

## BRYOPHYTE MOLECULAR BARCODING RECORDS. 1

### БРИОЛОГИЧЕСКИЕ НАХОДКИ ПО РЕЗУЛЬТАТАМ ДНК-МАРКИРОВАНИЯ. 1

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Abstract

DNA-barcoding revealed/confirmed the range extension of the following bryophytes: *Brachythecium baicalense* (Altai, Listvyaga Range), *Brachythecium irinae* (West Taimyr, Putorana Plateau), *Schistidium grandirete* (Yakutia, Upper course of Indigirka River), and *Schistidium tenuinerve* (North Urals).

Резюме

С помощью ДНК-баркодинга выявлены или подтверждены находки за пределами основного ареала следующих видов мохообразных: *Brachythecium baicalense* (Алтай, хребет Листвяга), *Brachythecium irinae* (Западный Таймыр, плато Путорана), *Schistidium grandirete* (Якутия, верховья р. Индигирка) и *Schistidium tenuinerve* (Северный Урал).

KEYWORDS: mosses, new records, molecular markers, nrITS, Russia

#### INTRODUCTION

This paper opens a series of brief reports of new findings of rare moss species, revealed in the course of molecular phylogenetic studies. Similarly to material that appear in a series of “New bryophyte records” in *Arctoa* and “New national and regional bryophyte records” in *Journal of Bryology*, they represent new additions to the regional floras and confirmation of dubious records in cases when morphological characters are variable and certain identification based solely on morphology is difficult. However, as these records appear during the molecular phylogenetic studies, *i.e.*, not in the course of field exploration or taxonomic revisions and are not based solely on morphology, their format and content would be slightly different.

Obviously, we are going to include information on GenBank accession number, comments on species distribution and its diagnostic characters, and sometimes present short trees, or even their fragments, wherever relevant for confirmation of taxonomic position, especially if they point some challenge against previous studies or add new insight into relationship of taxa. Often such small results are interesting for taxonomists, but too narrow or too small for separate article. At the same time, we believe that a simple direct submission to GenBank would be too invisible.

Materials in this series would obligatory include (1) herbarium label of specimen(s); (2) brief description of

species distribution showing an importance of a new record; (3) GenBank accession number; (4) supplementary material in a form of alignment or phylogenetic tree or both, supporting the taxonomic identity of the species.

#### 1. *Brachythecium baicalense* Ignatov

Contributors: M.S. Ignatov, O.I. Kuznetsova

Specimen: Russia, Altai, Ust-Koksa Distr., Katun River 5 km upstream from Kaitanak Creek, 50°05'N – 85°27'E, 1100 m alt., 21.VIII.2012 *Ignatov & Ignatova 12-646a* (MHA).

DNA: isolate OK414, Genbank # MN864525 (nuclear Internal Transcribed Spacer region).

Distribution: Described from Irkutsk Province (Ignatov *et al.*, 2008), the species was later found in SE Yakutia, Khabarovsk and Primorsky Territories (Ignatov & Milyutina, 2010). Later in Botcha Nature Reserve, the species was found to be quite abundant on litter in wet secondary coniferous forests (Ignatova *et al.*, 2013). Present record extends its range to the western part of Altai Mountains, Listvyaga Range situated at the border with Kazakhstan, where this species is also likely present.

It is difficult to recognize *Brachythecium baicalense* in the field: its habit is really protean. It may look like a depauperate *B. erythrorrhizon* or large *Brachythecium velutinum*, and therefore be ignored by collectors as an imperfectly developed plants. Microscopic study reveals its identity by combination of narrow serrate

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leaves, dense areolation, enlarged alar cells, and autoicous sexual condition.

#### 2. *Brachythecium irinae* Ignatov

Contributors: V.F. Fedosov, M.S. Ignatov, O.I. Kuznetsova

Specimen: Russia, Krasnoyarsk Territory, Putorana Plateau, vicinity of Glubokoe Lake, 69,30131° N – 90,08388° E, valley of a creek east of Chamege Creek, creek bank, rotten log, 30 July 2015 *Fedosov 15-0768* (MW).

DNA: isolate OK1221, Genbank # MN864526 (nuclear Internal Transcribed Spacer region).

*Brachythecium irinae* was described from Kamchatka, where it is locally common, but mainland Siberian localities are very few, although one specimen was found in Altai (Ignatov & Milyutina, 2010). Present records indicate its wide distribution farther to the west. In the field, *Brachythecium irinae* looks as a loose-leaved phenotypes of *B. mildeanum* from shady places (which sometimes can be confused with *Leptodictyum*), but under microscope can be recognized by conspicuously homogeneous areolation throughout basal part of leaf and very thin-walled cells. DNA indicates no relationship to *B. mildeanum*, while ITS is totally identical with *B. salebrosum*, which however is distinct in differentiated small alar cells, and not so loose leaf areolation.

#### 3. *Schistidium grandirete* H.H. Blom

Contributors: E.A. Ignatova, O.I. Kuznetsova

Specimen: Russia, Yakutia, Oimyakon District, Ust-Nera surroundings, Tas-Kystabyt Mt. Range, 64°27'38"N – 143°20'45"E, 1350 m alt., NW-faced cirque, on mossy rock-field, 2.VIII.2015 *Ignatov & Ignatova 15-1167* (MHA).

DNA: Isolate OK1217, GenBank # MN864521 (nuclear Internal Transcribed Spacer region).

This northern species with circumpolar distribution is known mostly from high Arctic (Blom, 1996). In Russia it is rare, being reported from the islands of Arctic Ocean, northern and southern Taimyr, and Chukotka. This is the first record of *S. grandirete* in Yakutia, and most southern locality in Eurasia. Due to reddish color of plants, large laminal cells with sinuate walls and presence of scattered papillae it can be confused with *S. papillosum* Culm. and *S. andreaeopsis* (Müll. Hal.) Laz. Leaf cells are larger in *S. grandirete* than in *S. papillosum*, and papillose costa is helpful for its separating from *S. andreaeopsis*. However, these characters are variable, and some specimens call for identification with the help of DNA markers.

#### 4. *Schistidium tenuinerve* Ignatova & H.H. Blom

Contributors: E.A. Ignatova, O.I. Kuznetsova

Specimen: Russia, Perm Territory, Krasnovishersk District, Vishersky Nature Reserve, Listvennichny Mt. Range, 61°01'26"N – 58°54'24"E, 820 m alt., on gently inclined rock surface covered with thin layer of fine soil, 28.VII.2018 *Bezgodov 198* (MHA).

DNA: isolate OK2259, GenBank # MN864522 (nuclear Internal transcribed spacer region).

*Schistidium tenuinerve* was described from Asiatic Russia, where it is known from Krasnoyarsk Territory, Yaku-

tia, Kamchatka and southern Siberia (Ignatova *et al.*, 2010; Ignatova & Blom, 2017). In European Russia it was found in the South Ural, Murmank Province (Ellis *et al.*, 2016; Ignatova & Blom, 2017), and Karelia (Sofronova *et al.*, 2017). Here we confirm the report of the species from the North Ural (Ignatova *et al.*, 2019). Morphologically *S. tenuinerve* is similar to several species with flattened hair-points at leaf apices, *i.e.*, *S. flaccidum*, *S. recurvum*, *S. scandicum*, *S. venetum*, *S. scabripilum*, *etc.* It can be recognized by combination of the following characters: leaf lamina unistratose; costa weakly convex, smooth on dorsal surface; hyaline hair-points flat, weakly and distantly denticulate; exothecial cells mainly quadrate and transversely rectangular; peristome teeth with few perforations. A detailed comparison is given by Ignatova & Blom (2017).

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