

## GEPHE SUMMARY

**Gephebase Gene**  
EPSPS

**Entry Status**  
Published

**GepheID**  
GP00001886

**Main curator**  
Courtier

## PHENOTYPIC CHANGE

**Trait Category**  
Physiology

**Trait**  
Xenobiotic resistance (herbicides; glyphosate)

**Trait State in Taxon A**  
Kochia scoparia - sensitive

**Trait State in Taxon B**  
Kochia scoparia - resistant

**Ancestral State**  
Taxon A

**Taxonomic Status**  
Intraspecific

### Taxon A

**Latin Name**  
*Bassia scoparia*

**Common Name**  
-

**Synonyms**  
Kochia densiflora; Kochia scoparia; burning bush; summer cypress; Bassia scoparia (L.) A.J.Scott, 1978; Kochia densiflora Turcz. ex Aellen, 1954; Kochia scoparia (L.) Schrad., 1809; Bassia scorpia

**Rank**  
species

**Lineage**  
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliopsida; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetales; Caryophyllales; Chenopodiaceae; Camphorosmoideae; Camphorosmeae; Bassia

**Parent**  
Bassia () - (Rank: genus)

**NCBI Taxonomy ID**  
83154

**is Taxon A an Intraspecies?**  
No

### Taxon B

**Latin Name**  
*Bassia scoparia*

**Common Name**  
-

**Synonyms**  
Kochia densiflora; Kochia scoparia; burning bush; summer cypress; Bassia scoparia (L.) A.J.Scott, 1978; Kochia densiflora Turcz. ex Aellen, 1954; Kochia scoparia (L.) Schrad., 1809; Bassia scorpia

**Rank**  
species

**Lineage**  
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliopsida; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetales; Caryophyllales; Chenopodiaceae; Camphorosmoideae; Camphorosmeae; Bassia

**Parent**  
Bassia () - (Rank: genus)

**NCBI Taxonomy ID**  
83154

**is Taxon B an Intraspecies?**  
No

## GENOTYPIC CHANGE

**Generic Gene Name**  
At2g45300

**Synonyms**  
F4L23.19; At2g45300

**String**  
3702.AT2G45300.1

**Sequence Similarities**  
Belongs to the EPSP synthase family.

**GO - Molecular Function**  
GO:0003866 : 3-phosphoshikimate 1-carboxyvinyltransferase activity

**GO - Biological Process**  
GO:0009073 : aromatic amino acid family biosynthetic process  
GO:0009423 : chorismate biosynthetic process

**GO - Cellular Component**  
GO:0009507 : chloroplast  
GO:0009570 : chloroplast stroma

**UniProtKB Arabidopsis thaliana**  
P05466

**GenebankID or UniProtKB**

#### Presumptive Null

No

#### Molecular Type

Gene Amplification

#### Aberration Type

Insertion

#### Insertion Size

10-100 kb

#### Molecular Details of the Mutation

15-25 copies of the EPSPS gene

#### Experimental Evidence

Candidate Gene

#### Main Reference

Glyphosate resistance: state of knowledge. (2014)

#### Authors

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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#### Additional References

## RELATED GEPHE

#### Related Genes

No matches found.

#### Related Haplotypes

No matches found.

## COMMENTS