

Supplementary Table S2. Comparison of the Top 50 transcription factors (TFs) predicted to regulate the lignin biosynthesis pathway by Hybrid Extremely Randomized Trees and Plain Hybrid Extremely Randomized Trees on Poplar Transcriptomic Test Data Set. The frequency of each TF within the top 2000 predicted regulatory relationships was calculated to represent how many pathway genes it might have inferred. Red font indicates TFs that are known regulators of the lignin biosynthesis pathway, based on published literature. Red font with yellow highlight indicates TFs that are recognized as master regulators of lignin biosynthesis (e.g., MYB83, MYB46). Blue font denotes TFs that act further upstream in the regulatory hierarchy, influencing the expression of MYB83 and MYB46.

Hybrid Extremely Randomized Trees Model				Plain Extremely Randomized Trees Model				Spearman Correlation Coefficient			
Rank	Transcription Factor	Freq.	Reference	Rank	Transcription Factor	Freq.	Reference	Rank	Transcription Factor	Freq.	Reference
1	Potri007G046200_AP2	24	-	1	Potri002G252800_bHLH15	24	-	1	Potri013G039100_A5g28300	14	-
2	Potri002G168700_WRKY53	24	-	2	Potri006G251800_HY5	24	-	2	Potri018G129800_YABBY5	14	-
3	Potri001G088600_ARF9	24	-	3	Potri005G140700_AP2	24	-	3	Potri003G036900_Atlg55110	13	-
4	Potri002G139500_A2g44730	24	-	4	Potri018G029500_HY5	23	-	4	Potri001G137800_A5g46880	13	-
5	Potri003G169600_SEP3	24	-	5	Potri008G120900	23	-	5	Potri014G152000_Atlg05230	13	-
6	Potri002G172800_ARF9	24	-	6	Potri007G046200_AP2	22	-	6	Potri004G020400	13	-
7	Potri011G075800_AG	24	-	7	Potri017G137600_KAN	21	-	7	Potri004G230800	13	-
8	Potri001G092900_WRKY53	24	-	8	Potri004G082400_KAN	21	-	8	Potri019G045900	13	-
9	Potri005G140700_AP2	24	-	9	Potri002G172800_ARF9	21	-	9	Potri014G107200_A5g61970	12	-
10	Potri003G138600_WRKY53	24	-	10	Potri002G168700_WRKY53	20	-	10	Potri011G083100	12	-
11	Potri017G137600_KAN	24	-	11	Potri001G267300 MYB83	19	Zhong et al., 2012	11	Potri015G075600_GL1	12	-
12	Potri014G096200_WRKY53	24	-	12	Potri017G107500	19	-	12	Potri014G099900_Atlg01250	12	-
13	Potri004G082400_KAN	24	-	13	Potri001G327100_TCP20	19	-	13	Potri014G037200_KAN4	12	-
14	Potri006G251800_HY5	24	-	14	Potri019G123500_WRKY33	18	-	14	Potri015G104200_bHLH137	12	-
15	Potri002G252800_bHLH15	24	-	15	Potri004G108320	16	-	15	Potri015G022000_TRY	12	-
16	Potri018G029500_HY5	24	-	16	Potri014G096200_WRKY53	16	-	16	Potri003G046700	12	-
17	Potri001G058400_SEP3	24	-	17	Potri008G148400_FLP	16	-	17	Potri013G054000_NAC	12	-
18	Potri001G267300 MYB83	23	Zhong et al., 2012	18	Potri003G138600_WRKY53	15	-	18	Potri003G169100	12	-
19	Potri008G148400_FLP	23	-	19	Potri006G221800_TT2	15	-	19	Potri012G104900_bHLH137	12	-
20	Potri009G055700_AGL15	23	-	20	Potri002G023400 E2FC	15	Han et al., 2022	20	Potri016G136500	11	-
21	Potri002G164400_WRKY22	23	-	21	Potri009G061500 MYB83	15	Zhong et al., 2012	21	Potri005G205400_A2g43000	11	-
22	Potri004G064300_AG	23	-	22	Potri013G153400_WRKY33	15	-	22	Potri002G041700	11	-
23	Potri014G051200_A2g44730	22	-	23	Potri014G100100_ARF9	15	-	23	Potri005G246700	11	-
24	Potri013G153400_WRKY33	22	-	24	Potri010G093000_FLP	14	-	24	Potri017G094800_TFPD	11	-
25	Potri014G090300_WRKY22	22	-	25	Potri002G139500_A2g4473	14	-	25	Potri004G050150_ARF3	10	-
26	Potri002G023400 E2FC	21	Han et al., 2022	26	Potri011G007800_WRKY42	14	-	26	Potri010G223300_GATA-8	10	-
27	Potri017G082900_hb-34	21	-	27	Potri014G090300_WRKY22	14	-	27	Potri007G014400 VND2	10	Zhou et al., 2014
28	Potri009G061500 MYB83	20	Zhong et al., 2012	28	Potri003G167900_TCP20	14	-	28	Potri006G152700	10	-
29	Potri010G093000_FLP	20	-	29	Potri002G164400_WRKY22	13	-	29	Potri018G068700	10	-
30	Potri003G167900_TCP20	20	-	30	Potri012G031700_WRKY53	13	-	30	Potri017G016700 SND2	10	Zhong et al., 2008
31	Potri003G142100_ARF9	19	-	31	Potri002G180800_LHY	13	-	31	Potri002G141200_A2g44940	10	-
32	Potri012G031700_WRKY53	18	-	32	Potri014G051200_A2g4473	12	-	32	Potri017G082000_Atlg26870	10	-
33	Potri011G132400	18	-	33	Potri001G088600_ARF9	12	-	33	Potri004G159300_A2g16400	10	-
34	Potri006G105300_WRKY33	18	-	34	Potri001G154200_ERF6	12	-	34	Potri010G099100_A2g02070	10	-
35	Potri004G007500_WRKY42	18	-	35	Potri017G068748_TCP20	12	-	35	Potri007G135300 SND2	10	Zhong et al., 2008
36	Potri016G128300_WRKY33	17	-	36	Potri016G083600_TTG2	12	-	36	Potri017G119900_C3H14	10	Chai et al., 2015
37	Potri013G113100 VND7	17	Yamaguchi et al., 2011	37	Potri004G007500_WRKY42	12	-	37	Potri012G126500	10	-
38	Potri014G100100_ARF9	17	-	38	Potri006G133200_TTG2	12	-	38	Potri001G137600_KAN2	10	-
39	Potri011G007800_WRKY42	16	-	39	Potri001G092900_WRKY53	12	-	39	Potri002G181600_A5g61970	10	-
40	Potri008G113200	16	-	40	Potri019G083600 VND7	12	Yamaguchi et al., 2011	40	Potri014G066100_A5g60580	10	-
41	Potri017G016700 SND2	16	Zhong et al., 2008	41	Potri010G006800	12	-	41	Potri017G139500	10	-
42	Potri006G221800_TT2	15	-	42	Potri011G132400	11	-	42	Potri008G106700	10	-
43	Potri019G083600 VND7	15	Yamaguchi et al., 2011	43	Potri009G055700_AGL15	11	-	43	Potri002G154700_ANL2	10	-
44	Potri001G080900_A2g43000	14	-	44	Potri013G113100 VND7	11	Yamaguchi et al., 2011	44	Potri007G014400	10	-
45	Potri015G075600_GL1	14	-	45	Potri002G055400_bHLH65	10	-	45	Potri001G112200_KNAT7	10	Qin et al., 2020
46	Potri002G172101_bHLH13	14	-	46	Potri003G151000_A5g6159	9	-	46	Potri002G034600	10	-
47	Potri014G066100_A5g60580	14	-	47	Potri001G079600_A5g6159	9	-	47	Potri004G095100_C3H14	9	Chai et al., 2015
48	Potri001G154200_ERF6	14	-	48	Potri003G142100_ARF9	9	-	48	Potri017G137600_KAN	9	-
49	Potri007G135300 SND2	14	Zhong et al., 2008	49	Potri006G005500_A5g4764	9	-	49	Potri005G192000_Atlg76890	9	-
50	Potri003G080600_ERF6	13	-	50	Potri012G138900_HSF6	9	-	50	Potri014G080900	9	-