Supplementary Information

Table S1. Effects of drought stress on leaf relative water content, leaf plasma-membrane permeability and malondialdehyde content of 50 Chinese fir clones.

Serial number	Clones number	Leaf Relative Water Content（%）		Leaf Plasma-Membrane Permeability（%）		Malondialdehyde content（μmol g^{-1}）	
		Check Treatment	Drought Treatment	Check Treatment	Drought Treatment	Check Treatment	Drought Treatment
1	007	65.52±2.04 ab	60.92±1.49 abcde	15.98±6.51 cdefghij	50.97±7.12 cdefgh	4.47±0.80 acdef	9.60±1.87 defghijklm
2	014	66.66±1.06 ab	61.73±2.39 abcde	12.95±1.54 efghij	64.6±1.01 aacdefgh	5.39±0.54 acdef	12.90±1.53 cdefghi
3	017	68.34±3.80 ab	54.61±1.92 abcdef	18.17±7.98 acdefghij	85.35±10.77 aac	4.96±0.79 acdef	11.52±1.02 cdefghijk
4	026	65.17±1.17 ab	35.39±3.95 fg	15.32±4.64defghij	79.04±5.46 aacde	6.69±0.77 aac	16.56±0.99 ac
5	021	62.65±7.57 ab	58.35±7.56 abcde	12.63±6.00fghij	59.34±5.74 aacdefgh	6.64±0.55 aacd	14.99±1.25 acde
6	025	71.68±4.02 a	59.26±5.04 abcde	15.49±8.68cdefghij	62.54±6.15 aacdefgh	4.12±0.72 acdef	7.97±1.68 fghijklm
7	033	65.20±2.75 ab a	59.14±3.47 abcde	18.09±0.59 acdefghij	57.88±4.03 acdefgh	4.27±0.38 acdef	4.97±1.09 lm
8	038	73.08±4.06 a	64.93±7.08 abc	16.23±3.28 cdefghij	64.89±11.93 aacdefgh	3.62±0.57 acdef	12.52±2.23 cdefghij
9	046	72.12±7.41 a	60.87±4.30 abcde	9.60±0.53 j	72.23±5.13 aacdefg	5.63±1.25 acdef	11.03±1.83 cdefghijkl
10	052	71.45±4.36 a	56.44±4.82 abcde	27.44±4.59 aacd	41.57±8.78 gh	2.24±0.38 def	8.52±1.17 efghijklm
11	062	68.62±4.51 ab	58.14±1.70 abcde	17.03±2.83 cdefghij	42.53±6.30 fgh	5.04±0.35 acdef	6.99±1.32 hijklm
12	065	67.51±2.83 ab	58.47±9.28 abcde	18.48±6.69 acdefghij	62.15±5.54 aacdefgh	7.83±0.71 aa	14.45±2.97 cdef
13	070	64.79±2.25 ab	52.61±13.40 abcdefg	19.78±3.14 acdefghij	88.88±6.37 aa	4.12±0.44 acdef	26.16±3.84 a
14	071	74.99±3.03 a	57.81±7.89 abcde	12.26±2.22 fghij	70.12±13.48 aacdefg	3.71±0.07 acdef	13.44±1.18 cdefgh
15	075	73.31±4.62 a	64.69±3.82 abc	10.48±2.10 hij	35.59±16.83 h	9.82±0.69 a	13.03±2.42 cdefghi
16	079	69.67±3.39 ab	59.74±4.81 abcde	15.92±2.82 cdefghij	67.25±7.59 aacdefgh	6.18±1.18 aacdef	7.51±1.33 ghijklm
17	080	66.10±2.12 ab	55.92±2.82 abcde	33.87±2.46 a	68.43±7.74 aacdefgh	4.49±0.31 acdef	6.56±1.19 ijklm
18	083	64.71±4.57 ab	53.50±5.88 abcdefg	19.52±8.34 acdefghij	48.46±6.93 defgh	4.88±0.46 acdef	12.9±1.65 cdefghi
19	087	73.15±7.71 a	55.34±6.17 abcde	15.26±5.34 defghij	56.89±9.08 acdefgh	6.46±1.07 aacde	12.90±0.49 cdefghi
20	105	66.42±3.75 ab	60.22±3.45 abcde	15.08±3.79 defghij	67.75±6.81 aacdefgh	6.45±0.56 aacde	11.49±2.20 cdefghijk
21	106	64.16±2.41 ab	43.20±5.99 defg	16.10±1.96 cdefghij	70.46±5.06 aacdefg	6.33±0.43 aacdef	11.74±3.10 cdefghijk
22	108	68.76±1.37 ab	58.67±1.17 abcde	12.40±2.80 fghij	47.83±6.59 defgh	5.27±1.74 acdef	12.13±0.83 cdefghij
23	109	75.38±2.65 a	70.03±2.08 a	18.21±8.49 acdefghij	55.53±6.03 acdefgh	4.03±2.20 acdef	13.55±2.99 cdefgh
24	113	68.83±3.33 ab	46.71±2.87 cdefg	13.01±2.48 efghij	87.36±10.81 aa	4.86±0.51 acdef	20.68±2.43 a
25	115	71.13±5.63 a	53.43±6.79 abcdefg	17.28±3.25 cdefghij	57.27±5.26 acdefgh	4.22±0.08 acdef	12.56±1.57 cdefghij
26	116	73.55±8.23 a	65.43±4.15 abc	33.76±6.38 a	76.00±4 aacdefg	5.43±0.37 acdef	7.98±1.73 fghijklm
27	118	73.45±6.92 a	59.00±7.14 abcde	20.36±8.71 acdefghij	43.88±9.14 fgh	6.35±0.82 aacdef	13.03±1.19 cdefghi
28	125	72.61±6.07 a	56.87±5.08 abcde	28.20±2.45 aac	80.76±12.9 aacd	4.56±0.74 acdef	6.09±1.68 jklm
29	129	72.47±6.23 a	62.12±8.77 abcd	12.90±0.63 efghij	55.58±4.54 acdefgh	3.25±0.98 cdef	9.53±0.59 defghijklm
30	138	71.30±10.45 a	50.98±7.14 aacdefg	10.16±4.65 ij	70.02±7.94 aacdefg	3.47±0.37 acdef	8.62±1.2 efghijklm
31	139	70.09±4.42 a	58.64±6.69 aacde	25.13±6.27 aacdef	74.98±5.16 aacdefg	2.87±0.09 cdef	4.78±0.05 lm
32	146	67.48±11.70 ab	48.04±6.66 acdefg	22.27±5.73 aacdefghij	54.51±14.79 acdefgh	1.97±0.65 f	3.49±1.89 m
33	149	66.02±6.20 aa	62.11±6.95 aacd	11.14±1.41 ghij	61.70±9.17 aacdefgh	5.44±2.07 acdef	11.51±1.88 cdefghijk
34	153	76.17±9.33 a	42.07±6.13 efg	22.73±3.16 aacdefghi	69.22±3.13 aacdefgh	5.22±2.25 acdef	9.82±0.31 defghijklm
35	164	62.19±8.96 aa	59.37±5.41 aacde	25.76±4.29 aacde	50.63±7.58 defgh	3.24±2.18 cdef	4.99±0.53 lm
36	194	68.67±7.46 aa	58.85±2.63 aacde	14.26±1.10 efghij	68.86±4.00 aacdefgh	2.20±0.70 ef	13.42±1.57 cdefgh
37	197	71.45±5.01 a	57.73±5.73 aacde	16.05±5.22 cdefghij	65.00±10.31 aacdefgh	3.51±0.29 acdef	14.23±1.77 cdef
38	200	54.17±4.81 a	41.88±8.88 efg	30.51±8.18 aa	47.50±3.83 defgh	4.45±1.08 acdef	4.63±0.71lm

39	201	66.97±2.80 aa	64.01±1.58 aac	21.93±2.16 aacdefghij	59.90±5.75 aacdefgh	4.18±0.47 acdef	11.73±2.85 cdefghijk
40	206	65.09±2.77 aa	52.35±5.28 aacdefg	14.92±7.76 defghij	92.94±1.39 a	5.65±0.30 acdef	9.57±2.47 defghijklm
41	211	67.51±2.83 aa	51.23±8.32 aacdefg	21.60±1.51 aacdefghij	76.83±9.33 aacdef	4.55±0.08 acdef	5.47±1.43klm
42	228	73.17±1.73 a	64.15±5.23 aac	13.01±1.72 efghij	44.82±4.89 efgh	4.07±1.79 acdef	9.45±1.62 defghijklm
43	238	71.66±3.69 a	51.78±10.15 aacdefg	15.34±2.18 defghij	55.83±8.50 acdefgh	6.46±1.81 aacde	7.85±1.12fghijklm
44	243	64.78±4.33 aa	53.93±8.55 aacdefg	11.54±2.51 ghij	70.87±6.67 aacdefg	4.30±0.21 acdef	13.77±1.20 cdefg
45	246	73.62±2.56 a	47.18±9.64 acdefg	16.81±6.16 cdefghij	72.41±2.82 aacdefg	3.41±0.72cdef	4.92±1.79lm
46	254	71.15±5.41 a	63.10±2.06 aacd	16.77±4.50 cdefghij	70.05±8.07 aacdefg	3.06±1.10cdef	15.69±1.12 acd
47	258	74.91±6.02 a	60.46±6.36 aacde	20.49±0.70 acdefghij	71.05±23.88 aacdefg	4.82±0.85 acdef	5.44±1.12klm
48	263	71.28±2.88 a	67.15±2.07 aa	23.13±6.94 aacdefgh	51.97±5.03 cdefg	3.02±0.94cdef	6.63±0.69ijklm
49	266	71.17±6.33 a	62.79±9.76 aacd	21.41±4.60 acdefghij	63.11±9.87 aacdefgh	6.79±0.78 aac	12.58±1.48 cdefghij
50	267	76.51±3.01 a	35.14±5.36 g	23.98±4.59 aacdefg	78.97±0.35 aacde	2.84±0.54cdef	14.69±2.21 cde

Note: Significant differences between different Chinese fir clones are indicated by different letters in the same column (P <0.05).

Table S2. The membership values of each indicator and the evaluations of drought tolerance among 50 Chinese fir clones.

Serial number	Clones number	Value of membership function of each indicator			Membership function mean	Drought resistant sorting
		Leaf Relative Water Content	Relative conductivity	MDA content		
1	007	0.6234	0.7345	0.7046	0.6875	14
2	014	0.6605	0.6782	0.5735	0.6374	29
3	017	0.5962	0.3895	0.6308	0.5388	41
4	026	0.2499	0.5033	0.4104	0.3879	50
5	021	0.5224	0.7304	0.4478	0.5669	38
6	025	0.7376	0.6437	0.7626	0.7147	7
7	033	0.5908	0.6307	0.8192	0.6802	19
8	038	0.8502	0.6080	0.6944	0.7175	6
9	046	0.7704	0.6806	0.5995	0.6835	16
10	052	0.6920	0.5802	0.8704	0.7142	8
11	062	0.6530	0.7863	0.7256	0.7216	5
12	065	0.6328	0.5855	0.3839	0.5341	42
13	070	0.4879	0.3256	0.3629	0.3921	49
14	071	0.7909	0.6442	0.6687	0.7012	10
15	075	0.8519	0.9819	0.2885	0.7074	9
16	079	0.6995	0.5938	0.6417	0.6450	27
17	080	0.5649	0.2137	0.7697	0.5161	43
18	083	0.4990	0.6834	0.6058	0.5961	31
19	087	0.7144	0.6976	0.5050	0.6390	28
20	105	0.6336	0.6067	0.5367	0.5923	34
21	106	0.3389	0.5622	0.5391	0.4801	46
22	108	0.6636	0.8356	0.5980	0.6991	11
23	109	0.9747	0.6489	0.6458	0.7565	4
24	113	0.4939	0.4784	0.4363	0.4695	47
25	115	0.6417	0.6527	0.6551	0.6498	24
26	116	0.8678	0.1500	0.6791	0.5656	39
27	118	0.7736	0.7026	0.5093	0.6630	22
28	125	0.7241	0.2231	0.7761	0.5744	35
29	129	0.7963	0.7578	0.7836	0.7792	2
30	138	0.6103	0.6882	0.7898	0.6961	12
31	139	0.6930	0.3365	0.9120	0.6472	26
32	146	0.4828	0.5740	0.9983	0.6850	15
33	149	0.6516	0.7406	0.6008	0.6643	20
34	153	0.5917	0.4362	0.6519	0.5599	40
35	164	0.5266	0.5360	0.8839	0.6488	25
36	194	0.6644	0.6139	0.7652	0.6812	18
37	197	0.7105	0.6107	0.6637	0.6616	23
38	200	0.0966	0.4655	0.8153	0.4592	48
39	201	0.7002	0.5341	0.6764	0.6369	30
40	206	0.4910	0.3904	0.6299	0.5038	45
41	211	0.5291	0.3933	0.7902	0.5709	36
42	228	0.8411	0.8493	0.7331	0.8078	1
43	238	0.6300	0.4619	0.6159	0.5692	37
44	243	0.5066	0.6524	0.6236	0.5942	33
45	246	0.6079	0.5305	0.9080	0.6821	17
46	254	0.7808	0.5517	0.6604	0.6643	21

47	258	0.8271	0.4666	0.7738	0.6891	13
48	263	0.8418	0.5784	0.8624	0.7609	3
49	266	0.7768	0.5168	0.4910	0.5949	32
50	267	0.5000	0.3256	0.6966	0.5074	44

Table S3. The name, number and culture conditions of leaf samples for transcriptome analysis.

Sample Name	Organ	Numbering	Culture Conditions
High drought-tolerant capacity: NO. 228	Leaf	A_1-A_3	Drought Treatment
		B_1-B_3	Normal Culture
Low drought-tolerant capacity: NO. 026	Leaf	C_1-C_3	Drought Treatment
		D_1-D_3	Normal Culture

Note: Each sample is organized into 3 biological replicates, numbered 1-3.

Table S4. Number of drought-related transcription factors by species

Name	AP2	ARF	BES1	GRAS	MYB	NAC	WRKY	bHLH	bZIP
Arabidopsis thaliana	30	37	14	37	168	138	90	225	127
Zea mays	54	62	17	104	203	189	161	308	216
Gossypium hirsutum	59	69	24	164	441	306	238	427	224
Nicotiana tabacum	93	87	27	126	319	280	210	435	210
Populus trichocarpa	59	98	32	151	266	289	185	379	214
Selaginella moellendorffii	10	7	5	54	24	22	19	55	25
Vitis vinifera	19	17	6	43	138	71	59	115	47
Salvia miltiorrhiza	23	15	6	34	116	87	77	151	62
Prunus persica	25	40	17	83	163	186	85	282	157
Cunninghamia lanceolata	470	85	32	194	647	229	224	368	237

Note: The numbers of *Cunninghamia lanceolata* transcription factors were obtained from the transcriptome sequencing data, and other species were obtained from the PlantTFDB v5.0 (http://planttfdb.cbi.pku.edu.cn/)..

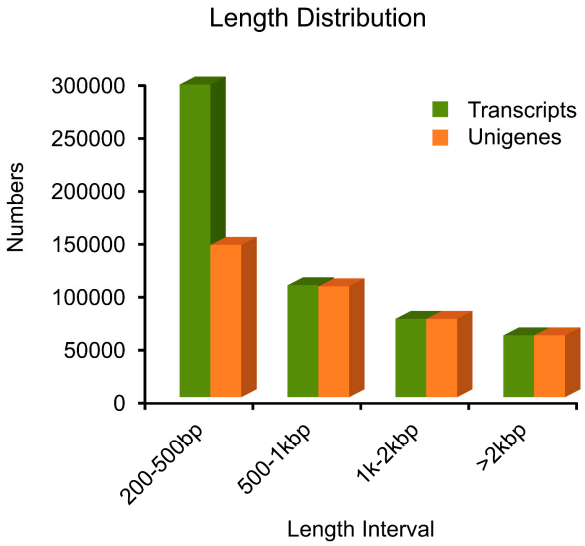

Fig. S1. Frequency distribution and gene annotation of different splicing lengths among different Chinese fir clones. The abscissa is the splice transcript/gene length interval, and the ordinate is the numbers of occurrences of splice transcripts/genes of each length.

Fig. S2. Gene functional classification in GO database among different Chinese fir clones. The classifications are shown in three main categories and fifty seven groups. The three classifications represent the three basic classifications of Go term (from top to bottom are biological processe, cellular component, and molecular function).

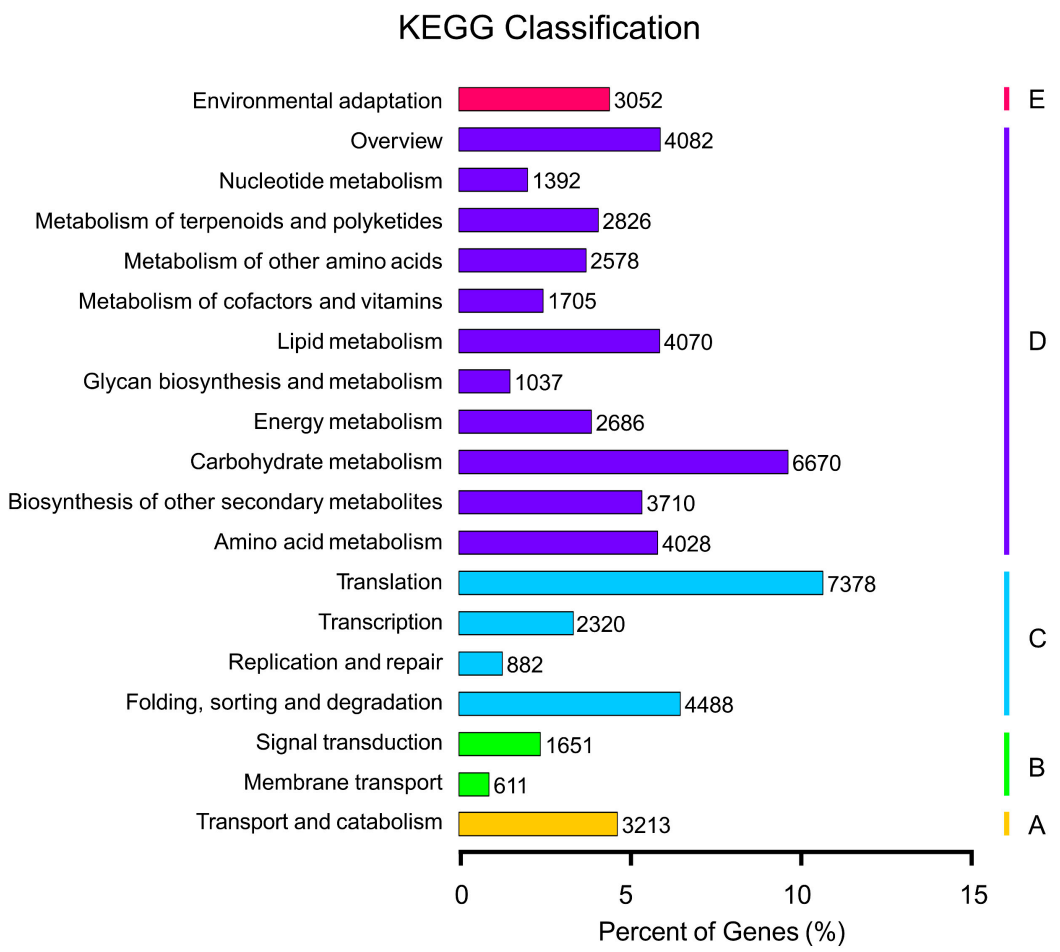

Fig. S3. Gene functional classifications in KEGG database among different Chinese fir clones. The genes of Chinese fir leaves involved in KEGG metabolic pathway can be divided into 5 categories and 19 secondary branches.

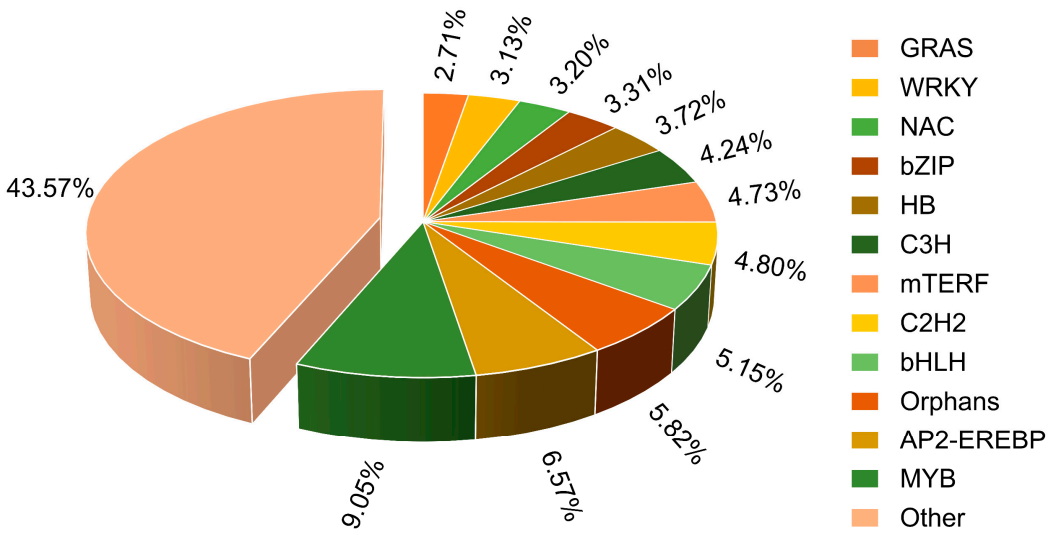

Fig. S4. Classifications of transcription factors of leaves among different Chinese fir clones.

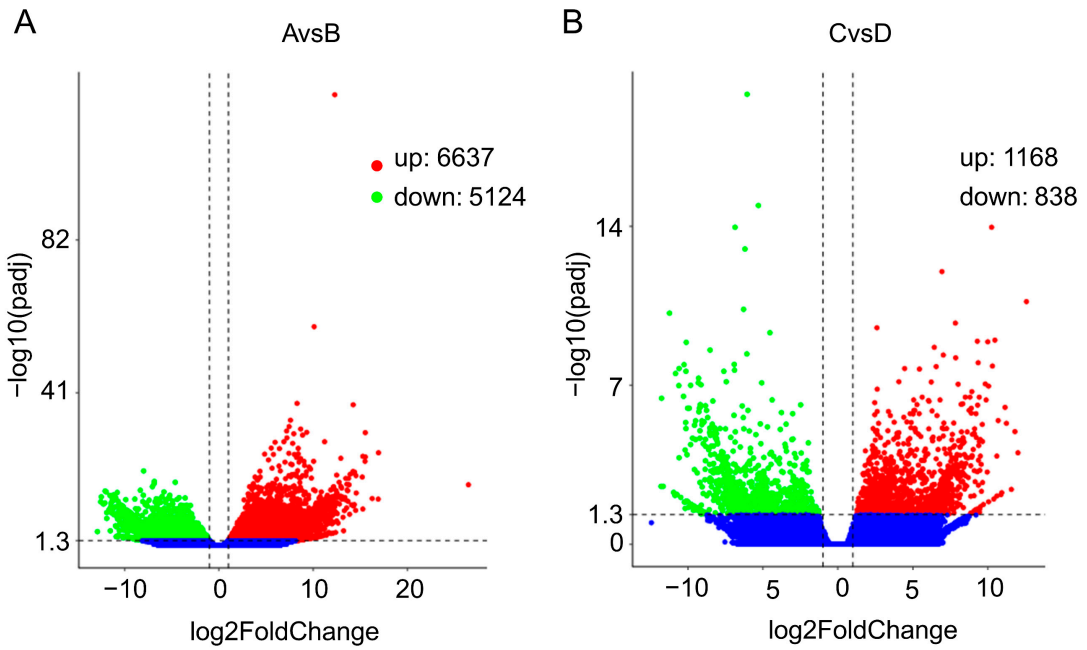

Fig. S5. Analysis of differentially expressed genes (DEGs) of the same Chinese fir clone under drought stress and normal culture. The screening conditions for differential genes were padj < 0.05 and |log2FoldChange| > 1. Abscissa is the change of gene expression multiple in different samples; ordinate is the statistical significance of the change of gene expression. The greater the - log10 is, the more significant difference is between drought stress and CK. Dot represents gene, and blue dots represent no significant difference. Red dots represent significant up regulation, and green dots represent significant down regulation. A, C are leaf DEGs in No. 228 and No. 026 under drought stressed, and B, D are leaf DEGs in No. 228 and No. 026 under normal conditions.

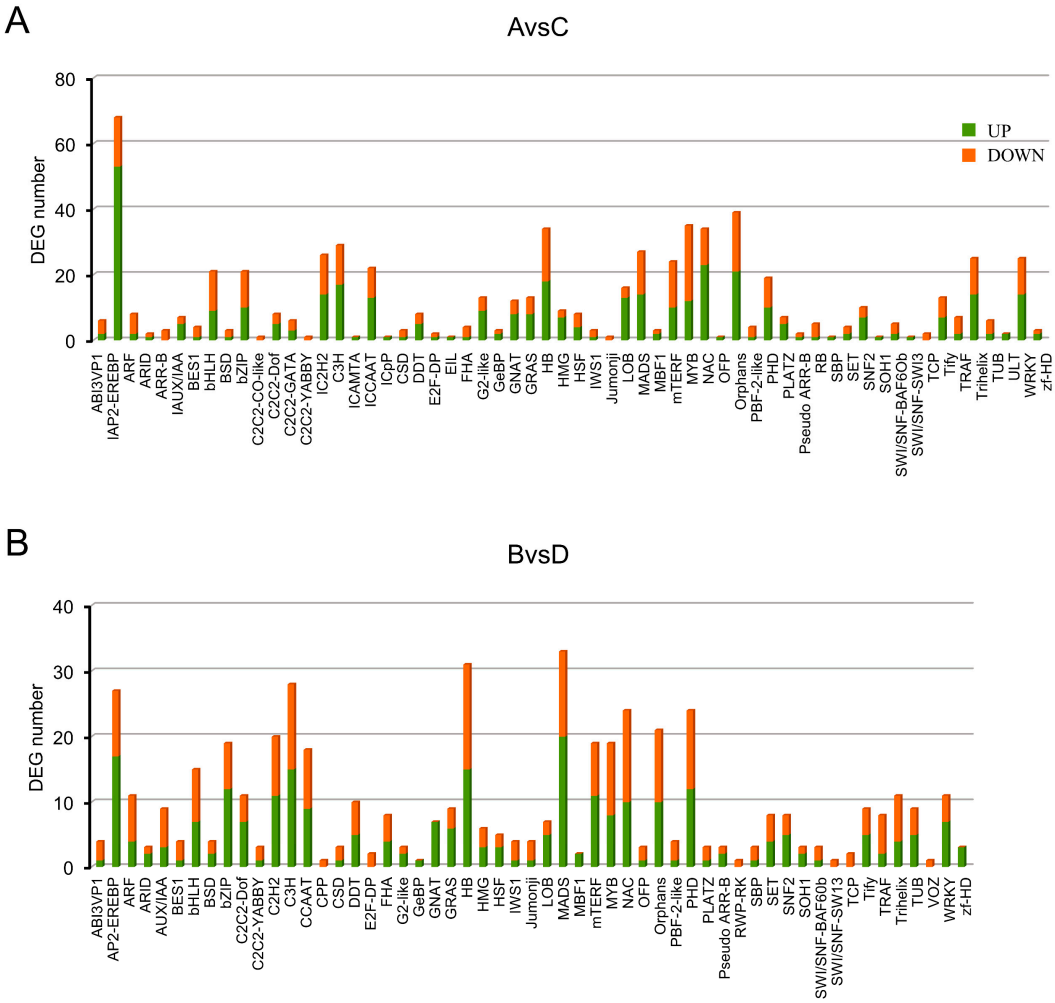

Fig. S6. Differential expressions of transcription factors among different Chinese fir clones under drought stress. The abscissa is the type of transcription factors that are differentially expressed in different comparison groups, and the ordinate is the number of transcription factors. A vs C were the comparisions of leaf DEGs between No. 228 and No. 026 under drought stresse, and B vs D were the comparisions of leaf DEGs between No. 228 and No. 026 under normal conditions.

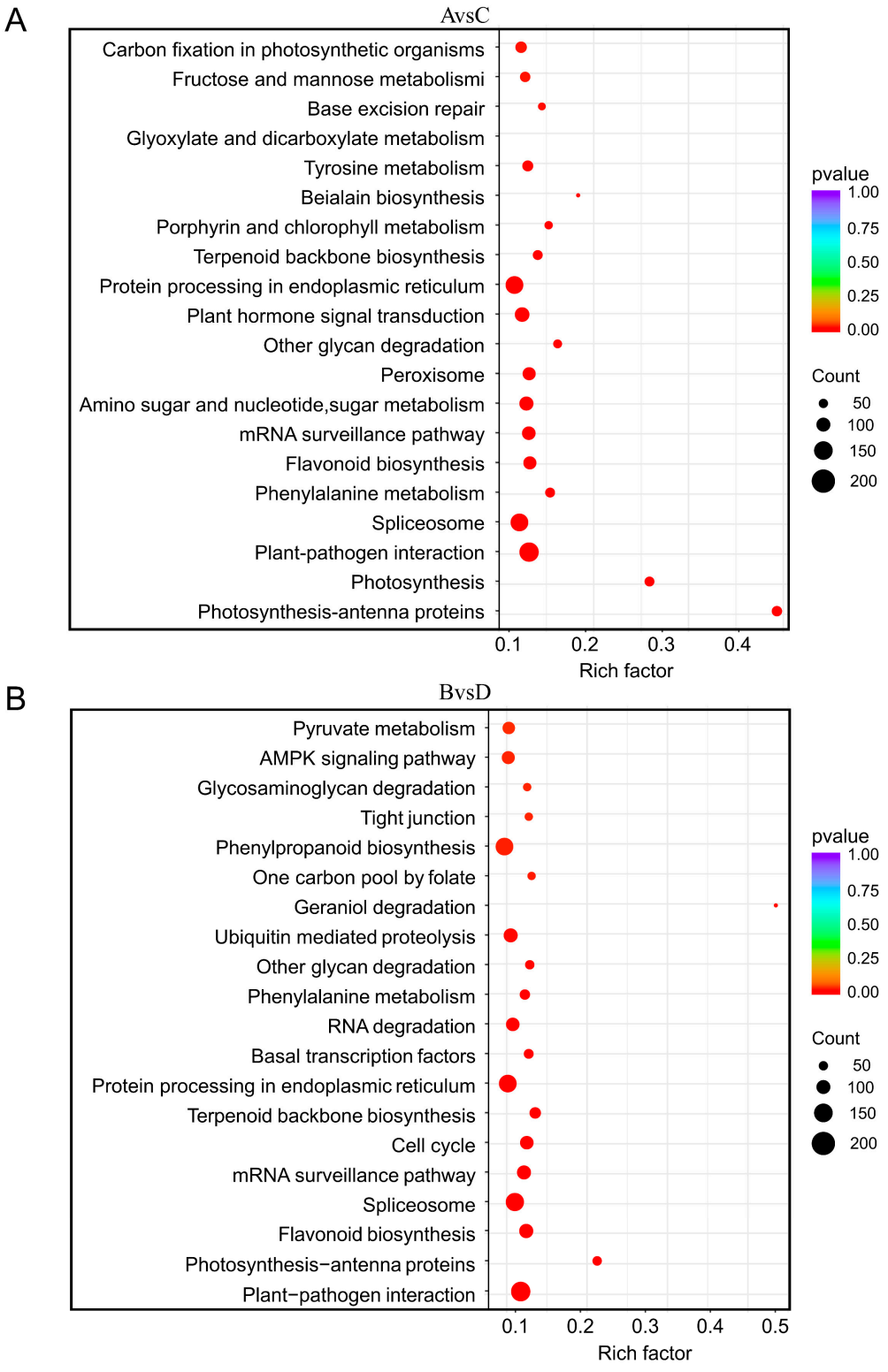

Fig. S7. The scatter plot of differential gene in KEGG pathway enrichment. The ordinate represents the name of the pathway, and the abscissa represents the rich factor corresponding to the pathway. The p-value is represented by the dot color , and the smaller the pvalue is, the color is closed to red. The number of differential genes contained in each pathway is expressed by the dot size. A vs C were the comparisions of leaf DEGs between No. 228 and No. 026 under drought stress, and B vs D were the comparisions of leaf DEGs between No. 228 and No. 026 under normal conditions.