Table 1 Suppl. Sampling standards of *Lycium ruthenicum.*

Period naming		A description of the sampling criteria
Flower	H1	Floret bud
	H2	Medium flower bud
	H3	Large flower bud
	H4	Unfertilized flower
	H5	The fertilized flower, but the petals are still red.
Fruit	G1	The fruit sample with red petals which has just been pollinated.
	G2	The fruit sample with yellow and white petals attached.
	G3	The fruit sample when yellow and white petals turn into withered petals.
	G4	The fruit sample with ovary and sepals, but the fruit has not become wider.
	G5	The fruit sample when ovary and sepal were flush but widened.
	G6	The fruit sample when ovary is higher than sepal but fruit color is still cyan green.
	G7	The fruit sample when color turns slightly purple.
	G8	The fruit sample when color is deepened and turns to light purple.
	G9	The fruit sample when color is deep purple and close to black, but the fruit is not fully ripe yet.
	G10	The fruit sample when color is deep purple and close to black, but the fruit is not fully ripe yet.

Table 2 Suppl. Sampling standards of *Lycium barbarum*.

Period naming		A description of the sampling criteria
Flower	H1	Floret bud
	H2	Medium flower bud
	H3	Large flower bud
	H4	Unfertilized flower
	H5	The fertilized flower, but the petals are still red.
Fruit	G1	The fruit sample with red petals which has just been pollinated.
	G2	The fruit sample when the red petals change to yellow petals.
	G3	The fruit sample with withering petals but ovary lower than sepals.
	G4	The fruit sample with ovary 1~3 mm higher than sepals.
	G5	The fruit sample with ovary 4~6 mm higher than sepals.
	G6	The fruit sample with ovary 7~9 mm higher than sepals.
	G7	The fruit sample when the tip turns slightly red.
	G8	The fruit sample in the state of half red and half green.
	G9	The fruit sample when all the fruits turn orange red.
	G10	The fruit sample appears deep orange red.

Table 3 Suppl. Distribution of splicing length and frequency.

Transcript Length Interval	200~500 bp	500~1 kb	1k~2 kb	>2 kb	total
Lba: Number of transcripts	104669	35883	23144	13524	177220
Lru: Number of transcripts	118529	39488	25539	15206	198825
Lba: Number of unigenes	93599	27938	15193	8086	144816
Lru: Number of unigenes	105659	30194	16353	8778	160984

Table 4 Suppl. Splicing length distribution.

	Min Length	Mean Length	Median Length	Max Length	N50	N90	Total Nucleotides
Lba: Transcripts	201	733	406	15862	1218	287	129910932
Lru: Transcripts	201	729	399	15797	1218	283	144965739
Lba: Unigenes	201	642	368	15862	959	266	92953930
Lru: Unigenes	201	633	360	15797	943	262	101842549

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Lru: Unigenes	201	633	360	15797	943	262	101842549

Table 5 Suppl. Reads and reference sequence alignment situation list.

Sample name	Total reads	Total mapped
A-1	65104854	42567458 (65.38%)
A-2	55264280	36168750 (65.45%)
A-3	64814950	42600350 (65.73%)
B-1	70163714	46409998 (66.15%)
B-2	54184334	34933952 (64.47%)
B-3	56522544	36465368 (64.51%)

A-1, A-2, and A-3 represent three repeat RNA mixed samples of *L. barbarum*. B-1, B-2, and B-3 represent three repeat RNA mixed samples of *L. ruthenicum*.

Table 6 Suppl. The large transcription factor family genes related to flower and fruit development were screened.

Number		
TF family	Up	Down
C2H2	TRINITY_DN44101_c0_g5	TRINITY_DN36279_c0_g1
	TRINITY_DN54071_c3_g1	TRINITY_DN46112_c0_g1
	TRINITY_DN55757_c0_g3	TRINITY_DN47031_c1_g4
	TRINITY_DN58324_c2_g35	TRINITY_DN48720_c2_g3
		TRINITY_DN54071_c3_g2
		TRINITY_DN39847_c1_g2
		TRINITY_DN40228_c0_g2
		TRINITY_DN43880_c6_g1
		TRINITY_DN45541_c3_g1
		TRINITY_DN45586_c2_g3
		TRINITY_DN49907_c0_g3
		TRINITY_DN39847_c1_g2
MYB	TRINITY_DN52099_c0_g5	TRINITY_DN34881_c0_g1
	TRINITY_DN62415_c2_g3	TRINITY_DN36224_c0_g1
	TRINITY_DN39444_c3_g2	TRINITY_DN38330_c5_g1
	TRINITY_DN39654_c4_g1	TRINITY_DN39594_c1_g5
	TRINITY_DN47507_c1_g1	TRINITY_DN39948_c2_g1
	TRINITY_DN48026_c0_g5	TRINITY_DN43880_c6_g4
		TRINITY_DN44408_c2_g2
		TRINITY_DN46170_c3_g2
		TRINITY_DN47470_c0_g1
		TRINITY_DN55549_c1_g1
		TRINITY_DN56728_c0_g2
		TRINITY_DN58344_c0_g3
		TRINITY_DN58344_c0_g7
		TRINITY_DN58965_c1_g1
		TRINITY_DN34916_c0_g1
		TRINITY_DN35171_c0_g1
		TRINITY_DN38817_c0_g2
NAC	TRINITY_DN38920_c1_g4	TRINITY_DN41418_c3_g2
	TRINITY_DN45821_c2_g3	TRINITY_DN43268_c1_g1
	TRINITY_DN53738_c1_g1	TRINITY_DN43268_c2_g5
		TRINITY_DN44514_c3_g2
		TRINITY_DN53738_c2_g2
		TRINITY_DN58255_c0_g4

Table 7 Suppl. The large transcription factor family genes related to flower and fruit development were screened.

Number		
TF family	Up	Down
		TRINITY_DN38146_c0_g1
		TRINITY_DN39584_c0_g1
		TRINITY_DN39584_c0_g2
		TRINITY_DN41386_c1_g1
	TRINITY_DN38798_c0_g1	TRINITY_DN41476_c1_g2
	TRINITY_DN41386_c2_g1	TRINITY_DN45081_c0_g2
WRKY	TRINITY_DN48362_c2_g1	TRINITY_DN46793_c1_g2
	TRINITY_DN48362_c2_g2	TRINITY_DN49325_c3_g3
		TRINITY_DN51002_c2_g1
		TRINITY_DN54527_c1_g1
		TRINITY_DN57312_c3_g5
		TRINITY_DN59348_c3_g1
		TRINITY_DN64188_c2_g4
	TRINITY_DN38320_c0_g1	
	TRINITY_DN40495_c1_g1	
	TRINITY_DN41129_c2_g1	21TRINITY_DN38964_c0_g1
	TRINITY_DN43725_c0_g1	TRINITY_DN41277_c0_g1
	TRINITY_DN47259_c3_g2	TRINITY_DN47167_c2_g1
MADS-box	TRINITY_DN48123_c1_g3	TRINITY_DN47444_c3_g2
	TRINITY_DN56838_c0_g4	TRINITY_DN58634_c0_g1
	TRINITY_DN59803_c2_g1	TRINITY_DN61119_c2_g1
	TRINITY_DN64120_c0_g1	TRINITY_DN56838_c0_g1
	TRINITY_DN43493_c1_g3	TRINITY_DN60011_c0_g3
	TRINITY_DN48456_c0_g1	
	TRINITY_DN56838_c0_g3	
	TRINITY_DN46955_c3_g1	TRINITY_DN30877_c0_g1
bZIP	TRINITY_DN54870_c1_g4	TRINITY_DN44680_c0_g2
	TRINITY_DN57600_c0_g1	TRINITY_DN54870_c1_g6
	TRINITY_DN59551_c0_g41	TRINITY_DN57400_c0_g1

Table 8 Suppl. The large transcription factor family genes related to flower and fruit development were screened.

Number		
TF family	Up	Down
bHLH	5TRINITY_DN58577_c1_g1	TRINITY_DN39724_c1_g2
		TRINITY_DN42993_c1_g1
		TRINITY_DN45296_c2_g2
		TRINITY_DN45831_c2_g6
		TRINITY_DN46292_c0_g2
		TRINITY_DN46988_c1_g2
		TRINITY_DN48731_c1_g2
		TRINITY_DN52475_c0_g1
		TRINITY_DN56727_c0_g7
		TRINITY_DN56781_c3_g2
		TRINITY_DN59997_c0_g1
		TRINITY_DN59997_c0_g3
		TRINITY_DN61352_c0_g4
		TRINITY_DN62391_c1_g54
B3	TRINITY_DN22399_c0_g1	TRINITY_DN24892_c0_g1
	TRINITY_DN36835_c0_g1	TRINITY_DN37783_c0_g1
	TRINITY_DN38784_c3_g1	TRINITY_DN40024_c2_g1
	TRINITY_DN40135_c2_g2	TRINITY_DN40024_c2_g2
	TRINITY_DN42917_c0_g1	TRINITY_DN41724_c5_g3
	TRINITY_DN43076_c0_g6	TRINITY_DN43076_c0_g3
	TRINITY_DN43380_c1_g4	TRINITY_DN43076_c0_g4
	TRINITY_DN45484_c0_g1	TRINITY_DN50321_c0_g2
	TRINITY_DN51936_c3_g4	TRINITY_DN54019_c0_g1
	TRINITY_DN55651_c0_g3	TRINITY_DN55651_c0_g1
		TRINITY_DN62258_c1_g2
		TRINITY_DN63058_c1_g1