

GEPHE SUMMARY

EPSPS (https://www.gephebase.org/search-criteria?/and+Gene Gephebase="EPSPS" #gephebase-summary-title)	Gephebase Gene	GP00001891	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 #gephebase-summary-title"="" (herbicides;="" glyphosate)"="" href="https://www.gephebase.org/search-criteria?/and+Trait=" resistance="" xenobiotic="">https://www.gephebase.org/search-criteria?/and+Trait="Xenobiotic resistance (herbicides; glyphosate)" #gephebase-summary-title)	Trait		
Echinochloa colona - sensitive	Trait State in Taxon A		
Echinochloa colona - 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	
Echinochloa colona (<a #gephebase-summary-title"="" colona"="" echinochloa="" href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms="Echinochloa colona" #gephebase-summary-title)	Latin Name	Echinochloa colona (<a #gephebase-summary-title"="" colona"="" echinochloa="" href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms="Echinochloa colona" #gephebase-summary-title)	Latin Name
-	Common Name	-	Common Name
Echinochloa colonum; Deccan grass; corn panic grass; jungle-rice; millet-rice; shama millet; Echinochloa colona (L.) Link	Synonyms	Echinochloa colonum; Deccan grass; corn panic grass; jungle-rice; millet-rice; shama millet; Echinochloa colona (L.) Link	Synonyms
species	Rank	species	Rank
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliopsida; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; PACMAD clade; Panicoideae; Panicoideae; Paniceae; Boivinellinae; Echinochloa	Lineage	cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliopsida; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; PACMAD clade; Panicoideae; Panicoideae; Paniceae; Boivinellinae; Echinochloa	Lineage
Echinochloa () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 45618)	Parent	Echinochloa () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 45618)	Parent
90396 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 90396)	NCBI Taxonomy ID	90396 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 90396)	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	0	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 - Cellular Component

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>)

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

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

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

Pro106Thr leading to resistance

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	Pro	Thr	106

Main Reference

Multiple target site resistance to glyphosate in junglerice (*Echinochloa colona*) lines from California orchards. (2018) (<https://pubmed.ncbi.nlm.nih.gov/29722118>)

Authors

Morran S; Moretti ML; Brunharo CA; Fischer AJ; Hanson BD

Abstract

In California specialty cropping systems such as vineyards and orchards, *Echinochloa colona* is present as a summer annual weed. It is able to germinate throughout the growing season whenever favorable conditions are present, and management relies heavily on glyphosate applications. Glyphosate-resistant (GR) *E. colona* biotypes are present in the state, but the levels of resistance observed suggest that there may be differences in mechanisms of resistance among populations.

Echinochloa colona lines collected from different regions of California's Central Valley presented resistance levels ranging from 1.4 to 4.3-fold compared to susceptible lines. No differences in the absorption and translocation of [¹⁴C]-glyphosate were observed among lines. Resistant lines accumulated eight-fold less shikimic acid after treatment with 435 and 870 g a.e. ha glyphosate compared to the most susceptible line. Sequencing of a region of the EPSPS gene revealed three single nucleotide changes leading to amino acid substitutions at Proline 106, including Pro106Leu, Pro106Thr and Pro106Ser.

These results indicate that an altered target site in EPSPS is contributing to resistance in these lines and resistance has evolved independently, multiple times in the Central Valley of California. Additional research is needed to further understand the genomic contributions of resistance loci in this polyploid weed species. © 2018 Society of Chemical Industry.

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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=^EPSPS^/and+Taxon ID=^90396^/or+Gene Gephebase=^EPSPS^/and+Taxon ID=^90396^#gephebase-summary-title>)

EXTERNAL LINKS

COMMENTS

©ConvergentEvolution in this species there are three single nucleotide changes leading to amino acid substitutions at Proline 106; including Pro106Leu; Pro106Thr and Pro106Ser

