

Supplementary Data

Transcriptome analysis in response to UV-B stress in soybean [*Glycine max* (L.) Merr.]

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Supplementary Table 1. Sequence characterization of DEGs in UV-B treated soybean.

Access no. ^a	Putative identity	E-value ^b	Functional category ^c			FunCat category ^d
			Molecular function	Biological process	Cellular component	
Up-regulated DEGs in sensitive cultivar, cv. Dawonkong						
AAQ22726	40S ribosomal protein S25	5.E-32	RNA binding structural constituent of ribosome	translation	cytosolic small ribosomal subunit (sensu Eukaryota)	01 11 12 14 16 18 20 32 70
AAQ74628	Lipid transfer protein II	7.E-41	N/A ^c	N/A	cytoplasmic membrane- bound vesicle	N/A
ABN09189	cAMP response element binding (CREB) protein	4.E-83	DNA binding	regulation of transcription, DNA- dependent	mitochondrion	10 11 14 16 20 32 42 70
BAB33422	Putative senescence-associated protein	4.E-51	N/A	N/A	plastid	02 42
CAD91335	Monosaccharide transporter	1.E-76	N/A	N/A	membrane	01 10 14 16 18 20 30 34 38 40 42 70
NP_198393	Unknown protein	6.E-33	unknown	unknown	unknown	N/A
ABE82233	Calcium-binding EF-hand	2.E-23	calcium ion binding	unknown	unknown	16
CAB56741	Cytochrome P450 monooxygenase	7.E-72	monooxygenase activity	electron transport	plastid	01 02 14 16 18 20 42 70
BAD18376	Type 1 metallothionein	1.E-08	N/A	N/A	plastid	02 42
YP_538807	Ycf2	2.E-115	unknown	unknown	chloroplast	11 14 30
ABN05665	Ubiquitin-like protein	8.E-19	N/A	N/A	mitochondrion	14 20 42 70
ABE84787	Mss4-like	1.E-75	guanyl-nucleotide exchange factor activity zinc in binding	membrane fusion	N/A	16 18 42
AAM97011	Expressed protein	2.E-46	unknown	N/A	chloroplast	11 14 30
ABI63627	Solaneyl diphosphate synthase	5.E-16	dimethylallyltransferase ase activity	N/A	plastid	01 02 42
ABE80204	Pathogenesis-related transcriptional factor and ERF	2.E-25	transcription factor activity	regulation of transcription, DNA- dependent	Nucleus plastid	01 02 10 11 12 14 16 20 30 32 42 70
NP_199045	Unknown protein	4.E-35	unknown	protein modification ubiquitin cycle	unknown	14
BAB86891	Syringolide-induced protein 14-1- 1	7.E-24	N/A	N/A	cytoplasmic membrane- bound vesicle	N/A
P24922	Eukaryotic translation initiation factor 5A-2	3.E-83	translation initiation factor activity	translation initiation	unknown	12
P26969	Glycine dehydrogenase [decarboxylating]	1.E-86	N/A	N/A	mitochondrion	14 20 42 70
P31336	Photosystem II 5 kDa protein, chloroplast precursor	1.E-12	N/A	N/A	N/A	N/A
NP_563979	Unknown protein	1.E-06	unknown	unknown	unknown	N/A
AAZ66389	RAV-like DNA-binding protein	1.E-74	DNA binding transcription factor activity	regulation of transcriptio, DNA-dependent	nucleus	10 11 16 32 42 70
ABD64947	Ethylene responsive element binding factor, putative	1.E-41	transcription factor activity	regulation of transcription, DNA- dependent	nucleus	10 11 12 14 16 20 30 32 42 70
P26987	Stress-induced protein SAM22	9.E-79	N/A	N/A	cytoplasmic membrane- bound vesicle	N/A
AAD55467	Putative splicing factor Prp8	5.E-31	N/A	N/A	mitochondrion	14 20 40 42 70

ABN08606	Dihydroorotase	5.E-25	dihydroorotase activity	N/A	unknown	01
AAL66290	Adenosine 5'-phosphosulfate reductase	5.E-94	adenylyl-sulfate reductase activity phosphoadenylyl-sulfate reductase (thioredoxin) activity	phosphoadenylyl sulfate reduction by phosphoadenylyl-sulfate reductase (thioredoxin) sulfate assimilation	N/A	01
NP_973831	Transporter	2.E-04	transporter activity	transport	unknown	01 02 16 18 20 30 32 34 42 70
NP_196100	Structural constituent of ribosome	1.E-53	structural constituent of ribosome	translation	Intracellular ribosome	01 12 14 16 18 20 30 32 34 40 42 70
ABE84787	Mss4-like	1.E-75	guanyl-nucleotide exchange factor activity zinc in binding	membrane fusion	N/A	16 18 42
AAL58570	Vacuolar processing enzyme 2	2.E-22	N/A	N/A	cytoplasmic membrane-bound vesicle	N/A
AAS57914	70 kDa heat shock cognate protein 3	1.E-147	N/A	N/A	Centrosome phagocytic vesicle	10 20 42 70
AAK44146	Unknown protein	2.E-05	unknown	unknown	mitochondrion	14 20 40 42 70
CAC08564	Wound-induced GSK-3-like protein	2.E-21	protein serine/threonine kinase activity	protein amino acid phosphorylation regulation of protein catabolic process	cytoplasm cytosol nucleus	01 10 11 12 14 16 18 20 30 34 42 70
ABE80998	Phosphoglycerate kinase	5.E-70	phosphoglycerate kinase activity	N/A	cytosol	01 12 14 16 20 30 34 70
NP_171839	Unknown protein	6.E-30	1-aminocyclopropane-1-carboxylate oxidase activity	unknown	unknown	01
AAM15358	Mutator-like transposase	4.E-80	transposase activity	N/A	N/A	38
S04125	Chlorophyll a/b binding protein type III precursor	9.E-23	N/A	N/A	plastid	02 42
----- Down-regulated DEGs in sensitive cultivar, cv. Dawonkong -----						
ABB88834	Thaumatine-like protein	3.E-75	unknown	response to other organism	N/A	N/A
AAL29886	Chlorophyll a/b binding protein type II	6.E-100	N/A	N/A	plastid	02 42
NP_568196	Catalytic/ iron ion binding/ lipoate synthase/ lipoic acid synthase	1.E-32	catalytic activity iron ion binding lipoate synthase activity lipoic acid synthase activity	lipoate biosynthesis lipoic acid biosynthesis	chloroplast	01 11 14 16 18 30
AAG24882	Ribulose-1,5-bisphosphate carboxylase small subunit rbcS1	1.E-71	N/A	N/A	plastid	02 42
AAA50172	Photosystem II type I chlorophyll a/b-binding protein	6.E-116	N/A	N/A	plastid	02 42
NP_192772	LHCB5 (Light harvesting complex of photosystem II 5); chlorophyll binding	3.E-76	chlorophyll binding	photosynthesis photosynthesis light harvesting	chloroplast stromal thylakoid cell part protein complex photosystem II antenna complex PSII associated light-harvesting complex II	02 70
YP_538807	Ycf2	9.E-71	unknown	unknown	chloroplast	11 14 30
YP_538803	Ribosomal protein S3	5.E-29	structural constituent of ribosome	translation	cytosolic small ribosomal subunit	01 12 14 16 18 20 32 70
Q9FY06	Inner membrane protein PPF-1, chloroplast precursor (PosS-floral-specific protein 1)	5.E-54	N/A	N/A	plastid	02 42
NP_174003	Transferase, transferring glycosyl groups / transferase, transferring hexosyl groups	6.E-73	transferase activity, transferring glycosyl groups transferase activity, transferring hexosyl groups	protein amino acid glycosylation	endomembrane system membrane	01 14 16 18 20 30 34 38 40 42 70
AAL54887	Cytochrome P450-dependent fatty acid hydroxylase	2.E-87	N/A	electron transport	cytoplasmic membrane-bound vesicle	02 16 20 42 70
AAZ66389	RAV-like DNA-binding protein	1.E-74	DNA binding transcription factor	regulation of transcriptio, DNA-dependent	nucleus	10 11 16 32 42 70

NP_195713	DNA binding	8.E-69 DNA binding	chromosome organization and biogenesis (sensu Eukaryota) nucleosome assembly	Chloroplast Nucleosome nucleus	10 11 12 14 16 20 30 32 42 70
ABE93196	Zinc finger, AN1-type; Zinc finger, A20-type; Antihemostatic protein	3.E-08 unknown	unknown	unknown	N/A
ABE89041	RNA-binding region RNA-1 (RNA recognition motif)	4.E-25 nucleic acid binding	unknown	unknown	12 16
ABE78003	HAD-superfamily hydrolase, subfamily IIA	2.E-96 hydrolase activity	metabolic process	N/A	01 12 14 32
Q41387	Photosystem II reaction center W protein	1.E-23 N/A	N/A	membrane	01 14 16 18 20 30 40 42 70
ABE86328	Protein kinase	4.E-27 ATP binding protein serine/threonine kinase activity	protein amino acid phosphorylation	N/A	01 14 16 30
ABE92034	Tetratricopeptide-like helical	4.E-70 chaperone regulator activity	N/A	phagocytic vesicle	14 20
ABE78317	DNA binding protein S1FA	4.E-13 N/A	N/A	mitochondrion	14 20 40 42 70
AAQ74628	Lipid transfer protein II	7.E-41 N/A	N/A	cytoplasmic membrane-bound vesicle	N/A
ABE82329	Peptidylprolyl isomerase, FKBP-type	1.E-29 N/A	N/A	cytoplasmic membrane-bound vesicle	N/A
AAB86942	Endoplasmic reticulum HSC70-congnate binding protein precursor	6.E-38 N/A	N/A	cytoplasmic membrane-bound vesicle	N/A
ABE85731	Ribosomal protein S9	5.E-73 structural constituent of ribosome	translation	plastid small ribosomal subunit	01 12 14 16 18 20 32 70
YP_538805	Ribosomal protein L2	4.E-131 RNA binding structural constituent of ribosome	translation	Plastid ribosome	01 02 11 12 16 18 20 30 32 42 70
O98997	Ribulose biphosphate carboxylase/oxygenase activase	1.E-69 ATP binding transcription factor activity	N/A	plastid	02 11 16 42
CAA10125	40S ribosomal protein S19	1.E-28 RNA binding	N/A	N/A	11 16
NP_567338	SAH7	9.E-31 unknown	unknown	endomembrane system	20 42
AAN03474	Syntaxin	4.E-79 S-SNARE activity	intracellular protein transport membrane fusion	phragmoplast	N/A
AAC49183	SDL5A	3.E-25 N/A	mitochondrial fission mitochondrion organization and biogenesis pollen maturation	cell plate	10 20 42
ABE89392	Ubiquitin-conjugating enzyme, E2; UBA-like	2.E-69 ubiquitin-protein ligase activity	protein modification ubiquitin cycle	N/A	14 16
AAM97011	Expressed protein	2.E-46 unknown	N/A	chloroplast	11 14 30
NP_191790	ATP binding/ATP-dependent helicase/RNA helicase/helicase/nucleic acid binding	2.E-48 ATP binding ATP-dependent helicase activity helicase activity nucleic acid binding RNA helicase activity	N/A	unknown	10 11 12 16 18
AAA02946	Nodulin-26	3.E-19 transporter activity	transport	cytoplasmic membrane-bound vesicle membrane fraction membrane	01 02 14 16 18 20 30 32 34 40 42 70
EAZ05455	Hypothetical protein	1.E-05 structural constituent of ribosome translation initiation factor activity	translation	Nucleus ribosome	01 10 12 14 16 18 20 30 32 42 70
NP_195843	Catalytic/hadolase	9.E-23 catalytic activity hydrolase activity	metabolism	unknown	01 12 14 18 32
Up-regulated DEGs in insensitive cultivar, cv. Jimpunkong					
EAZ02107	Hypothetical protein	1.E-106 DNA binding	regulation of	intracellular	10 11 14 16

				transcription, DNA-dependent transcription from RNA polymerase II promoter	DNA-directed RNA polymerase II, core complex	18 20 30 32 34 40 42 70
AAQ74628	Lipid transfer protein II	7.E-41	N/A	N/A	cytoplasmic membrane-bound vesicle	N/A
ABE83768	Photosystem I reaction centre subunit N	3.E-56	N/A	photosynthesis	plasma membrane-derived	02
EAZ23096	Hypothetical protein	7.E-22	protein kinase activity protein serine/threonine kinase activity protein-tyrosine kinase activity ATP binding	protein folding protein amino acid phosphorylation	N/A	01 10 14 16 18 30
ABN08415	Helicase, R-terminal	7.E-51	ATP-dependent helicase activity	N/A	N/A	10 11 16
BAD18376	Type 1 metallothionein	1.E-17	copper ion binding metal ion binding	response to copper ion response to high light intensity	unknown	16 34
1808316A	Metallothionein-like protein	7.E-10	N/A	N/A	plastid	02 42
AAG24882	Ribulose-1,5-bisphosphate carboxylase small subunit rbcS1	1.E-71	N/A	N/A	plastid	02 42
ABE82894	SAM (and some other nucleotide) binding motif	4.E-54	unknown	unknown	N/A	N/A
YP_538807	Ycf2	2.E-115	unknown	unknown	chloroplast	11 14 30
ABE92731	Esterase/lipase/thioesterase	4.E-39	N/A	N/A	plastid	02 42
AAM97011	Expressed protein	2.E-46	unknown	N/A	chloroplast	11 14 30
P26969	Glycine dehydrogenase [decarboxylating]	1.E-86	N/A	N/A	mitochondrion	14 20 42 70
AAS57914	70 kDa heat shock cognate protein 3	1.E-147	N/A	N/A	Centrosome phagocytic vesicle	10 20 42 70
AAD27878	Chlorophyll a/b binding protein CP29	1.E-59	N/A	N/A	chloroplast	11 14 30
AAX18864	Chloroplast glutamine synthetase	3.E-49	glutamate-ammonia ligase nitrogen fixation activity	N/A	N/A	01
NP_178070	Cation transporter	2.E-28	cation transporter activity	cation transport	membrane	01 10 14 16 18 20 30 34 38 40 42 70
NP_196513	Structural constituent of ribosome	2.E-58	structural constituent of ribosome	translation	cytosolic small ribosomal subunit (sensu Eukaryota)	N/A
ABE84787	Mss4-like	1.E-75	guanyl-nucleotide exchange factor activity zinc in binding	membrane fusion	N/A	16 18 42
AAL58570	Vacuolar processing enzyme 2	2.E-22	N/A	N/A	cytoplasmic membrane-bound vesicle	N/A
AAS57914	70 kDa heat shock cognate protein 3	1.E-147	N/A	N/A	Centrosome phagocytic vesicle	10 20 42 70
O98997	Ribulose bisphosphate carboxylase/oxygenase activase	6.E-59	ATP binding transcription factor activity	N/A	plastid	02 11 16 42
AAV44043	Putative mitochondrial processing peptidase alpha subunit	1.E-28	N/A	N/A	mitochondrion	14 20 40 42 70
BAB86927	Glucosyltransferase-9	2.E-126	transferase activity, transferring hexosyl groups	metabolic process	N/A	01
ABE80998	Phosphoglycerate kinase	5.E-70	phosphoglycerate kinase activity	N/A	cytosol	01 12 14 16 20 30 34 70
BAC10550	Nine-cis-epoxycarotenoid dioxygenase2	2.E-25	9-cis-epoxycarotenoid dioxygenase activity	abscisic acid biosynthetic process	chloroplast stroma chloroplast thylakoid membrane	01 14
----- Down-regulated DEGs in insensitive cultivar, cv. Jinpumkong -----						
AAL29886	Chlorophyll a/b binding protein type II	6.E-100	N/A	N/A	plastid	02 42
AAA50172	Photosystem II type I chlorophyll a/b-binding protein	6.E-116	N/A	N/A	plastid	02 42
P09911	Ferredoxin-I, chloroplast precursor	5.E-48	electron acceptor activity	electron transport	chromoplast stroma photosynthetic electron transport chain	02 16 20 42 70

1808316A	Metallothionein-like protein	7.E-10	N/A	N/A	plastid	02 42
YP_538803	Ribosomal protein S3	5.E-29	structural constituent of ribosome	translation	cytosolic small ribosomal subunit	01 12 14 16 18 20 32 70
Q9FY06	Inner membrane protein PPF-1, chloroplast precursor (PosS-floral-specific protein 1)	5.E-54	N/A	N/A	plastid	02 42
NP_051046	ATP synthase CFO C subunit	9.E-23	hydrogen ion transporting ATPase activity, rotational mechanism	unidimensional cell growth	hydrogen ion transporting ATPase V1 domain plasma membrane	02 16 20 40 42 70
AAB68961	Protein kinase 3	2.E-86	kinase activity	N/A	N/A	01 02 10 11 12 14 18 30
O49954	Glycine dehydrogenase [decarboxylating]	1.E-80	glycine dehydrogenase (decarboxylating) activity	glycine metabolic process	glycine dehydrogenase complex (decarboxylating)	01 16 70
NP_195713	DNA binding	8.E-69	DNA binding	chromosome organization and biogenesis (sensu Eukaryota) nucleosome assembly	Chloroplast nucleosome nucleus	10 11 12 14 16 20 30 32 42 70
P05478	18.5 kDa class I heat shock protein (HSP 18.5)	5.E-78	N/A	response to heat	unknown	32 34
P31336	Photosystem II 5 kDa protein, chloroplast precursor	1.E-12	N/A	N/A	N/A	N/A
ABE89041	RNA-binding region RNA-1 (RNA recognition motif)	4.E-25	nucleic acid binding	unknown	unknown	12 16
NP_188329	HCF107 (high chlorophyll fluorescent 107)	5.E-38	unknown	plastid organization and biogenesis regulation of translation RNA processing	chloroplast envelope	11 12 16 18 32 42 70
AAF17254	Small GTP-binding protein Sar1Bnt	2.E-46	GTP binding	small GTPase mediated signal transduction	mitochondrion	14 16 20 30 42 70
ABE82233	Calcium-binding EF-hand	2.E-28	calcium ion binding	unknown	unknown	16
Q41387	Photosystem II reaction center W protein	1.E-23	N/A	N/A	membrane	01 14 16 18 20 30 40 42 70
ABE78317	DNA binding protein S1FA	4.E-13	N/A	N/A	mitochondrion	14 20 40 42 70
ABE82329	Peptidylprolyl isomerase, FKBP-type	3.E-73	N/A	N/A	plastid	02 42
NP_192772	LHCB5 (Light harvesting complex of photosystem II 5); chlorophyll binding	3.E-76	chlorophyll binding	Photosynthesis photosynthesis light harvesting	chloroplast stromal thylakoid cell part, protein complex photosystem II antenna complex PSII associated light-harvesting complex II cytoplasmic membrane-bound vesicle	02 70
BAD95470	BiP	5.E-66	N/A	N/A	cytoplasmic membrane-bound vesicle	N/A
AAG24882	Ribulose-1,5-bisphosphate carboxylase small subunit rbcS1	1.E-71	N/A	N/A	plastid	02 42
O98997	Ribulose bisphosphate carboxylase/oxygenase activase	1.E-69	ATP binding transcription factor activity	N/A	plastid	02 11 16 42
CAA10125	40S ribosomal protein S19	1.E-28	RNA binding	N/A	N/A	11 16
AAP03873	Photosystem I reaction center subunit X psak	8.E-48		photosynthesis	plasma membrane-derived photosystem I	02
NP_567441	Metal ion binding	3.E-72	metal ion binding	unknown	unknown	16
P25096	Protein P21	1.E-112	protein binding	N/A	N/A	11 16 18 42

^a Access no. was GeneBank accession number.

^b E-values represent matches expected by chance from BLASTx program.

^c Functional categorization was carried out by alignment with the GeneOntology database.

^d FunCat categorization was carried out by alignment with the MIPS database. 01, Metabolism; 02, energy; 04, storage protein; 10, cell cycle and DNA processing; 11, transcription; 12, protein synthesis; 14, protein fate (folding, modification, destination); 16, protein with binding function of cofactor requirement (structural or catalytic); 18, regulation of metabolism and protein function; 20, cellular transport, transport facilities and transport routes; 30, cellular communication/signal transduction mechanism; 32, cell rescue, defense and virulence; 34, interaction with the environment; 38, transposable elements, viral and plasmid proteins; 40, cell fate; 41, development (systemic); 42, biogenesis of cellular components; 43, cell type differentiation; 45, tissue differentiation; 47, organ differentiation; 70, subcellular localization; 73, cell type localization; 75, tissue localization; 77, organ localization; 98, classification not yet clear-cut; 99, unclassified proteins.

^e Not determined.