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Table S1. Origin and provider information of 203 *P. ginseng* germplasms used in this study.

No.	Germplasm name	Origin country	Germplasm type	Origin (Locality, Province, Country)	Provider / Reference
1	Cheonryang	Korea	Cultivated ginseng	Eumseong-gun, Chungcheongbuk-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
2	Chunpoong	Korea	Cultivated ginseng	Anseong-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
3	Cheongsun	Korea	Cultivated ginseng	Anseong-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
4	G03001	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
5	G03002	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
6	G03003	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
7	G03004	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
8	G03005	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
9	G03006	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
10	G03007	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
11	G03008	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
12	G03009	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
13	G03010	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
14	G03011	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
15	G03012	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
16	G03013	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
17	G03015	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
18	G03016	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
19	G03017	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
20	G03018	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
21	G03019	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
22	G03020	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
23	G03021	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
24	G03022	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
25	G03024	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
26	G03025	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
27	G03026	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
28	G03027	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
29	G03028	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
30	G03029	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
31	G03030	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
32	G03031	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
33	G03034	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
34	G03035	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
35	G03036	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
36	G03037	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
37	G03038	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
38	G03039	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
39	G03040	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
40	G03041	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
41	G03042	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
42	G03043	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
43	G03044	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
44	G03045	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
45	G03046	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
46	G03047	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
47	G03048	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
48	G03049	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
49	G03050	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
50	G03051	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
51	G03052	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
52	G03053	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
53	G03054	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
54	G03055	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
55	G03056	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
56	G03057	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea

57	G03058	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
58	G03059	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
59	G03060	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
60	G03061	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
61	G03062	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
62	G03063	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
63	G03064	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
64	G03065	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
65	G03067	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
66	G03068	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
67	G03069	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
68	G03070	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
69	G03071	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
70	G03072	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
71	G03075	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
72	G03076	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
73	G03077	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
74	G03078	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
75	G03079	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
76	G03080	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
77	G03081	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
78	G03083	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
79	G03084	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
80	G03086	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
81	G03089	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
82	G03092	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
83	G03093	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
84	G03096	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
85	G03105	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
86	G03107	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
87	G03109	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
88	G03110	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
89	G03111	Korea	Cultivated ginseng	Daejeon, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
90	G03112	Korea	Cultivated ginseng	Daejeon, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
91	G03114	Korea	Cultivated ginseng	Daejeon, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
92	G03118	Korea	Cultivated ginseng	Daejeon, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
93	G03119	Korea	Cultivated ginseng	Daejeon, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
94	G03140	Korea	Cultivated ginseng	Daejeon, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
95	G03180	Korea	Cultivated ginseng	Daejeon, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
96	G04051	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
97	G04054	Korea	Cultivated ginseng	Yeoju-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
98	G04076	Korea	Cultivated ginseng	Daejeon, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
99	G05021	Korea	Cultivated ginseng	Suwon-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
100	G05032	Korea	Cultivated ginseng	Suwon-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
101	G05097	Korea	Cultivated ginseng	Pocheon-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
102	G08024	Korea	Cultivated ginseng	Gongju-si, Chungcheongnam-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
103	G08034	Korea	Cultivated ginseng	Buyeo-gun, Chungcheongnam-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
104	Gopoong	Korea	Cultivated ginseng	Anseong-si, Gyeonggi-do, Korea	Lab. of Functional Plants, Seoul National University, Korea
105	Gopoong	Korea	Cultivated ginseng	Anseong-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
106	Gowon	Korea	Cultivated ginseng	Eumseong-gun, Chungcheongbuk-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
107	Gumpoong	Korea	Cultivated ginseng	Anseong-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
108	Gumjin	Korea	Cultivated ginseng	Geumsan-gun, Chungcheongnam-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
109	Gumsun	Korea	Cultivated ginseng	Geumsan-gun, Chungcheongnam-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
110	Hwangsook	Korea	Cultivated ginseng	Eumseong-gun, Chungcheongbuk-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
111	Jakyung	Korea	Cultivated ginseng	Eumseong-gun, Chungcheongbuk-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
112	K-1	Korea	Cultivated ginseng	Yongin-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
113	K-farm 1	Korea	Cultivated ginseng	Geumsan-gun, Chungcheongnam-do, Korea	Institute of Chinese Materia Medica, China Academy of Chinese Medical Sciences, China
114	K-farm 2	Korea	Cultivated ginseng	Geumsan-gun, Chungcheongnam-do, Korea	Institute of Chinese Materia Medica, China Academy of Chinese Medical Sciences, China
115	K-farm 3	Korea	Cultivated ginseng	Geumsan-gun, Chungcheongnam-do, Korea	Institute of Chinese Materia Medica, China Academy of Chinese Medical Sciences, China
116	K-farm 4	Korea	Cultivated ginseng	Geumsan-gun, Chungcheongnam-do, Korea	Institute of Chinese Materia Medica, China Academy of Chinese Medical Sciences, China
117	K-farm 5	Korea	Cultivated ginseng	Geumsan-gun, Chungcheongnam-do, Korea	Institute of Chinese Materia Medica, China Academy of Chinese Medical Sciences, China

118	M05057	Korea	Cultivated ginseng	Suwon-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
119	Sunhyang	Korea	Cultivated ginseng	Anseong-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
120	Sunpoong	Korea	Cultivated ginseng	Anseong-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
121	Sunun	Korea	Cultivated ginseng	Anseong-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
122	Sunwon	Korea	Cultivated ginseng	Anseong-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
123	Yunpoong	Korea	Cultivated ginseng	Anseong-si, Gyeonggi-do, Korea	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
124	Cheongsong 1	Korea	Wild ginseng	Yeongjongdo, Incheon, Korea	Lab. of Functional Plants, Seoul National University, Korea
125	Cheongsong 2	Korea	Wild ginseng	Yeongjongdo, Incheon, Korea	Lab. of Functional Plants, Seoul National University, Korea
126	Cheongsong 3	Korea	Wild ginseng	Yeongjongdo, Incheon, Korea	Lab. of Functional Plants, Seoul National University, Korea
127	Dajeon	Korea	Wild ginseng	Daejeon, Korea	Lab. of Functional Plants, Seoul National University, Korea
128	Gangwon 1	Korea	Wild ginseng	Hwacheon-gun, Gangwon-do, Korea	Lab. of Functional Plants, Seoul National University, Korea
129	Gangwon 2	Korea	Wild ginseng	Hwacheon-gun, Gangwon-do, Korea	Lab. of Functional Plants, Seoul National University, Korea
130	Gangwon 3	Korea	Wild ginseng	Hwacheon-gun, Gangwon-do, Korea	Lab. of Functional Plants, Seoul National University, Korea
131	Gangwon 4	Korea	Wild ginseng	Hwacheon-gun, Gangwon-do, Korea	Lab. of Functional Plants, Seoul National University, Korea
132	Gangwon 6	Korea	Wild ginseng	Hwacheon-gun, Gangwon-do, Korea	Lab. of Functional Plants, Seoul National University, Korea
133	Gangwon 7	Korea	Wild ginseng	Hwacheon-gun, Gangwon-do, Korea	Lab. of Functional Plants, Seoul National University, Korea
134	Gangwon 8	Korea	Wild ginseng	Hwacheon-gun, Gangwon-do, Korea	Lab. of Functional Plants, Seoul National University, Korea
135	Gangwon 9	Korea	Wild ginseng	Hwacheon-gun, Gangwon-do, Korea	Lab. of Functional Plants, Seoul National University, Korea
136	Gangwon 10	Korea	Wild ginseng	Hwacheon-gun, Gangwon-do, Korea	Lab. of Functional Plants, Seoul National University, Korea
137	Gangwon 11	Korea	Wild ginseng	Hwacheon-gun, Gangwon-do, Korea	Lab. of Functional Plants, Seoul National University, Korea
138	Gangwon 12	Korea	Wild ginseng	Hwacheon-gun, Gangwon-do, Korea	Lab. of Functional Plants, Seoul National University, Korea
139	Gangwon 13	Korea	Wild ginseng	Hwacheon-gun, Gangwon-do, Korea	Lab. of Functional Plants, Seoul National University, Korea
140	Gangwon 14	Korea	Wild ginseng	Hwacheon-gun, Gangwon-do, Korea	Lab. of Functional Plants, Seoul National University, Korea
141	Gangwon 15	Korea	Wild ginseng	Hwacheon-gun, Gangwon-do, Korea	Lab. of Functional Plants, Seoul National University, Korea
142	Gangwon 16	Korea	Wild ginseng	Hwacheon-gun, Gangwon-do, Korea	Lab. of Functional Plants, Seoul National University, Korea
143	Gangwon 17	Korea	Wild ginseng	Hwacheon-gun, Gangwon-do, Korea	Lab. of Functional Plants, Seoul National University, Korea
144	Hamyang 1	Korea	Wild ginseng	Hamyang-gun, Gyeongsangnam-do, Korea	Lab. of Functional Plants, Seoul National University, Korea
145	Hamyang 3	Korea	Wild ginseng	Hamyang-gun, Gyeongsangnam-do, Korea	Lab. of Functional Plants, Seoul National University, Korea
146	Hamyang 4	Korea	Wild ginseng	Hamyang-gun, Gyeongsangnam-do, Korea	Lab. of Functional Plants, Seoul National University, Korea
147	Hamyang 5	Korea	Wild ginseng	Hamyang-gun, Gyeongsangnam-do, Korea	Lab. of Functional Plants, Seoul National University, Korea
148	Hamyang 6	Korea	Wild ginseng	Hamyang-gun, Gyeongsangnam-do, Korea	Lab. of Functional Plants, Seoul National University, Korea
149	Hamyang 8	Korea	Wild ginseng	Hamyang-gun, Gyeongsangnam-do, Korea	Lab. of Functional Plants, Seoul National University, Korea
150	Hamyang 9	Korea	Wild ginseng	Hamyang-gun, Gyeongsangnam-do, Korea	Lab. of Functional Plants, Seoul National University, Korea
151	Hamyang 10	Korea	Wild ginseng	Hamyang-gun, Gyeongsangnam-do, Korea	Lab. of Functional Plants, Seoul National University, Korea
152	JD1	Korea	Wild ginseng	Hadong-gun, Gyeongsangnam-do, Korea	Lab. of Functional Plants, Seoul National University, Korea
153	JD2	Korea	Wild ginseng	Hadong-gun, Gyeongsangnam-do, Korea	Lab. of Functional Plants, Seoul National University, Korea
154	JD3	Korea	Wild ginseng	Hadong-gun, Gyeongsangnam-do, Korea	Lab. of Functional Plants, Seoul National University, Korea
155	JD4	Korea	Wild ginseng	Hadong-gun, Gyeongsangnam-do, Korea	Lab. of Functional Plants, Seoul National University, Korea
156	JD5	Korea	Wild ginseng	Hadong-gun, Gyeongsangnam-do, Korea	Lab. of Functional Plants, Seoul National University, Korea
157	17T1-1	China	Cultivated ginseng	Ji'an, Jilin, China	Lab. of Functional Plants, Seoul National University, Korea
158	17T1-2	China	Cultivated ginseng	Ji'an, Jilin, China	Lab. of Functional Plants, Seoul National University, Korea
159	17T1-3	China	Cultivated ginseng	Ji'an, Jilin, China	Lab. of Functional Plants, Seoul National University, Korea
160	17T2-1	China	Cultivated ginseng	Ji'an, Jilin, China	Lab. of Functional Plants, Seoul National University, Korea
161	17T2-2	China	Cultivated ginseng	Ji'an, Jilin, China	Lab. of Functional Plants, Seoul National University, Korea
162	17T2-3	China	Cultivated ginseng	Ji'an, Jilin, China	Lab. of Functional Plants, Seoul National University, Korea
163	18T1-1	China	Cultivated ginseng	Ji'an, Jilin, China	Lab. of Functional Plants, Seoul National University, Korea
164	18T1-2	China	Cultivated ginseng	Ji'an, Jilin, China	Lab. of Functional Plants, Seoul National University, Korea
165	18T1-3	China	Cultivated ginseng	Ji'an, Jilin, China	Lab. of Functional Plants, Seoul National University, Korea
166	18T2-1	China	Cultivated ginseng	Ji'an, Jilin, China	Lab. of Functional Plants, Seoul National University, Korea
167	18T2-2	China	Cultivated ginseng	Ji'an, Jilin, China	Lab. of Functional Plants, Seoul National University, Korea
168	18T2-3	China	Cultivated ginseng	Ji'an, Jilin, China	Lab. of Functional Plants, Seoul National University, Korea
169	18T3-1	China	Cultivated ginseng	Ji'an, Jilin, China	Lab. of Functional Plants, Seoul National University, Korea
170	18T3-2	China	Cultivated ginseng	Ji'an, Jilin, China	Lab. of Functional Plants, Seoul National University, Korea
171	18T3-3	China	Cultivated ginseng	Ji'an, Jilin, China	Lab. of Functional Plants, Seoul National University, Korea
172	C-farm 1	China	Cultivated ginseng	Fusong, Jilin, China	Institute of Chinese Materia Medica, China Academy of Chinese Medical Sciences, China
173	C-farm 2	China	Cultivated ginseng	Fusong, Jilin, China	Institute of Chinese Materia Medica, China Academy of Chinese Medical Sciences, China
174	C-farm 3	China	Cultivated ginseng	Fusong, Jilin, China	Institute of Chinese Materia Medica, China Academy of Chinese Medical Sciences, China
175	C-farm 4	China	Cultivated ginseng	Fusong, Jilin, China	Institute of Chinese Materia Medica, China Academy of Chinese Medical Sciences, China
176	C-farm 5	China	Cultivated ginseng	Fusong, Jilin, China	Institute of Chinese Materia Medica, China Academy of Chinese Medical Sciences, China
177	Damaya	China	Cultivated ginseng	Dūnhuà, Jilin, China	School of Pharmaceutical Sciences, Changchun University of Chinese Medicine, China / Zhao *et al*. 2015
178	Ermaya	China	Cultivated ginseng	Dūnhuà, Jilin, China	School of Pharmaceutical Sciences, Changchun University of Chinese Medicine, China / Zhao *et al*. 2015

179	G06001	China	Cultivated ginseng	Fusong, Jilin, China	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
180	G06003	China	Cultivated ginseng	Fusong, Jilin, China	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
181	G06010	China	Cultivated ginseng	Tonghua, Jilin, China	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
182	G08082	China	Cultivated ginseng	Huanren, Liaoning, China	Ginseng Division, Department of Herbal Crop Research, Rural Development Administration, Korea
183	Gaolishen	China	Cultivated ginseng	Dūnhuà, Jilin, China	School of Pharmaceutical Sciences, Changchun University of Chinese Medicine, China / Zhao *et al* . 2015
184	Jilin	China	Cultivated ginseng	Changchun, Jilin, China	College of Life Science, Jilin Agricultural University, China / Wang *et al* . 2018
185	JYH-2016473	China	Cultivated ginseng	Unknown, China	Key Laboratory for Plant Diversity and Biogeography of East Asia, Kunming Institute of Botany, China / https://www.ncbi.nlm.nih.gov/nuccore/MK408938
186	Yeshanshen	China	Wild ginseng	Dūnhuà, Jilin, China	School of Pharmaceutical Sciences, Changchun University of Chinese Medicine, China / Zhao *et al* . 2015
187	J-farm 1	Japan	Cultivated ginseng	Azumino, Nagano, Japan	Institute of Chinese Materia Medica, China Academy of Chinese Medical Sciences, China
188	J-farm 2	Japan	Cultivated ginseng	Azumino, Nagano, Japan	Institute of Chinese Materia Medica, China Academy of Chinese Medical Sciences, China
189	J-farm 3	Japan	Cultivated ginseng	Azumino, Nagano, Japan	Institute of Chinese Materia Medica, China Academy of Chinese Medical Sciences, China
190	J-farm 4	Japan	Cultivated ginseng	Azumino, Nagano, Japan	Institute of Chinese Materia Medica, China Academy of Chinese Medical Sciences, China
191	J-farm 5	Japan	Cultivated ginseng	Azumino, Nagano, Japan	Institute of Chinese Materia Medica, China Academy of Chinese Medical Sciences, China
192	Mimaki 1	Japan	Cultivated ginseng	Suwon-si, Gyeonggi-do, Korea	Lab. of Functional Plants, Seoul National University, Korea / Japanese cultivar
193	Mimaki 2	Japan	Cultivated ginseng	Suwon-si, Gyeonggi-do, Korea	Lab. of Functional Plants, Seoul National University, Korea / Japanese cultivar
194	Mimaki 3	Japan	Cultivated ginseng	Suwon-si, Gyeonggi-do, Korea	Lab. of Functional Plants, Seoul National University, Korea / Japanese cultivar
195	Russia 0	Russia	Wild ginseng	Vladivostok, Primorsky Krai, Russia	Lab. of Functional Plants, Seoul National University, Korea
196	Russia 1	Russia	Wild ginseng	Vladivostok, Primorsky Krai, Russia	Lab. of Functional Plants, Seoul National University, Korea
197	Russia 2	Russia	Wild ginseng	Vladivostok, Primorsky Krai, Russia	Lab. of Functional Plants, Seoul National University, Korea
198	Russia 3	Russia	Wild ginseng	Chuguevskoe, Primorsky Krai, Russia	Lab. of Functional Plants, Seoul National University, Korea
199	Russia 4	Russia	Wild ginseng	Chuguevskoe, Primorsky Krai, Russia	Lab. of Functional Plants, Seoul National University, Korea
200	Russia 5	Russia	Wild ginseng	Chuguevskoe, Primorsky Krai, Russia	Lab. of Functional Plants, Seoul National University, Korea
201	Russia 6	Russia	Wild ginseng	Chuguevskoe, Primorsky Krai, Russia	Lab. of Functional Plants, Seoul National University, Korea
202	Russia 7	Russia	Wild ginseng	Chuguevskoe, Primorsky Krai, Russia	Lab. of Functional Plants, Seoul National University, Korea
203	Russia 8	Russia	Wild ginseng	Chuguevskoe, Primorsky Krai, Russia	Lab. of Functional Plants, Seoul National University, Korea

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Table S2. Plastome sequence assembly statistics of the 44 ginseng germplasms used in this study

No.	**Name**	**Abbreviation**	**Origin**	**Type**	**Plastid genome**				**GenBank No.**	**Reference**
					LSC	**SSC**	**IR**	**Entire**		
0	Sobek z)	SB	Korea	Wild collection	86,106	18,070	26,071	156,318	AY582139	Kim *et al* . 2004
1	Cheongsun	CS		Cultivar	86,129	18,077	26,075	156,356	KM067386	Kim *et al* . 2015b
2	Chunpoong	CP			86,128	18,084	26,018	156,248	KM088019	
3	Gopoong	GO			86,128	18,077	26,075	156,355	KM067387	
4	Gumpoong	GP			86,129	18,077	26,075	156,356	KM067388	
5	Sunhyang	SH			86,200	18,077	26,074	156,425	KM067393	
6	Sunwon	SW			86,128	18,077	26,075	156,355	KM067390	
7	Sunpoong	SP			86,128	18,077	26,075	156,355	KM067391	
8	Sunun	SU			86,128	18,077	26,075	156,355	KM067392	
9	Yunpoong	YP			86,128	18,077	26,075	156,355	KM088020	
10	Hwangsook	HS		Landrace	86,128	18,077	26,018	156,241	KM067394	
11	Jakyung	JK			86,128	18,077	26,075	156,355	KM067389	
12	K-farm 1	KF1		Farm collection	86,128	18,077	26,075	156,355	MT416073	This study
13	K-farm 2	KF2			86,128	18,084	26,018	156,248	MT416074	
14	K-farm 3	KF3			86,128	18,084	26,018	156,248	MT416075	
15	K-farm 4	KF4			86,129	18,077	26,075	156,356	MT416076	
16	K-farm 5	KF5			86,128	18,077	26,018	156,241	MT416077	
17	Cheongsong 2	ChS2		Wild collection	86,128	18,077	26,075	156,355	MK415693	
18	Daejeon	DJ			86,128	18,077	26,075	156,355	MK415694	
19	Gangwon 2	G2			86,129	18,077	26,075	156,356	MK415695	
20	Gangwon 8	G8			86,128	18,077	26,075	156,355	MK415696	
21	Gangwon 13	G13			86,128	18,077	26,075	156,355	MK415697	
22	Gangwon 15	G15			86,129	18,077	26,075	156,356	MK415698	
23	Gangwon 16	G16			86,128	18,077	26,075	156,355	MK415699	
24	Gangwon 17	G17			86,128	18,077	26,075	156,355	MK415700	
25	Hamyang 1	HY1			86,128	18,077	26,074	156,353	MN864139	
26	C-farm 1	CF1	China	Farm collection	86,128	18,077	26,075	156,355	MT416063	This study
27	C-farm 2	CF2			86,128	18,077	26,075	156,355	MT416064	
28	C-farm 3	CF3			86,128	18,077	26,075	156,355	MT416065	
29	C-farm 4	CF4			86,128	18,077	26,075	156,355	MT416066	
30	C-farm 5	CF5			86,128	18,077	26,075	156,355	MT416067	
31	Jilin y)	JL		Landrace	86,128	18,077	26,018	156,241	MH049735	Wang *et al* . 2018
32	Damaya	DMY			86,129	18,077	26,074	156,354	KC686331	Zhao *et al* . 2015
33	Gaolishen	GLS			86,129	18,077	26,074	156,354	KC686333	
34	Ermaya	EMY			86,129	18,077	26,074	156,354	KC686332	
35	Yeshanshen	YSS		Wild collection	86,130	18,077	26,074	156,355	KF431956	
36	JYH-2016473	JYH		-	86,128	18,077	26,018	156,241	MK408938	-
37	Mimaki 1	M1	Japan	Cultivar	86,128	18,077	26,075	156,355	MK415701	This study
38	J-farm 1	JF1		Farm collection	86,128	18,077	26,075	156,355	MT416068	
39	J-farm 2	JF2			86,127	18,077	26,075	156,354	MT416069	
40	J-farm 3	JF3			86,128	18,077	26,075	156,355	MT416070	
41	J-farm 4	JF4			86,128	18,077	26,075	156,355	MT416071	
42	J-farm 5	JF5			86,128	18,077	26,075	156,355	MT416072	
43	Russia 1	R1	Russia	Wild collection	86,128	18,077	26,075	156,355	MK415702	This study
44	Russia 2	R2			86,129	18,077	26,075	156,356	MK415703	

z) The sequence of this germplasm was not used for comparative analysis due to its low sequence accuracy. y) The reported length for each section of this germplasm was readjusted by comparison with other germplasms.

IR, Inverted repeat; LSC, Large single copy; SSC, Small single copy.

Table S3. Variation information of the *P. quinquefolius* plastomes

No.	**Variant type**	***P. quinquefolious* 1 (NC027456, 156,088 bp)**		***P. quinquefolious 2* (MK408923, 156,070 bp)**		**Region**
		Genotype	**Position**	**Genotype**	**Position**	
1	InDel	$(A)_{13}$	4,835	$(A)_{12}$	4,834 | 4,835	LSC
2	SNP	T	24,192	C	24,191	
3	InDel	$(C)_{13}$	38,149 ~ 38,151	$(C)_{10}$	38,147 | 38,148	
4	SNP	C	56,945	A	56,941	
5	SNP	C	59,389	T	59,385	
6	SNP	T	60,441	G	60,437	
7	SNP	C	60,992	A	60,988	
8	InDel	TATTAAATTATTATAA	61,322 ~ 61,337	-	61,317 | 61,318	
9	SNP	C	64,601	T	64,581	
10	InDel	$(A)_{8}$	73,253 | 73,254	$(A)_{9}$	73,234	
11	InDel	$(A)_{8}$	73,919 | 73,920	$(A)_{9}$	73,901	
12	SNP	A	78,705	T	78,687	
13	SNP	A	78,706	T	78,688	
14	SNP	T	82,075	C	82,057	
15	SNP	T	95,250 / 146,934	A	95,232 / 146,916	IR
16	SNP	G	95,251 / 146,933	T	95,233 / 146,915	
17	SNP	A	95,252 / 146,932	C	95,234 / 146,914	
18	SNP	T	95,253 / 146,931	A	95,235 / 146,913	
19	SNP	T	99,395 / 142,789	A	99,377 / 142,771	
20	SNP	C	100,912 / 141,272	T	100,894 / 141,254	

IR, Inverted repeat; LSC, Large single copy

Table S4. Sequence information for the 10 KASP markers developed based on ginseng plastome sequences

Variation No z)	Marker name	Nucleotide position y)	Allele		Allele-specific primer sequence (5'->3')	Common primer sequence (5'->3')
S1	pgcpKASP006	7,159	FAM	G	CGTTGTCACTAAAATAGAACGAAATC**G**	GGAAATGCTTAGTTTAACTTAATATGTAAT
			HEX	T	AACGTTGTCACTAAAATAGAACGAAATC**T**	
S2	pgcpKASP001	21,344	FAM	T	AAAAGATTGTGGCACCGTCCGA**A**	CCCATTTCGGGGACTCACAGAAATA
			HEX	C	AAAGATTGTGGCACCGTCCGA**G**	
S3	pgcpKASP005	22,287	FAM	T	GAAATATGACCAACAGTAGTTCGAATATA**T**	GGGCAATATCTAATAGTAAGAAGTATAAAA
			HEX	G	AAATATGACCAACAGTAGTTCGAATATA**G**	
S4	pgcpKASP009	23,946	FAM	A	TTAAAATTCTAGAACCCCCCCC**A**	TGGGAACTTGAGTAAGGAGTAGATCTTTT
			HEX	C	TAAAATTCTAGAACCCCCCCC**C**	
S5	pgcpKASP010	40,011	FAM	C	GAGAATAGTAATTCACTATTCTTAACAATAG**G**	AACCCAGAGCAATAGCATGATGAACTAA
			HEX	T	GAGAATAGTAATTCACTATTCTTAACAATAG**A**	
S6	pgcpKASP003	44,895	FAM	G	GACATGAGTTTTAAACTGAAATCTTAAATTT**G**	CTGAAGGTGGGAGAAAAGATAAAACCAAA
			HEX	T	GACATGAGTTTTAAACTGAAATCTTAAATTT**T**	
S7	pgcpKASP004	90,858 / 151,519	FAM	G	ACATCACTTCTGCTTCTATTGTAATAAA**G**	CGGGCCTTTTCCACATAAAAAGGGAA
			HEX	A	CACATCACTTCTGCTTCTATTGTAATAAA**A**	
S9	pgcpKASP002	117,376	FAM	G	GCTAAGAATTATTACAGGTCCC**G**	GACACGATAACTCCAATAATCCAACTGTT
			HEX	A	CTGCTAAGAATTATTACAGGTCCC**A**	
S10	pgcpKASP007	118,525	FAM	T	AACATCTCCCGGCCAACGTAATTT**A**	CCATATGAGATACAGAGGAATAGGCTATT
			HEX	A	AACATCTCCCGGCCAACGTAATTT**T**	
S11	pgcpKASP008	127,069	FAM	A	TTCTTCTTGATTTCGATTCTTTAATTCAAAA**A**	GCAAAAATGGAATTTTTTTAGACCATCAAA
			HEX	T	TCTTCTTGATTTCGATTCTTTAATTCAAAA**T**	

Bold and underlined nucleotides in the primer sequences represent allele-specific positions. z) Variation number shown in Fig. 1. y) Variation positions are based on the plastome sequence of *P. ginseng* cv. ‘Chunpoong’ (KM088019).

FAM, Fluorescein amidite; HEX, Hexachloro-fluorescein; KASP, Kompetitive allele-specific PCR.

Table S5. Sequence information for the four InDel markers developed based on ginseng plastome sequences

Variation No [z)]	Marker name	Nucleotide position [y)]	Primer sequence (5'->3')		TR unit length (bp)	CNV	Product size (bp)
ID2	pgcp097f2*r	7,189	Forward	TGGAAAGGCTGTTGTCACTG	13	1 - 2	378 / 391
			Reverse	TCAGCAACGGGAGATATTCA			
ID3	pgcp137	32,850	Forward	TCCTGAACCACTAGACGATGG	59	1 - 2	457 / 516
			Reverse	TTTCGATAACTTCTTGATCCCTCT			
ID6	pgycf1	111,304 / 130,897	Forward	GGTATTAGTCTGGATACGGCAAA	57	2 - 5	615 / 672 / 729 / 786
			Reverse	TCGAAAAGAAGGGTCACAAGA			
ID7	pgcp139f*r2	115,833	Forward	TGTGCGACAAACAAATAAGTCA	7	2 - 3	150 / 157
			Reverse	CGAAGCGAGTTCCATTTCAT			

All InDel markers were developed in Kim *et al*. 2015b. [z)] Variation number shown in Fig. 1. [y)] Variation positions are based on the plastome sequence of *P. ginseng* cv. 'Chunpoong' (KM088019).

CNV, Copy number variation; TR, Tandem repeat.

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Table S6. Genotype and group information for 203 individual ginseng plants

Origin	Germ-plasm type	No.	Variation No. z) (Marker) / Name	S1 pgcp KASP 006	S2 pgcp KASP 001	S3 pgcp KASP 005	S4 pgcp KASP 009	S5 pgcp KASP 010	S6 pgcp KASP 003	S7 pgcp KASP 004	S9 pgcp KASP 002	S10 pgcp KASP 007	S11 pgcp KASP 008	ID2 pgcp 097f2*r y)	ID3 pgcp 137 y)	ID6 pg ycf1 y)	ID7 pgcp 139f*r2 y)	SNP combination	InDel combination	Haplotype
		1	Cheonryang	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		2	**CP**	G	C	T	A	C	G	A	A	T	A	1	1	3	3	GCTACGAATA	1133	I
		3	**CS**	G	T	G	A	C	G	A	G	T	A	1	1	4	2	GTGACGAGTA	1142	B'
		4	G03001	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		5	G03002	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B
		6	G03003	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B
		7	G03004	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B
		8	G03005	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		9	G03006	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		10	G03007	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		11	G03008	G	C	T	A	C	G	A	A	T	A	1	1	3	3	GCTACGAATA	1133	I
		12	G03009	G	C	T	A	C	G	A	A	T	A	1	2	5	2	GCTACGAATA	1252	I
		13	G03010	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B
		14	G03011	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		15	G03012	G	C	G	A	C	G	A	A	T	A	1	1	2	2	GCGACGAATA	1122	A
		16	G03013	G	C	G	C	C	G	A	A	T	A	1	1	4	2	GCGCCGAATA	1142	J
		17	G03015	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		18	G03016	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B
		19	G03017	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		20	G03018	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B
		21	G03019	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		22	G03020	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		23	G03021	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		24	G03022	G	C	G	A	C	T	A	A	T	A	2	2	5	2	GCGACTAATA	2252	C
		25	G03024	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		26	G03025	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		27	G03026	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B
		28	G03027	G	C	T	C	C	G	A	A	T	A	1	2	3	2	GCTCCGAATA	1232	IJ
		29	G03028	G	C	T	C	C	G	A	A	T	A	1	2	3	2	GCTCCGAATA	1232	IJ
		30	G03029	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		31	G03030	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		32	G03031	G	C	G	A	C	G	A	A	A	A	1	1	4	2	GCGACGAAAA	1142	D
		33	G03034	G	T	G	A	C	G	A	G	T	A	1	1	4	2	GTGACGAGTA	1142	B'
		34	G03035	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		35	G03036	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		36	G03037	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		37	G03038	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		38	G03039	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		39	G03040	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B

		40	G03041	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		41	G03042	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		42	G03043	G	T	G	A	C	G	A	G	T	A	1	1	4	2	GTGACGAGTA	1142	B'
		43	G03044	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		44	G03045	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		45	G03046	G	C	G	A	C	G	A	A	T	A	1	1	3	2	GCGACGAATA	1132	A
		46	G03047	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		47	G03048	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B
		48	G03049	G	C	T	A	C	G	A	A	T	A	1	1	3	3	GCTACGAATA	1133	I
		49	G03050	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		50	G03051	G	C	G	A	C	G	A	A	T	A	1	2	4	2	GCGACGAATA	1242	A
		51	G03052	G	C	G	A	C	T	A	A	T	A	1	1	4	2	GCGACTAATA	1142	C
		52	G03053	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		53	G03054	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		54	G03055	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B
		55	G03056	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B
		56	G03057	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B
		57	G03058	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		58	G03059	G	C	G	A	C	G	A	A	T	A	1	2	4	2	GCGACGAATA	1242	A
		59	G03060	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		60	G03061	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		61	G03062	G	C	G	A	C	T	A	A	T	A	1	1	4	2	GCGACTAATA	1142	C
	C	62	G03063	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		63	G03064	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		64	G03065	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		65	G03067	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		66	G03068	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B
		67	G03069	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		68	G03070	G	C	G	A	C	G	A	A	A	A	1	1	4	2	GCGACGAAAA	1142	D
		69	G03071	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		70	G03072	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		71	G03075	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		72	G03076	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B
		73	G03077	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B
		74	G03078	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		75	G03079	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		76	G03080	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		77	G03081	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		78	G03083	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
Korea		79	G03084	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		80	G03086	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		81	G03089	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		82	G03092	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		83	G03093	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		84	G03096	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		85	G03105	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A

86	G03107	G	C	G	A	C	G	A	A	T	A	1	1	3	2	GCGACGAATA	1132	A
87	G03109	G	C	G	A	C	G	G	A	T	A	1	1	4	2	GCGACGGATA	1142	E
88	G03110	G	T	G	A	C	G	A	G	T	A	1	1	4	2	GTGACGAGTA	1142	B'
89	G03111	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B
90	G03112	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
91	G03114	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B
92	G03118	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B
93	G03119	G	C	G	A	C	G	G	A	T	A	1	1	4	2	GCGACGGATA	1142	E
94	G03140	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
95	G03180	G	C	G	A	C	G	A	A	A	A	1	1	4	2	GCGACGAAAA	1142	D
96	G04051	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
97	G04054	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
98	G04076	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
99	G05021	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B
100	G05032	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
101	G05097	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
102	G08024	G	T	G	A	C	G	A	G	T	A	1	1	4	2	GTGACGAGTA	1142	B'
103	G08034	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
104	**GO**	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
105	GO	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B
106	Gowon	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B
107	**GP**	G	T	G	A	C	G	A	G	T	A	1	1	4	2	GTGACGAGTA	1142	B'
108	Gumjin	T	C	G	A	C	G	A	A	T	A	2	2	4	2	TCGACGAATA	2242	G
109	Gumsun	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B
110	**HS**	G	C	G	A	C	G	A	A	T	T	1	1	3	2	GCGACGAATT	1132	F
111	**JK**	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
112	K-1	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
113	**KF1**	G	C	G	A	T	G	A	A	T	A	1	1	4	2	GCGATGAATA	1142	H
114	**KF2**	G	C	T	A	C	G	A	A	T	A	1	1	3	2	GCTACGAATA	1132	I
115	**KF3**	G	C	T	A	C	G	A	A	T	A	1	1	3	2	GCTACGAATA	1132	I
116	**KF4**	G	C	G	A	C	T	A	A	T	A	1	1	4	2	GCGACTAATA	1142	C
117	**KF5**	G	C	G	A	C	G	A	A	T	T	1	1	3	2	GCGACGAATT	1132	F
118	M05057	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
119	**SH**	T	C	G	A	C	G	A	A	T	A	2	2	4	2	TCGACGAATA	2242	G
120	**SP**	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
121	**SU**	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
122	**SW**	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
123	**YP**	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
124	Cheongsong 1	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
125	**ChS2**	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
126	Cheongsong 3	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
127	**DJ**	G	C	G	A	C	G	A	A	A	A	1	1	4	2	GCGACGAAAA	1142	D
128	Gangwon 1	G	C	G	C	C	G	A	A	T	A	1	1	4	2	GCGCCGAATA	1142	J
129	**G2**	G	T	G	A	C	G	A	G	T	A	1	1	4	2	GTGACGAGTA	1142	B'
130	Gangwon 3	G	T	G	A	C	G	A	G	T	A	1	1	4	2	GTGACGAGTA	1142	B'
131	Gangwon 4	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A

		132	Gangwon 6	G	C	H	A	C	G	A	A	T	A	1	1	4	2	GCHACGAATA	1142	#N/A
		133	Gangwon 7	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		134	**G8**	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		135	Gangwon 9	G	C	H	A	C	G	A	A	T	A	1	1	4	2	GCHACGAATA	1142	#N/A
		136	Gangwon 10	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		137	Gangwon 11	G	T	G	A	C	G	A	G	T	A	1	1	4	2	GTGACGAGTA	1142	B'
		138	Gangwon 12	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		139	**G13**	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
	W	140	Gangwon 14	G	C	H	A	C	G	H	A	T	T	1	1	3	2	GCHACGHATT	1132	#N/A
		141	**G15**	G	C	G	A	C	T	A	A	T	A	1	1	4	2	GCGACTAATA	1142	C
		142	**G16**	G	C	G	A	C	G	A	A	A	A	1	1	4	2	GCGACGAAAA	1142	D
		143	**G17**	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		144	**HY1**	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		145	Hamyang 3	G	C	G	A	C	G	A	A	T	A	1	2	4	2	GCGACGAATA	1242	A
		146	Hamyang 4	G	C	H	A	C	G	A	A	T	A	1	1	4	2	GCHACGAATA	1142	#N/A
		147	Hamyang 5	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B
		148	Hamyang 6	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		149	Hamyang 8	G	C	G	A	C	G	A	A	T	A	1	1	2	2	GCGACGAATA	1122	A
		150	Hamyang 9	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		151	Hamyang 10	G	C	T	A	C	G	A	A	T	A	1	2	5	2	GCTACGAATA	1252	I
		152	JD1	G	T	G	A	C	G	A	G	T	A	1	1	4	2	GTGACGAGTA	1142	B'
		153	JD2	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		154	JD3	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		155	JD4	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		156	JD5	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		157	17T1-1	G	C	G	A	C	T	A	A	T	A	1	1	4	2	GCGACTAATA	1142	C
		158	17T1-2	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		159	17T1-3	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		160	17T2-1	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		161	17T2-2	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		162	17T2-3	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		163	18T1-1	G	C	G	A	C	G	A	A	T	A	1	1	2	2	GCGACGAATA	1122	A
		164	18T1-2	G	C	G	A	C	G	A	A	T	A	1	1	2	2	GCGACGAATA	1122	A
		165	18T1-3	G	C	T	C	C	G	A	A	T	A	1	2	3	2	GCTCCGAATA	1232	IJ
		166	18T2-1	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		167	18T2-2	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		168	18T2-3	G	C	H	A	C	G	A	A	T	A	1	1	4	2	GCHACGAATA	1142	#N/A
		169	18T3-1	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		170	18T3-2	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
China	C	171	18T3-3	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		172	**CF1**	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		173	**CF2**	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		174	**CF3**	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		175	**CF4**	G	C	G	A	C	G	A	A	A	A	1	1	4	2	GCGACGAAAA	1142	D
		176	**CF5**	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		177	**DMY**	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A

		178	**EMY**	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		179	G06001	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B
		180	G06003	G	C	G	A	C	G	A	A	T	A	1	2	4	2	GCGACGAATA	1242	A
		181	G06010	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		182	G08082	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B
		183	**GLS**	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		184	**JL**	G	C	G	A	C	G	A	A	T	T	1	1	3	2	GCGACGAATT	1132	F
		185	**JYH**	G	C	G	A	C	G	A	A	T	A	1	1	3	2	GCGACGAATA	1132	A
	W	186	**YSS**	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
Japan	C	187	**JF1**	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		188	**JF2**	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		189	**JF3**	G	C	G	C	C	G	A	A	T	A	1	1	4	2	GCGCCGAATA	1142	J
		190	**JF4**	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		191	**JF5**	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		192	**M 1**	G	C	G	A	C	G	G	A	T	A	1	1	4	2	GCGACGGATA	1142	E
		193	Mimaki 2	G	C	G	A	C	G	G	A	T	A	1	1	4	2	GCGACGGATA	1142	E
		194	Mimaki 3	G	C	T	A	C	G	A	A	T	A	1	1	3	3	GCTACGAATA	1133	I
Russia	W	195	Russia 0	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B
		196	**R1**	G	C	G	A	C	G	A	A	T	A	1	1	4	2	GCGACGAATA	1142	A
		197	**R2**	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B
		198	Russia 3	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B
		199	Russia 4	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B
		200	Russia 5	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B
		201	Russia 6	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B
		202	Russia 7	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B
		203	Russia 8	G	T	G	A	C	G	A	A	T	A	1	1	4	2	GTGACGAATA	1142	B

The germplasms in bold letters represent the sequenced samples. [z] Variation number shown in Fig. 1. [y] InDel markers were developed in Kim *et al* . 2015b and the genotypes were represented using the copy numbers of each TR units.

C, Cultivated ginseng; TR, Tandem repeat; W, Wild ginseng.