

Table S1 Collection details of the 26 populations of *Saccharina japonica* studied.

Population number	Sample site	Sample size	Coordinates	Data of collection
1	Hokkaido, Japan	27	N45°27' E141°38'	2012.12
2	Hokkaido, Japan	6	N45°24' E141°40'	2012.12
3	Hokkaido, Japan	22	N43°20' E140°23'	2012.07
4	Hokkaido, Japan	10	N43°11' E140°47'	2012.07
5	Hokkaido, Japan	24	N43°12' E140°51'	2012.07
6	Hokkaido, Japan	21	N43°12' E141°00'	2012.07
7	Hokkaido, Japan	28	N41°46' E140°41'	2011.10
8	Hokkaido, Japan	26	N42°06' E140°35'	2011.10
9	Hokkaido, Japan	7	N42°31' E140°23'	2012.07
10	Hokkaido, Japan	28	N43°17' E145°31'	2012.07
11	Hokkaido, Japan	32	N43°58' E144°52'	2012.06
12	Kunashir Island, Russia	28	N44°03' E145°43'	2011.09
13	Sakhalin, Russia	24	N46°06' E143°18'	2011.09
14	Sakhalin, Russia	29	N46°36' E142°54'	2011.09
15	Sakhalin, Russia	28	N46°25' E141°51'	2013.09
16	Sakhalin, Russia	21	N46°32' E141°48'	2011.09
17	Sakhalin, Russia	30	N46°32' E141°48'	2011.09
18	Sakhalin, Russia	16	N47°08' E142°03'	2011.09
19	Sakhalin, Russia	26	N48°50' E141°55'	2011.09
20	Sakhalin, Russia	29	N48°50' E141°55'	2011.09
21	Primorsky, Russia	30	N43°57' E135°27'	2012.10
22	Primorsky, Russia	6	N43°06' E131°52'	2011.09
23	South Korea	27	N37°47' E128°55'	2013.06
24	Liaoning, China	27	N39°05' E 122°47'	2014.07
25	Shandong, China	30	N37°29' E121°34'	2011.05
26	Shandong, China	30	N37°09' E122°35'	2011.05