

## HEPATIC FLORA OF KHARIMKOTAN AND CHIRINKOTAN ISLANDS (KURIL ISLANDS, RUSSIAN FAR EAST)

### ФЛОРА ПЕЧЕНОЧНИКОВ ОСТРОВОВ ХАРИМКОТАН И ЧИРИНКОТАН (КУРИЛЬСКИЕ ОСТРОВА, РОССИЙСКИЙ ДАЛЬНИЙ ВОСТОК)

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#### Abstract

The first annotated list of hepatic of Kharimkotan and Chirinkotan (the northern Kuril Islands) includes 35 species. *Scapania lingulata* H. Buch and *Riccardia cf. multifida* (L.) Gray are recorded for the northern Kurils for the first time.

#### Резюме

Приводится аннотированный список печеночников островов Харимкотан и Чиринкотан (северные Курилы), включающий 35 видов. *Scapania lingulata* H. Buch и *Riccardia cf. multifida* (L.) Gray впервые указываются для северных Курил.

KEYWORDS: flora, liverworts, Northern Kuril Islands

#### INTRODUCTION

With the exception of Shumshu Isl. the Greater Kuril Ridge is the chain of volcanic islands that stretches approximately 1200 km from Hokkaido up to the Kamchatka Peninsula, separating the Sea of Okhotsk from the North Pacific Ocean. The northern Kurils include islands eastward of Kruzenshtern Strait. The climate is more severe than in the southern Kurils: the annual mean temperature is +1.5–3 °C, winter is colder and prolonged, summer is less warm and shorter. Frostless season is 120 days. The average annual precipitation is 700–1000 mm. The main types of vegetation are thickets of *Duschekia maximoviczii* and *Pinus pumila*, tundra and meadow communities.

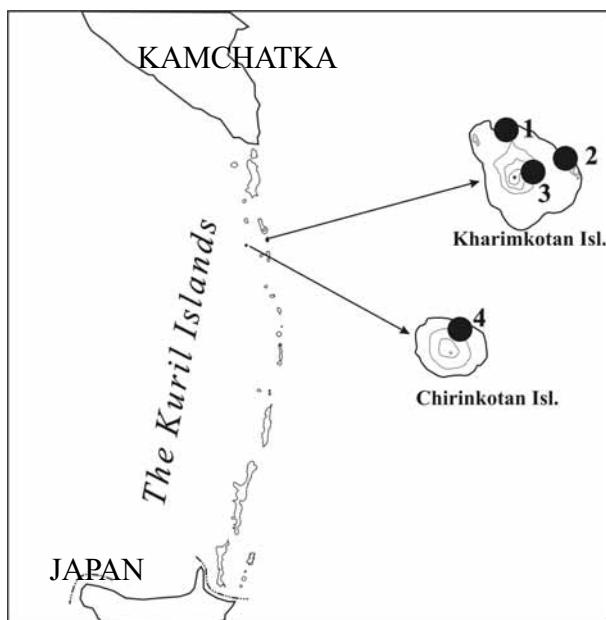
Data on hepatic flora of the northernmost Kuril islands, Paramushir and Shumshu, were published by Horikawa (1934), Noguchi (1967), Bakalin & Cherdantseva (2006). In 2006–2008 the author collected liverworts in the uninhabited middle and the northern Kuril Islands, including Kharimkotan and Chirinkotan. Results of identification of collections from the middle Kurils (Simushir, Keto, Rasshua Islands) and two northern Kuril Islands, Onekotan and Shiashkotan, were published (Nyushko, 2010) whereas only two liverworts (*Scapania obcordata* and *S. tundrae*) were recorded for Kharimkotan Island (Nyushko, 2009). In present paper we publish the first data on the hepatic flora of Kharimkotan and Chirinkotan Islands.

#### STUDY AREA AND VEGETATION

Kharimkotan Island is a volcanic island stretched out from the north to the south. Its area is 68 km<sup>2</sup> (8×12 km), the highest point is 1157 m above sea level. The last strong eruption took place in 1933 (Gorshkov, 1967). Thickets of *Pinus pumila* are well developed only on the southwestern slope of Sev vergina Volcano. Pure stands of *Duschekia maximoviczii* occur from marine terrace to lower mountain slopes. Heaths were found on the sand dune, and usually they are well developed on terraces and wind-swept mountain slopes. Common species are *Empetrum sibiricum*, *Rhododendron aureum*, *R. kamtschaticum*, *Vaccinium uliginosum*, *V. vitis-idaea*, etc. Grasslands are found on terrace and mountain slopes. *Calamagrostis langsdorffii* is most widely distributed species, and *Festuca rubra* is locally abundant. Herb communities represented by tall herb meadows are common in the lowland, and subalpine meadows are mainly restricted to the marine terraces (Takahashi *et al.*, 2006).

Chirinkotan is a small island with 6 km<sup>2</sup> in area, measuring 3 km in width. Its highest point is 724 m above sea level. The island is the top of a partially submerged stratovolcano, which is still active with major eruptions being recorded in 1760, 1884, 1900, 1979, 1986, and 2004 (Gorshkov, 1967). Soil and vegetation cover are poorly developed. Slopes are covered by grasslands and sparse tundra communities. Sparse thickets of *Duschekia maximoviczii* occur in north-western part of the island.

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#### ANNOTATED LIST OF SPECIES

Annotated list of hepaticas was compiled based on identification of 60 specimens from Kharimkotan and 30 specimens from Chirinkotan collected by the author in 2006-2008. It counts 35 species, including 30 species for Kharimkotan Isl. and 12 for Chirinkotan Isl. The nomenclature of hepaticas follows Potemkin & Sofronova (2009). After names of species the collecting localities (according to Fig. 1), characteristic of the habitats and elevation are given. Then the information on the presence of reproductive structures is provided, using the following abbreviations: per. – perianthia, gem. – gemmae.

Specimens are kept in Herbarium of Institute of Marine Geology and Geophysics FEB RAS (SAK).

*Aneura pinguis* (L.) Dumort. **Kh** – 1: peaty soil along rivulet in sedge bog. 5 m alt.

*Anthelia cf. julacea* (L.) Dumort. **Kh** – 2: soil on steep coastal cliffs. 5-10 m alt.

*Blasia pusilla* L. **Kh** – 2: wet pyroclastic deposits on the bank of lake with high content of Fe. 5-10 m alt. Gem.

*Blepharostoma trichophyllum* (L.) Dumort. **Kh** – 1: edge of sedge tussock and peaty soil in sedge bog. 5 m alt.

*Cephalozia bicuspidata* (L.) Dumort. **Kh** – 1, 2: edge of sedge tussock and on bare peaty soil in sedge bog; soil on steep coastal cliffs; boulders in flooded *Calamagrostis* meadow. 5-10 m alt. **Ch** – 4: boulders and crevices of rocks in the canyon; bare soil in sparse grass-tundra communities on slope; fine-grained soil in crevices of rocks on volcanic top plateau. 50-620 m alt. Per.

*Cephaloziella varians* (Gottsche) Steph. **Kh** – 2: wet pyroclastic deposits on the bank of lake with high content of Fe. 5-10 m alt.

*Diplophyllum taxifolium* (Wahlenb.) Dumort. **Kh** –

Fig. 1. Study area and the collecting localities:

**Kharimkotan (Kh)**: 1 – Severgina Bay, Severgino Settlement area ( $49^{\circ}09' N - 154^{\circ}30' E$ ); 2 – The Salt Lakes ( $49^{\circ}07'-08' N - 154^{\circ}34'-35' E$ ); 3 – blister cone of Severgina Volcano ( $49^{\circ}07' N - 154^{\circ}30' E$ );

**Chirinkotan (Ch)**: 4 – slope and top of Chirinkotan Volcano ( $48^{\circ}58' N - 153^{\circ}29' E$ ).

1: edge of sedge tussock and peaty soil in sedge bog. 5 m alt. **Ch** – 4: fine-grained soil on vertical wall of canyon; bare soil in sparse grass-tundra communities on slope. 200-300 m alt.

*Gymnocolea inflata* (Huds.) Dumort. **Ch** – 4: bare soil in sparse grass-tundra communities on slope. 200-300 m alt. The collection represents *G. marginata* – phenotype.

*Jungermannia exsertifolia* Steph. subsp. *cordifolia* (Dumort.) Váňa. **Kh** – 1: peaty soil along rivulet in sedge bog. 5 m alt.

*J. polaris* Lindb. **Kh** – 1: damp fine-grained soil along rivulet in sedge bog; edge of sedge tussock and peaty soil in sedge bog. 5 m alt. Per.

*Lophozia wenzelii* var. *groenlandica* (Nees) Bakalin. **Ch** – 4: bare soil in sparse grass-tundra communities on slope. 200-300 m alt.

*Marchantia latifolia* Gray. **Kh** – 1: peaty soil along rivulet in sedge bog. 5 m alt. Gem.

*Nardia assamica* (Mitt.) Amakawa. **Kh** – 3: near the hydrosolfatara. 1000 m alt.

*N. breidleri* (Limpr.) Lindb. **Ch** – 4: fine-grained soil in crevices of rocks on volcanic top plateau. 600-620 m alt.

*N. geoscyphus* (De Not.) Lindb. **Kh** – 1, 2: damp fine grained soil along rivulet in sedge bog; edge of sedge tussock and peaty soil in sedge bog; soil on steep coastal cliffs; wet boulders in flooded *Calamagrostis* meadow. 5-10 m alt. Per.

*N. insecta* Lindb. **Kh** – 2: wet boulders in flooded *Calamagrostis* meadow. 5-10 m alt. **Ch** – 4: fine-grained soil in crevices of rocks on volcanic top plateau. 600-620 m alt.

*N. japonica* Steph. **Ch** – 4: fine-grained soil in crevices of rocks on volcanic top plateau. 600-620 m alt.

*N. scalaris* Gray. **Kh** – 2: soil on steep coastal cliffs; wet boulders in flooded *Calamagrostis* meadow. 5-10 m alt. **Ch** – 4: fine-grained soil on vertical wall of canyon; bare soil in sparse grass-tundra communities on slope. 200-300 m alt.

*Pellia neesiana* (Gottsche) Limpr. **Kh** – 1: damp fine grained soil along rivulet in sedge bog; wet boulders in flooded *Calamagrostis* meadow. 5-10 m alt. **Ch** – 4: boulders and in base of rocks in canyon. 50-150 m alt. Per.

*Pleurocladula albescens* (Hook.) Grolle. **Kh** – 2: soil on steep coastal cliffs; wet boulders in flooded *Calamagrostis* meadow. 5-10 m alt. **Ch** – 4: fine-grained soil on vertical wall of canyon; fine-grained soil in crevices of rocks on volcanic top plateau. 200-620 m alt.

*Riccardia cf. multifida* (L.) Gray. **Kh** – 1: edge of sedge tussock and peaty soil in sedge bog. 5 m alt.

*Scapania curta* (Mart.) Dumort. **Kh** – 2: wet boulders in flooded *Calamagrostis* meadow. 5-10 m alt.

*S. lingulata* H. Buch. **Ch** – 4: bare soil in sparse grass-dwarf shrub tundra communities on slope. 200-300 m alt.

*S. obcordata* (Berggr.) S.W. Arnell. **Kh** – 2: wet boulders in flooded *Calamagrostis* meadow; wet pyroclastic deposits on the bank of lake with high content of Fe. 5-10 m alt.

*S. paludicola* Loeske & Müll. Frib. **Kh** – 1: peaty soil along rivulet in sedge bog. 5 m alt.

*S. paludosa* (Müll. Frib.) Müll. Frib. **Kh** – 1, 2: edge of sedge tussock and peaty soil in sedge bog; wet boulders in flooded *Calamagrostis* meadow. 5-10 m alt.

*S. scandica* (Arnell & H. Buch) Macvicar. **Kh** – 1, 2: damp fine grained soil along rivulet in sedge bog; soil on steep coastal cliffs. 5-10 m alt. **Ch** – 4: boulders and crevices of rocks in the canyon. 50-150 m alt. Per., gem.

*S. tundrae* (Arnell) H. Buch. **Kh** – 2: wet pyroclastic deposits on the bank of lake with high content of Fe. 5-10 m alt.

*S. uliginosa* (Sw. ex Lindenb.) Dumort. **Kh** – 1: damp fine grained soil along rivulet in sedge bog. 5 m alt.

*S. undulata* (L.) Dumort. **Kh** – 1: edge of sedge tussock and peaty soil in sedge bog; wet boulders in flooded *Calamagrostis* meadow. 5-10 m alt.

*Schistochilopsis incisa* (Schrad.) Konstant. **Kh** – 2: Wet boulders in flooded *Calamagrostis* meadow. 5-10 m alt.

*Solenostoma aomorensense* Steph. **Kh** – 2: soil on steep coastal cliffs; wet boulders in flooded *Calamagrostis* meadow; wet pyroclastic deposits on the bank of lake with high content of Fe. 5-10 m alt.

*S. hyalinum* (Lyell) Mitt. **Kh** – 1: damp fine grained soil along rivulet in sedge bog. 5 m alt. Per.

*S. obovatum* (Nees) R.M. Schust. s.l. **Kh** – 1: damp fine-grained soil along rivulet in sedge bog. 5 m alt.

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