Table S1. qRT-PCR Primer sequences of the genes

Gene Name	Forward Sequence（5′-3′）	Reverse Sequence（5′-3′）	Length (bp)
PmAP2/ERF11	GGTTCCTGTGCTCGTCTCAATCTG	GGTACTAGCGGCTGAGGCATTAAAG	105
PmAP2/ERF14	GTTTGGCTGGGGACTTTCGATACG	GGAGGCGGACGAAGAATTAGTTGG	131
PmAP2/ERF44	CGAACCCAAGACGAGACTGCTC	GCGAACGCCTCTATATGCTGGATAC	81
PmAP2/ERF46	GTCTCAGTACAAGGGCGTGGTTC	GGCGGCGTCTTCTTCTCTGTTG	111
PmAP2/ERF49	GTCGTTGCAGCAAACTGGTAAGC	TGGCAGCGTCTTCTTCCTTGTTG	143
PmAP2/ERF77	ACGCCGCAATGTATTGTCTGAGAG	CATGCTGAATTTGCTCACGGGAAAG	102
PmAP2/ERF80	AGATCCGCTTTGCCCAATTTCCC	AGACCATCGGCTGCGTTAATTCG	124
PmAP2/ERF96	CCGCCGCCAAAGAATGTAAAGAAG	ACTGAAGGTGCCAAGCCAAACTC	135
PmAP2/ERF109	TCCTACGCTCGGCTCAACCTAC	CTGAAACGTCGCTGTCGCAGAG	81
PmUBI4	AGCTCCGACACCATTGATAA	CCAAAGTACGTCCATCTTCCA	115
PmCYP	CAAGGGTTCGTCGTTCCAC	GGCAAACTTCTCGCCGTA	109

Table S2. Physical and chemical analysis of AP2/ERF in *Pinus massoniana*

Gene name	Group	Amino acid number	Isoelectric point	Molecular weigh	Instability index	Hydropathicity	Subcellular localization	Transmembrane structure
PmAP2/ERF1	VIII	235	8.23	26.28	53.66	-0.779	Nucl	None
PmAP2/ERF2	VI	474	4.87	52.62	58.04	-0.641	Nucl	None
PmAP2/ERF3	VI	522	5.28	57.80	55.26	-0.625	Nucl	None
PmAP2/ERF4	I	442	5.50	48.57	58.61	-0.474	Nucl	None
PmAP2/ERF5	IV	532	4.77	59.30	60.46	-0.784	Nucl	None
PmAP2/ERF6	II	181	5.69	20.71	58.74	-0.718	Cyto. Nucl	None
PmAP2/ERF7	VII	448	5.00	49.44	52.86	-0.709	Nucl	None
PmAP2/ERF8	VII	457	5.93	50.02	59.58	-0.649	Nucl	None
PmAP2/ERF9	I	438	6.94	48.54	47.90	-0.481	Nucl	None
PmAP2/ERF10	I	421	4.94	46.45	52.26	-0.600	Nucl	None
PmAP2/ERF11	IV	435	5.64	47.99	42.97	-0.763	Nucl	None
PmAP2/ERF12	RAV	526	8.75	57.73	54.73	-0.587	Nucl	None
PmAP2/ERF13	AP2	430	5.36	48.40	61.34	-0.716	Cyto. Nucl	None
PmAP2/ERF14	X	464	6.54	51.51	62.76	-0.932	Nucl	None
PmAP2/ERF15	AP2	418	8.11	46.30	52.91	-0.769	Cyto. Nucl	None
PmAP2/ERF16	II	162	10.92	17.92	62.24	-0.387	Cyto. Nucl	None
PmAP2/ERF17	X	390	6.31	44.12	56.56	-0.746	Nucl	None
PmAP2/ERF18	IX	379	5.42	42.51	55.46	-0.673	Nucl	None
PmAP2/ERF19	IX	349	5.21	38.90	57.26	-0.564	Nucl	None
PmAP2/ER	II	336	9.28	36.82	55.96	-0.879	Cyto.	None

F20							Nucl	
PmAP2/ER F21	II	200	5.66	22.18	63.54	-0.546	Cyto. Nucl	None
PmAP2/ER F22	IX	315	5.75	35.35	68.31	-0.828	Nucl	None
PmAP2/ER F23	III	290	6.26	32.16	54.37	-0.375	Cyto. Nucl	None
PmAP2/ER F24	II	254	4.97	28.19	71.89	-0.530	Cyto. Nucl	None
PmAP2/ER F25	II	251	4.80	27.38	70.48	-0.370	Cyto. Nucl	None
PmAP2/ER F26	VIII	205	9.47	22.39	53.01	-0.420	Nucl	None
PmAP2/ER F27	II	234	4.48	25.43	65.39	-0.357	Cyto. Nucl	None
PmAP2/ER F28	II	207	5.35	23.50	80.90	-0.849	Cyto. Nucl	None
PmAP2/ER F29	II	244	4.55	27.21	70.39	-0.522	Cyto. Nucl	None
PmAP2/ER F30	III	245	8.73	27.17	53.13	-0.661	Cyto. Nucl	None
PmAP2/ER F31	II	206	4.89	23.31	75.41	-0.734	Cyto. Nucl	None
PmAP2/ER F32	VIII	211	9.09	23.30	62.24	-0.594	Nucl	None
PmAP2/ER F33	VIII	212	9.97	22.80	66.92	-0.816	Nucl	None
PmAP2/ER F34	III	289	6.38	31.93	48.38	-0.420	Cyto	None
PmAP2/ER F35	II	127	10.30	14.61	39.55	-0.759	Cyto. Nucl	None
PmAP2/ER F36	II	199	4.62	22.58	57.89	-0.631	Cyto. Nucl	None
PmAP2/ER F37	II	199	5.77	22.19	64.58	-0.488	Cyto. Nucl	None
PmAP2/ER F38	II	199	4.70	22.45	62.64	-0.524	Cyto. Nucl	None
PmAP2/ER F39	II	177	7.49	20.06	68.92	-0.647	Cyto. Nucl	None
PmAP2/ER F40	II	160	8.82	17.58	78.33	-0.564	Cyto. Nucl	None
PmAP2/ER F41	VIII	181	9.29	20.19	58.12	-0.739	Nucl	None
PmAP2/ER	VIII	209	10.11	23.28	49.72	-0.761	Nucl	None

F42								
PmAP2/ERF43	AP2	683	8.47	76.18	60.92	-0.800	Nucl	None
PmAP2/ERF44	III	255	6.02	28.04	65.10	-0.662	Cyto. Nucl	None
PmAP2/ERF45	VIII	303	8.49	32.85	43.57	-0.534	Nucl	None
PmAP2/ERF46	RAV	555	6.98	61.80	48.05	-0.667	Nucl	None
PmAP2/ERF47	I	457	5.36	50.91	45.05	-0.553	Nucl	None
PmAP2/ERF48	VIII	232	8.93	24.90	49.03	-0.503	Nucl	None
PmAP2/ERF49	RAV	446	9.52	50.13	36.18	-0.656	Nucl	None
PmAP2/ERF50	II	191	9.03	21.15	59.88	-0.623	Cyto. Nucl	None
PmAP2/ERF51	III	290	6.76	31.27	55.26	-0.591	Nucl	None
PmAP2/ERF52	II	201	8.93	22.07	58.10	-0.558	Cyto. Nucl	None
PmAP2/ERF53	RAV	587	8.86	65.95	43.04	-0.702	Nucl	None
PmAP2/ERF54	AP2	675	5.86	74.62	53.20	-0.830	Nucl	None
PmAP2/ERF55	VIII	164	10.33	18.48	41.97	-0.306	Nucl	None
PmAP2/ERF56	III	292	6.02	32.36	64.29	-0.536	Cyto. Nucl	None
PmAP2/ERF57	AP2	421	5.68	46.91	49.81	-0.600	Nucl	None
PmAP2/ERF58	III	101	11.56	11.34	74.48	-0.358	Cyto. Nucl	None
PmAP2/ERF59	RAV	481	8.87	53.99	46.25	-0.627	Nucl	None
PmAP2/ERF60	II	199	8.60	22.11	57.01	-0.436	Nucl	None
PmAP2/ERF61	II	153	11.13	17.37	75.80	-0.742	Cyto. Nucl	None
PmAP2/ERF62	II	200	8.63	22.45	60.27	-0.800	Cyto. Nucl	None
PmAP2/ERF63	IX	340	5.99	38.09	50.65	-0.596	Nucl	None
PmAP2/ER	IX	267	7.65	30.45	71.41	-0.690	Nucl	None

F64								
PmAP2/ER F65	II	235	6.89	26.61	56.14	-0.534	Cyto. Nucl	None
PmAP2/ER F66	IV	281	10.43	30.95	43.01	-0.730	Nucl	None
PmAP2/ER F67	I	115	10.28	13.26	41.38	-0.931	Nucl	None
PmAP2/ER F68	AP2	660	6.97	72.61	48.73	-0.665	Cyto. Nucl	None
PmAP2/ER F69	VII	499	6.49	55.17	48.09	-0.666	Nucl	None
PmAP2/ER F70	II	219	4.95	24.91	68.78	-0.754	Cyto. Nucl	None
PmAP2/ER F71	VII	325	9.31	36.23	28.21	-0.836	Nucl	None
PmAP2/ER F72	RAV	594	7.31	66.36	50.89	-0.709	Nucl	None
PmAP2/ER F73	II	202	9.80	22.83	66.25	-0.601	Cyto. Nucl	None
PmAP2/ER F74	VI	270	8.59	30.26	39.06	-0.712	Nucl	None
PmAP2/ER F75	II	213	8.88	23.13	67.88	-0.298	Cyto. Nucl	None
PmAP2/ER F76	IX	406	5.02	45.33	58.00	-0.579	Nucl	None
PmAP2/ER F77	II	195	4.91	22.17	53.14	-0.535	Cyto	None
PmAP2/ER F78	X	215	10.34	24.59	81.85	-0.836	Nucl	None
PmAP2/ER F79	VIII	294	6.32	32.67	62.58	-0.652	Nucl	None
PmAP2/ER F80	III	223	4.92	24.93	44.39	-0.692	Nucl	None
PmAP2/ER F81	II	186	4.59	20.48	59.27	-0.161	Cyto	None
PmAP2/ER F82	VIII	144	10.45	16.19	48.77	-0.755	Nucl	None
PmAP2/ER F83	III	233	6.90	26.11	59.63	-0.712	Cyto. Nucl	None
PmAP2/ER F84	III	161	10.44	17.98	63.59	-0.337	Cyto. Nucl	None
PmAP2/ER F85	VII	339	9.63	38.55	45.88	-0.970	Nucl	None
PmAP2/ER	IX	182	8.71	20.03	48.50	-0.613	Nucl	None

F86								
PmAP2/ER F87	V	395	6.14	43.87	55.24	-0.568	Cyto. Nucl	None
PmAP2/ER F88	II	247	6.84	27.70	65.52	-0.413	Cyto. Nucl	None
PmAP2/ER F89	III	220	11.65	24.91	64.78	-0.660	Nucl	None
PmAP2/ER F90	AP2	637	6.02	70.45	50.61	-0.718	Cyto. Nucl	None
PmAP2/ER F91	II	186	7.74	21.10	58.96	-0.775	Cyto. Nucl	None
PmAP2/ER F92	II	232	9.41	25.29	57.92	-0.322	Cyto. Nucl	None
PmAP2/ER F93	VI	130	10.54	15.05	48.76	-0.842	Nucl	None
PmAP2/ER F94	II	188	5.05	20.80	65.88	-0.470	Cyto. Nucl	None
PmAP2/ER F95	VIII	161	9.95	18.55	51.02	-0.660	Nucl	None
PmAP2/ER F96	IX	341	6.92	38.08	52.50	-0.601	Nucl	None
PmAP2/ER F97	II	175	8.80	20.04	64.89	-0.733	Cyto. Nucl	None
PmAP2/ER F98	X	211	10.11	23.42	64.11	-0.572	Nucl	None
PmAP2/ER F99	IX	259	5.01	28.81	66.21	-0.658	Nucl	None
PmAP2/ER F100	VII	323	8.99	35.77	43.34	-0.828	Nucl	None
PmAP2/ER F101	III	245	5.83	27.01	38.63	-0.505	Nucl	None
PmAP2/ER F102	AP2	279	10.19	31.22	51.44	-0.695	Nucl	None
PmAP2/ER F103	II	128	8.93	13.88	64.02	-0.362	Cyto. Nucl	None
PmAP2/ER F104	IX	295	8.87	33.32	60.37	-0.737	Nucl	None
PmAP2/ER F105	III	318	4.78	34.28	54.62	-0.320	Nucl	None
PmAP2/ER F106	VIII	210	9.12	23.49	52.25	-0.738	Nucl	None
PmAP2/ER F107	III	147	11.04	16.79	57.47	-0.988	Cyto. Nucl	None
PmAP2/ER	RAV	464	8.29	51.81	50.40	-0.609	Nucl	None

F108								
PmAP2/ER F109	IV	352	6.91	38.01	47.80	-0.597	Nucl	None
PmAP2/ER F110	IX	228	8.90	25.72	37.65	-0.709	Nucl	None
PmAP2/ER F111	II	196	4.75	22.26	55.75	-0.521	Cyto. Nucl	None
PmAP2/ER F112	II	201	9.13	22.43	57.62	-0.617	Cyto. Nucl	None
PmAP2/ER F113	RAV	362	9.28	41.25	34.11	-0.433	Nucl	None
PmAP2/ER F114	I	235	6.32	26.95	47.89	-0.839	Nucl	None
PmAP2/ER F115	RAV	432	7.04	49.58	41.88	-0.731	Nucl	None
PmAP2/ER F116	X	194	9.10	21.24	43.75	-0.548	Nucl	None
PmAP2/ER F117	IX	197	6.23	21.67	65.76	-0.586	Nucl	None
PmAP2/ER F118	VIII	205	9.14	21.89	47.65	-0.345	Nucl	None
PmAP2/ER F119	II	289	6.26	32.47	68.41	-0.604	Cyto. Nucl	None
PmAP2/ER F120	IX	248	5.17	28.63	83.07	-0.819	Nucl	None
PmAP2/ER F121	VII	371	8.98	41.25	29.62	-0.846	Nucl	None
PmAP2/ER F122	II	218	7.67	24.72	51.89	-0.802	Cyto. Nucl	None
PmAP2/ER F123	VIII	185	10.61	20.41	39.61	-0.566	Nucl	None
PmAP2/ER F124	II	191	4.96	20.87	59.05	-0.371	Cyto. Nucl	None

Note: Cyto is cytoplasmic Cytoplasm; Nucl is cytosolic Nuclear.