

Table S1. List of the stilbene derivatives identified in the methanol extracts of pine *Pinus koraiensis* bark, needles, branches, wood, and strobiles.

Peak no.	Rt (min)	Negative ion mode			Positive ion mode		Elemental composition	MS2 fragmentation [M-H] (m/z)	UV, λ max (nm)	Assignment
		[M-H] (m/z)	[2M-H] (m/z)	[M-H+HCOOH] (m/z)	[M+H] (m/z)	[M+H-Glu] (m/z)				
1	18	405.113	811.424	465.14	407.139	245.108	C20H22O9	243.065;225;201	315	<i>t</i> -astringin
2	20.7	389.125	779.257	435.129	391.137	229.088	C20H22O8	227.074;185.061	304	<i>t</i> -piceid
3	23.3	389.1172	---	435.126	391.137	229.066	C20H22O8	227.071	288	<i>cis</i> -piceid
4	27.2	419.135	839.268	---	421.159	259.046	C21H24O9	257.079;241.05	315	<i>t</i> -isorhapontin
5	28	403.14	807.3	449.144	405.148	567.215	C21H24O8	241.087;225.058	304	<i>t</i> -pinostilbenoside
6	28.8	227.075	---	287.09	229.084	---	C14H12O3	185.068;143.053	305	<i>t</i> -resveratrol
7	37.8	241.088	---	288.9	243.125	---	C15H14O3	225.06	304	<i>t</i> -pinostilben

Table S2. Stilbene content in different Pinaceae species.

Resource	Main stilbenes	The content of main monomeric stilbenes	Total content of stilbenes	References in main text
Scots pine <i>Pinus sylvestris</i> (seedlings)	Pinosylvin Pinosylvin monomethyl ether	up to 3.8 mg/g DW up to 6.7 mg/g DW	up to 10.5 mg/g DW	[29]
Black pine <i>Pinus nigra</i> Arn. (heartwood)	Pinosylvin monomethyl ether Pinosylvin Pinosylvin dimethyl ether	up to 40.32 mg/g DW up to 17.07 mg/g DW up to 2.54 mg/g DW	up to 60 mg/g DW	[23]
<i>Pinus strobus</i>	Pinosylvin Pinosylvin monomethyl ether dihydropsylvin monomethyl ether	n.m. up to 3.9 mg/g FW up to 21,5 mg/g FW	up to 25 mg/g FW	[24]
<i>Pinus sibirica</i> (bark)	Pinosylvin monomethyl ether Pinosylvin Pinosylvin dimethyl ether Pinostilben Pinostilbenoside <i>t</i> -piceid	n.m.	n.m.	[25]
<i>Pinus koraiensis</i> (bark)	Pinostilben Pinostilbenoside <i>t</i> - resveratrol	n.m.	n.m.	[26]
<i>Picea abies</i> (bark)	<i>t</i> -piceid <i>t</i> -astringin <i>t</i> -isorhapontin	up to 3 mg/g DW up to 50 mg/g DW up to 70 mg/g DW	up to 120 mg/g DW	[27]
<i>Picea abies</i> (root bark)	<i>t</i> -isorhapontin, <i>t</i> -astringin, <i>t</i> -piceid	up to 29.5 mg/g DW, up to 10.7 mg/g DW, up to 5 mg/g DW,	up to 45.2 mg/g DW	[30]
<i>Picea jezoensis</i> (bark)	<i>t</i> -astringin, <i>t</i> -piceid, <i>t</i> -isorhapontin	up to 16 mg/g DW, up to 4 mg/g DW, up to 144 mg/g DW	up to 165 mg/g DW	[4]
<i>Picea jezoensis</i> (needles)	<i>t</i> -astringin, <i>t</i> -piceid, <i>t</i> - resveratrol	up to 6.4 mg/g DW up to 1.3 mg/g DW up to 0.24 mg/g DW	up to 8.19 mg/g DW	
<i>Picea sitchensis</i> (root bark)	<i>t</i> -astringin, <i>t</i> -isorhapontin	up to 65 mg/g FW, up to 25 mg/g FW,	up to 90 mg/g FW	[28]
<i>Picea glehnii</i> (bark)	<i>t</i> -isorhapontin <i>t</i> -piceid, <i>t</i> -astringin	n.m.	n.m.	[21]
<i>Picea mariana</i> (bark)	<i>t</i> - resveratrol	up to 0.1 mg/g DW	up to 0.1 mg/g DW	[32]

n.m. – not measured.

Table S3. Primers used for amplification of *Pinus koraiensis* cDNAs in PCR.

cDNA	Primers names	Primers sequences, 5'-3'
Primers for obtaining of the full <i>PkSTS</i> cDNAs		
Full <i>PkSTS</i> cDNA obtaining	PkSTS-nachS, PkSTS-KonA	5'ATGTCTGTAGGAATGGGCG, 5'TTAAGGGAAAGGAATGCTC
Primers for real-time PCRs in <i>P. koraiensis</i> probes		
<i>PkSTS1</i>	PkSTS1-realS2, PkSTS1-realA2	5'TTGGATCCCACAAAACCTCAG, 5'CAATATGAAGTGGACGCACGG
<i>PkSTS2</i>	PkSTS2/3-realS1, PkSTS2-realA1	5'AAGAAGAATCCGGAATTGTGCGC, 5'CTCCGCCGCCAACATCGCC
<i>PkSTS3</i>	PkSTS2/3-realS1, PkSTS3-realA1	5'AAGAAGAATCCGGAATTGTGCGC, 5'CTCCGCCGCCAACATCCCC
<i>PkActin</i>	<i>PkActin</i> -realS, <i>PkActin</i> -realA	5'GGATGGTGTAGTCACACAGTGC, 5'TCGCCCAGCAAGATCCAACCTAA
<i>PkGAPDH</i>	<i>PkGAPGH</i> -realS, <i>PkGAPDH</i> -realA	5'TGAGTGGGGATACAGCAACCGA, 5'GTGAAGCAACTAAAGCCATGTGTGA

Table S4. Comparison of nucleotide and deduced amino acid sequences of the STS genes from *Pinus strobus* and *Pinus koraiensis*.

Gene (GenBank Acc. no.)	PsSTS	PkSTS1	PkSTS2	PkSTS3
PsSTS	–	98 (97)	97 (96)	97 (97)
PkSTS1	98 (97)	–	97 (98)	97 (97)
PkSTS2	97 (96)	98 (98)	–	97 (97)
PkSTS3	97 (97)	97 (97)	97 (97)	–

Identity (%) of nucleotide and amino acid (in brackets) sequences was determined with the help of the NCBI BLAST program (<http://blast.ncbi.nlm.nih.gov>), using the blastp algorithm (protein-protein BLAST).

Figure S1. Nucleotide sequence of the *PkSTS* genes and primes used for real-time PCR.

PkSTS1-realS2, TTGGATCCCACAAAACCTCAG
PkSTS1-realA2, CAATATGAAGTGGACGCACGG
PkSTS2/3-realS1, AAGAAGAATCCGGAATTGTGCGC
PkSTS2-realA1, CTCCGCCGCCAACATCGCC
PkSTS2/3-realS1, AAGAAGAATCCGGAATTGTGCGC
PkSTS3-realA1, CTCCGCCGCCAACATCCCC

>PkSTS1a1=s1970-1,2,3,4

ATGTCGTAGGAATGGGCGTTGATTTGGAAGCTTTCAGGAAATCCCAGAGGGCAGATGGCTTCGCTTCGATCCTTGCTATC
GGTACGGCCAATCCCCCTAATGTTGTGGATCAGAGCACATATCCAGATTACTTTCGAATCACCAATAACGAGGATAA
CACAGACCTCAAGGATAAGTTCAAGCGAATATGTGAAAGGTCGGCAATAAAAAAGAGACACATGTACCTGACGGAGGAG
ATTCTGATGAAGAATCCGGAATTGTGCACATTCTTGAGGTTGCCATCACTGGACACACGGCAGGCGATGTTGGCGGCAGA
GGTGCCCCGGCTAGGAAAAAGAGGCAGCTGAAAAGGCGATTGAGGAGTGGGGACAACCCAAGTCGAGGATCACTCATCTC
ATCTTTTGCACCACAACCACTCCAGATTTACCCGGAGCCGACTTTGAGGTAGCCAAGTTGCTGGGGCTGCACCCCAAGTGTG
AAGAGAGTGGGCGTGTTCACATGTTGCTTACCAGGAGGCACCGTTCTTCGCTGGCGAAAGACCTTGCCGAAAACAA
TCGAGGAGCTCGGGTGTGCTGCTGTCAGTGAAAACACTGCCGTTATCTTCCGCGGACCCTCCGAGACTCACCTGGATG
GCCTAGTGGGCCTAGCTCTGTTCCGGCGATGGTGCCTCTGCCCTCATCGTGGGAGCTGATCCCATCCCTCAAGTGGAGAAGC
CCTGTTTCGAAATCGTTTGGACAGCCAGACAGTTGTTCCCAACAGCGATGGAGCAATCAGTGGGAAGGTGAGAGAGGTG
GGATTGACCTTCCAACCTCAAAGGCGCGGTTCCGGATCTCATCTTACCAACATTGAAAAGTGTCTGGTGGAGGCGTTTCAGT

CAGTTCAATATCTCCGACTGGAACCAGTTGTTCTGGATTGCTCATCCCGGAGGACGTGCCATCCTTGACCAGGTGGAGGCA
AGCCTCAATTTGGATCCCACAAAACCTCAGAGCCACCAGGCACGTTATGAGCGAGTACGGAAACATGTCCAGTCCGTGCGT
CCACTTCATATTGGATGAGACCAGGAAGGCGTCTCGACAAAACGGATGTTCAACCAGCGGAGGGGGATTCCAAATGGGA
GTCCTCTTTGGATTTCGGGCCGGCCTCACCATCGAAACAGTTGTTCTCAAGAGCATTCCCTTTCCCTTAA

>PkSTS1b1=s2010-1,2,3,4

ATGTCTGTAGGAATGGGCGTTGATTTGGAAGCTTTTCGGGAAATCCCAGAGGGCAGATGGCTTCGCTTCGATCCTTGCTATC
GGTACGGCCAATCCCCCTAATGTTGTGGATCAGAGCACATATCCAGATTACTACTTTTCGAATCACCAATAACGAGGATAA
CACAGACCTCAAGGATAAGTTCAAGCGAATATGTGAAAGGTCGGCAATAAAAAAGAGACACATGTACCTGACGGAGGAG
ATTCTGATGAAGAATCCGGAATTGTGCACATTCTTGGAGGTGCCATCACTGGACACACGGCAGGCGATGTTGGCGGCGGA
GGTGCCCCGGCTAGGAAAAGAGGCAGCTGAAAAGGCGATTGAGGAGTGGGGACAACCCAAGTCGAGGATCACTCATCTC
ATCTTTGCACCACAACCACTCCAGATTTACCCGGAGCCGACCTTTGAGGTAGCCATCCCTGGACACACGGCAGGCGATGTTGGCGGCGGA
AAGAGAGTGGGCGTGTTCCAACATGGCTGCTTCTCCGGAGGCACCGTTCTTCGGCTGGCGAAAAGACCTTGCCGAAAACAA
TCGAGGAGCTCGGGTGCTGGTGTGTGTAGTGAAACCACCGCTGTTACCTTCCGCGGACCCTCCGAGACTCACCTGGATG
GCCTAGTGGGCCTAGCTCTGTTTCGGCGATGGTGCGTCTGCCCTCATCGTGGGAGCTGATCCCATCCCTCAAGTGGAGAAGC
CCTGTTTCGAAATCGTTTGGACAGCCCAGACAGTTGTTCCCAACAGCGATGGAGCAATCAGTGGGAAGGTGAGAGAGGTG
GGATTGACCTTCCAACCTCAAAGGCGCGGTTCCGGATCTCATCTCTACCAACATTGAAAAGTGTCTGGTGGAGGCGTTTCACT
CAGTTCAATATCTCCGACTGGAACCACTGAGTGTCTGGATTGCTCATCCCGAGGACGTGCCATCCTTGACCAGGTAGAGGCA
AGCCTCAATTTGGATCCCACAAAACCTCAGAGCCACCAGGCACGTTATGAGCGAGTACGGAACATGTCCAGTCCGTGCGT
CCACTTCATATTGGGTGAGACCAGGAAGGCGTCTCGACAAAACGGATGTTCAACCAGCGGAGGGGGATTCCAAATGGGA
GTCCTCTTTGGATTTCGGGCCGGCCTCACCATCGAAACAGTTGTTCTCAAGAGCATTCCCTTTCCCTTAA

>PkSTS1c1=s2021-13,14,15,16

ATGTCTGTAGGAATGGGCGTTGATTTGGAAGCTTTTCAGGAAATCCCAGAGGGCAGATGGCTTCGCTTCGATCCTTGCTATC
GGTACGGCCAATCCCCCTAATGTTGTGGATCAGAGCACATATCCAGATTACTACTTTTCGAATCACCAATAACGAGGATAA
GACAGACCTCAAGGATAAGTTCAAGCGAATATGTGAAAGGTCGGCAATAAAAAAGAGACACATGTACTTGACGGAGGAG
ATTCTGAAGAAGAATCCGGAATTGTGCGCGTTTTCGGAGGTGCCATCCCTGGACACACGGCAGGCGATGTTGGCGGCGGA
GGTGCCCCGGCTAGGAAAAGAGGCGGCTGAAAAGGCGATTGAGGAGTGGGGACAACCCAAGTCGAGGATCACTCATCTC
ATCTTTTGCACCACAACCGCTCCGGATTTACCCGGAGCCGACTTTGAGGTAGCCAAGTTGCTGGGGCTGCACCCCAGTGTG
AAGAGAGTGGGCGTGTTCCAACATGGCTGCTTCTCCGGAGGCACCGTTCTTCGGCTGGCGAAAAGACCTTGCCGAAAACAG
TCGAGGAGCTCGGGTGCTGGTGTGTGCAGTGAAAACACTGCCGTTATCTTCCGCGGACCCTCCGAGACTCACCTGGATG
GCCTAGTGGGCCTAGCTCTGTTTCGGCGATGGTGCGTCTGCCCTCATCGTGGGAGTTGATCCCATCCCTCAGGTGGAGAAGC
CCTGTTTCGAAATCGTTTGGACAGCCCAGACAGTTGTTCCCAACAGCGATGGAGCAATCAGTGGGAAGGTGAGAGAGGTG
GGATTGACCTTCCAACCTCAAAGGCGCGGTTCCGGATCTCATCTCTACCAACATTGAAAAGTGTCTGGTGGAGGCGTTTCACT
CAGTTCAATATCTCCGACTGGAACCAGTTGTTCTGGATTGCTCATCCCGAGGACGTGCCATCCTTGACCAGGTGGAGGCA
AGCCTCAATTTGGATCCCACAAAACCTCAGAGCCACCAGGCACGTTATGAGCGAGTACAGAAACATGTCCAGTCCGTGCGT
CCACTTCATATTGGATGAGACCAGGAAGGCGTCTCGACAAAACGGATGTTCAACCAGTGGAGGGGGATTCCAAATGGGA
GTCCTCTTTGGATTTCGGGCCGGCCTCACCCTCGAAACAGTGGTTCTCAAGAGCATTCCCTTTCCCTTAA

>PkSTS2a1=s1970-5,6,7,8

ATGTCTGTAGGAATGGGCGTTGATTTGGAAGCTTTTCAGGAAATCCCAGAGGGCAGATGGCTTCGCTTCGATCCTTGCTATC
GGTACGGCCAATCCCCCTAATGTTGTAGATCAGAGCACATATCCAGATTACTACTTTTCGAATCACCAATAACGAGGATAA
CACAGACCTCAAGGATAAGTTCAAGCGAATATGTGAAAGGTCGGCAATAAAAAAGAGACACATGTACCTGACGGAGGAG
ATTCTGATGAAGAATCCGGAATTGTGCACATTCTTGGAGGTGTCATCACTGGACACACGGCAGGCGATGTTGGCGGCGGA
GGTGCCCCGGCTAGGAAAAGAGGCAGCTGAAAAGGCGATTGAGGAGTGGGGACAACCCAAGTCGAGGATCACTCATCTC
ATCTTTTGCACCACAACCACTCCAGATTTACCCGGAGCGGACTTTGAGGTAGCCAAGTTGCTGGGGCTGCACCCCAGTGTG
AAGAGAGTGGGCGTGTTCCAACATGGCTGCTTCTCCGGAGGCACCGTTCTTCGGCTGGCGAAAAGACCTTGCCGAAAACAA
TCGAGGAGCTCGGGTGCTGGTGTGTGTAGTGAAAACACCGCTGTTACCTTCCCGCGGACCCTCCGAGACTCACCTGGAT
GGCTAGTGGGCTAGCTGTCTGTCTGGCGATGCTGCTTCCCTCATCGTGGGAGCTGATCCCATCCCTCAAGTGGAGAAG
CCCTGTTTCGAAATCGTTTGGACATCCCAGACAATTGTTCCCGACACGCGAGCAATCGGTGGAAAGGTGAGAGAGGT
GGGATTGACCTTCCAACCTCAAAGGCGCGGTTCCGGATCTCATCTCTACCAACATTGAAAAGTGTCTGGTGGAGGCGTTCA
GTCAGTTCAATATCTCCGACTGGAACCAGTTGTTCTGGATTGCTCATCCCGAGGACGTGCCATCCTTGACCAGGTGGAGG
CAAGCCTCAATCTGGATCCCACAAAACCTCAGAGCCACCAGGCACGTTATGAGCGAGTATGGAACATGTCCAGTGTGTGC
GTCCACTTCATATTGGATGAGACCAGGAAGGCGTCTCGACAAAACGGATGTTCAACCAGCGGAGGGGGATTTCAAATGGG
AGTCCTCTTTGGATTTCGGGCCGGCCTCACCATCGTAACAGTCGTTCTCAAGAGCATTCCCTTTCCCTTAA

>S2b1=s2021-9,10,11,12

ATGTCTGTAGGAATGGGCGTTGATTTGGAAGCTTTTCAGGAAATCCCAGAGGGCAGATGGCTTCGCTTCAATCCTTGCTATC
GGTACGGCCAATCCCCCAATGTTGTGGATCAGAGCACATATCCAGATTACTACTTTTCGAATCACCAATAACGAGGATAA
CACAGAGCTCAAGGATAAGTTCAAGCGAATATGTGAAAGGTCGGCAATAAAAAAGAGACACATGTACCTGACGGAGGAG
ATTCTGAAGAAGAATCCGGAATTGTGCGCATTCTTGGAGGTGCCATCACTGGACACACGGCAGGCGATGTTGGCGGCGGA
GGTGCCCCGGCTAGGAAAAGAGGCAGCTGAAAAGGCGATTGAGGAGTGGGGACAACCCAAGTCGAGGATCACTCATCTC
ATCTTTTGCACCACAACCACTCCAGATTTACCCGGAGCCGACTTTGAGGTAGCCAAGTTGCTGGGGCTGCACCCCAGTGTG
AAGAGAGTGGGCGTGTTCCAACATGGCTGCTTCTCCGGAGGCACCGTTCTTCGGCTGGCGAAAAGACCTTGCCGAAAACAA
TCGAGGAGCTCGGGTGCTGGTGTGTGCAGTGAAAACACCGCCGTTACCTTCCGCGGACCCTCCGAGACTCACCTGGATG
GCCTAGTGGGCCTAGCTCTGTTTCGGCGATGGTGCATCTGCCCTCATCGTGGGAGCTGATCCCATCCCTCAAGTGGAGAAGC
CCTGTTTCGAAATCGTTTGGACATCCCAGACAATTGTTCCCGACAGCGACGGAGCAATCGGTGGGAAGGTGAGAGAGGTG
GGATTGACCTTCCAACCTCAAAGGCGCGGTTCCGGATCTCATCTCTACCAACATTGAAAAGTGTCTGGTGGAGGCGTTTCACT
CAGTTCAATATCTTCGACTGGAACCAGTTGTTCTGGATTGCTCATCCCGAGGACGTGCCATCCTTGACCAGGTGGAGGCA
AGCCTCAATCTGGATCCCACAAAACCTCAGAGCCACCAGGCACGTTATGAGCGAGTATGGAACATGTCCAGTGTGTGCGT
CCACTTCATATTGGATGAGACCAGGAAGGCGTCTCGACAAAACGGATGTTCAACCAGCGGAGGGGGATTTCAAATGGGA
GTCCTCTTTGGATTTCGGGCCGGCCTCACCATCGAAACAGTCGTTCTCAAGAGCATTCCCTTTCCCTTAA

>PkSTS3a1=s1978-1,2,3,4

ATGTCTGTAGGAATGGGCGTTGATTTGGAAGCTTTCAGGAAATCCCAGAGGGCAGATGGCTTCGCTTCGATCCTTGCTATC
GGCACGGCCAATCCCCCAATGTTGTGGACGAGCACATATCCAGATTACTTTTCGAATCACCAATAACGAGGATAA
GACAGACCTCAAGGATAAGTTCAAGCGAATATGTGAAAGGTCGGCAATAAAAAAGAGACACATGTACTTGACGGAGGAG
ATTCTGAAGAAGAATCCGGAATTGTGCGCGTTTTTGGAGGTGCCATCCCTGGACACACGGCAGGGGATGTTGGCGGCGGA
GGTGCCCCGGCTAGGAAAAGAGGCGGCTGAAAAGGCGATTGAGGAGTGGGGACAACCCAAGTCGAGGATCACTCATCTC
ATCTTTTGCACCACAACCACTCCGGATTTACCCGGAGCCGACTTTGAGGTAGCCAAGTTGCTGGGGCTGCACCCCAGTGTG
AAGAGAGTGGGCGTGTTC AACATGGCTGCTTCTCCGGAGGCACCGTTCTTCGGCTGGCGAAAAGACCTTGCCGAAAACAA
TCGAGGAGCTCGGGTGTGGTGTGTGTCAGTGAAACCACCGCCGTTACCTTCCGCGGACCCTCCGAGACTCACCTAGATG
GCCTAGTGGGCCTAGCTCTGTTTCGGCGACGGTGCGTCTGCCCTCATCGTGGGAGCCGATCCCATCCCTCAAGTGGAGAAG
CCCTGTTTCGAAATCATTGAGACATCCCAGACAGTTGTTCCCAACAGCGACGGAGCAATCGGTGGGAAGGTGAGAGAGGT
GGGATTGACCTTCCAACCTCAAAGGCGCGGTTCCGGATCTCATCTCTACCAACATTGAAAAGTGTCTGGTGGAGGCGTTTAG
TCAGTTCAATATCTCCGACTGGAACCAAGTTGTTTTGGATTGCTCATCCCGGAGGACGTGCCATCCTTGACCAGGTGGAGGC
AAGCCTCAATCTGGATCCCAAAAACCTCAGAGCCACAAGGCACGTTATGAGCGAGTACGGAAACATGTCCAGTGTGCTGCG
TCCACTTCATATTGGATGAGACCAGGAAGGCGTCTCGACAAAACGGATGTTCAACCAGCGGAGGGGGATTCCAAATGGG
AGTCCTCTTTGGATTTCGGGCGGGCCTCACCGTCGAAAACAGTGGTTCTCAAGAGCATTCTTTCCCTTAA

>PkSTS3b1=s1978-5,6,7,8

ATGTCTGTAGGAATGGGCGTTGATTTGGAAGCTTTCAGGAAATCCCAGAGGGCAGATGGCTTCGCTTTGATCCTTGCTATC
GGCACGGCCAATCCCCCAATGTTGTGGATCAGAGCACATATCCAGATTACTTTTCGAATCACCAATAACGAGGATAA
GACAGACCTCAAGGATAAGTTCAAGCGAATATGTGAAAGGTCGGCAATAAAAAAGAGACACATGTACTTGACGGAGGAG
ATTCTGAAGAAGAATCCGGAATTGTGCGCGTTTTTGGAGGTGCCATCCCTGGACACACGGCAGGGGATGTTGGCGGCGGA
GGTGCCCCGGCTAGGAAAAGAGGCGGCTGAAAAGGCGATTGAGGAGTGGGGACAACCCAAGTCGAGGATCACTCATCTC
ATCTTTTGCACCACAACCACTCCGGATTTACCCGGAGCCGACTTTGAGGTAGCCAAGTTGCTGGGGCTGCACCCCAGTGTG
AAGAGAGTGGGCGTGTTC AACATGGCTGCTTCTCCGGAGGCACCGTTCTTCGGCTGGCGAAAAGACCTTGCCGAAAACAA
TCGAGGAGCTCGGGTGTGGTGTGTAGTGAAACCATGCTGTTACCTTCCGCGGACCCTCCGAGACTCACCTGGATGG
CCTAGTGGGCCTAGCTCTGTTTCGGCGATGGTGTCATCTGCCCTCATCGTGGGAGCTGATCCCATCCCTCAAGTGGAGAAGCC
CTGTTTCGAAATCGTTTGGACATCCCAGACAATTGTTCCCGACAGCGACGGAGCAATCGGTGGGAAGGTGAGAGAGGTGG
GATTGACCTTCCAACCTCAAAGGCGCGGTTCCGGATCTCATCTCTACCAACATTGAAAAGTGTCTGGTGGAGGCGTTCA
AGTTCAATATCTCCGACTGGAACCAAGTTGTTCTGGATTGCTCATCCCGGAGGACGTGCCATCCTTGACCAGGTGGAGGCAA
GCCTCAATCTGGATCCCAAAAACCTCAGAGCCACCAGGCACGTTATGAGCGAGTATGGAACATGTCCAGTGTGTGCGTC
CACTTCATATTGGATGAGACCAGGAAGGCGTCTCGACAAAACGGATGTTCAACCAGCGGAGGGGGATTCCAAATGGGAG
TCCTCTTTGGATTTCGGGCGGGCCTCACCATCGAAACAGTCGTTCTCAAGAGCATTCTTTCCCTTAA

>PkSTS3c1=s2012-5,6,7,8

ATGTCTGTAGGAATGGGCGTTGATTTGGAAGCTTTCAGGAAATCCCAGAGGGCAGATGGCTTCGCTTCAATCCTTGCTATC
GGTACGGCCAATCCCCCAATGTTGTGGATCAGAGCACATATCCAGATTACTTTTCGAATCACCAATAACGAGGATAA
CACAGAGCTCAAGGATAAGTTCAAGCGAATATGTGAAAGGTCGGCAATAAAAAAGAGACACATGTACCTGACGGAGGAG
ATTCTGAAGAAGAATCCGGAATTGTGCGCATCTTGGAGGTGCCATCACTGGACACACGGCAGGCGATGTTGGCGGCGAGA
GGTGCCCCGGCTAGGAAAAGAGGCGGCTGAAAAGGCGATTGAGGAGTGGGGACAACCCAAGTCGAGGATCACTCATCTC
ATCTTTTGCACCACAACCACTCCGGATTTACCCGGAGCCGACTTTGAGGTAGCCAAGTCGCTGGGGCTGCACCCCAGTGTG
AAGAGAGTGGGCGTGTTC AACATGGCTGCTTCTCCGGAGGCACCGTTCTTCGGCTGGCGAAAAGACCTTGCCGAAAACAA
TCGAGGAGCTCGGGTGTGGTGTGTGTCAGTGAAACCACCGCCGTTACCTTCCGCGGACCCTCCGAGACTCACCTAGATG
GCCTAGTGGGCCTAGCTCTGTTTCGGCGACGGTGCGTCTGCCCTCATCGTGGGAGCCGATCCCATCCCTCAAGTGGAGAAG
CCCTGTTTCGAAATCATTGAGACATCCCAGACAGTTGTTCCCAACAGCGACGGAGCAATCGGTGGGAAGGTGAGAGAGGT
GGGATTGACCTTCCAACCTCAAAGGCGCGGTTCCGGATCTCATCTCTACCAACATTGAAAAGTGTCTGGTGGAGGCGTTCA
GTCAGTTCAATATCTCCGACTGGAACCAAGTTGTTCTGGATTGCTCATCCCGGAGGACGTGCCATCCTTGACCAGGTGGAGG
CAAGCCTCAATTTGGATCCCAAAAACCTCAGAGCCACCAGGCACGTTATGAGCGAGTATGGAACATGTCCAGTGTGTGCG
GTCCACTTCATATTGGATGAGACCAGGAAGGCGTCTCGACAAAACGGATGTTCAACCAGCGGAGGGGGATTCCAAATGG
GAGTCCTCTTTGGATTTCGGGCGGGCCTCACCATCGAAACAGTCGTTCTCAAGAGCATTCTTTCCCTTAA

>PkActin (s1944-2)

CAAACAGAGAGAAGATGACTCAGATCATGTTTGAAACTTTCAATGTGCCTGCTATGTATGTTGCCATTTCAGGCAGTTCTGT
CTTTGTACGCAAGTGGTTCGTACAACCTGGTATTGTACTGGATTCTGGGGATGGTGTAGTCACACAGTGCCCATTTATGAAG
GATATGCCTTGCCCTCATGCTATACTTAGGTTGGATCTTGCTGGGCGAGATTTGACAGATGCATTAATGAAGATCTTGACAG
AGAGAGGGTATTCAATTCACCACCACTGCGGAGCGTGAAATTGTCCGTGATGTGAAGGAAAAGCTTGCGTATGTGGCTCTT
GACTATGAACAGGAGCTTGAGACAGCTAAAAGCAGTTCA