Table S1. Summary of 28 populations used in the present study, including voucher informations.

Code / location	Latitude/longitude(N/E)	No.	Desert	Collecting number	Collector
Total		280			
1 SHK	39.64°/106.60°	10		SHK01-10	
2 DGN	40.71°/108.51°	10	Kubuqi Desert	DGN01-10	Shi XJ &
3 DGTL	40.49°/108.67°	10		DGTL01-10	Zhang ML
4 DLT	40.28°/109.93°	10		DLT01-10	
5 AZQ	40.33°/109.39°	10		AZQ01-10	
6 BJT	38.05°/107.68°	10	Mu Us Desert	BJT01-10	Shi XJ &
7 JL	37.46°/105.01°	10		JL01-10	Zhang ML
8 YC	37.93°/106.41°	10		YC01-10	
9 YBA	39.35°/102.34°	10		YBA01-10	
10 YBB	39.55°/102.53°	10	Badain Jaran	YBB01-10	Shi XJ &
11 YQA	39.56°/102.60°	10	Desert	YQA01-10	Zhang ML
12 YQB	39.64°/102.58°	10		YQB01-10	
13 WHA	39.78°/106.86°	10		WHA01-10	
14 WHB	39.78°/106.85°	10		WHB01-10	
15 WHC	39.64°/106.63°	10		WHC01-10	
16 WHD	39.64°/106.6°	10	Ulan Buh	WHD01-10	Shi XJ &
17 WHE	39.91°/106.66°	10	Desert	WHE01-10	Zhang ML
18 WHF	39.82°/106.69°	10		WHF01-10	
19 WHG	40.03°/106.63°	10		WHG01-10	
20 WST	38.16°/107.51°	10		WST01-10	
21 ZQA	38.71°/105.33°	10		ZQA01-10	
22 ZQB	38.69°/105.40°	10		ZQB01-10	
23 ZWA	37.57°/105.10°	10		ZWA01-10	
24 ZWB	37.59°/104.6°	10	Tengger Desert	ZWB01-10	Shi XJ &
25 ZQC	38.55°/105.35°	10		ZQC01-10	Zhang ML
26 SPT	37.45°/104.93°	10		SPT01-10	
27 MJW	37.89°/107.58°	10		MJW01-10	
28 ZQDS	38.30°/103.72°	10		ZQDS01-10	

Table S2. The haplotype sequences of the two chloroplast DNA fragment from 28 populations of *S. centiflora* used in analysis from five deserts in Northwest China with corresponding GenBank reference numbers for each haplotype.

Haplotype	*psb*A-*trn*H	*rps*16-*trn*Q
H1	MF416962	MF416968
H2	MF416963	MF416969
H3	MF416964	MF416970
H4	MF416967	MF416972
H5	MF416965	MF416968
H6	MF416966	MF416971

Table S3. The ribotype sequences based on the ITS fragment from 250 individuals of *S. centiflora* used in analysis from five deserts in Northwest China with corresponding GenBank reference numbers for each ribotype.

Raplotype	*ITS*
R1	MF416973
R2	MF416974
R3	MF416975
R4	MF416976
R5	MF416977
R6	MF416978
R7	MF416979
R8	MF416980
R9	MF416981
R10	MF416982
R11	MF416983
R12	MF416984
R13	MF416985
R14	MF416986
R15	MF416987
R16	MF416988
R17	MF416989
R18	MF416990
R19	MF416991
R20	MF416992
R21	MF416993
R22	MF416994
R23	MF416995
R24	MF416996
R25	MF416997
R26	MF416998
R27	MF416999
R28	MF417000
R29	MF417001
R30	MF417002
R31	MF417003

Table S4. Summary of the six haplotypes (H1-H6) based on aligned sequences of the two chloroplast DNA fragment of 280 individuals and 28 populations of *S. centiflora* from five deserts in Northwest China.

Hap	*psb*A-*trn*H					*rps*16-*trn*Q			
Nucleotide Position(bp)	185	270	308	347	376	147	359	667	769
H1	C	A	T	T	C	G	C	C	T
H2	C	A	G	T	C	A	C	C	C
H3	C	A	G	A	C	G	A	C	C
H4	C	G	G	A	C	G	C	C	C
H5	T	A	T	T	C	G	C	C	T
H6	T	A	T	T	T	G	C	T	T

Table S5. Summary of the 31 ribotypes (R1-R31) based on aligned sequences of ITS fragments from 250 individuals and 28 populations of *S. centiflora* sampled from five deserts in Northwest China.

Ribotypes	ITS											
Nucleotide Position(bp)	72	105	118	147	166	174	178	212	228	229	239	258
R1	C	G	C	C	T	C	A	C	T	C	C	T
R2	C	G	C	C	T	C	A	C	T	C	C	C
R3	C	G	C	C	T	C	A	C	T	C	C	T
R4	C	G	C	C	T	C	A	C	T	T	C	C
R5	C	G	C	C	T	C	A	C	T	C	C	C
R6	C	G	C	C	T	C	A	C	T	C	C	C
R7	C	G	C	C	A	C	A	C	T	C	C	C
R8	C	G	C	C	T	C	A	C	T	T	C	C
R9	C	G	C	C	T	C	A	C	T	T	C	C
R10	C	G	C	C	T	C	A	C	T	T	C	C
R11	C	G	C	C	T	C	A	C	T	C	C	C
R12	C	G	C	C	T	C	A	C	T	T	C	C
R13	C	G	C	C	T	C	A	C	T	T	C	C
R14	C	G	C	C	T	C	A	C	T	C	C	C
R15	C	G	C	C	T	C	G	C	T	C	C	C
R16	C	G	C	C	T	C	A	C	T	C	C	T
R17	C	G	C	C	T	C	A	C	T	C	T	C
R18	C	G	C	C	A	C	A	C	T	C	C	C
R19	C	G	T	C	A	C	A	C	T	C	C	C
R20	C	G	C	C	T	C	A	C	G	C	C	C
R21	C	T	C	C	A	C	A	C	T	C	C	C
R22	C	G	C	C	T	C	A	C	T	C	C	C
R23	C	G	C	C	A	C	A	T	T	C	C	C
R24	C	G	C	C	T	C	A	C	T	C	C	C
R25	C	G	C	C	A	T	A	C	T	C	C	C
R26	T	G	C	C	T	C	A	C	T	C	C	C
R27	C	G	C	C	T	C	A	C	T	C	T	C
R28	C	G	C	T	T	C	A	C	T	C	C	C
R29	C	G	C	C	T	C	A	C	T	C	C	C
R30	C	G	C	C	T	C	A	C	T	C	C	C
R31	C	G	C	C	T	C	A	C	T	C	C	C

Ribotypes	ITS											
Nucleotide Position(bp)	284	295	299	430	461	475	480	483	489	490	491	494

R1	C	T	C	C	C	C	C	C	A	G	G	C
R2	C	C	C	C	C	C	C	C	G	G	G	C
R3	C	T	C	C	C	C	C	C	A	G	G	C
R4	C	C	C	C	C	C	C	C	G	G	G	C
R5	C	C	C	C	C	C	C	C	G	G	G	C
R6	C	C	C	C	C	C	C	C	G	G	G	C
R7	C	C	C	C	C	C	C	C	G	G	G	C
R8	C	C	C	C	C	C	C	C	G	G	G	C
R9	C	T	C	C	C	C	C	C	G	G	G	C
R10	C	C	C	C	C	C	C	C	G	G	G	C
R11	C	T	C	C	C	C	C	C	A	G	G	C
R12	C	C	T	T	C	C	C	C	G	G	G	C
R13	C	C	C	C	C	C	C	C	G	G	A	C
R14	T	C	C	C	C	C	C	T	A	A	G	C
R15	C	C	C	C	C	C	C	C	G	G	G	C
R16	C	C	C	C	C	C	C	C	G	G	G	C
R17	C	C	C	C	C	C	C	C	G	G	G	C
R18	C	C	C	C	C	T	C	C	G	G	G	C
R19	C	C	C	C	C	C	C	C	G	G	G	C
R20	C	C	C	C	C	C	C	C	G	G	G	C
R21	C	C	C	C	C	C	C	C	G	G	G	C
R22	C	C	C	C	C	C	C	C	G	G	G	G
R23	C	C	C	C	C	C	C	C	G	G	G	C
R24	C	C	C	C	C	C	A	C	G	G	G	C
R25	C	C	C	C	C	C	C	C	G	G	G	C
R26	C	C	C	C	C	C	C	C	G	G	G	C
R27	C	C	C	C	C	C	C	C	G	G	G	C
R28	C	C	C	C	C	C	C	C	G	G	G	C
R29	C	C	C	C	T	C	C	C	G	G	G	C
R30	C	C	C	C	C	C	C	C	G	G	A	C
R31	C	C	C	C	C	C	C	C	G	G	G	C

Ribotypes	ITS							
Nucleotide Position(bp)	552	573	611	622	630	635	637	680
R1	G	C	T	G	G	C	C	C
R2	G	C	T	G	G	C	C	C
R3	G	C	T	G	G	C	C	T
R4	G	C	T	G	G	C	C	T
R5	G	C	T	A	G	C	T	C
R6	G	C	T	A	G	C	C	C

R7	G	C	T	A	G	C	C	C
R8	G	C	T	G	G	C	C	C
R9	G	C	T	G	G	C	C	C
R10	G	T	T	G	G	C	C	C
R11	G	C	T	G	G	C	C	C
R12	G	T	T	G	G	C	C	C
R13	G	T	T	G	G	C	C	C
R14	G	C	T	G	A	C	C	C
R15	G	C	T	A	G	C	C	C
R16	G	C	T	A	G	C	C	C
R17	G	C	T	A	G	C	C	C
R18	G	C	T	A	G	C	C	C
R19	G	C	T	A	G	C	C	C
R20	G	C	T	A	G	C	C	C
R21	G	C	T	A	G	C	C	C
R22	G	C	T	A	G	C	C	C
R23	G	C	T	A	G	C	C	C
R24	G	C	C	A	G	C	C	C
R25	G	C	T	A	G	C	C	C
R26	G	C	T	A	G	C	C	C
R27	G	C	T	A	G	T	C	C
R28	G	C	T	A	G	C	T	C
R29	G	C	T	A	G	C	T	C
R30	G	C	T	A	G	C	T	C
R31	T	C	T	A	G	C	T	C