

Supplementary Materials

Table S1.

Information of RNA-Seq data in pomegranate

Accession No.	Sample Name	Cultivars	Sample Type	Note
SRR5446598	B1	'Tunisia'	Floral pistil	3.0-5.0 mm bisexual buds
SRR5446595	B2	'Tunisia'	Floral pistil	5.1-13.0 mm bisexual buds
SRR5446592	B3	'Tunisia'	Floral pistil	13.1-25.0 mm bisexual buds
SRR5446607	F1	'Tunisia'	Floral pistil	3.0-5.0 mm functional male buds
SRR5446604	F2	'Tunisia'	Floral pistil	5.1-13.0 mm functional male buds
SRR5446601	F3	'Tunisia'	Floral pistil	13.1-25.0 mm functional male buds
SRR5279388	O1	'Dabenzi'	Outer seed coat	Outer seed coat 50 days after blooming
SRR5279387	O2	'Dabenzi'	Outer seed coat	Outer seed coat 95 days after blooming
SRR5279386	O3	'Dabenzi'	Outer seed coat	Outer seed coat 140 days after blooming
SRR5279391	I1	'Dabenzi'	Inner seed coat	Inner seed coat 50 days after blooming
SRR5279390	I2	'Dabenzi'	Inner seed coat	Inner seed coat 95 days after blooming
SRR5279389	I3	'Dabenzi'	Inner seed coat	Inner seed coat 140 days after blooming
SRR5279394	P1	'Dabenzi'	Pericarp	Pericarp 50 days after blooming
SRR5279393	P2	'Dabenzi'	Pericarp	Pericarp 95 days after blooming
SRR5279392	P3	'Dabenzi'	Pericarp	Pericarp 140 days after blooming

Table S2.

Primers of PgTCP genes for qRT-PCR

Primer	Gene ID	Primer sequence (5'-3')
<i>qRT-PgTCP1</i>	<i>XP_031376537.1</i>	F: AGCAACAATAAGTCATGCCCAA
		R: AGCAGGCATTCGAACCCTC
<i>qRT-PgTCP2</i>	<i>XP_031380983.1</i>	F: GACCCACTCCGTTTCATCCTG
		R: AGTGTGGGACCTACGATGGA
<i>qRT-PgTCP3</i>	<i>XP_031382285.1</i>	F: CAATGTCACCCCTGCCGTCT
		R: TCATGTGCTGGTACCCCTCG
<i>qRT-PgTCP4</i>	<i>XP_031379050.1</i>	F: CTCCAAAACGGCACGAGCA
		R: TAGCCACCAAGACCTACGGAA
<i>qRT-PgTCP5</i>	<i>XP_031387561.1</i>	F: CTTCCGCAGAGACCAACACC
		R: CCTTCTTGTCGCGTCT
<i>qRT-PgTCP6</i>	<i>XP_031386304.1</i>	F: CCATCCCTGCCAACTTCACC
		R: TATACGAACCCTCACCGCCAG
<i>qRT-PgTCP7</i>	<i>XP_031393792.1</i>	F: CATCCTTCCTCAACCACGAA

		R: TTGACTGCTTACGACCGA
<i>qRT-PgTCP8</i>	<i>XP_031394404.1</i>	F: TGCGAATAGGACCGTTACCCAA
		R: CATTGTCGACTTCTTTGCCAC
<i>qRT-PgTCP9</i>	<i>XP_031393225.1</i>	F: ATACAGCAGCAACCCTAACCC
		R: TCTTCGCTACCGCCGTGT
<i>qRT-PgTCP10</i>	<i>XP_031394085.1</i>	F: CGCAGAACCGTCACAGTCCA
		R: CTCAAAAGCATCAGCGCCCGTA
<i>qRT-PgTCP11</i>	<i>XP_031393941.1</i>	F: CAAGATCCCAACCTCGACACC
		R: ACCCTCGGCTGTACGCTA
<i>qRT-PgTCP12</i>	<i>XP_031396126.1</i>	F: TATTTCTAAGGAGGAGATGCCACA
		R: AGTAAGTCTTCTCTCTTTTCGC
<i>qRT-PgTCP13</i>	<i>XP_031398943.1</i>	F: GTCAGCCAAGCAAGTTGTG
		R: ACCCCAGCTCCCTATTGGAT
<i>qRT-PgTCP14</i>	<i>XP_031397178.1</i>	F: GGCTCCGGTACTATTCCCT
		R: AGCTGTAAGTGAACCCCATCG
<i>qRT-PgTCP15</i>	<i>XP_031402668.1</i>	F: ACAAAGCCCTAGTCATCGG
		R: CGACCATCATATAACACGAAC
<i>qRT-PgTCP16</i>	<i>XP_031405563.1</i>	F: CCAAACCTTCTTCTAATGGCAG
		R: TACCCCAAAGCTGAATCCC
<i>qRT-PgTCP17</i>	<i>XP_031403833.1</i>	F: CCACCCTTACAAATGCCT
		R: TGCTTGCTTAGAAACGTCGAA
<i>qRT-PgTCP18</i>	<i>XP_031403837.1</i>	F: TCCCACCCTTACAAATGCCT
		R: ATGCTTGCTTAGAAACGTCGAA
<i>qRT-PgTCP19</i>	<i>XP_031403839.1</i>	F: TTAGGCATGAACCAACCGACA
		R: CAACCTCATTCTCCGGTCCC
<i>qRT-PgTCP20</i>	<i>XP_031403699.1</i>	F: GCAGCATGTTTCTCTGTCGAA
		R: TTGACCCGGATCTCAGACCT
<i>qRT-PgTCP21</i>	<i>XP_031406638.1</i>	F: CAACATGAGCACAGGCGACCC
		R: TCGTCCTTCTCCGCAATCACA
<i>qRT-PgTCP22</i>	<i>XP_031405073.1</i>	F: TCCCTAATGTAGACGAGGCA
		R: TCCTCTAGTCTCGCTCCAC
<i>qRT-PgTCP23</i>	<i>XP_031371696.1</i>	F: AACCCAAGAATTGTCCGTGTC
		R: ACCGAGAGTCTGATCCTACGA
<i>qRT-PgTCP24</i>	<i>XP_031374820.1</i>	F: GCACGAGTCTCCAAGTTCAGC
		R: CGCCCTTCAACCTTCGTGT
<i>PgActin</i>	<i>XP_031386853.1</i>	F: AGTCCTCTTCCAGCCATCTC
		R: CACTGAGCACAATGTTTCCA

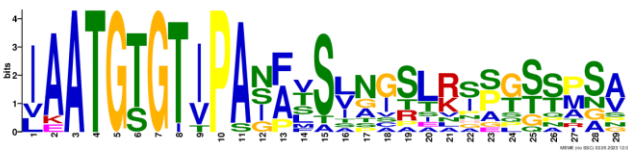
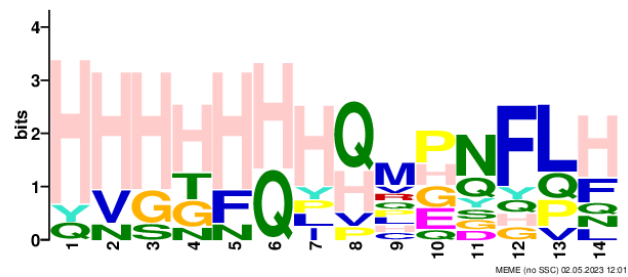
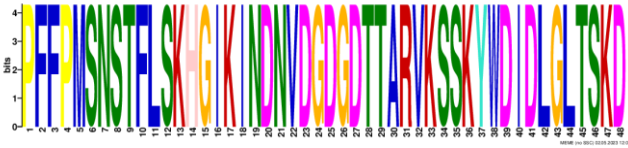
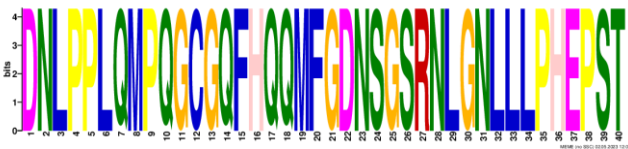
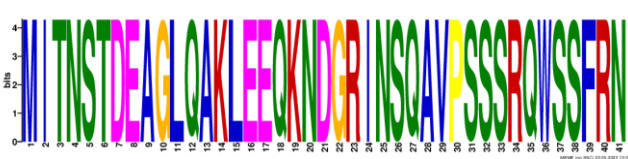
Table S3.Basic information of TCP family members identified in *Punica granatum*

Gene name	Gene ID	Chromosome location	Protein Length (aa)	MW (kDa)	pI	GRAVY	Subcellular localization
<i>PgTCP1</i>	<i>XP_031376537.1</i>	Chr1:40836713-40838842	369	38.82	8.45	-0.304	Nucleus
<i>PgTCP2</i>	<i>XP_031380983.1</i>	Chr2:28195506-28197561	272	28.11	9.51	-0.456	Nucleus
<i>PgTCP3</i>	<i>XP_031382285.1</i>	Chr2:34860458-34861499	226	23.43	6.59	-0.193	Nucleus
<i>PgTCP4</i>	<i>XP_031379050.1</i>	Chr2:41205068-41207094	300	32.45	5.14	-0.621	Nucleus
<i>PgTCP5</i>	<i>XP_031387561.1</i>	Chr3:34850713-34852568	302	31.34	9.04	-0.428	Nucleus
<i>PgTCP6</i>	<i>XP_031386304.1</i>	Chr3:36722022-36723993	385	40.72	8.05	-0.568	Nucleus
<i>PgTCP7</i>	<i>XP_031393792.1</i>	Chr4:4371865-4373399	335	36.92	10.06	-0.723	Nucleus
<i>PgTCP8</i>	<i>XP_031394404.1</i>	Chr4:9268873-9270570	386	40.19	6.8	-0.4	Nucleus
<i>PgTCP9</i>	<i>XP_031393225.1</i>	Chr4:13635213-13637686	460	47.64	6.4	-0.58	Nucleus
<i>PgTCP10</i>	<i>XP_031394085.1</i>	Chr4:35336053-35337929	346	36.30	6.63	-0.521	Nucleus
<i>PgTCP11</i>	<i>XP_031393941.1</i>	Chr4:39313792-39315149	318	33.54	7.86	-0.374	Nucleus
<i>PgTCP12</i>	<i>XP_031396126.1</i>	Chr5:742905-744813	372	41.11	6.83	-0.815	Nucleus
<i>PgTCP13</i>	<i>XP_031398943.1</i>	Chr5:1181359-1183832	365	40.35	6.9	-0.732	Nucleus
<i>PgTCP14</i>	<i>XP_031397178.1</i>	Chr5:3737070-3738414	221	23.23	7.02	-0.406	Nucleus
<i>PgTCP15</i>	<i>XP_031402668.1</i>	Chr6:20500578-20501720	380	42.23	5.86	-0.767	Nucleus
<i>PgTCP16</i>	<i>XP_031405563.1</i>	Chr7:1589105-1590730	403	43.41	9.14	-0.529	Nucleus
<i>PgTCP17</i>	<i>XP_031403833.1</i>	Chr7:2178910-2180938	395	43.93	6.22	-0.675	Nucleus
<i>PgTCP18</i>	<i>XP_031403837.1</i>	Chr7:2178908-2180938	302	33.82	8.46	-0.724	Nucleus
<i>PgTCP19</i>	<i>XP_031403839.1</i>	Chr7:2677705-2679852	366	41.19	6.63	-0.826	Nucleus
<i>PgTCP20</i>	<i>XP_031403699.1</i>	Chr7:9522853-9531986	490	53.12	7.48	-0.778	Nucleus
<i>PgTCP21</i>	<i>XP_031406638.1</i>	Chr7:24136187-24137941	296	31.37	9.33	-0.751	Nucleus
<i>PgTCP22</i>	<i>XP_031405073.1</i>	Chr7:27970123-27973566	703	76.93	6.7	-0.8	Nucleus
<i>PgTCP23</i>	<i>XP_031371696.1</i>	Chr8:26012590-26014611	344	38.38	9.08	-0.515	Nucleus
<i>PgTCP24</i>	<i>XP_031374820.1</i>	Chr8:26313777-26315488	397	42.30	8.57	-0.714	Nucleus

Table S4.

The motif logo of PgTCP genes

motif ID	LOGO	E-value	Sites	Width
motif1		1.2e-665	24	50

motif2		2.9e-059	12	29
motif3		3.9e-034	11	15
motif4		7.2e-019	2	50
motif5		2.5e-015	10	14
motif6		5.0e-015	2	48
motif7		3.9e-009	2	40
motif8		6.0e-008	3	19
motif9		2.1e-007	2	41

motif10



1.8e-003

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Table S5.

Pomegranate collinearity and Ka/Ks analysis

		Method	Ka	Ks	KaKs
PgTCP4	PgTCP10	MA	0.126639	6.24202	0.0202881
PgTCP3	PgTCP14	MA	0.171535	2.68082	0.0639861
PgTCP6	PgTCP16	MA	0.112322	2.59494	0.0432849
PgTCP5	PgTCP21	MA	0.114085	1.49572	0.076274
PgTCP6	PgTCP24	MA	0.104791	3.70626	0.028274
PgTCP8	PgTCP11	MA	0.211289	5.83834	0.0361898
PgTCP7	PgTCP12	MA	0.233723	2.04505	0.114287
PgTCP15	PgTCP19	MA	0.231928	4.49404	0.0516079
PgTCP16	PgTCP24	MA	0.0726627	1.78192	0.0407778
PgTCP18	PgTCP23	MA	0.112399	3.41771	0.0328872

Table S6.

The collinear relationship between Arabidopsis thaliana and pomegranate

PgTCP1	AtTCP9
PgTCP2	AtTCP7
PgTCP2	AtTCP21
PgTCP3	AtTCP11
PgTCP6	AtTCP15
PgTCP8	AtTCP19
PgTCP9	AtTCP23
PgTCP9	AtTCP22
PgTCP11	AtTCP19
PgTCP13	AtTCP13
PgTCP14	AtTCP11
PgTCP15	AtTCP12
PgTCP16	AtTCP14
PgTCP18	AtTCP5
PgTCP18	AtTCP17
PgTCP19	AtTCP18
PgTCP20	AtTCP24
PgTCP20	AtTCP2
PgTCP23	AtTCP3

<i>PgTCP22</i>	<i>AtTCP4</i>
<i>PgTCP23</i>	<i>AtTCP5</i>
<i>PgTCP23</i>	<i>AtTCP17</i>
<i>PgTCP24</i>	<i>AtTCP14</i>

Table S7.

Predictions of PgTCP gene functions

<i>AtTCP genes</i>	<i>PgTCP genes</i>	<i>Functions</i>
		<i>Controls morphogenesis of shoot organs,</i>
		<i>Participates in ovule development,</i>
<i>AtTCP2</i>	<i>PgTCP20</i>	<i>Promotes light- regulated transcription of CHS, CAB, HYH and HY5,</i>
		<i>Regulates positively photomorphogenesis (e.g. hypocotyl elongation inhibition and cotyledon opening in response to blue light)</i>
<i>AtTCP3</i>	<i>PgTCP23</i>	<i>Controls morphogenesis of shoot organs,</i>
		<i>Participates in ovule development.</i>
		<i>Control morphogenesis of shoot organs,</i>
<i>AtTCP4</i>	<i>PgTCP22</i>	<i>Required during early steps of embryogenesis. Participates in ovule development,</i>
		<i>Activates LOX2 expression by binding to the 5'-GGACCA-3' motif found in its promoter</i>
<i>AtTCP5</i>	<i>PgTCP23/18</i>	<i>Controls morphogenesis of shoot organs,</i>
		<i>Participates in ovule development</i>
<i>AtTCP7</i>	<i>PgTCP2</i>	<i>Interacts with Nuclear Factor-Ys to promote flowering by directly regulating SOC1</i>
<i>AtTCP9</i>	<i>PgTCP1</i>	<i>None</i>
<i>AtTCP11</i>	<i>PgTCP3/14</i>	<i>None</i>
		<i>Prevents axillary bud outgrowth,</i>
<i>AtTCP12</i>	<i>PgTCP15</i>	<i>Delay early axillary bud development,</i>
		<i>Involved in the auxin-induced control of apical dominance</i>
		<i>Controls morphogenesis of shoot organs,</i>
<i>AtTCP13</i>	<i>PgTCP13</i>	<i>Binds to the 3'-ACC-5' repeats in the light-responsive promoter (LRP) of psbD, and activates its transcription,</i>
		<i>Participates in ovule development.</i>
		<i>Together with TCP15, modulates plant stature by promoting cell division in young internodes,</i>
		<i>Represses cell proliferation in leaf and floral tissues. Together with TCP15, acts downstream of gibberellin (GA), and the stratification pathways that promote seed germination,</i>
<i>AtTCP14</i>	<i>PgTCP16/24</i>	<i>Involved in the control of cell proliferation at the root apical meristem (RAM) by regulating the activity of CYCB1-1,</i>

		<i>Involved in the regulation of seed germination. May regulate the activation of embryonic growth potential development</i> <i>Together with TCP14, modulates plant stature by promoting cell division in young internodes,</i> <i>Represses cell proliferation in developing leaf blade and specific floral tissues ,</i>
<i>AtTCP15</i>	<i>PgTCP6</i>	<i>Together with TCP15, acts downstream of gibberellin (GA), and the stratification pathways that promote seed germination.</i> <i>Involved in the control of cell proliferation at the root apical meristem (RAM) by regulating the activity of CYCB1-1.</i>
<i>AtTCP17</i>	<i>PgTCP18/23</i>	<i>Plays a pivotal role in the control of morphogenesis of shoot organs by negatively regulating the expression of boundary-specific genes such as CUC genes,</i> <i>Participates in ovule development</i>
<i>AtTCP18</i>	<i>PgTCP19</i>	<i>Prevents axillary bud outgrowth and delays early axillary bud development,</i>
<i>AtTCP19</i>	<i>PgTCP11</i>	<i>Indirectly required for the auxin-induced control of apical dominance</i> <i>None</i>
<i>AtTCP21</i>	<i>PgTCP2</i>	<i>Regulates the circadian clock,</i> <i>Acts as a repressor of CCA1 by binding to its promoter,</i> <i>No binding to the LHY promoter.</i>
<i>AtTCP22</i>	<i>PgTCP9</i>	<i>None</i>
<i>AtTCP23</i>	<i>PgTCP9</i>	<i>None</i>
<i>AtTCP24</i>	<i>PgTCP20</i>	<i>Controls morphogenesis of shoot organs by negatively regulating the expression of boundary-specific genes such as CUC genes, probably through the induction of miRNA (e.g. miR164),</i> <i>In association with ABAP1, exerts a negative role in cell proliferation in leaves, possibly by inhibiting mitotic DNA replication,</i> <i>Participates in ovule development</i>
