

Supplementary Table 1. Primer information of which the PCR is successful for the Chrysanthemum SSR markers of our study.

No.	Name	Primer sequence	SSR motif	Annealing temp.
1	KNOU_CRYSSR1	F:GAGTTCTTCGGAGTAAGATCCG R:TGGCGTGTACAAGTTTCG	(GAT)7	55
2	KNOU_CRYSSR4	F:ACAGTACACACACAGCCAACAC R:GTAATGCTTCCGTCTGCATAGC	(CAA)4	55
3	KNOU_CRYSSR5	F:ACCATAACCACCACCCTGT R:GAGGTAGGTTTGGTGGTCG	(CCA)5	55
4	KNOU_CRYSSR6	F:GGAGGCTCGGAATTTGTT R:CCATCGACGAAACTAACGAG	(CGT)7	55
5	KNOU_CRYSSR7	F:AGGCCCAACTTTATTCACCC R:CCAAATCCAATCTCCGGC	(GAG)4	55
6	KNOU_CRYSSR8	F:CTCGACATTCGTCAAAGTCC R:GAATCCCATTCTGCTTCG	(ACA)4	55
7	KNOU_CRYSSR9	F:CATTACACTCACCTACACACC R:CCTCCCTCTTTACAATGTCAC	(TCA)4	55
8	KNOU_CRYSSR10	F:GAACATGCAATGGATGGG R:CCACCACACTCCGTCAATTAT	(TGA)4	55
9	KNOU_CRYSSR11	F:CCCATCTCAATCCTTCACTC R:GTAACACCAACCCTACCTTCT	(ACC)5	55
10	KNOU_CRYSSR14	F:GAAGGGAAGGGTATGGAAGA R:TAGCATAAGCTTGGGCTCTC	(ATA)4	55
11	KNOU_CRYSSR15	F:GACTTCAAACCTGACAACG R:GGGACATGTTTTGTGACGG	(TCA)6	55
12	KNOU_CRYSSR16	F:ACAAGTAGTAGGAGGAGGAGGA R:CAGTGTAGCCGGTACAGAAGA	(AGT)5	55
13	KNOU_CRYSSR17	F:GTTCCGGATCGCTTCATCA R:TAACCGCGGTGATAGTTCG	(GAT)8	55
14	KNOU_CRYSSR18	F:CGCGTATGCTAATGAAGGAC R:CCTTCAAACCCAAACCCTAC	(TGA)5	55
15	KNOU_CRYSSR20	F:GGCTCTGATCACCCATTCTAC R:ACCAAACACTACCACCGTGA	(CGC)7	55
16	KNOU_CRYSSR22	F:GATCCATAGCCCAAATGGTG R:GCCGAGAGCTAACAAGATCA	(ATC)7	55
17	KNOU_CRYSSR23	F:GTGATAAGGAGCAAGTCCGAG R:CGGCATTACAACCTCCCTAGT	(GAT)4	55
18	KNOU_CRYSSR25	F:GTTCGAATACCTCGTTTGGC R:GAAACACCTCTAGTTCACGCTC	(ATA)4	55
19	KNOU_CRYSSR27	F:CGTACACTCCAACACCCTTC R:CAACAAGACCCGAATCCTC	(TTG)6	55
20	KNOU_CRYSSR29	F:CTCTCTCAAGTGAAGTTGTGGC R:AGAAAGGGTCCGGCTTGAT	(TGT)5	55
21	KNOU_CRYSSR30	F:CAACTACCTGATCAACCTCCTC R:GGAGTCGTGAAAGTGGTCAT	(AAC)4	55
22	KNOU_CRYSSR31	F:GGAAGCAAGTGTGTGGTTTC R:ACCTCCCATAGAATCTTGAGC	(TG)9	55
23	KNOU_CRYSSR35	F:GTGAGGAGACCTTTTACAGCAG R:ATCCAAGTGGTGGGAGGTAAC	(TG)9	55
24	KNOU_CRYSSR37	F:CACTTCTCGTTATCCTCACACC R:CTGTGTCTACGATTGGCATC	(AC)6	55
25	KNOU_CRYSSR38	F:TATTGCCACATGCACACC R:GTATATCACTAACCCCATCCC	(CA)6	55
26	KNOU_CRYSSR40	F:GACGGATTTTGAGCTTGGAG R:GAACCAATAATCCCGACACC	(TA)13	55
27	KNOU_CRYSSR42	F:CAAAGTACTACCAAACGCGG R:GTAACATTGAGGGTGTAGCAGC	(CA)6	55
28	KNOU_CRYSSR45	F:AAACAGCCTGACCCAATCTC R:GTCATCATCCAACCAACAAC	(ATTT)6	55
29	KNOU_CRYSSR48	F:CTCCATCCATCCATGTGAGT R:ACCACAGCACTGGACAT	(TAAC)5	55
30	KNOU_CRYSSR49	F:CTTTGCTAGTGTGATACTGGC R:ATAATCCGCCAGCTAGGGT	(TGTT)5	55
31	KNOU_CRYSSR50	F:GATGGTGAGACATTGCGTCT R:GCTCAAGGATTATGGACACTGG	(TTAT)4	55

Supplementary Table 2. Chrysanthemum cultivars used for the genetic relationship and population analyses based on simple sequence repeat markers.

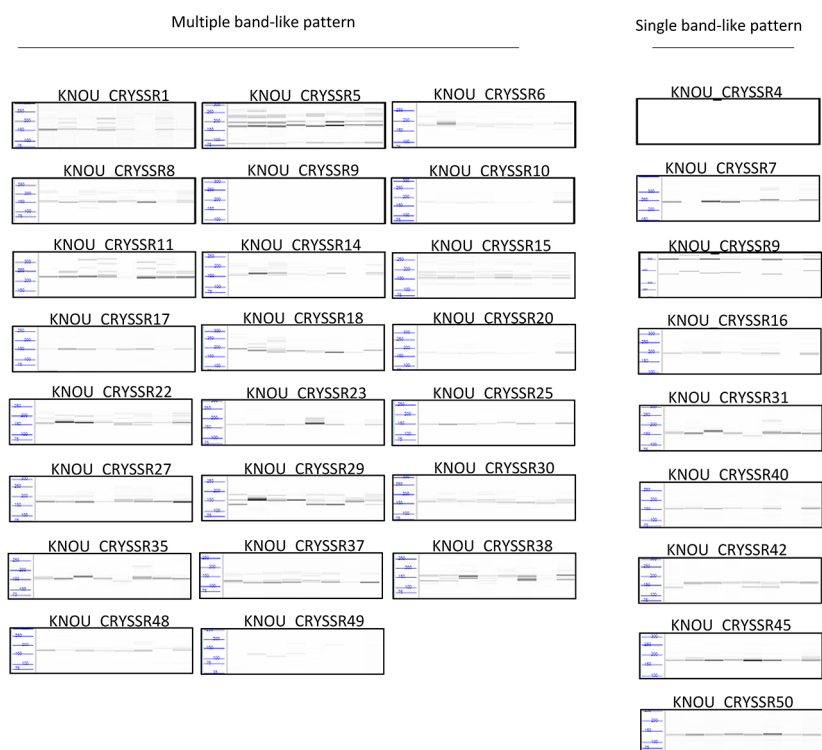
No.	Cultivar name	Types	No.	Cultivar name	Types
1	Yes Nuri	spray	29	Blue Hope	spray
2	Yes Chorus	spray	30	Goldeneye	spray
3	Yellow Pangpang	spray	31	Sinmyong	spray
4	Dream Prince	spray	32	Deliacream	spray
5	Kastelli	spray	33	Ilweol	spray
6	Mantree	spray	34	Power ND	spray
7	Yes Together	spray	35	Fire Pink	spray
8	Yes Now	spray	36	Dream Round	spray
9	Yes Star	spray	37	Field Green	spray
10	Greenwitch	spray	38	Yellow Marble	spray
11	Pink Pride	spray	39	Angel	spray
12	Purple Cone	spray	40	Yes Holic	spray
13	Froggy	spray	41	Bubble ND	spray
14	Black Marble	spray	42	Sweet Candy	spray
15	Leopard	spray	43	Yellow Kid	spray
16	Argus	spray	44	Love Mine	spray
17	Borami	spray	45	Joy cream	spray
18	Mujigae	spray	46	Magic Star	spray
19	Hwiparam	spray	47	Loving You	spray
20	Yes morning	spray	48	Yes Luna	spray
21	Magic	spray	49	Yes Ruby	spray
22	Yellow Cap	spray	50	Peach ND	spray
23	Cherry Blossom	spray	51	Yes Song	spray
24	Secret Pink	spray	52	Yes Elsa	spray
25	Orange ND	spray	53	Baekseol	standard
26	Bright ND	spray	54	Baekson	standard
27	SP13-154-01	spray	55	Zinba	standard
28	Joy Pink	spray	56	Sumi	standard

Supplementary Table 3. The size information of DNA amplicon in the chrysanthemum SSR marker of our study. The PCR amplicons of each SSR locus are separated by ZAG DNA analyzer and the corresponding sizes are determined with Prosize software. Major alleles at each SSR locus are specified by slash.

No	Origin	Knou CrySSR_4	Knou CrySSR_7	Knou CrySSR_16	Knou CrySSR_31	Knou CrySSR_40	Knou CrySSR_42	Knou CrySSR_45	Knou CrySSR_50
1	Yes Nuri	251/251	243/243	194/194	163/163	154/154	140/140	172/172	134/134
2	Yes Chorus	251/251	250/250	NS ^z /NS	163/163	NS/NS	140/164	172/172	138/130
3	Yellow Pangpang	248/285	241/241	194/194	163/163	156/156	140/140	174/174	134/134
4	Dream Prince	263/290	241/241	194/250	163/163	158/158	140/140	172/185	134/134
5	Kastelli	258/258	241/241	194/194	163/163	157/157	165/140	172/172	134/134
6	Mantree	258/260	252/252	198/250	163/163	158/158	164/140	174/174	136/136
7	Yes Together	256/256	240/240	194/216	156/156	156/156	163/140	174/174	134/134
8	Yes Now	254/254	243/243	194/194	163/163	155/155	164/140	172/172	134/134
9	Yes Star	254/288	NS/NS	194/202	156/156	155/166	161/138	172/188	134/134
10	Greenwich	NS/NS	243/243	194/194	143/163	155/155	153/141	174/174	NS/NS
11	Pink Pride	257/257	251/251	NS/NS	NS/NS	NS/NS	165/165	174/174	134/134
12	Purple Cone	257/257	241/241	194/173	163/163	155/155	140/140	174/185	134/134
13	Froggy	255/255	243/256	NS/NS	144/144	NS/NS	142/165	174/185	134/134
14	Black Marble	258/258	NS/NS	194/205	156/156	155/166	142/165	172/172	134/134
15	Leopard	254/254	241/241	194/173	143/143	158/158	NS/NS	172/172	134/134
16	Argus	254/281	241/241	194/194	156/156	155/155	140/154	174/185	134/134
17	Borami	251/251	NS/NS	194/202	156/156	155/155	164/164	174/184	134/134
18	Mujigae	257/257	243/243	197/214	168/168	155/155	164/164	172/172	134/134
19	Hwiparam	262/262	NS/NS	194/194	163/163	158/158	164/164	172/172	134/134
20	Yes morning	251/251	246/246	194/187	163/163	155/155	165/165	174/174	134/134
21	Magic	254/254	249/249	NS/NS	163/163	NS/NS	140/140	174/174	134/131
22	Yellow Cap	291/255	246/246	194/173	163/163	155/167	164/138	169/174	134/110
23	Cherry Blossom	251/251	252/242	197/214	163/163	155/155	138/138	172/172	136/136
24	Secret Pink	254/254	243/243	194/194	156/156	158/169	140/140	174/184	134/110
25	Orange ND	NS/NS	NS/NS	194/194	142/142	NS/NS	164/164	172/172	134/134
26	Bright ND	251/251	252/252	194/187	155/155	155/165	165/165	172/184	134/134
27	SP13-154-01	290/255	246/246	194/194	163/156	155/155	140/140	174/184	137/137
28	Joy Pink	262/262	246/258	NS/NS	156/163	155/155	140/140	174/184	134/134
29	Blue Hope	263/263	NS/NS	217/214	163/156	155/155	140/140	174/174	134/134
30	Goldeneye	254/254	243/243	189/189	163/163	155/162	144/144	172/172	134/134
31	sinmyong	254/254	241/241	NS/NS	163/163	NS/NS	140/140	174/184	134/134
32	Deliacream	249/249	240/250	193/193	155/155	NS/NS	165/140	172/172	134/134
33	Ilweol	254/254	243/243	NS/NS	NS/NS	NS/NS	166/166	172/172	132/132
34	Power ND	NS/NS	241/241	193/193	156/156	157/157	140/166	172/172	134/134
35	Fire Pink	NS/NS	251/251	194/201	155/155	NS/NS	142/142	174/174	134/134
36	Dream Round	254/254	241/241	194/194	163/163	155/155	146/166	174/174	134/134
37	Field Green	254/257	249/249	192/192	162/162	155/166	146/166	172/172	134/134
38	Yellow Marble	254/250	241/241	193/193	163/163	158/166	NS/NS	172/184	132/132
39	Angel	255/255	250/250	193/193	156/156	155/161	165/165	174/184	134/134
40	Yes Holic	254/254	NS/NS	194/194	163/156	155/161	167/142	174/174	134/134

Supplementary Table 3. Continued.

No	Origin	Knou CrySSR_4	Knou CrySSR_7	Knou CrySSR_16	Knou CrySSR_31	Knou CrySSR_40	Knou CrySSR_42	Knou CrySSR_45	Knou CrySSR_50
41	Bubble ND	254/254	241/241	293/193	153/156	158/158	159/142	174/174	134/141
42	Sweet Candy	263/263	243/243	NS/NS	163/156	NS/NS	142/142	174/174	134/134
43	Yellow Kid	287/290	241/241	194/194	163/163	155/214	165/142	174/174	136/141
44	Love Mine	254/254	243/254	197/192	143/143	183/202	142/142	174/174	134/134
45	Joy cream	289/289	NS/NS	NS/NS	163/163	156/156	140/165	174/174	134/134
46	Magic Star	259/259	NS/NS	NS/NS	163/163	NS/NS	166/166	172/172	134/134
47	Loving You	254/254	241/241	NS/NS	143/143	NS/NS	142/142	172/172	134/134
48	Yes Luna	256/256	243/243	193/193	155/155	155/155	166/140	175/175	134/134
49	Yes Ruby	257/257	241/241	198/198	157/157	158/158	166/166	174/174	136/136
50	Peach ND	254/290	243/255	193/193	155/155	155/168	166/166	174/174	134/134
51	Yes Song	256/256	243/243	193/193	154/154	169/158	165/140	174/174	134/134
52	Yes Elsa	254/254	249/249	193/193	155/155	NS/NS	140/140	172/172	134/134
53	Baekseol	257/290	246/246	193/187	143/143	158/158	167/142	172/180	134/134
54	Baekson	257/290	253/246	194/185	156/163	155/166	143/160	172/172	136/136
55	Zinba	254/254	246/246	NS/NS	157/157	NS/NS	167/167	174/174	134/134
56	Sumi	254/254	251/251	188/193	155/155	158/158	165/165	174/185	134/134



Supplementary Fig. 1. Virtual gel images of PCR amplification for 31 chrysanthemum SSR loci, which produce multiple band-like (the group on the left) and single band like (the group on the right) pattern. The DNA template of each PCR reaction for lane 1 is Argus; lane 2, Borami; lane 3, Mujigae; lane 4, Yes Ruby; lane 5, Baekseol; lane6, Baekson; lane7, Zinba; lane8, Sumi. The PCR amplicon of each SSR locus is separated by capillary electrophoresis system and visualized as a virtual gel image, obtained from PROSize software (v.2.0). Size markers on the left for each gel are separated by 50 bp.