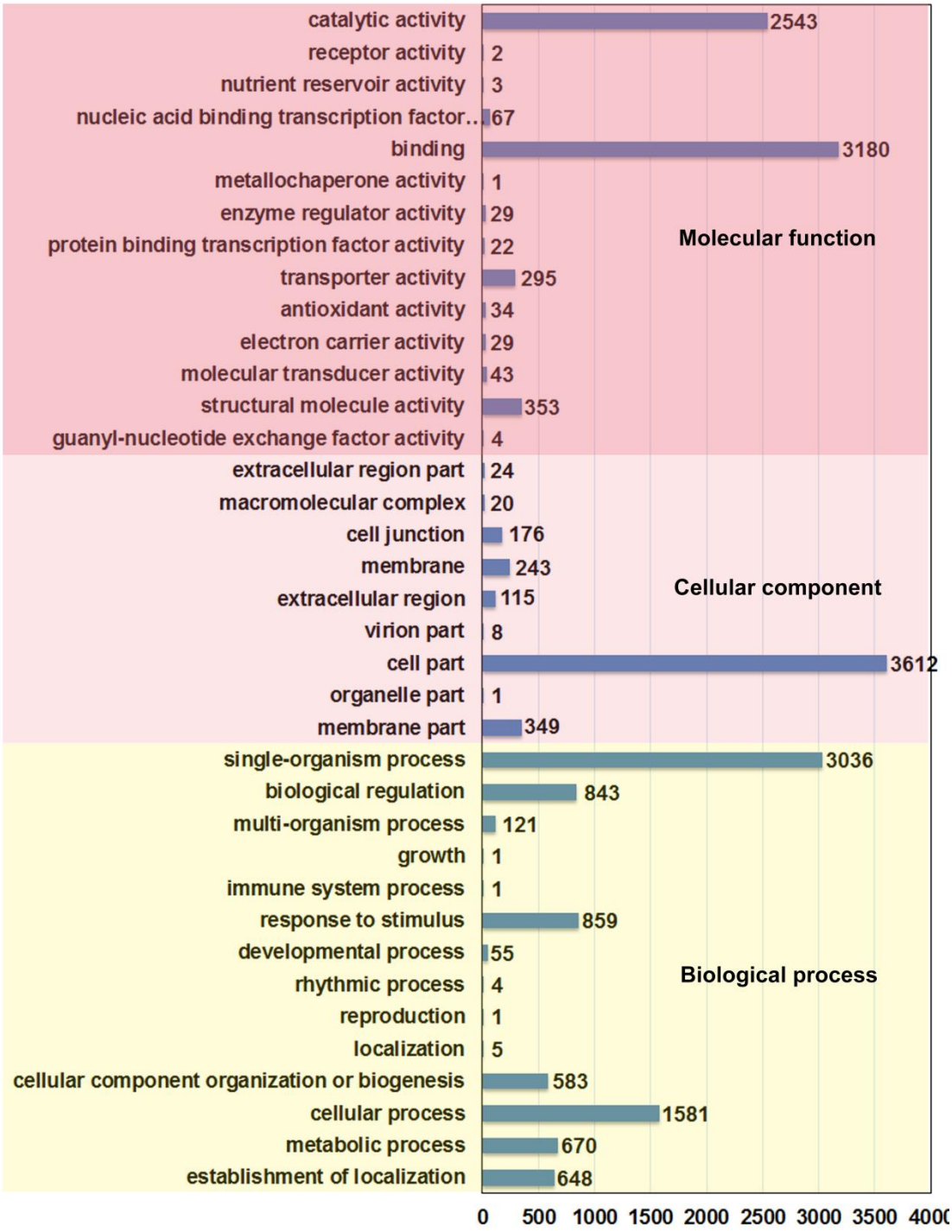
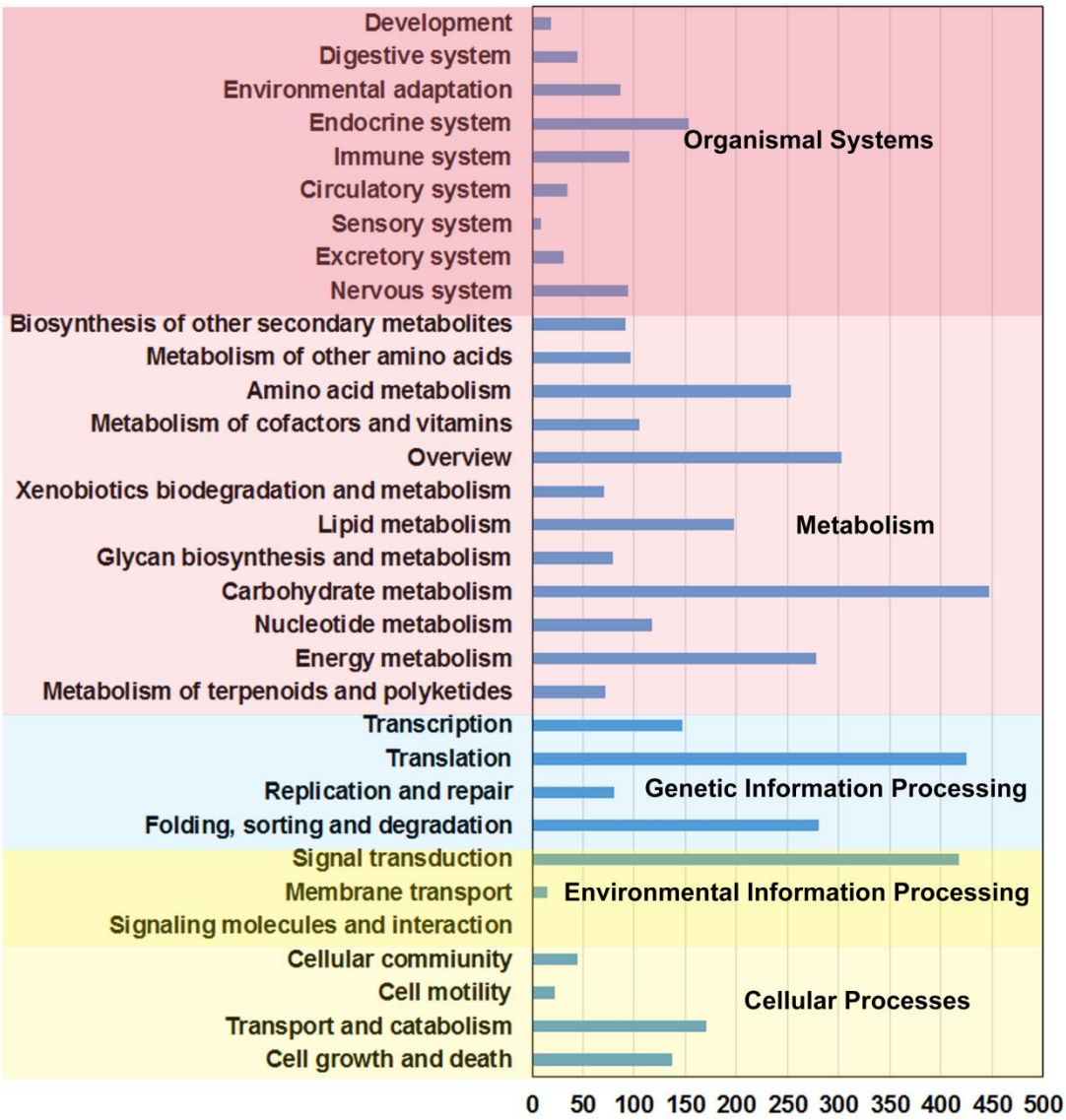


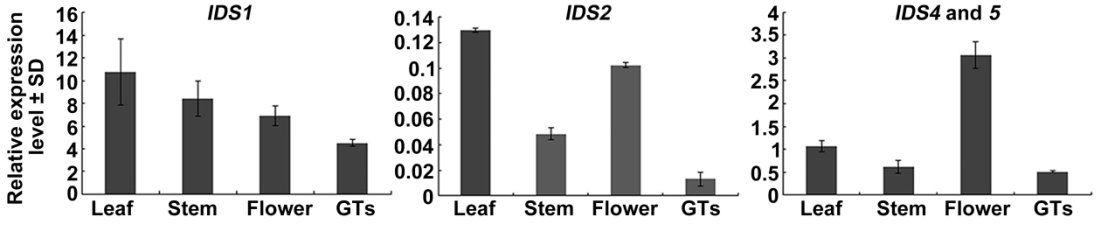
Supplemental Figure 1. GO Classification of Unigenes of the Glandular Trichome Transcriptome of *Leucosceptrum canum*.

Unigenes were assigned into three main categories of GO classification: biological processes, cellular components, and molecular function.



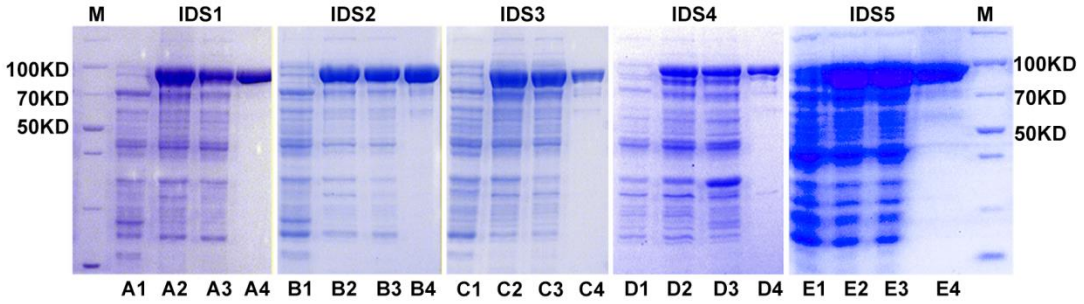
Supplemental Figure 2. KEGG Pathways Significantly Enriched for Unigenes of the Glandular Trichome Transcriptome of *L*. *canum*.

The annotated unigenes were assigned to 32 pathways, belonging to five biological processes: organismal systems, metabolism, genetic information processing, environmental information processing, and cellular processes. The represented pathways were carbohydrate metabolism (10.1%), translation (9.6%), and signal transduction (9.4%), and 1.63% of unigenes were involved in metabolism of terpenoids and polyketides.



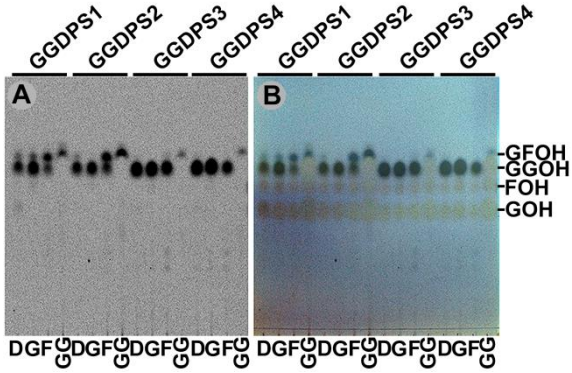
Supplemental Figure 3. Transcript Level Analysis of *IDS1*, *IDS2*, *IDS4* and *5* in Different Organs of *L*. *canum*.

GTs, glandular trichomes. All results are presented as mean ± SD of five experimental replicates and three technical replicates.



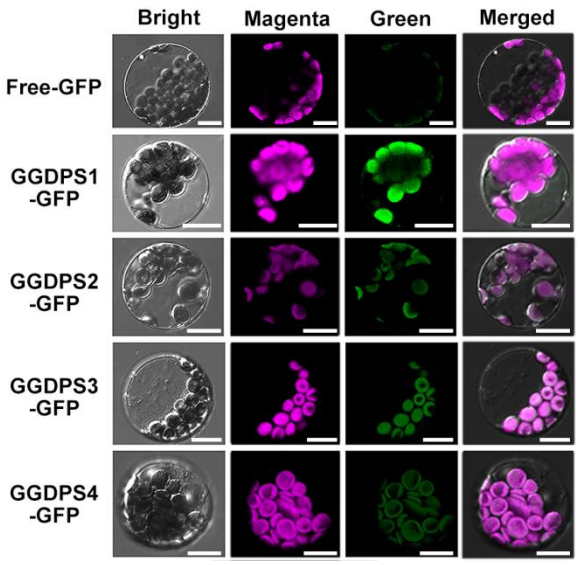
Supplemental Figure 4. SDS–PAGE Analysis of Recombinant Lc-IDS1-5 Proteins Expressed in *Escherichia coli*.

The proteins were visualized by Coomassie staining. M, molecular mass markers; A1-E1, crude bacterial extracts without induction by IPTG; A2-E2, crude bacterial extracts induced by IPTG; A3-E3, water-soluble protein; A4-E4, purified recombinant proteins after Ni-NTA agarose chromatography.



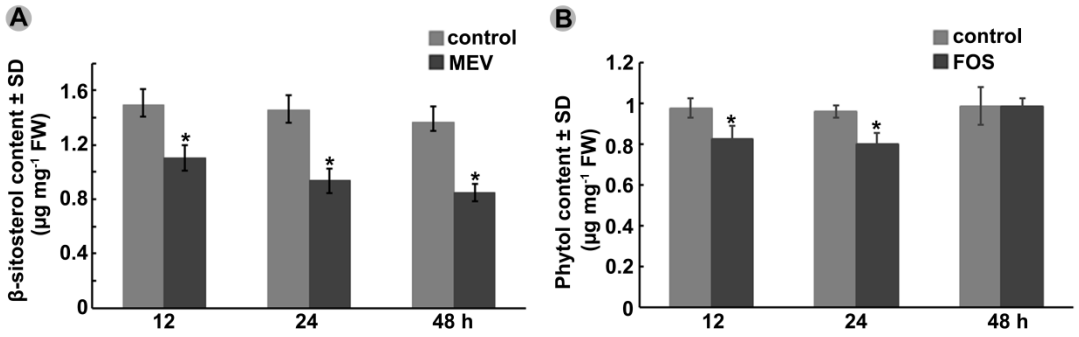
Supplemental Figure 5. *In vitro* Enzyme Activity Assay of GGDPSs.

The *in vitro* activities of *L. canum* GGDPSs were assayed using the same method as that of GFDPS by radio-TLC. ^{14}C image and merged image of ^{14}C image and iodine coloration of hydrolyzed products of assays of GGDPSs performed with different allylic substrates (listed below) and [1-^{14}C]-IPP as substrate and separated by TLC. GOH, Geraniol; FOH, farnesol; GGOH, geranylgeraniol; GFOH, geranylfarnesol were used as authentic standards and visualized by iodine coloration. D, dimethylallyl diphosphate; G, geranyl diphosphate; F, farnesyl diphosphate; GG, geranylgeranyl diphosphate indicated the different allylic substrates.



Supplemental Figure 6. Subcellular Localization of GGDPSs.

GFP-fusion proteins were visualized by laser confocal microscopy. Chloroplasts are represented by magenta chlorophyll autofluorescence. Green fluorescence indicates the presence of GFP. Free-GFP, GGDPS1-GFP, GGDPS2-GFP, GGDPS3-GFP and GGDPS4-GFP indicate *Arabidopsis* leaf protoplasts harboring the plasmids containing the empty vector fused to GFP, the full length cDNA of GGDPS1-4 fused to GFP respectively; Scale bar = 10 μm.



Supplemental Figure 7. The contents of β-sitosterol and phytol in the leaves of *L. canum* after MEV and FOS treatments.

Asterisks indicate significant differences from control plants ($P<0.05$ by significant one-way ANOVA tests; n=9).

Supplemental Table 1. Enzyme Activity of Purified Recombinant GFDPS Protein Enhanced by Tween 20.

Substrates	GFDP Peak Area (counts)	
	Assay without Tween 20	Assay with Tween 20
GGDP+IDP	415±70	599,000±2,000
FDP+IDP	182±30	469,000±20,000
GDP+IDP	-	10,700±300
DMADP+IDP	-	6,970±330

Results are presented as mean ± SD of three experimental replicates and four technical replicates.

Supplemental Table 2. Product Profiles of Purified Recombinant GFDPS Protein.

Allylic substrate	IDP content	Product Composition (ratio, %)	
		GFDP	FFDP
GGDP (100 μM)	100 μM	89.6±4.7	10.4±4.7
	300 μM	91.6±0.09	8.4±0.09
	500 μM	90.7±0.09	9.3±0.09
FDP (100 μM)	100 μM	87.8±2.6	12.2±2.6
	300 μM	90.4±4.2	9.6±4.2
	500 μM	92.1±1.0	7.9±1.0
GDP (100 μM)	100 μM	95.2±1.7	4.8±1.7
	300 μM	88.0±6.0	12.0±6.0
	500 μM	80.1±5.0	19.9±5.0
DMADP (100 μM)	100 μM	100	0
	300 μM	83.3±8.4	16.7±8.4
	500 μM	77.3±1.2	22.7±1.2

Results are presented as mean ± SD of three experimental replicates.

Supplemental Table 3. Conserved Motifs Represented by Different Colored Bars.

Motif	Conserved motif
Motif 1	DDPCMDNDDTRRGQPTWHKVFG
Motif 2	KRVRPMLCIAACELVGGNESTAMPAACAVEMIHTMSLIHDD
Motif 3	CMGLYFQVVDDILDCTKSSEQLGKTAGKD
Motif 4	AVLAGDFLFSFAFWH
Motif 5	NHIPRILKKHFRGKPYYVDLLDLFNEVEFQTASGQMIDLIT

Supplemental Table 4. Kinetic Parameters for the Purified Recombinant GGDPSs.

	DMADP		GDP		FDP		GGDP	
	K_m, μM	K_{cat}, $S^{-1}\times10^3$	K_m, μM	K_{cat}, $S^{-1}\times10^3$	K_m, μM	K_{cat}, $S^{-1}\times10^3$	K_m, μM	K_{cat}, $S^{-1}\times10^3$
GGDPS1	6.13	1.84	22.6	4.77	5.12	1.41	52.2	0.14
GGDPS2	8.11	1.94	6.58	2.47	7.39	8.18	34.33	0.12
GGDPS3	7.94	2.49	22.1	9.17	10.3	4.87	6.96	0.95
GGDPS4	7.29	4.64	13.0	2.28	12.7	6.95	10.3	0.92

Results are presented as the averages of three technical replicates.