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Summary: *Cakile edentula* (Bigelow) Hook. (*Brassicaceae*) is an invasive coastal plant species native to eastern North America. Its rapid spread has been recognized recently in eastern Asia; Korea, Primorsky Territory, Sakhalin, Honshu, and Hokkaido. We found naturalized populations of *Cakile edentula* in several ocean beaches of Kunashiri and Etorofu Islands in the southern Kuril Islands. As this species has not been mentioned previously for the Kuril Islands, its naturalization must have occurred only recently.

Cakile edentula (Bigelow) Hook. (*Brassicaceae*) is an annual or biennial coastal plant with fleshy branches and 2-jointed fruits (Rodman 1974, Nakai 2003). It was described from North America (Hooker 1830). Its original distribution is along the Atlantic coast of North America from Labrador to Florida and on the shores of the Great Lakes (Rodman 1974, Sauer 1988). It became naturalized on the Pacific coast of North America and on the shores of temperate Australia from the end of the 19th century (Sauer 1988). Its naturalization has been reported recently in Eastern Asia, ranging from south to north: beach at Gangnung City of Korea (Kil and Song 2008), Furugelm Island, 110 km southwest of Vladivostok of the Primorsky Province (Chubar 2008), Nazimova spit, Khassanskii Region of the Primorsky Province (Probatova et al. 2012), and 8 km south from Novikovo, Korsakov Region of Sakhalin (Smirnov 2009). *Cakile edentula* has a peculiar mechanism for seed dispersal – the bottom segment of the fruit with half of the seeds remains attached to the dying mother plant, while the top segment with the remainder of the seeds detaches and is commonly washed away by waves. The seeds remain viable for at least 10 weeks in sea water (Sauer 1988).

Naturalization of *Cakile edentula* in Japan was first reported in 1982 on a sandy beach in Niigata Prefecture (Asai 1982). Since then, its occurrence has been reported from several coastal localities of Japan, from Shimane Prefecture northward along the Sea of Japan, and from Ibaraki Prefecture to the north of Pacific Ocean side (Ohmori 1987, Igarashi 2001, Takita 2001, Kiyosue and Asai 2009, Kosugi and Sato 2010). In Hokkaido, its naturalization has been reported from many localities in Hidaka, Iburi, Oshima, Abashiri, Hiyama (Igarashi 2001), Rishiri Island (Kosugi and Sato 2010),

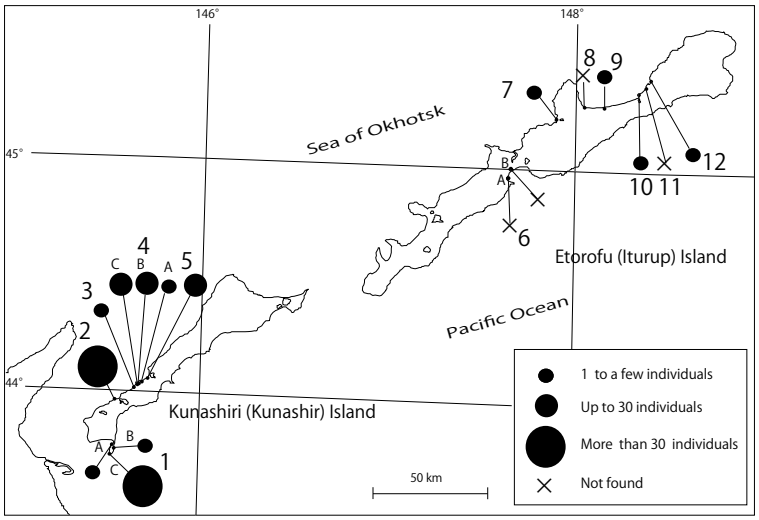

Fig. 1. Studied localities for occurrence of *Cakile edentula*. Numbers in the map (1–12) correspond to those of Table 1.

Rebun Island (Miyamoto 2007) and Betsukai-cho in Nemuro (Sukeno and Kohata 2012). In the Blue List of Hokkaido (Hokkaido 2010), *Cakile edentula* is categorized as A3, meaning that an alien species has become established in Hokkaido and its harmful effect on natural ecosystems has been reported or suspected. Extermination of *Cakile edentula* has been carried out in some localities on Hokkaido (Kosugi and Sato 2010).

Among the two subspecies of *Cakile edentula* recognized by Rodman (1974) subsp. *edentula* and subsp. *harperi* (Rodman 1974), the naturalized plants in Japan are considered to be subsp. *edentula* (Nakai 2003).

During our expedition to Kunashiri and Etorofu Islands of the Kuril Islands in August and September 2012, we found *Cakile edentula* on sandy beaches on both islands. It was not noticed by Ken Sato during his visit to Kunashiri in 1999 (Sato 2007), including Zaimokuiwa Cape or Stolbchatyy, where we found several individuals (Population 4: Table 1, Fig. 1), and it was not mentioned in previous plant lists of the Kuril Islands (Vorobjev et al. 1974, Barkalov 2000, 2009 and others). It therefore must have arrived in these islands quite recently. According to fruit form and size in comparison with specimens in TI, the plants of Kunashiri and Etorofu have been identified as *Cakile edentula* subsp. *edentula*, the same subspecies naturalized on Honshu and Hokkaido, Japan.

The localities are shown in Table 1 and in Fig. 1. The plant was found in mass in the southern part of Kunashiri Island. At Keramui-misaki Cape (Population 1: Table 1, Fig. 1), it occurred with other coastal plants, such as *Salsola komarovii* Iljin and *Atriplex subcordata* Kitag. Along the Okhotsk seacoast of northwest of Tofutsu Lake (Population 2: Table 1, Fig. 1) it formed nearly pure communities on sandy beaches between *Leymus mollis* (Trin. ex Spreng.) Pilg. communities and the seashore. Few to many individuals were observed along the Okhotsk seacoast of southern Kunashiri (Population 3–5). On Etorofu, it occurred in limited localities with few individuals, also among coastal plants such as *Carex macrocephala* Willd. ex Spreng., *Salsola komarovii*, *Honckenya peploides* (L.) Ehrh. and *Ixeris repens* (L.) A. Gray. Most individuals were found on sandy beaches and were not seen

Table 1. Localities studied and the occurrence of *Cakile edentula* in August-September, 2012

Locality		Latitude	Longitude	Occurrence*
Kunashiri (Kunashir) Island				
1	Keramui-misaki Cape (Cape Veslo) and its peninsula (Penn. Veslovskiy)			
A	Western coast of peninsula	43°43′10.8″	145°33′23.3″	+
B	Eastern (Pacific Ocean) coast of penninsula	43°42′32.1″	145°33′32.5″	+
C	Southern end of peninsula	43°39′11.2″	145°32′20.6″	+++
2	Okhotsk Sea coast between NW of Tofutsu (Peschannoye) Lake and Cape Znamenka	43°56′59.6″	145°35′15.5″	+++
3	Shimanobori-kaigan Coast	44°00′42.0″	145°40′37.8″	+
4	Between Yaitai-kotan (“13km”) village and Zaimokuiwa Cape (Cape Stolbchatyy)			
A	Between village and Zaimokuiwa Cape (Cape Stolbchatyy)	44°01′48.8″	145°41′42.1″	+
B	1km east from Zaimokuiwa Cape (Cape Stolbchatyy)	44°01′40.5″	145°41′21.3″	++
C	East side of Zaimokuiwa Cape (Cape Stolbchatyy)	44°01′34.2″	145°41′06.0″	++
5	Seacoast at SW of Nikishoro-ko Lake (Lake Legunnoye)	44°02′55.8″	145°44′20.4″	++
Etorofu (Iturup) Island				
6	Coast of Hitokappu-wan (Kasatka) Bay			
A	Rakko-jima (Chertova skala)	44°57′22.8″(from)	147°36′55.1″(from)	-
		44°57′38.8″(to)	147°37′03.5″(to)	
B	Hamanaka-hama	44°59′03.6″(from)	147°38′21.2″(from)	-
		44°59′12.2″(to)	147°38′31.4″(to)	
7	Coast of Shana (Kuril’sky)	45°13′44.0″	147°52′19.8″	+
8	Coast of Bettobu (Reydovo)	45°15′53.2″	148°02′28.7″	-
9	Biyonotsu-fishing ground (Chernyye skaly)	45°15′31.6″	148°10′05.5″	+
10	Shimonaibo (Senokosnaya)	45°20′40.1″	148°25′48.4″	+
11	Shibetoro, Otoimaushi (Dobrynina)	45°21′38.6″	148°27′39.9″	-
12	Sokiya (Sof’ya)	45°23′17.8″	148°28′50.0″	+

* -: not found; +: observed 1-few individuals; ++: up to 30 individuals; +++: more than 300 individuals.

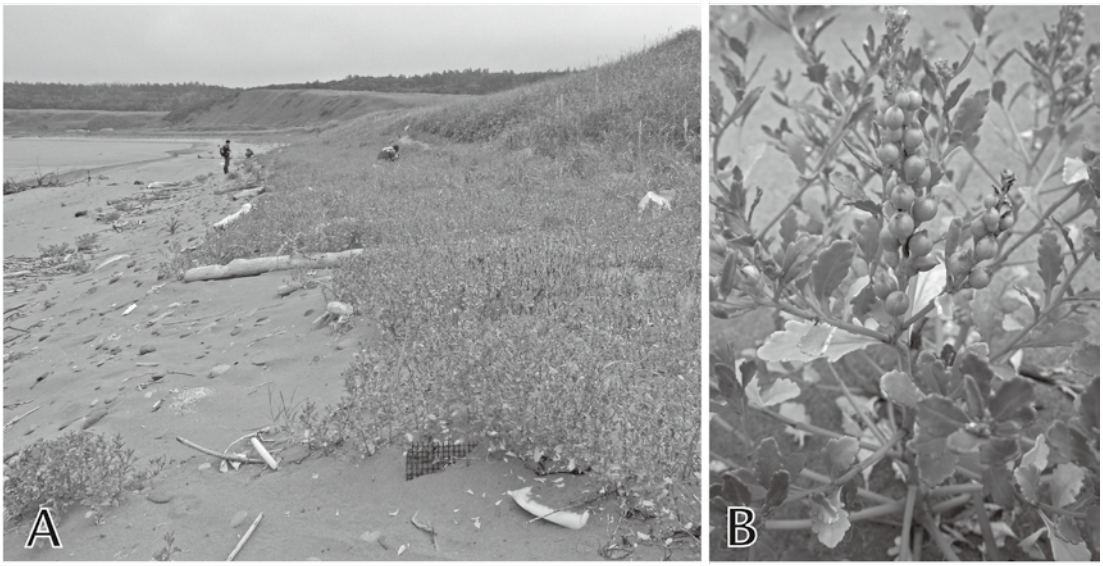

Fig. 2. *Cakile edentula* observed at the Okhotsk Sea coast, north of Tofutsu Lake (Population 2 in Table 1 and Fig. 1). A. Habitat. B. Habit.

on rocky shores.

Although the direct effect of *Cakile edentula* on the indigenous flora and vegetation is still unknown, continuous monitoring for its occurrence on these islands is necessary.

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福田知子[a]，加藤ゆき恵[b]，佐藤広行[c]，A. A. Taran[d]，V. Yu. Barkalov[e]，高橋英樹[f]：**国後・択捉島の海岸へのオニハマダイコン（アブラナ科）の帰化―千島列島からの初報告**

オニハマダイコン（アブラナ科）は北米東部原産の海浜植物であり，近年，東アジア各地（韓国，沿海州，サハリン，本州，北海道）に急速に拡大している．2012年8月～9月の調査の折，国後・択捉両島の砂浜でオニハマダイコンの生育を確認した．これまで千島列島の植物相リストに記載が無いことから，この種は最近になってこれらの島々に侵入したものと思われる．今後，これらの場所における継続的モニタリングが必要と考えられる．

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