

## GEPHE SUMMARY

<p>benzoic acid/salicylic acid carboxyl methyltransferase (BSMT)  <a +benzoic+acid="" href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=" salicylic+acid+carboxyl+methyltransferase+(bsmt)+"#gephebase-summary-title"="">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase="+benzoic+acid/salicylic+acid+carboxyl+methyltransferase+(BSMT)+"#gephebase-summary-title</a></p> <p>Published</p>	<p>Gephebase Gene</p> <p>GP00001766</p> <p>Courtier</p> <p>Entry Status</p>	<p>GepheID</p> <p>Main curator</p>
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## PHENOTYPIC CHANGE

<p>Physiology (<a +physiology+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait+Category=">https://www.gephebase.org/search-criteria?/and+Trait+Category="+Physiology+"#gephebase-summary-title</a>)</p> <p>Fragrance (<a +fragrance+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait="+Fragrance+"#gephebase-summary-title</a>)</p> <p>Petunia inflata (less odorant; bee pollinated)</p> <p>Petunia axillaris (very odorant; increase of phenylpropanoids and benzenoids; hawkmoth pollinated)</p> <p>Taxon A</p> <p>Interspecific (<a +interspecific+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=">https://www.gephebase.org/search-criteria?/and+Taxonomic+Status="+Interspecific+"#gephebase-summary-title</a>)</p>	<p>Trait Category</p> <p>Trait</p> <p>Trait State in Taxon A</p> <p>Trait State in Taxon B</p> <p>Ancestral State</p> <p>Taxonomic Status</p>	<p>Taxon B</p>	
<p>Petunia integrifolia subsp. inflata  <a +petunia+integrifolia+subsp.+inflata+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Petunia+integrifolia+subsp.+inflata+"#gephebase-summary-title</a></p> <p>-</p> <p>Petunia inflata; Petunia inflata R.E.Fr., 1911; Petunia integrifolia subsp. inflata (R.E.Fr.) Wijsman, 1982</p> <p>subspecies</p> <p>cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Solanaceae; Petunioideae; Petunia; Petunia integrifolia</p> <p>Petunia integrifolia () - (Rank: species)  <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4103">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4103</a></p> <p>212142  <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=212142">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=212142</a></p> <p>No</p>	<p>Latin Name</p> <p>Common Name</p> <p>Synonyms</p> <p>Rank</p> <p>Lineage</p> <p>Parent</p> <p>NCBI Taxonomy ID</p> <p>is Taxon A an Intraspecies?</p>	<p>Petunia axillaris  <a +petunia+axillaris+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Petunia+axillaris+"#gephebase-summary-title</a></p> <p>-</p> <p>large white petunia; white moon petunia; Petunia axillaris (Lam.) Britton, Stern &amp; Poggenb.; Petunia axillaris</p> <p>species</p> <p>cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Solanaceae; Petunioideae; Petunia</p> <p>Petunia () - (Rank: genus)  <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4101">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4101</a></p> <p>33119  <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=33119">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=33119</a></p> <p>No</p>	<p>Latin Name</p> <p>Common Name</p> <p>Synonyms</p> <p>Rank</p> <p>Lineage</p> <p>Parent</p> <p>NCBI Taxonomy ID</p> <p>is Taxon B an Intraspecies?</p>

## GENOTYPIC CHANGE

<p>BSMT1</p> <p>ATBSMT1; At3g11480; F24K9.15</p> <p>3702.AT3G11480.1  <a href="http://string-db.org/newstring.cgi/show_network_section.pl?identifier=3702.AT3G11480.1">http://string-db.org/newstring.cgi/show_network_section.pl?identifier=3702.AT3G11480.1</a></p> <p>Belongs to the methyltransferase superfamily. Type-7 methyltransferase family, SABATH subfamily.</p> <p>GO:0046872 : metal ion binding (<a href="https://www.ebi.ac.uk/QuickGO/term/GO:0046872">https://www.ebi.ac.uk/QuickGO/term/GO:0046872</a>)          GO:0008757 : S-adenosylmethionine-dependent methyltransferase activity (<a href="https://www.ebi.ac.uk/QuickGO/term/GO:0008757">https://www.ebi.ac.uk/QuickGO/term/GO:0008757</a>)</p>	<p>Generic Gene Name</p> <p>Synonyms</p> <p>String</p> <p>Sequence Similarities</p> <p>GO - Molecular Function</p>	<p>UniProtKB Arabidopsis thaliana</p> <p>Q6XML3 (<a href="http://www.uniprot.org/uniprot/Q6XML3">http://www.uniprot.org/uniprot/Q6XML3</a>)</p> <p>0</p> <p>GenebankID or UniProtKB</p>
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GO:0052624 : 2-phytyl-1,4-naphthoquinone methyltransferase activity  
 (https://www.ebi.ac.uk/QuickGO/term/GO:0052624)  
 GO:0080150 : S-adenosyl-L-methionine:benzoic acid carboxyl methyl transferase activity  
 (https://www.ebi.ac.uk/QuickGO/term/GO:0080150)

GO - Biological Process

GO:0006952 : defense response (https://www.ebi.ac.uk/QuickGO/term/GO:0006952)  
 GO:0009611 : response to wounding (https://www.ebi.ac.uk/QuickGO/term/GO:0009611)  
 GO:0051707 : response to other organism  
 (https://www.ebi.ac.uk/QuickGO/term/GO:0051707)

GO - Cellular Component

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

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

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

Allele-specific expression in hybrids - de novo expression in *P. axillaris* Molecular Details of the Mutation

Linkage Mapping (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Linkage Mapping^#gephebase-summary-title) Experimental Evidence

Gain and Loss of Floral Scent Production through Changes in Structural Genes during Pollinator-Mediated Speciation. (2016) (https://pubmed.ncbi.nlm.nih.gov/27916524) Main Reference

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Abstract

The interactions of plants with their pollinators are thought to be a driving force in the evolution of angiosperms. Adaptation to a new pollinator involves coordinated changes in multiple floral traits controlled by multiple genes. Surprisingly, such complex genetic shifts have happened numerous times during evolution. Here we report on the genetic basis of the changes in one such trait, floral scent emission, in the genus *Petunia* (Solanaceae). The increase in the quantity and complexity of the volatiles during the shift from bee to hawkmoth pollination was due to de novo expression of the genes encoding benzoic acid/salicylic acid carboxyl methyltransferase (BSMT) and benzoyl-CoA:benzylalcohol/2-phenylethanol benzoyltransferase (BPBT) together with moderately increased transcript levels for most enzymes of the phenylpropanoid/benzenoid pathway. Loss of cinnamate-CoA ligase (CNL) function as well as a reduction in the expression of the MYB transcription factor ODO1 explain the loss of scent during the transition from moth to hummingbird pollination. The CNL gene in the hummingbird-adapted species is inactive due to a stop codon, but also appears to have undergone further degradation over time. Therefore, we propose that loss of scent happened relatively early in the transition toward hummingbird pollination, and probably preceded the loss of UV-absorbing flavonols. The discovery that CNL is also involved in the loss of scent during the transition from outcrossing to selfing in *Capsella* (Brassicaceae) (see the accompanying paper) raises interesting questions about the possible causes of deep evolutionary conservation of the targets of evolutionary change.

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RELATED GEPHE

1 (benzoyl-CoA:benzylalcohol/2-phenylethanol benzoyltransferase (BPBT)) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^212142^/and+Trait=Frangrance/or+Taxon ID=^33119^/and+Trait=Frangrance/and+groupHaplotypes=true#gephebase-summary-title) Related Genes

No matches found. Related Haplotypes

EXTERNAL LINKS

COMMENTS