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Citation	北海道大学総合博物館研究報告, 42-46
Issue Date	2014-03-31
Doc URL	http://hdl.handle.net/2115/55186
Type	bulletin (article)
File Information	7-AquaticPlants-42-46.pdf



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Aquatic Plants Collected in Kunashir and Iturup Islands, in 2012

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Abstract A list of 37 species in 16 families of aquatic plants was prepared based on a field trip to Kunashir and Iturup Islands in 2012. Common aquatic plants in the islands of Kunashir and Iturup are *Potamogeton perfoliatus*, *P. praelongus*, *Persicaria amphibia* and *Hippuris vulgaris*. We recorded eight species of *Potamogeton*. The temperate family Hydrocharitaceae and the genus *Trapa* were not found.

Key words: aquatic plants, Kunashir, Iturup

Introduction

Despite the numerous freshwater and brackish lakes, ponds, rivers and wetlands on the Kuril Islands, the total number of aquatic plant species is relatively low, approximately half belong to the genus *Potamogeton* (Miki 1934; Tatewaki 1939). Interestingly, the family Hydrocharitaceae, which is widely distributed from Honshu to Hokkaido in Japan, is not represented in the Kurils (Tatewaki 1934, 1939). The only studies specifically on the aquatic plants of Kurils was reported by Miki in 1933 and 1934. Recently, there have been few reports of aquatic plants in the northern Kurils (Takahashi and Kuwahara 1998; Takahashi et al. 1998). Barkalov (2009) summarized the total flora and vegetation of the Kuril Islands, recorded about 50 species of aquatic plants on Kunashir Island and Iturup Island. Other records of aquatic plants were rarely found out here and there in the studies of flora and vegetation conducted on the southern Kurils (Miyabe 1890; Kawakami 1901; Takeda 1914; Ohwi 1932a, 1932b, 1933; Matsumura 1934; Miki 1934; Tatewaki 1934, 1939, 1957).

Although many aquatic plant species have become endangered in recent years, relatively few studies have been conducted on aquatic plants of the Kuril Islands to date. This list therefore provides some basic biological information related to the conservation biology of the aquatic plants on these islands.

Materials and Methods

We conducted botanical surveys of the Kunashir and Iturup islands from August 18, 2012 to September 8, 2012. Aquatic plants

were collected from the south of Kunashir Island and the center of Iturup Island (Takahashi et al. 2013). Four botanists collected aquatic plants along the shore on foot, except at Lake Peschanoye, where we sailed across the lake by boat from the southeast shore (Pacific Ocean-side) to the northwest shore (Okhotsk Sea-side). Voucher specimens are deposited in the Herbarium of the Hokkaido University Museum (SAPS).

Results and discussion

A total of 37 species belonging to 16 families of aquatic plants were identified on Kunashir and Iturup Islands; 26 species in 13 families were collected on Kunashir Island, and 21 species in 12 families were collected on Iturup Island (see Appendix). In the two islands, common species are *Potamogeton perfoliatus*, *P. praelongus*, *Persicaria amphibia* and *Hippuris vulgaris*. Barkalov (2009) found *Zostera japonica* only on Kunashir Island. Based on the list, there appeared to be more species of Zosteraceae on Kunashir Island than on Iturup Island, but this bias is partly due to the limited time of our survey. We could not find Hydrocharitaceae, *Trapa* and Alismataceae. However, *Alisma canaliculatum* and *A. plantago-aquatica* var. *orientale* were both recorded on Kunashir Island, the latter is doubted an invasive species (Barkalov 2009).

The type locality of *Sparganium kawakamii* H. Hara (Hara 1938) is given as “Ponto” around Rubetsu on Iturup Island. We could not find this species around Lake Maloye (Rubetsu-numa) and Pioner (Rubetsu). In the monograph of *Sparganium* (Cook and Nicholls 1986) and Japanese aquatic plants identification manual (Kadono 1994), *S. kawakamii* is included in *S. angustifolium* Michx.. On the other hands, Russian botanist recognized two

species. Barkalov (2009) reported that *S. kawakamii* grows in the southern Kurils, *S. angustifolium* was observed to be more common in the northern Kurils. It is necessary to reexamine the confusion on taxonomy about *S. kawakamii*.

In Japan, numerous aquatic plant species are endangered by waterfront developments, and some exotic aquatic plants are also problematic in these environments. We therefore consider it necessary to survey aquatic flora of the Kurils in greater detail.

Acknowledgements

We are thankful to Dr. A. A. Taran for joining our field survey, and to Dr. Y. Kadota, A. Shimizu, and Dr. N. Murakami for sending us information regarding the type specimens of *Sparganium kawakamii* and for permission to examine herbarium specimens. We also thank Dr. H. Nagamasu, Dr. T. Shiga, Dr. T. Azuma for permission to examine herbarium specimens. This study was supported in part by a Grant-in-Aid to No. 21405009 for Scientific Research (B) from the Japan Society for the Promotion of Science to H. Takahashi.

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APPENDIX

An aquatic plants list of Kunashir and Iturup Islands, collected on a field trip in 2012.

<Ferns and fern allies>

EQUISETACEAE

Equisetum fluviatile L. [Mizu-dokusa]

KUNASHIR: Bog around river at Southeast side of Lake Peschanoye (Lake Tōfutsu). Aug. 18, 2012. T. Fukuda 106, H. Takahashi et al. 35082, Y. Kato 079.

KUNASHIR: Lakeside of Lake Arigel (Southwest of Lake Nikisyoro). Aug. 23, 2012. T. Fukuda 267.

ITURUP: South part of Lake Maloye (Rubetsu numa). Aug. 30, 2012. T. Fukuda 552.

ITURUP: South of Rydovo (Bettobu), pond near old sanatorium. Sept. 1, 2012. T. Fukuda 626.

ISOETACEAE

Isoetes asiatica (Makino) Makino [Hime-mizunira]

KUNASHIR: Furukamappu, Lake Serebyanoye (Furukamappu-numa). Aug. 23, 2012. Y. Kato 242.

<Angiospermae>

ARACEAE

Lemna trisulca L. [Hinzimo]

ITURUP: Nouttheast of Lake Maloye (Rubetsu numa), small pond

on the banks of Kuibyshevka River (Rubetsu river). Aug. 30, 2012. H. Takahashi 35587.

ITURUP: Small ponds, South of Kuibyshevka river near mouth (Rubetsu river). Aug. 30, 2012. T. Fukuda 2012-542.

CYPERACEAE

Eleocharis acicularis (L.) Roem. et Schult. var. *longiseta* Svenson [Matsubai]

KUNASHIR: Furukamappu, Lake Serebyanoye (Furukamappu-numa). Aug. 23, 2012. Y. Kato 258a.

Eleocharis kantschatica (C.A.Mey.) Kom. [Hime-harii]

KUNASHIR: South of Veslovskyy peninsula (Keramui-misaki), freshwater pond among meadow. Aug. 21, 2012. T. Fukuda 208.

Eleocharis mamillata H. Lindb. var. *cyclocarpa* Kitag. [Ōnuma-harii]

KUNASHIR: Peschanoye Mire (Tōfutsu-sitsugen). Aug. 18, 2012. H. Takahashi et al. 35122.

Eleocharis margaritacea (Hultén) Miyabe et Kudô [Shiromino-harii]

KUNASHIR: Peschanoye Mire (Tōfutsu-sitsugen). Aug. 18, 2012. Y. Kato 087.

Eleocharis palustris (L.) Roem. et Schult. [Kuronuma-harii]

KUNASHIR: Lakeside of Lake Arigel (Southwest of Lake Nikisyoro). Aug. 23, 2012. T. Fukuda 266.

ITURUP: South part of Lake Maloye (Rubetsu numa). Aug. 30, 2012. T. Fukuda 558.

Schoenoplectus tabernaemontani (C.C.Gmel.) Palla [Futoi]

KUNASHIR: Southeast side of Lake Peschanoye (Lake Tōfutsu), at the beginning of Peschanoye River. Aug. 19, 2012. T. Fukuda 133.

Scirpus wichurae Boeck. [Aburagaya]

KUNASHIR: In coniferous forest along road between capes Chetverikova and Puzanova. Aug. 19, 2012. T. Fukuda 304.

KUNASHIR: Peschanoye Mire (Tōfutsu-sitsugen). Aug. 18, 2012. H. Takahashi et al. 35085, Y. Kato 090, H. Sato et al. 01588 (SAPS042189).

HALORAGACEAE

Myriophyllum spicatum L. [Hozakino-fusamo]

KUNASHIR: Peschanoye Mire (Tōfutsu-sitsugen). Aug. 18, 2012. H. Takahashi et al. 35124, H. Sato et al. 01599(SAPS042192).

ITURUP: South part of Lake Maloye (Rubetsu-numa). Aug. 30, 2012. H. Takahashi 35578.

ITURUP: South part of Lake Bragodatnoye (Lake Toshimoi). Sep. 2, 2012. H. Takahashi 35612.

LENTIBULARIACEAE

Utricularia japonica Makino [Tanuki-mo]

KUNASHIR: Cape Veslo (Keramui-zaki), lake near lighthouse. Aug. 21, 2012. H. Takahashi et al. 35267.

MENYANTHACEAE

Menyanthes trifoliata L. [Mitsu-gasiwa]

KUNASHIR: Peschanoye Mire (Tōfutsu-sitsugen). Aug. 18, 2012. H. Takahashi et al. 35087, T. Fukuda 2012-93.

MONTIACEAE

Montia fontana L. [Numa-hakobe]

ITURUP: Osenny (Oito), branch of Osenny river near sea coast. Sept. 4, 2012. T. Fukuda 653.

NYMPHAEACEAE

Nuphar pumila (Timm) DC. var. *pumila* [Nemuro-kōhone]

KUNASHIR: Peschanoye Mire (Tōfutsu-sitsugen), in standing water. Aug. 18-19, 2012. Y. Kato, Photograph!

Nymphaea tetragona Georgi [Hitsujigusa]

KUNASHIR: Around Lake Serebryanoye (Furukamappu-numa). Aug. 23, 26, 2012.

Note: No voucher specimen. This plant was identified by eye in the field.

PLANTAGINACEAE

Callitriche hermaphoditica L. [Chishima-mizuhakobe]

ITURUP: South part of Lake Maloye (Rubetsu-numa). Aug. 30, 2012. T. Fukuda 555, H. Takahashi 35582.

Hippuris vulgaris L. [Sugina-mo]

KUNASHIR: Bog around river at Southeast side of Lake Peschanoye (Lake Tōfutsu). Aug. 18, 2012. T. Fukuda 2012-96, 2012-113.

KUNASHIR: South of Veslovskyy penninsula (Keramui-misaki), in freshwater pond among meadow. Aug. 21, 2012. T. Fukuda 2012-210.

KUNASHIR: Cape Veslo (Keramui-zaki), Lake near lighthouse. Aug. 21, 2012. H. Takahashi et al. 35266.

ITURUP: South part of Lake Maloye (Rubetsu-numa). Aug. 30, 2012. H. Takahashi 35579, T. Fukuda 2012-564.

ITURUP: Small ponds, South of Kuibyshevka river near mouth (Rubetsu river). Aug. 30, 2012. T. Fukuda 2012-549.

ITURUP: South of Rydovo (Bettobu), pond near old sanatorium. Sept. 1, 2012. T. Fukuda 2012-631.

POACEAE

Phragmites australis (Cav.) Trin. ex Steud. [Yoshi]

KUNASHIR: Peschanoye Mire (Tōfutsu-sitsugen). Aug. 18, 2012. H. Takahashi et al. 35097, H. Sato et al. 01620 (SAPS042380).

POLYGONACEAE

Percicaria amphibia (L.) Delarbre [Ezono-mizutade]

KUNASHIR: Lake Arigel (SW of Lake Nikisyoro). Aug. 22, 2012. H. Takahashi 35328.

KUNASHIR: Lake Arigel (SW of Lake Nikisyoro). Aug. 23, 2012. T. Fukuda 2012-275.

ITURUP: South part of Lake Kuibyshevskoye (Rausu-numa). Aug. 30, 2012. H. Takahashi 35569.

ITURUP: East lakeside of Lake Kuibyshevskoye (Rausu-numa). Aug. 30, 2012. T. Fukuda 2012-572.

ITURUP: South part of Lake Maloye (Rubetsu-numa). Aug. 30, 2012. T. Fukuda 2012-557.

ITURUP: West coast of Lake Lebedinoye (Shyana-numa). Sept. 6, 2012. T. Fukuda 694.

POTAMOGETONACEAE

Potamogeton berchtoldii Fieber [Itomo]

ITURUP: Kasatka Bay (Hitokappu-wan), around Chertova skala (Rakko-iwa), in pond. Sept. 2, 2012. H. Takahashi 35600.

Potamogeton compressus L. [Ezoyanagi-mo]

KUNASHIR: East lakeside of Lake Veslovskoye (Lake Keramui), in brackish marsh., Aug. 21, 2012. T. Fukuda 217.

ITURUP: South part of Lake Maloye (Rubetsu-numa). Aug. 30, 2012. T. Fukuda 551a.

ITURUP: North part of Lake Maloye (Rubetsu-numa). Aug. 30, 2012. H. Takahashi 35571.

ITURUP: Lake Lebedinoye (Shana-numa). Sept. 6, 2012. T. Fukuda 693.

Potamogeton fryeri A. Benn. [Futo-hirumushiro]

ITURUP: South of Rydovo (Bettobu), pond near old sanatorium. Sept. 1, 2012. T. Fukuda 630.

Potamogeton gramineus L. [Ezono-hirumushiro]

KUNASHIR: Peschanoye Mire (Tōfutsu-sitsugen). Aug. 18, 2012. H. Sato 01600.

KUNASHIR: Lake Peschanoye (Lake Tōfutsu). Aug. 19, 2012. H. Takahashi et al. 35115a; Y. Kato 083b.

KUNASHIR: Furukamappu, Lake Serebyanoye (Furukamappu-numa). Aug. 23, 2012. Y. Kato 257a; 258c.

KUNASHIR: Southwest part of Lake Arigel (SW of Lake Nikisyoro). Aug. 23, 2012. T. Fukuda 274.

Potamogeton maackianus A. Benn. [Sen-ninmo]

ITURUP: South part of Lake Maloye (Rubetsu-numa). Aug. 30, 2012. T. Fukuda 551b; H. Takahashi 35583.

ITURUP: South coast of Lake Blagodatnye (Toshimoi). Sept. 2, 2012. T. Fukuda 642.

Potamogeton natans L. [O-hirumushiro]

ITURUP: Kasatka Bay (Hitokappu-wan), around Chertova skala (Rakko-iwa), in pond. Sept. 2, 2012. H. Takahashi 35599.

Potamogeton perfoliatus L. [Hirohano-ebimo]

KUNASHIR: South of Lake Peschanoye (Lake Tōfutsu). Aug. 19, 2012. T. Fukuda 180, H. Takahashi et al. 35115a.

KUNASHIR: Northwest side of Lake Arigel (Lake Nikisyoro). Aug. 22, 2012. H. Takahashi 35322.

KUNASHIR: Southwest part of Lake Arigel (Lake Nikisyoro). Aug. 23, 2012. T. Fukuda 274.

KUNASHIR: Furukamappu, Lake Serebyanoye (Furukamappu-numa). Aug. 23, 2012. Y. Kato 257b; 258d.

ITURUP: Mouth of Kuibyshevka (Rubetsu river), in bogs (with stream). Aug. 30, 2012. T. Fukuda 541, 544, 548.

ITURUP: South part of Lake Maloye (Rubetsu-numa). Aug. 30, 2012. T. Fukuda 553; 563, H. Takahashi 35577.

ITURUP: Kuril'sk, within small stream. Sep. 2, 2012. H. Takahashi 35616.

ITURUP: Near mouth of river (Kurokinai river), near Chertova Skala (South of Rakko-iwa). Sept. 2, 2012. T. Fukuda 647.

ITURUP: Southwest coast of coastal lakes, S lake of "Zalivnye" lakes (near Rebut-numa). Sept. 2, 2012. T. Fukuda 648.

Potamogeton praelongus Wulfen [Nagaba-ebimo]

KUNASHIR: Tōfutsu, Lake Peschanoye (Lake Tōfutsu). Aug. 19, 2012. Y. Kato 083a.

KUNASHIR: Furukamappu, Lake Serebyanoye (Furukamappu-numa). Aug. 23, 2012. Y. Kato 258b.

ITURUP: Mouth of Kuibyshevka (Rubetsu river), in bogs (with stream). Aug. 30, 2012. T. Fukuda 541.

ITURUP: Northwest of Lake Maloye, small pond on the banks of Kuibyshevka River (Rubetsu river). Aug. 30, 2012. H. Takahashi 35586.

ITURUP: South part of Lake Maloye (Rubetsu-numa). Aug. 30, 2012. T. Fukuda 556; H. Takahashi 35581.

RANUNCULACEAE

Ranunculus nipponicus Nakai var. *submerses* H. Hara [Baika-mo]

ITURUP: Tornaya Bay (Toro). Aug. 28, 2012. H. Takahashi and T. Fukuda 35426.

Ranunculus yesoensis Nakai [Chitosebaika-mo]

ITURUP: South part of Lake Maloye (Rubetsu-numa). Aug. 30, 2012. T. Fukuda 550, H. Takahashi 35572.

TYPHACEAE

Sparganium erectum L. [Mikuri]

ITURUP: Kuril'sk, at branch of Kurilka river (Shana river). Sept. 7, 2012. T. Fukuda 697.

Sparganium glomeratum (Beurl. ex Laest.) L. M. Newman [Tama-mikuri]

ITURUP: Northwest of Lake Maloye (Rubetsu numa), in pond among the lower reaches of Kuybyshevka river. Aug. 30, 2012. H. Takahashi 35591.

ITURUP: South of Kuibyshevka river (Rubetsu river) near mouth, in a small pond. Aug. 30, 2012. T. Fukuda 532.

ITURUP: Near mouth of river (Kurokinai river), near Chertova Skala (South of Rakko-iwa). Sept. 2, 2012. T. Fukuda 646.

Typha latifolia L. [Gama]

KUNASHIR: Lakeside of Lake Arigel (Southwest of Lake Nikisyoro). Aug. 23, 2012. T. Fukuda 272.

ITURUP: Cut-off channels, North of Kuibyshevka river (Rubetsu river). Aug. 30, 2012. T. Fukuda 533.

ZOSTERACEAE

Phyllospadix iwatensis Makino [Sugamo]

KUNASHIR: Along the beach between northwest coast of Lake Peschanoye (Lake Tōfutsu) and Znamenka cape (Nihon-iwa), in sea. Aug. 19, 2012. H. Takahashi et al. 35179.

KUNASHIR: Along the beach between "13km" Village (Yaitaikotan) and Stolbchatyy Cape (Zaimoku-iwa), in sea. Aug. 22, 2012. H. Takahashi et al. 35310.

ITURUP: Dobrynina Bay (Otoimausi). Stony beach to coastal meadows around fish company. Aug. 27, 2012. H. Takahashi and T. Fukuda 35404.

Zostera asiatica Miki [Ōamamo]

KUNASHIR: East of Lake Veslovskoye (Lake Keramui). Aug. 21, 2012. H. Takahashi et al. 35240.

Zostera japonica Asch. et Graebn. [Koamamo]

KUNASHIR: East lakeside of Lake Veslovskoye (Lake Keramui), in brackish marsh. Aug. 21, 2012. T. Fukuda 205.

KUNASHIR: East of Lake Veslovskoye (Lake Keramui). Aug. 21, 2012. H. Takahashi et al. 35242.

Zostera marina L. [Amamo]

KUNASHIR: East of Lake Veslovskoye (Lake Keramui). Aug. 21, 2012. H. Takahashi et al. 35241.

山崎真実¹, 福田知子², 加藤ゆき恵³, 佐藤広行⁴, 高橋英樹⁵: 2012年野外調査において国後島および択捉島で採集された水生植物

2012年の踏査において採集された水生植物は37種16科で、国後島では26種13科、択捉島では21種12科であった。国後島・択捉島で多かった水草は、ヒロハノエビモ、ナガバエビモ、エゾノミズタデ、スギナモであり、特にヒルムシロ属は8種が認められた。また海草としてはスガモが比較的多かった。が認められた。また海草としてはスガモが比較的多かった。これまでの報告において千島列島で確認されていないトチカガミ科、ヒシ属は今回も見つけれ

れなかった．エトロフソウ *Sparganium kawakamii* H. Hara の基準標本産地である留別沼から留別付近を探索したが，該当する種類は確認できなかった．水生植物には絶滅危惧種となっているものも多く，千島列島における水生植物相は十分に明らかにされていないため，今後も重点的に調査を行う必要がある．

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- 2 国立科学博物館植物部門，
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- 4 北海道大学大学院農学院，
- 5 北海道大学総合博物館)

Takahashi et al. 35115a; Y. Kato 083b.
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KUNASHIR: Furukamappu, Lake Serebyanoye (Furukamappu-numa). Aug. 23, 2012. Y. Kato 258b.
ITURUP: Mouth of Kuibyshevka (Rubetsu river), in bogs (with stream). Aug. 30, 2012. T. Fukuda 541.
ITURUP: Northwest of Lake Maloye, small pond on the banks of Kuibyshevka River (Rubetsu river). Aug. 30, 2012. H. Takahashi 35586.
ITURUP: South part of Lake Maloye (Rubetsu-numa). Aug. 30, 2012. T. Fukuda 556; H. Takahashi 35581.

RANUNCULACEAE

Ranunculus nipponicus Nakai var. *submerses* H. Hara [Baika-mo]
ITURUP: Tornaya Bay (Toro). Aug. 28, 2012. H. Takahashi and T. Fukuda 35426.
Ranunculus yesoensis Nakai [Chitosebaika-mo]
ITURUP: South part of Lake Maloye (Rubetsu-numa). Aug. 30, 2012. T. Fukuda 550, H. Takahashi 35572.

TYPHACEAE

Sparganium erectum L. [Mikuri]
ITURUP: Kuril'sk, at branch of Kurilka river (Shana river). Sept. 7,

2012. T. Fukuda 697.

Sparganium glomeratum (Beurl. ex Laest.) L. M. Newman [Tama-mikuri]
ITURUP: Northwest of Lake Maloye (Rubetsu numa), in pond among the lower reaches of Kuybyshevka river. Aug. 30, 2012. H. Takahashi 35591.
ITURUP: South of Kuibyshevka river (Rubetsu river) near mouth, in a small pond. Aug. 30, 2012. T. Fukuda 532.
ITURUP: Near mouth of river (Kurokinai river), near Chertova Skala (South of Rakko-iwa)., Sept. 2, 2012. T. Fukuda 646.
Typha latifolia L. [Gama]
KUNASHIR: Lakeside of Lake Arigel (Southwest of Lake Nikisyoro). Aug. 23, 2012. T. Fukuda 272.
ITURUP: Cut-off channels, North of Kuibyshevka river (Rubetsu river). Aug. 30, 2012. T. Fukuda 533.

ZOSTERACEAE

Phyllospadix iwatensis Makino [Sugamo]
KUNASHIR: Along the beach between northwest coast of Lake Peschanoye (Lake Tōfutsu) and Znamenka cape (Nihon-iwa), in sea. Aug. 19, 2012. Takahashi et al. 35179.
KUNASHIR: Along the beach between "13km" Village (Yaitaikotan) and Stolbchaty Cape (Zaimoku-iwa), in sea. Aug. 22, 2012. Takahashi et al. 35310.
ITURUP: Dobrynya Bay (Otoimausi). Stony beach to coastal meadows around fish company. Aug. 27, 2012. H. Takahashi and T. Fukuda 35404.
Zostera asiatica Miki [Ōmamo]
KUNASHIR: East of Lake Veslovskoye (Lake Keramui). Aug. 21, 2012. H. Takahashi et al. 35240.
Zostera japonica Asch. et Graebn. [Koamamo]
KUNASHIR: East lakeside of Lake Veslovskoye (Lake Keramui), in brackish marsh. Aug. 21, 2012. T. Fukuda 205.
KUNASHIR: East of Lake Veslovskoye (Lake Keramui). Aug. 21, 2012. H. Takahashi et al. 35242.
Zostera marina L. [Amamo]
KUNASHIR: East of Lake Veslovskoye (Lake Keramui). Aug. 21, 2012. H. Takahashi et al. 35241.

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2012年野外調査において国後島および択捉島で採集された水生植物

2012年の踏査において採集された水生植物は37種16科で、国後島では26種13科、択捉島では21種12科であった。これまでの報告において千島列島で確認されていないトチカガミ科、ヒシ科、オモダカ科は今回も見つけられなかった。エトロフソウ *Sparganium kawakamii* Hara の基準標本産地である留別沼から留別付近を探索したが、該当する種類は確認できなかった。エトロフソウはホソバウキミクリの変異に含める考えが通説になっているが、ロシアの研究者の間ではそれぞれ独立した種として捉えられており、分類学的な再検討が必要である。水生植物には絶滅危惧種となっているものも多く、千島列島における水生植物相は十分に明らかにされていないため、今後も重点的に調査を

