

Table S1. *C/SI-bZIP* genes identified in *P. tomentosa*.

Gene names	Gene ID	Chr	Number of Amino Acid (aa)	Molecular Weight (kDa)	Theoretical pI	Instability Index
<i>PtobZIP42</i>	<i>POTOM_026607</i>	6	301	32.48	5.72	53.91
<i>PtobZIP25</i>	<i>POTOM_020647</i>	5	457	49.37	6.36	61.39
<i>PtobZIP32</i>	<i>POTOM_021892</i>	5	443	47.74	6.69	54.87
<i>PtobZIP7</i>	<i>POTOM_009536</i>	2	497	53.85	5.78	57.58
<i>PtobZIP49</i>	<i>POTOM_031535</i>	8	143	16.46	9.36	68.21
<i>PtobZIP63</i>	<i>POTOM_038208</i>	10	143	16.51	9.66	56.33
<i>PtobZIP75</i>	<i>POTOM_048317</i>	14	139	15.88	7.84	58.38
<i>PtobZIP15</i>	<i>POTOM_010759</i>	2	144	16.50	8.88	55.79
<i>PtobZIP44</i>	<i>POTOM_027938</i>	7	164	18.71	6.2	62.87
<i>PtobZIP27</i>	<i>POTOM_021242</i>	5	162	18.25	6.59	70.33
<i>PtobZIP21</i>	<i>POTOM_017716</i>	4	155	17.44	8.1	61.51
<i>PtobZIP55</i>	<i>POTOM_034782</i>	9	155	17.30	8.09	47.95
<i>PtobZIP33</i>	<i>POTOM_022015</i>	5	158	18.32	6.05	47.9
<i>PtobZIP6</i>	<i>POTOM_009428</i>	2	156	17.90	6.18	43.91

Table S2. Accession numbers of *C/SI*-genes presented in Fig. 1.

Gene Name	Locus names or Accession nos. or AGI codes	Species
<i>AtbZIP9</i>	<i>AT5G24800</i>	<i>Arabidopsis thaliana</i>
<i>AtbZIP10</i>	<i>AT4G02640</i>	<i>A. thaliana</i>
<i>AtbZIP25</i>	<i>AT3G54620</i>	<i>A. thaliana</i>
<i>AtbZIP63</i>	<i>AT5G28770</i>	<i>A. thaliana</i>
<i>AtbZIP1</i>	<i>AT5G49450</i>	<i>A. thaliana</i>
<i>AtbZIP2</i>	<i>AT2G18160</i>	<i>A. thaliana</i>
<i>AtbZIP11</i>	<i>AT4G34590</i>	<i>A. thaliana</i>
<i>AtbZIP44</i>	<i>AT1G75390</i>	<i>A. thaliana</i>
<i>AtbZIP53</i>	<i>AT3G62420</i>	<i>A. thaliana</i>
<i>MdbZIP81</i>	<i>MDP0000431572</i>	<i>Malus domestica</i>
<i>MdbZIP82</i>	<i>MDP0000441891</i>	<i>M. domestica</i>
<i>MdbZIP92</i>	<i>MDP0000680042</i>	<i>M. domestica</i>
<i>MdbZIP75</i>	<i>MDP0000270365</i>	<i>M. domestica</i>
<i>MdbZIP24</i>	<i>MDP0000275309</i>	<i>M. domestica</i>
<i>MdbZIP56</i>	<i>MDP0000176747</i>	<i>M. domestica</i>
<i>MdbZIP2</i>	<i>MDP0000249561</i>	<i>M. domestica</i>
<i>MdbZIP3</i>	<i>MDP0000265875</i>	<i>M. domestica</i>
<i>MdbZIP41</i>	<i>MDP0000205823</i>	<i>M. domestica</i>
<i>MdbZIP61</i>	<i>MDP0000239026</i>	<i>M. domestica</i>
<i>MdbZIP40</i>	<i>MDP0000521934</i>	<i>M. domestica</i>
<i>MdbZIP73</i>	<i>MDP0000448715</i>	<i>M. domestica</i>
<i>MdbZIP20</i>	<i>MDP0000437680</i>	<i>M. domestica</i>
<i>MdbZIP63</i>	<i>MDP0000234798</i>	<i>M. domestica</i>
<i>MdbZIP64</i>	<i>MDP0000949327</i>	<i>M. domestica</i>
<i>SlbZIP06</i>	<i>Solyc01g097330</i>	<i>Solanum lycopersicum</i>
<i>SlbZIP48</i>	<i>Solyc08g006110</i>	<i>S. lycopersicum</i>
<i>SlbZIP49</i>	<i>Solyc08g022080</i>	<i>S. lycopersicum</i>
<i>SlbZIP04</i>	<i>Solyc01g079480</i>	<i>S. lycopersicum</i>
<i>SlbZIP07</i>	<i>Solyc01g100460</i>	<i>S. lycopersicum</i>
<i>SlbZIP10</i>	<i>Solyc01g109880</i>	<i>S. lycopersicum</i>
<i>SlbZIP15</i>	<i>Solyc02g084860</i>	<i>S. lycopersicum</i>
<i>SlbZIP19</i>	<i>Solyc03g033730</i>	<i>S. lycopersicum</i>
<i>SlbZIP34</i>	<i>Solyc04g080740</i>	<i>S. lycopersicum</i>
<i>SlbZIP39</i>	<i>Solyc06g009640</i>	<i>S. lycopersicum</i>
<i>StbZIP38</i>	<i>PGSC0003DMT400038493</i>	<i>Solanum tuberosum</i>
<i>StbZIP02</i>	<i>PGSC0003DMT400088166</i>	<i>S. tuberosum</i>
<i>StbZIP04</i>	<i>PGSC0003DMT400007165</i>	<i>S. tuberosum</i>
<i>StbZIP05</i>	<i>PGSC0003DMT400085559</i>	<i>S. tuberosum</i>
<i>StbZIP08</i>	<i>PGSC0003DMT400079474</i>	<i>S. tuberosum</i>
<i>StbZIP12</i>	<i>PGSC0003DMT400040054</i>	<i>S. tuberosum</i>
<i>StbZIP13</i>	<i>PGSC0003DMT400009068</i>	<i>S. tuberosum</i>

Table S2. continued

Gene Name	Locus names or Accession nos. or AGI codes	Species
<i>StbZIP17</i>	<i>PGSC0003DMT400058187</i>	<i>S. tuberosum</i>
<i>StbZIP26</i>	<i>PGSC0003DMT400009493</i>	<i>S. tuberosum</i>
<i>StbZIP31</i>	<i>PGSC0003DMT400018832</i>	<i>S. tuberosum</i>
<i>StbZIP43</i>	<i>PGSC0003DMT400043542</i>	<i>S. tuberosum</i>
<i>ZmbZIP9</i>	<i>GRMZM2G073427</i>	<i>Zea mays</i>
<i>ZmbZIP16</i>	<i>GRMZM2G019446</i>	<i>Z. mays</i>
<i>ZmbZIP17</i>	<i>GRMZM2G016150</i>	<i>Z. mays</i>
<i>ZmbZIP60</i>	<i>GRMZM2G007063</i>	<i>Z. mays</i>
<i>ZmbZIP65</i>	<i>GRMZM2G098904</i>	<i>Z. mays</i>
<i>ZmbZIP85</i>	<i>GRMZM2G015534</i>	<i>Z. mays</i>
<i>ZmbZIP112</i>	<i>GRMZM2G103647</i>	<i>Z. mays</i>
<i>ZmbZIP7</i>	<i>GRMZM2G093020</i>	<i>Z. mays</i>
<i>ZmbZIP22</i>	<i>AC203957.3_FG004</i>	<i>Z. mays</i>
<i>ZmbZIP59</i>	<i>GRMZM2G361611</i>	<i>Z. mays</i>
<i>ZmbZIP64</i>	<i>GRMZM2G444748</i>	<i>Z. mays</i>
<i>ZmbZIP87</i>	<i>GRMZM2G092137</i>	<i>Z. mays</i>
<i>PtobZIP42</i>	<i>POTOM_026607</i>	<i>Populus tomentosa</i>
<i>PtobZIP25</i>	<i>POTOM_020647</i>	<i>P. tomentosa</i>
<i>PtobZIP32</i>	<i>POTOM_021892</i>	<i>P. tomentosa</i>
<i>PtobZIP7</i>	<i>POTOM_009536</i>	<i>P. tomentosa</i>
<i>PtobZIP49</i>	<i>POTOM_031535</i>	<i>P. tomentosa</i>
<i>PtobZIP63</i>	<i>POTOM_038208</i>	<i>P. tomentosa</i>
<i>PtobZIP75</i>	<i>POTOM_048317</i>	<i>P. tomentosa</i>
<i>PtobZIP15</i>	<i>POTOM_010759</i>	<i>P. tomentosa</i>
<i>PtobZIP44</i>	<i>POTOM_027938</i>	<i>P. tomentosa</i>
<i>PtobZIP27</i>	<i>POTOM_021242</i>	<i>P. tomentosa</i>
<i>PtobZIP21</i>	<i>POTOM_017716</i>	<i>P. tomentosa</i>
<i>PtobZIP55</i>	<i>POTOM_034782</i>	<i>P. tomentosa</i>
<i>PtobZIP33</i>	<i>POTOM_022015</i>	<i>P. tomentosa</i>
<i>PtobZIP6</i>	<i>POTOM_009428</i>	<i>P. tomentosa</i>

Table S3. The conserved motifs of the C/S1-bZIP proteins in Fig. 3.

Motif	Motif Consensus	Width
Motif 1	VDERKRKRKMJSNRESARRSRMRKQKHLDDLVTQVSQLRKENNQJLTRINV	50
Motif 2	TTQRYLNVEAENSILRAQIEELSHRLKSLNEILKYVNGSNG	41
Motif 3	ADDSFLNPLNLAYLNQPIMASADLFQY	27
Motif 4	MASSSGASSGSTKMQRSGSEE	21
Motif 5	CPNPHPQPLGRNLTAPIDSEEYRAFLKSKLDLACAAVAMSR	41
Motif 6	DGGS LGIPALPTAQKKQEVQARQTTSGSSREDSDDDDLEGDTGTNENMDP	50
Motif 7	ADDSFLNPLNLAYLNQPIMASADLFQY	26
Motif 8	FQNPWQVGAPVGPAGASPMFD	21
Motif 9	MNSVFSVDDFSGPFW	15
Motif 10	PSPGMPFVGGQVDASTDVAVP	21

Table S4. Identification of uORFs in S1-bZIPs from different species

Protein Name	uORF sequence	length (aa)	Species
AtbZIP1	MINLNQFLVYHSISVVILHWFYVIS	25	<i>Arabidopsis thaliana</i>
AtbZIP2	MTPVLCEILLSGLTVKSALCRRTHLVQSFSVVFLYWFYNVS	41	<i>A. thaliana</i>
AtbZIP11	MSPIILSEIFLSGFMLNSTIRRRTHLVQSFSVVFLYWLYYVS	42	<i>A. thaliana</i>
AtbZIP44	MSPVISEILRSGLTIDSSLRRRTHLVQSFSVVFLYWFYVFS	41	<i>A. thaliana</i>
AtbZIP53	MSYSILFRRIRILHSFSVVYLYTYVFS	28	<i>A. thaliana</i>
MdbZIP2	—	—	<i>Malus domestica</i>
MdbZIP3	—	—	<i>M. domestica</i>
MdbZIP41	—	—	<i>M. domestica</i>
MdbZIP61	—	—	<i>M. domestica</i>
MdbZIP40	—	—	<i>M. domestica</i>
MdbZIP73	—	—	<i>M. domestica</i>
MdbZIP20	—	—	<i>M. domestica</i>
MdbZIP63	—	—	<i>M. domestica</i>
MdbZIP64	—	—	<i>M. domestica</i>
SlbZIP04	MIHMRRVRIMHSFSVVFLYWFYVFS	25	<i>Solanum lycopersicum</i>
SlbZIP07	MISAITITFLGDCFRQSFSVLFLYHFYDFS	30	<i>S. lycopersicum</i>
SlbZIP10	MINSTYRRRTHLVQSFSVVFLYWFYFIS	28	<i>S. lycopersicum</i>
SlbZIP15	—	—	<i>S. lycopersicum</i>
SlbZIP19	—	—	<i>S. lycopersicum</i>
SlbZIP34	—	—	<i>S. lycopersicum</i>
SlbZIP39	—	—	<i>S. lycopersicum</i>
StbZIP02	—	—	<i>Solanum tuberosum</i>
StbZIP04	—	—	<i>S. tuberosum</i>
StbZIP05	—	—	<i>S. tuberosum</i>
StbZIP08	—	—	<i>S. tuberosum</i>
StbZIP12	—	—	<i>S. tuberosum</i>
StbZIP13	—	—	<i>S. tuberosum</i>
StbZIP17	—	—	<i>S. tuberosum</i>
StbZIP26	—	—	<i>S. tuberosum</i>
StbZIP31	—	—	<i>S. tuberosum</i>
StbZIP43	—	—	<i>S. tuberosum</i>
ZmbZIP7	MSQILSEVSHRCRFMINSTLRRGTHLVLSFSVVFLYWFYVFSVRS	45	<i>Zea mays</i>
ZmbZIP22	MLLLLVLSEHLLLSGFMIGSAITRLVQSFSVVFLYWFYVFSVCHCQ	46	<i>Z. mays</i>
ZmbZIP59	—	—	<i>Z. mays</i>
ZmbZIP64	—	—	<i>Z. mays</i>
ZmbZIP87	—	—	<i>Z. mays</i>
PtobZIP49	MKYFRLFCQIKISHSVSVLLYWFYVFS	28	<i>Populus tomentosa</i>
PtobZIP63	MNHLRLFCRNKISHSVSVLLYWFYVFS	28	<i>P. tomentosa</i>
PtobZIP75	MTYSILMRRIRILHSFSVVFLYWFYVFS	41	<i>P. tomentosa</i>
PtobZIP15	—	—	<i>P. tomentosa</i>
PtobZIP44	MTPVLSEILLSGFTINSTLRRGTHLVQSFSVVFLYWFYVFS	41	<i>P. tomentosa</i>

Table S4. continued

Protein Name	uORF sequence	length (aa)	Species
PtobZIP27	—	—	<i>P. tomentosa</i>
PtobZIP21	—	—	<i>P. tomentosa</i>
PtobZIP55	MSPILSEIFISGCMINSTFRRRTHLVQSFSVVFLYWLYYVS	41	<i>P. tomentosa</i>
PtobZIP33	—	—	<i>P. tomentosa</i>
PtobZIP6	—	—	<i>P. tomentosa</i>

Table S5. Primer sequences used in this study.

Name	Forward (5'- 3')	Reverse (5'- 3')	Applications
<i>PtobZIP42</i>	GGAGCAGAAAGCAGGAGGAA	CCCGAGTTTGTGTGACAGGG	RT-qPCR
<i>PtobZIP25</i>	GACCAATCCTGGTGTCTAG	GCATGGCATTATCTTTATAATT	
<i>PtobZIP32</i>	TCCAAATCCTCATCCGCAGC	CCATGACCAGTGCGAAAAGC	
<i>PtobZIP7</i>	ACCAATGCTGTAAAGCCGGA	CCCGCTTTGTGCCATTGAAA	
<i>PtobZIP49</i>	ATCAGGTTCTGACGTTGATGCG	TGTTCTGTGATTCGAGAGC	
<i>PtobZIP63</i>	TCAGGCTCTGAAATTGACCCA	AACTTTGTTGTCTGATTCGAGAG	
<i>PtobZIP75</i>	TGTGGAATTGACTGAGAGGC	AATAGGCTGTACTGAACACG	
<i>PtobZIP15</i>	GGTCGTGAACTCTGTGTTGC	TTGAAACATATCAGCAGATGCC	
<i>PtobZIP44</i>	CGAAGCTGAGAACTCTATCC	CAAAAGCACCAGTAGTGGG	
<i>PtobZIP27</i>	GAGATCCTGACAAGGATGA	TAGTCGCAGAAACAGAGGC	
<i>PtobZIP21</i>	GCGTTACTTGAGTGTTGAGG	ATTGAAGGTGATCGAGTCTC	
<i>PtobZIP55</i>	AGGCCGATAACTCAATCTTG	CATTAAAGATGCTTGAATCTCC	
<i>PtobZIP33</i>	CCATCAATGTCAACACACAGC	ATCAGGGAGATCCTCGTGATG	
<i>PtobZIP6</i>	GTCACAACACAGCACTTCTT	GCACTAGTTTGGAGATCCTC	
<i>PtoUBQ10</i>	GTTGATTTTTGCTGGGAAGC	GATCTTGGCCTTCACGTTGT	
<i>pGADT7-PtobZIP42</i>	GGAGGCCAGTGAATTCATGGAGGAGCAGAAAGCAGG	TCTGCAGCTCGAGCTCTTAAGACCAAATGTTTGTATACAGC	Yeast two-hybrid assay
<i>pGADT7-PtobZIP25</i>	GGAGGCCAGTGAATTCATGTACACAGACCAATCCT	TCTGCAGCTCGAGCTCTTACGACTGCTCCCCATTGG	
<i>pGADT7-PtobZIP32</i>	GGAGGCCAGTGAATTCATGAACAGTGTGTTCTCAGT	TCTGCAGCTCGAGCTCTCATTTCTTTTGGCCATCC	
<i>pGADT7-PtobZIP7</i>	GGAGGCCAGTGAATTCATGAATAGTGTCTTCTCAGTGG	TCTGCAGCTCGAGCTCTCATTTCTTTTGGCATCCCTCG	
<i>pGBKT7-PtobZIP49</i>	ATGGAGGCCGAATTCATGTCATCATCCCTGGCAAAG	CCGCTGCAGGTCGACTCTAGAATTTGAACATCCCAGAA GC	

Table S5. continued

Name	Forward (5'- 3')	Reverse (5'- 3')	Applications
pGBKT7- <i>PtobZIP63</i>	ATGGAGGCCGAATTCATGCCACCATCCTTTGCAA	CCGCTGCAGGTCGACTCTAAACTTTGAACATCCCAG	Yeast two-hybrid assay
pGBKT7- <i>PtobZIP75</i>	ATGGAGGCCGAATTCATGTCTGCAAGGCAAGCAGCGA	CCGCTGCAGGTCGACTTCAGCAGATGTCATAATAGGCTGT	
pGBKT7- <i>PtobZIP15</i>	ATGGAGGCCGAATTCATGTCTGCAAGGCAAGCGG	CCGCTGCAGGTCGACTCTAATATTGAAACATATCAGCATGAT	
pGBKT7- <i>PtobZIP44</i>	ATGGAGGCCGAATTCATGGCCTCTTCTAGTGGGGCATC	CCGCTGCAGGTCGACTTAGTACATGATCATGTCCATG	
pGBKT7- <i>PtobZIP27</i>	ATGGAGGCCGAATTCATGGCCTCTTCTAGTGGGGCATC	CCGCTGCAGGTCGACTCAGTACATAACCATGTCC	
pGBKT7- <i>PtobZIP21</i>	ATGGAGGCCGAATTCATGGCTTCCTCTAGTGGAAC	CCGCTGCAGGTCGACTCAGTAATGAAACATCTCTGC	
pGBKT7- <i>PtobZIP55</i>	ATGGAGGCCGAATTCATGGCTTCGTCCAGTGGAAC	CCGCTGCAGGTCGACTCAGTATTGAAACATATCT	
pGBKT7- <i>PtobZIP33</i>	ATGGAGGCCGAATTCATGGCATCCTCCAGTGGGGATTCC	CCGCTGCAGGTCGACTCAATACTGAAACAAATCTGGG	
pGBKT7- <i>PtobZIP6</i>	ATGGAGGCCGAATTCATGGCATCCTCTAGTGGAATT	CCGCTGCAGGTCGACTTCAATACTGAAACAAATCTGGAGATG	Construction of transgenic vectors
amiRNA-1	CTGCAAGGCGATTAAGTTGGGTAAC	GAATTCTCAATCTAGACTTGTTCTCTACATATATATTCT	
amiRNA-2	GAGAACAAGTCTAGATTGAGAATTCACAGGTCGTGATATG	GAGAGCAAGTCTAGAATGAGAAATCAAAGAGAATCAATGA	
amiRNA-3	GATTTCTCATTCTAGACTTGCTCTCTCTCTTTGTATTCC	GCGGATAACAATTTACACAGGAA ACAG	
amiRNA-4	CTGCAAGGCGATTAAGTTGGGTAAC	GCGGATAACAATTTACACAGGAA ACAG	The selection of transgenic lines
<i>bZIP55/21</i> -amiRNA-G	CCCAAAGAGCTCTTCTCTCTC	GAGTGGTGATATTGATGCTGG	