosus - resistant	Trait State in Taxon B		
Taxon A	Ancestral State		
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status= [^] Intraspecific [^] #gephebase-summary-title)	Taxonomic Status		
		Taxon A	Taxon B
	Latin Name		Latin Name
Amaranthus spinosus (<a href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=<sup>^</sup>Amaranthus spinosus<sup>^</sup>#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=[^]Amaranthus spinosus[^]#gephebase-summary-title)		Amaranthus spinosus (<a href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=<sup>^</sup>Amaranthus spinosus<sup>^</sup>#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=[^]Amaranthus spinosus[^]#gephebase-summary-title)	
-	Common Name	-	Common Name
Amaranthus spinosus L.	Synonyms	Amaranthus spinosus L.	Synonyms
species	Rank	species	Rank
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliopsida; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetales; Caryophyllales; Amaranthaceae; Amaranthus	Lineage	cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliopsida; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetales; Caryophyllales; Amaranthaceae; Amaranthus	Lineage
Amaranthus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3564)	Parent	Amaranthus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3564)	Parent
124765 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=124765)	NCBI Taxonomy ID	124765 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=124765)	NCBI Taxonomy ID
No	is Taxon A an Intraspecies?	No	is Taxon B an Intraspecies?

GENOTYPIC CHANGE

At2g45300	Generic Gene Name	P05466 (http://www.uniprot.org/uniprot/P05466)	UniProtKB Arabidopsis thaliana
F4L23.19; At2g45300	Synonyms	()	GenebankID or UniProtKB
3702.AT2G45300.1 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=3702.AT2G45300.1)	String		
Belongs to the EPSP synthase family.	Sequence Similarities		
GO:0003866 : 3-phosphoshikimate 1-carboxyvinyltransferase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0003866)	GO - Molecular Function		
GO:0009073 : aromatic amino acid family biosynthetic process (https://www.ebi.ac.uk/QuickGO/term/GO:0009073)	GO - Biological Process		
GO:0009423 : chorismate biosynthetic process (https://www.ebi.ac.uk/QuickGO/term/GO:0009423)			

GO:0009507 : chloroplast (<https://www.ebi.ac.uk/QuickGO/term/GO:0009507>)

GO:0009570 : chloroplast stroma (<https://www.ebi.ac.uk/QuickGO/term/GO:0009570>)

No (<https://www.gephebase.org/search-criteria?/and+Presumptive Null=^No^#gephebase-summary-title>)

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

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

10-100 kb

26-37 copies of the EPSPS gene

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

Glyphosate resistance: state of knowledge. (2014) (<https://pubmed.ncbi.nlm.nih.gov/25180399>)

Sammons RD; Gaines TA

Abstract
 Studies of mechanisms of resistance to glyphosate have increased current understanding of herbicide resistance mechanisms. Thus far, single-codon non-synonymous mutations of EPSPS (5-enolpyruvylshikimate-3-phosphate synthase) have been rare and, relative to other herbicide mode of action target-site mutations, unconventionally weak in magnitude for resistance to glyphosate. However, it is possible that weeds will emerge with non-synonymous mutations of two codons of EPSPS to produce an enzyme endowing greater resistance to glyphosate. Today, target-gene duplication is a common glyphosate resistance mechanism and could become a fundamental process for developing any resistance trait. Based on competition and substrate selectivity studies in several species, rapid vacuole sequestration of glyphosate occurs via a transporter mechanism. Conversely, as the chloroplast requires transporters for uptake of important metabolites, transporters associated with the two plastid membranes may separately, or together, successfully block glyphosate delivery. A model based on finite glyphosate dose and limiting time required for chloroplast loading sets the stage for understanding how uniquely different mechanisms can contribute to overall glyphosate resistance.

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Presumptive Null

Molecular Type

Aberration Type

Insertion Size

Molecular Details of the Mutation

Experimental Evidence

Main Reference

Authors

Abstract

Additional References

RELATED GEPHE

No matches found.

Related Genes

No matches found.

Related Haplotypes

EXTERNAL LINKS

COMMENTS