

Table S1 Basic information of the tested *E. sibiricus* accessions

Number	ID	Geographic sources	Group
1	GS014-8	Zhuoni, Gansu	QTP
2	GS013-14	Hezuo, Gansu	QTP
3	GS011-13	Luqu, Gansu	QTP
4	GS003-28	Xiahe, Gansu	QTP
5	GS003-15	Xiahe, Gansu	QTP
6	GS002-5	Xiahe, Gansu	QTP
7	HB013-5	Fengning, Hebei	NC
8	HB012-11	Guyuan, Hebei	NC
9	HB011-27	Guyuan, Hebei	NC
10	HB010-3	Guyuan, Hebei	NC
11	HB009-15	Guyuan, Hebei	NC
12	HB001-5	Zhangbei, Hebei	NC
13	NM036-3	Zhenglan Banner, Inner Mongolia	NC
14	NM032-12	Xiwu Banner, Inner Mongolia	NC
15	NM031-5	Linyou Banner, Inner Mongolia	NC
16	NM021-13	Ewenk Banner, Inner Mongolia	NC
17	NM011-6	Arong Banner, Inner Mongolia	NC
18	NM011-4	Arong Banner, Inner Mongolia	NC
19	NM008-1	Nahe, Heilongjiang	NC
20	NM003-14	Genhe, Inner Mongolia	NC
21	NM003-10	Genhe, Inner Mongolia	NC
22	QH013-8	Tianjun, Qinghai	QTP
23	QH008-33	Chenduo, Qinghai	QTP
24	QH006-22	Huangzhong, Qinghai	QTP
25	QH006-20	Huangzhong, Qinghai	QTP
26	QH005-35	Tongde, Qinghai	QTP
27	QH003-19	Zeku, Qinghai	QTP
28	QH002-3	Tongren, Qinghai	QTP
29	QH001-21	Hualong, Qinghai	QTP
30	PI326266	Amur region, Far East of Russia	W
31	W6 10304	Gorno Altay A.O., Siberia, Russia	W
32	PI598779	Amur region, Far East of Russia	W
33	PI598784	Southeast of Baikal, Buryat Autonomous Republic, Siberia, Russia	W
34	XZ012-16	Dingqing, Tibet	QTP
35	XZ009-25	Seni, Tibet	QTP
36	XZ009-20	Seni, Tibet	QTP
37	XZ008-20	Duilong Deqing, Tibet	QTP
38	XJ026-35	Urumqi, Xinjiang	XJ
39	XJ026-26	Urumqi, Xinjiang	XJ
40	XJ025-20	Urumqi, Xinjiang	XJ
41	XJ021-33	Qitai, Xinjiang	XJ

42	XJ013-28	Fuyun, Xinjiang	XJ
43	XJ012-17	Fuyun, Xinjiang	XJ
44	XJ003-15	Zhaosu, Xinjiang	XJ
45	SC018-16	Seda, Sichuan	QTP
46	SC015-20	Rangtang, Sichuan	QTP
47	SC012-16	Aba, Sichuan	QTP
48	SC011-4	Ruoergai, Sichuan	QTP
49	SC010-15	Ruoerga, Sichuan	QTP
50	SC002-4	Hongyuan, Sichuan	QTP

Note: ID30-33 come from National Plant Germplasm System (NPGS), and others are collected in China, which GS is Gansu province, HB is Hebei province, NM is Inner Mongolia Autonomous Region, QH is Qinghai province, XZ is Tibet Autonomous Region, XJ is Xinjiang Autonomous Region, SC is Sichuan province.