

# Supplementary Materials

**Table S1.** Primers used for quantitative real-time PCR (qRT-PCR) analysis.

Gene id	Gene Name	Forward Primer (5'-3')	Reverse Primer (3'-5')
TRIN- ITY_DN34241_c0_g1_i4_3	COMT	5'-GTCAACAAGCGAGCACCAA-3'	5'-GCCGACTTCAGCACCATC-3'
TRIN- ITY_DN7922_c0_g1_i1_2	peroxidase	5'-CGGTTCAAAGGGAGAGA-TACGA-3'	5'-ATCAAGAGGCTGGACAATT-AGACT-3'
TRIN- ITY_DN21407_c0_g1_i2_3	CCoAOMT	5'-CGCCGCATCAGCTAATCAAC-3'	5'-AAGCATCAGCATTTCAG-GAACAAC-3'
TRIN- ITY_DN24371_c0_g1_i1_3	CCoAOMT	5'-GACCACAACGAAGAA-GCAAACA-3'	5'-GACCAGCATCAGGAGCAGTA-3'
TRIN- ITY_DN32751_c0_g1_i5_6	COMT	5'-GACCGCTCAC-TCTGTGTTCTCA-3'	5'-tcagttcataccacaagtccatca-3'
TRIN- ITY_DN36612_c0_g2_i7_6	COMT	5'-GCACCACATCACCAC-TATTACC-3'	5'-ACCAGAGCAGCCAGAGTTG-3'
TRIN- ITY_DN28925_c0_g3_i3_5	F5H	5'-ACGCCATCAGACTTACGAGAG-3'	5'-GCTCCTGCTGGACCTTCTT-3'
TRIN- ITY_DN32196_c0_g1_i3_6	F5H	5'-CCAGGCAGTATGGAG-GAATCTT-3'	5'-CGGTCTGTAGGTGAGGTAGC-3'

**Table S2.** Summary of sequencing data quality preprocessing results.

Sample	RawReads(M)	RawBases(G)	CleanReads(M)	CleanBases(G)	ValidBases(%)	Q30 (%)	GC (%)
Jul CYB 1	47.85	7.18	47.27	6.83	95.13	94.13	47.11
Jul CYB 2	48.41	7.26	47.68	6.84	94.26	94.07	47.01
Jul CYB 3	47.9	7.19	47.03	6.75	93.88	94.05	47.06
Jul TYB 1	48.56	7.28	47.61	6.82	93.69	94.05	46.99
Jul TYB 2	50.1	7.51	49.4	7.16	95.3	94.03	47.1
Jul TYB 3	49.61	7.44	48.69	6.96	93.5	94.03	47.28
Oct CYB 1	49.87	7.48	49.02	6.93	92.64	93.78	46.71
Oct CYB 2	47.49	7.12	46.66	6.7	94.01	93.8	46.64
Oct CYB 3	47.71	7.16	46.72	6.63	92.69	93.68	46.56
Oct TYB 1	49.54	7.43	48.69	6.97	93.83	93.95	46.82
Oct TYB 2	51.07	7.66	50.12	7.09	92.49	94.04	46.65
Oct TYB 3	49.94	7.49	49.09	7.04	93.92	93.94	46.5
Sep CYB 1	49.65	7.45	48.76	6.96	93.4	94.12	46.83
Sep CYB 2	50.07	7.51	49.18	7.02	93.52	94.19	47
Sep CYB 3	51.34	7.7	50.42	7.16	92.95	93.73	46.69
Sep TYB 1	47.65	7.15	46.7	6.64	92.87	93.63	46.4
Sep TYB 2	51.43	7.71	50.46	7.22	93.63	93.74	46.89
Sep TYB 3	50.15	7.52	49.28	7.06	93.8	93.76	46.82

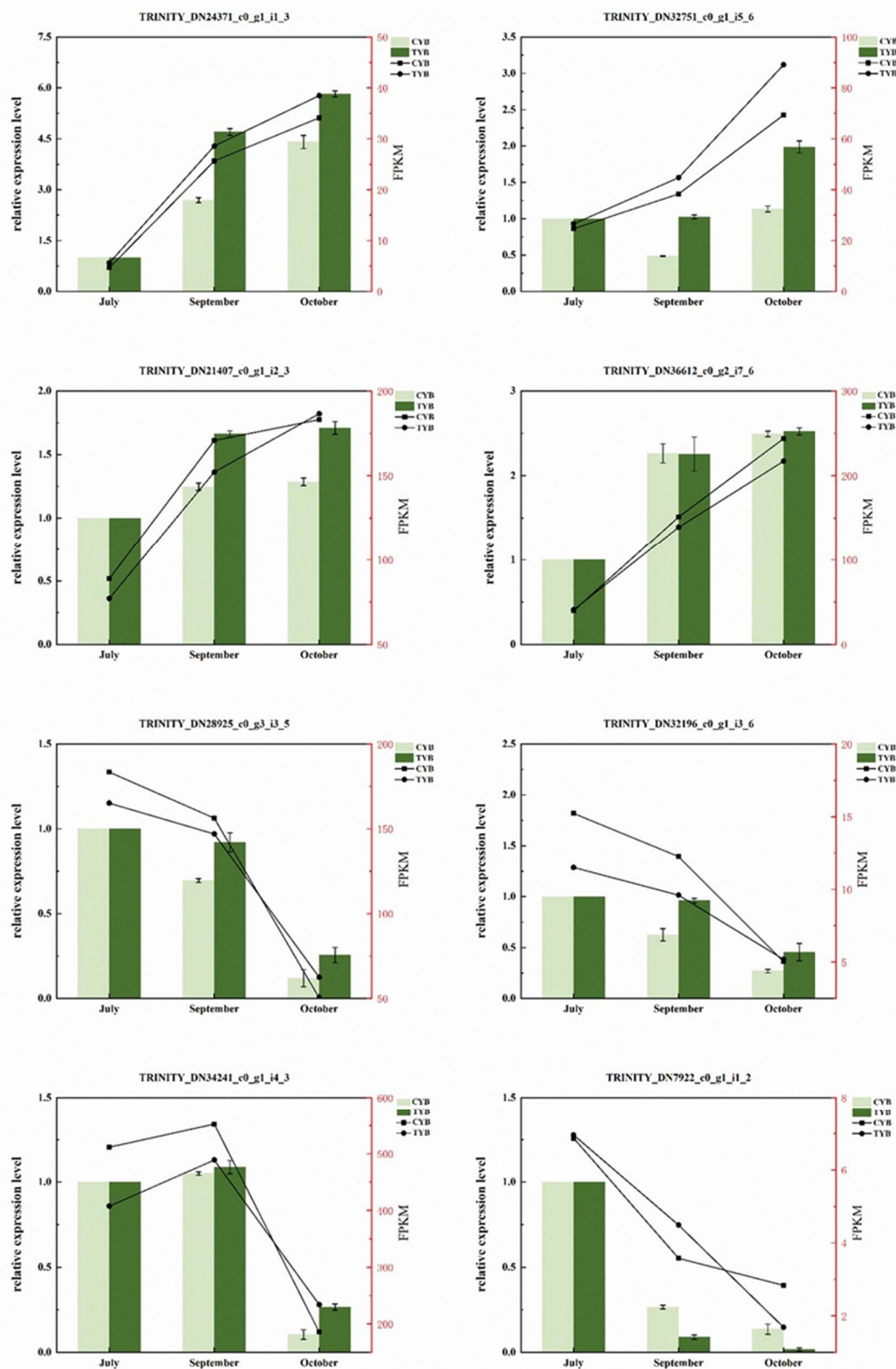
**Table S3.** DEGs selected from lignin biosynthesis process.

Sample	Group	Gene_id	Regulation	KEGG gene name	KEGG description
current-year branches	July vs September	TRIN- ITY_DN24371_c0_g1_i1_3	Up	E2.1.1.104	caffeoyl-CoA O-methyltransferase [EC:2.1.1.104]
		TRIN- ITY_DN2499_c0_g1_i2_6	Down	E1.11.1.7	peroxidase [EC:1.11.1.7]
		TRIN- ITY_DN29459_c1_g1_i1_2	Down	CAD	cinnamyl-alcohol dehydrogenase [EC:1.1.1.195]
		TRIN- ITY_DN31775_c0_g2_i1_2	Up	E2.1.1.68, COMT	caffeic acid 3-O-methyltransferase [EC:2.1.1.68]
		TRIN- ITY_DN36612_c0_g2_i7_6	Up	E2.1.1.68, COMT	caffeic acid 3-O-methyltransferase [EC:2.1.1.68]
		TRIN- ITY_DN36853_c2_g1_i10_6	Up	bglB	beta-glucosidase [EC:3.2.1.21]
		TRIN- ITY_DN7922_c0_g1_i1_2	Down	E1.11.1.7	peroxidase [EC:1.11.1.7]
	July vs October	TRIN- ITY_DN11357_c0_g1_i4_1	Down	CAD	cinnamyl-alcohol dehydrogenase [EC:1.1.1.195]

biennial branches	September vs October	TRIN- ITY_DN21407_c0_g1_i2_3	Up	E2.1.1.104	caffeoyl-CoA O-methyltransferase [EC:2.1.1.104]
		TRIN- ITY_DN24371_c0_g1_i1_3	Up	E2.1.1.104	caffeoyl-CoA O-methyltransferase [EC:2.1.1.104]
		TRIN- ITY_DN24407_c0_g1_i2_2	Down	E2.1.1.68, COMT	caffeic acid 3-O-methyltransferase [EC:2.1.1.68]
		TRIN- ITY_DN28925_c0_g3_i3_5	Down	CYP84A, F5H	ferulate-5-hydroxylase [EC:1.14.-.-]
		TRIN- ITY_DN32196_c0_g1_i3_6	Down	CYP84A, F5H	ferulate-5-hydroxylase [EC:1.14.-.-]
		TRIN- ITY_DN32751_c0_g1_i5_6	Up	E2.1.1.68, COMT	caffeic acid 3-O-methyltransferase [EC:2.1.1.68]
		TRIN- ITY_DN32831_c1_g5_i11_5	Up	bglB	beta-glucosidase [EC:3.2.1.21]
		TRIN- ITY_DN34241_c0_g1_i4_3	Down	E2.1.1.68, COMT	caffeic acid 3-O-methyltransferase [EC:2.1.1.68]
		TRIN- ITY_DN35266_c0_g2_i1_2	Down	CYP84A, F5H	ferulate-5-hydroxylase [EC:1.14.-.-]
		TRIN- ITY_DN36612_c0_g2_i7_6	Up	E2.1.1.68, COMT	caffeic acid 3-O-methyltransferase [EC:2.1.1.68]
		TRIN- ITY_DN36853_c2_g1_i10_6	Up	bglB	beta-glucosidase [EC:3.2.1.21]
		TRIN- ITY_DN7922_c0_g1_i1_2	Down	E1.11.1.7	peroxidase [EC:1.11.1.7]
		TRIN- ITY_DN9868_c0_g1_i1_4	Up	E2.1.1.104	caffeoyl-CoA O-methyltransferase [EC:2.1.1.104]
		TRIN- ITY_DN24407_c0_g1_i2_2	Down	E2.1.1.68, COMT	caffeic acid 3-O-methyltransferase [EC:2.1.1.68]
		TRIN- ITY_DN2499_c0_g1_i2_6	Up	E1.11.1.7	peroxidase [EC:1.11.1.7]
		TRIN- ITY_DN28925_c0_g3_i3_5	Down	CYP84A, F5H	ferulate-5-hydroxylase [EC:1.14.-.-]
		TRIN- ITY_DN32196_c0_g1_i3_6	Down	CYP84A, F5H	ferulate-5-hydroxylase [EC:1.14.-.-]
		TRIN- ITY_DN32831_c1_g5_i11_5	Up	bglB	beta-glucosidase [EC:3.2.1.21]
		TRIN- ITY_DN34241_c0_g1_i4_3	Down	E2.1.1.68, COMT	caffeic acid 3-O-methyltransferase [EC:2.1.1.68]
		TRIN- ITY_DN35266_c0_g2_i1_2	Down	CYP84A, F5H	ferulate-5-hydroxylase [EC:1.14.-.-]
		TRIN- ITY_DN36853_c2_g1_i10_6	Up	bglB	beta-glucosidase [EC:3.2.1.21]
biennial branches	July vs September	TRIN- ITY_DN24371_c0_g1_i1_3	Up	E2.1.1.104	caffeoyl-CoA O-methyltransferase [EC:2.1.1.104]
		TRIN- ITY_DN36612_c0_g2_i7_6	Up	E1.11.1.7	peroxidase [EC:1.11.1.7]
		TRIN- ITY_DN21407_c0_g1_i2_3	Up	E2.1.1.104	caffeoyl-CoA O-methyltransferase [EC:2.1.1.104]
		TRIN- ITY_DN24371_c0_g1_i1_3	Up	E2.1.1.104	caffeoyl-CoA O-methyltransferase [EC:2.1.1.104]
	July vs October	TRIN- ITY_DN24407_c0_g1_i2_2	Down	E2.1.1.68, COMT	caffeic acid 3-O-methyltransferase [EC:2.1.1.68]
		TRIN- ITY_DN28925_c0_g3_i3_5	Down	CYP84A, F5H	ferulate-5-hydroxylase [EC:1.14.-.-]
		TRIN- ITY_DN32196_c0_g1_i3_6	Down	CYP84A, F5H	ferulate-5-hydroxylase [EC:1.14.-.-]
		TRIN- ITY_DN32751_c0_g1_i5_6	Up	E2.1.1.68, COMT	caffeic acid 3-O-methyltransferase [EC:2.1.1.68]
		TRIN- ITY_DN32831_c1_g5_i11_5	Up	bglB	beta-glucosidase [EC:3.2.1.21]
		TRIN- ITY_DN36612_c0_g2_i7_6	Up	E2.1.1.68, COMT	caffeic acid 3-O-methyltransferase [EC:2.1.1.68]
	September vs October	TRIN- ITY_DN36853_c2_g1_i10_6	Up	bglB	beta-glucosidase [EC:3.2.1.21]
		TRIN- ITY_DN7922_c0_g1_i1_2	Down	E1.11.1.7	peroxidase [EC:1.11.1.7]
		TRIN- ITY_DN24407_c0_g1_i2_2	Down	E2.1.1.68, COMT	caffeic acid 3-O-methyltransferase [EC:2.1.1.68]

TRIN- ITY_DN2499_c0_g1_i2_6	Up	E1.11.1.7	peroxidase [EC:1.11.1.7]
TRIN- ITY_DN28925_c0_g3_i3_5	Down	CYP84A, F5H	ferulate-5-hydroxylase [EC:1.14.-.-]
TRIN- ITY_DN32196_c0_g1_i3_6	Down	CYP84A, F5H	ferulate-5-hydroxylase [EC:1.14.-.-]
TRIN- ITY_DN32831_c1_g5_i11_5	Up	bglB	beta-glucosidase [EC:3.2.1.21]
TRIN- ITY_DN34241_c0_g1_i4_3	Down	E2.1.1.68, COMT	caffeic acid 3-O-methyltransferase [EC:2.1.1.68]
TRIN- ITY_DN35266_c0_g2_i1_2	Down	CYP84A, F5H	ferulate-5-hydroxylase [EC:1.14.-.-]
TRIN- ITY_DN36853_c2_g1_i10_6	Up	bglB	beta-glucosidase [EC:3.2.1.21]

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**Figure S1.** qRT-PCR verification of eight DEGs. The bar chart indicates the relative expression level, and the dot plot indicates the FPKM value.