

CONTRIBUTION TO THE HEPATIC FLORA OF THE REPUBLIC OF DAGESTAN
(EASTERN CAUCASUS, RUSSIA)

К ФЛОРЕ ПЕЧЕНОЧНИКОВ ДАГЕСТАНА
(ВОСТОЧНЫЙ КАВКАЗ, РОССИЯ)

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Abstract

An annotated list of hepatics for the Republic of Dagestan records 35 species based on approximately 150 specimens collected mainly by the author. Eight species (*Chiloscyphus pallescens*, *Cololejeunea calcarea*, *Frullania jackii*, *Lophocolea bidentata*, *Ptilidium ciliare*, *Scapania praetervisa*, *Solenostoma confertissimum*, *Tritomaria quinquedentata*) are new records for Dagestan and one taxon (*Reboulia hemisphaerica* subsp. *australis*) is new to Russia and the Caucasus. New localities for three red-listed European species (*Frullania inflata*, *F. parvistipula*, *F. riparia*) also are documented. These records expand our knowledge of hepatic distributions in Dagestan and the Caucasus.

Резюме

Приводится аннотированный список печеночников, собранных преимущественно автором в Цудахарском, Чародинском и Гунибском районах Дагестана в ходе кратковременной поездки. Восемь видов (*Chiloscyphus pallescens*, *Cololejeunea calcarea*, *Frullania jackii*, *Lophocolea bidentata*, *Ptilidium ciliare*, *Scapania praetervisa*, *Solenostoma confertissimum*, *Tritomaria quinquedentata*) указываются впервые для Дагестана, один таксон (*Reboulia hemisphaerica* subsp. *australis*) является новым для России и Кавказа. Расширено представление о распространении большинства видов, приводящихся ранее для Дагестана из единичных точек. Выявлены новые местонахождения 3 видов (*Frullania inflata*, *F. parvistipula*, *F. riparia*) из числа включенных в Красную книгу Европы.

KEYWORDS: hepatics, phytogeography, rare species, Dagestan, Caucasus

INTRODUCTION

Little is known about the hepatic flora of the Republic of Dagestan in the eastern Caucasus. Ten species were recorded by Abramov & Abachev (1968), 26 species new to the republic were reported by Potemkin et al. (2010), and six were added by Potemkin & Urbanavichus (2010). In total, 42 species were recorded from Dagestan prior to the present study. The majority are known from a single or several localities on Gunib Plateau.

On 5-10 April 2011, I had an opportunity to collect hepatics in the Republic of Dagestan. Approximately 150 specimens were gathered in three administrative regions in inner Dagestan.

Collecting localities:

I. Tsudakhar District, Chugulabeck Ridge: 1 – near Experimental Mountain Botanical Garden of RAS; 2 – east of Tsudakhar, Tsudakhar *Carpinus* wood.

II. Charodinskij District, Nukatl' Ridge: 3 – Gunukhskoe Ravine near Gunukh Settlement, 4

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– near Uruk-Sota Settlement, valley of the right tributary of Kara-Or (Karalazurger) Creek;

III. Gunibskiy District: 5 – Gunib Plateau, 6 – Keger Ravine (Kara-Koisu River slope opposite Gunib) on the slope of the Keger Plateau.

ANNOTATED LIST OF SPECIES

Nomenclature follows Konstantinova, Bakalin et al. (2009). Data include information on the presence of reproductive structures, using the following abbreviations: andr. – androecia; gyn. – gynoecia, per. – perianthia or pseudoperianthia, spor. – sporophytes, gem. – gemmae. Collecting localities (1-6) are recorded, elevation range is given in parentheses and habitats are listed for rather widespread species, while for rare ones the labels are cited in full, including coordinates and elevation for each site and collection number preceded by 'K'. Data from other collector's specimens also are included with name and collection date. Habitats are characterized and associated hepatic species are cited. New records for the Caucasus are marked by two asterisks and by one asterisk for the Republic of Dagestan. Specimens are deposited in KPABG.

Aneura pinguis (L.) Dumort. – 1: bank of Sana River, 42°19'39"N – 47°09'53"E, 1100 m, under grasses on moist loamy soil (K1-1a-11), with *Pellia endiviifolia*; 5: canyon with rivulet, 42°24'15,6"N – 46°55'33,5"E, 1600 m, base of tree (K50-2-11), with *Pellia endiviifolia*. Earlier, this species was recorded from one locality on Gunib Plateau (Potemkin et al., 2010).

Apometzgeria pubescens (Schrank) Kuwah. – 4: valley of stream, steep slope, 42°13'30"N – 46°41'19"E, 2050 m, fragment of birch-willow-dominated forest, on base of birch (K43-2-11), mixed with *Plagiochila porelloides*; 5: canyon with rivulet, 42°24'15,6"N – 46°55'33,5"E, 1600 m, on cliffs in hornbeam forest, under grasses (K52-1-11), with *Plagiochila porelloides*. According to Potemkin et al. (2010) this species is rather frequent on the north forest-covered slope of Gunib Plateau.

Athalamia hyalina (Sommerf.) S.Hatt. (gyn., andr.) – 5(1930-2245 m): several localities on Gunib Plateau where the species is rather frequent, occurring on humus and cliffs in shaded niches, often under grasses. Earlier, this species

was recorded from five localities on Gunib Plateau by Potemkin et al. (2010).

A. spathysii (Lindenb.) S.Hatt. – 5: valley north of the Gunib River, slope of mountain, on loam, 1500 m (10.IV.2011, M.S.Ignatov). This species was recorded from Gunib Plateau by Potemkin et al. (2010), and Potemkin and Urbanavichus (2010). It seems that both species of *Athalamia* are rather frequent in appropriate sites on Gunib Plateau.

Barbilophozia barbata (Schmid. ex Schreb.) Loeske (per.) – 3: north-west-facing rock outcrops, 42°17'09"N – 46°45'55"E, 1890 m, under grasses on dead mosses and lichens (K29-5a-11), in extensive mats, with *Frullania tamarisci*, *Lophocolea minor*, *Plagiochila porelloides*; rock outcrops on bank of stream, 42°17'42"N – 46°45'46"E, 1930 m, in crevices covered by grasses (K31-1,2-11), with admixture of *Frullania tamarisci*, *Lophocolea minor*, *Plagiochila porelloides*, *Scapania praetervisa*, *Tritomaria quinquedentata*; cliffs at the foot of slope, 42°17'50"N – 46°45'09"E, 2090 m, on cliff under moss mats (K36-2,3-11), with *Cephaloziella divaricata*, *Frullania tamarisci*, *Plagiochila porelloides*, *Scapania verrucosa*, *Tritomaria quinquedentata*; edge of pine-birch grass *Vaccinium vitis-idaea* mossy forest on slope of mountain, 42°17'39"N, 46°45'10"E, 2170 m, on side of hillock under shrubs and grasses (K39-1-11), with *Ptilidium ciliare*; 4: slope to the floodplain of stream, 42°13'30"N – 46°41'19"E, 2020 m, on soil in niche under grasses (K41-1a-11), with *Cephaloziella divaricata*, *Tritomaria quinquedentata*. Earlier, this species was recorded from one locality in Tsumadinskiy District (Abramov & Abachev, 1968) and one locality on Gunib Plateau (Potemkin et al., 2010).

Cephaloziella divaricata (Sm.) Schiffn. (per., gem.) – 3: north-west-facing cliffs on left bank of stream, 42°17'09"N – 46°45'55"E, 1890 m, in crevices, among mosses (K29-4-11), mixed with *Scapania praetervisa*; cliffs at the base of slope, 42°17'50"N – 46°45'09"E, 2090 m., under moss mats (K36-3-11), mixed with *Barbilophozia barbata*, *Plagiochila porelloides*, *Scapania verrucosa*, *Tritomaria quinquedentata*; 4: north-facing shale cliffs in stream valley, 42°13'30"N – 46°41'19"E, 2020 m. alt., on soil in niche under

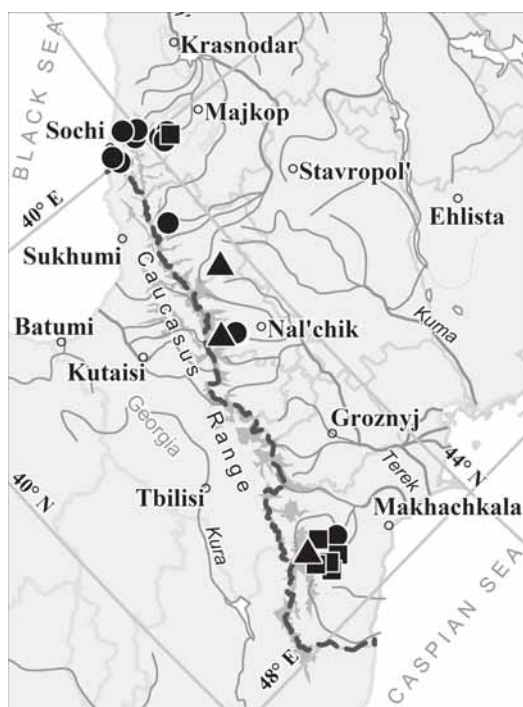


Fig. 1. Distribution of *Cololejeunea calcarea* (Libert) Schiffn. (circles), *Frullania riparia* Hampe ex Lehm. (squares) and *Frullania jackii* Gottsche (triangles) in Russia.

ing only small patches were found.

Conocephalum conicum (L.) Dumort. (female receptacle) – 5: valley of dry rivulet, 42°24'01"N, 46°54'09"E, 2090 m, under rock on soil rich in humus (K59-1-11). Earlier, the species was reported from three localities on Gunib Plateau (Potemkin et al., 2010).

C. salebrosum Szwedk., Buczk. & Odrzyk. (female receptacle) – 5 (1930-2065 m): common and sometimes abundant on soil under rocks and along streams in deep canyons in central part of the plateau, on roots of alder covered with soil; on humus in crevices and on rocky steps in deep rocky shaft, under rocks in *Alchemilla*-dominated meadows, near and under rocks in dry stream beds. In mats without admixture of another hepatics or mixed with *Lophocolea minor*, *Plagiochila porelloides*, *Pellia endiviifolia*, *Porella platyphylla*, *Preissia quadrata*, *Reboulia hemisphaerica*. Previously, this species was reported from two localities on Gunib Plateau (Potemkin et al., 2010).

Frullania inflata Gottsche (per., andr., spor.) – 2: on shaded rocks on slope, 42°20'05"N – 47°10'09"E, 1186 m (K17-1,2-11, K18-1-11), 42°20'01"N – 47°10'01"E, 1225 m (K19-1-11, K22-2-11), rarely on bases of *Fagus* (K22-3-11), on loam, 42°20'01"N – 47°10'01"E, 1300 m (K24-11). Usually in thin mats without admixture of other hepatics, rarely mixed with *Porella platyphylla* and *Radula complanata*. The species was recorded as well from one locality on Gunib Plateau (Potemkin et al., 2010).

**F. jackii* Gottsche – 4: valley of right tributary, north-facing rock outcrops with flat rocks, 42°12'56"N – 46°41'21"E, 2170 m, on rock in wet niche covered by grasses (K44-3-11) with admixture of *Tritomaria quinquedentata*.

F. parvistipula Steph. – 1, 2, 3, 5 (1300 – 2090 m): rather frequent on rock outcrops along streams or on mainly north-facing slopes, often in thin mats without admixture of hepatics or mixed with *Lophocolea minor*, *Porella platyphylla*, *Radula complanata*. According to Potemkin et al. (2010), the species is one of the commonest

grasses (K41-1a-11), mixed with *Barbilophozia barbata*, *Tritomaria quinquedentata*, on wet protuberance on fine earth-covered shale in depression under grasses (K41-2a-11), with *Scapania cuspiduligera*, as well as on bare soil among *Cladonia* and *Ditrichum flexicaule* in grass-moss community under cliffs (K41-4-11); on north-facing flat cliffs, 42°12'56"N – 46°41'21"E, 2170 m, moss-lichen mat, on lichens (K44-1-11). Previously, the species was known from one locality on Gunib Plateau (Potemkin et al., 2010).

**Chiloscyphus pallescens* (Ehrh. ex Hoffm.) Dumort. var. *pallescens* – 5: deep canyon with rivulet, 42°24'15,6"N – 46°55'33,5"E, 1600 m, fragment of alder forest with hornbeam, in depression on mossy rock (K47-9-11), mixed with *Lophocolea minor*.

**Cololejeunea calcarea* (Libert) Schiffn. (per., andr.) – 5: deep canyon with rivulet, 42°24'15,6"N – 46°55'33,5"E, 1600 m, fragment of hornbeam-alder forest, in crevices of cliff (K51-2a-11), with *Lejeunea cavifolia*. *Cololejeunea* species in the Caucasus have a quite characteristic appearance and can be distinguished from superficially similar *Lejeunea* species, even in the field, by significantly smaller size, apiculate dorsal lobes and velvety leaves. In spite of careful search-

hepatics in the forest zone on the Gunib Plateau. Also occurring in the alpine zone with a single locality at 2244 m.

F. riparia Hampe ex Lehm. – 1: north-facing slope, 42°19'26"N – 47°09'45"E, 1150 m, in crevice on overarching rock (K2-1-11) and on base of *Juniperus* creeping on rock (K2-2-11); in niche at the base of boulder, 42°19'26"N – 47°09'45"E, 1245 m, on rock (K3-2-11) and under rock (K3-4-11), mixed with *Porella platyphylla*; 2: slope to road, 42°20'01"N – 47°10'01"E, 1300 m, flat rock among bushes (K26-11); 3: right bank of stream, 42°17'09"N – 46°45'55"E, 1790 m, in crevices of boulder (K28-11); 6: neglected fruit garden, 42°22'47"N – 46°58'46"E, 1150 m, on rock on bank of stream (K54-1-11). Previously, the species was reported from two localities on Gunib Plateau (Potemkin et al. 2010).

F. tamarisci (L.) Dumort. (andr.) – 3: rock outcrops on north-west-facing slope on left bank of stream, 42°17'09"N – 46°45'55"E, 1890 m, on rock step, under moss cushion (K29-2-11), on dead mosses and lichens (K29-5a-11), mixed with *Barbilophozia barbata*, *Lophocolea minor*, *Plagiochila porelloides*, and on wet rock (K29-6b-11); cliffs near stream, 42°17'42"N – 46°45'46"E, 1930 m, in crevices under grasses (K31-1-11), mixed with *Barbilophozia barbata*, *Lophocolea minor*, *Plagiochila porelloides*, *Tritomaria quinquedentata*, and on rock outcrops (K35b-11), under moss cushion; left bank of stream, cliffs at the bottom of slope, 42°17'50"N – 46°45'09"E, 2090 m, on rock under moss cushions (K36-2a, c-11), mixed with *Barbilophozia barbata*, *Plagiochila porelloides*, *Tritomaria quinquedentata*; 4: rock outcrops with flat rocks, 42°12'56"N – 46°41'21"E, 2170 m, on rock under vegetation turf (K44-2-11), with *Plagiochila porelloides*, and on open rock (K44-4a-11), mixed with *Plagiochila porelloides* and *Tritomaria quinquedentata*. The species is known as well from one locality in Gunibskiy and one locality in Tlyarotinskiy Districts (Abramov & Abachev, 1968).

Jungermannia atrovirens Dumort. (per., andr., spor.) – 1: rock field near the top of mountain, 42°19'33"N – 47°09'17"E, 1460 m, at the base of rock (K13-11); 5: on soil and rocks at the bottom of outcrops, in crevices of rocks in deep ravines with streams, on loamy and clayish soil

along streams, on sandy soil between rocks in beds of dried streams, mixed with *Leiocolea badensis* (K45-2-11, K46-2,3-11), *Leiocolea collaris* (K46-4-11, K71-11), *Preissia quadrata* (K46-1-11). Previously, this species was recorded from two localities on the Gunib Plateau (Potemkin et al., 2010).

Leiocolea badensis (Gottsche) Jørg. (gyn., andr.) – 5: deep ravine with stream in central part of Gunib Plateau, at the bottom of rock outcrops, in crack on loamy soil (K46-2a-11), mixed with *Jungermannia atrovirens*; north-west-facing rock outcrops in subalpine belt, 42°24'01"N – 46°54'09"E, 2090 m, on moist loamy soil in niche under grasses (K60-2-11), with *Reboulia hemisphaerica*. Earlier, the species was recorded from two localities on the Gunib Plateau (Potemkin et al., 2010).

L. collaris (Nees) Schljakov (per., andr.) – 5: deep ravine with stream in central part of Gunib Plateau, 42° 24' 15,6" N – 46° 55' 33.5"E, 1600 m, at the bottom of rock outcrops, on loamy soil on rock step (K46-4-11), mixed with *Jungermannia atrovirens*, and on rock near bed of stream (K48-2-11); sources of Gunibka River, 42°24' 27"N – 46°54'10"E, 1930 m, in crevice of rock on bank of stream (K71b-11), with *Jungermannia atrovirens*. It seems that this species is rather frequent on Gunib Plateau where it was recorded earlier from four localities (Potemkin et al., 2010).

Lejeunea cavifolia (Ehrh.) Lindb. (per.) – 5: deep ravine with stream in central part of Gunib Plateau, 42° 24' 15,6" N – 46° 55' 33.5"E, 1600 m, flat north-facing slope, fragment of hornbeam-alder forest, under *Fagus*, on steep mossy cliff (K51-1-11), with *Plagiochila porelloides*, and on rock (K51-2b-11), with *Cololejeunea calcarea*. According to Potemkin et al. (2010) this species is rather frequent on Gunib Plateau.

**Lophocolea bidentata* (L.) Dumort. – 5: deep ravine with stream in central part of Gunib Plateau, 42° 24' 15,6" N – 46° 55' 33.5"E, 1600 m, north-facing gentle slope, fragment of hornbeam-alder forest, on rock (K47-7-11), with *Plagiochila porelloides*.

L. minor Nees (per., gem.) – 1, 3, 4, 5 (1200–2200 m): on soil and rock among grasses in steppe communities, on soil, dead mosses and lichens

in crevices and ledges on rock outcrops, on decaying wood in deep canyons, on soil on banks of streams, on fine earth and loamy soil in birch forests at the bottom of slopes. One of the most common hepatics in all study areas. Usually it grows in thin mats often mixed with other hepatics. Thirteen other species were recorded with this one (*Barbilophozia barbata*, *Frullania tamarisci*, *Chiloscyphus pallescens*, *Conocephalum salebrosum*, *Pellia endiviifolia*, *Plagiochila porelloides*, *Porella platyphylla*, *Radula complanata*, *Scapania praetervis*, *S. cuspiduligera*, *S. calcicola*, *Solenostoma confertissimum*, *Tritomaria quinqueidentata*). Reported as one of the most common hepatics on Gunib Plateau by Potemkin et al. (2010).

**Mannia fragrans* (Balb.) Frye & L. Clark var. *inodora* (Wallr.) Lindb. – 1: right bank of creek, 42°13'30"N – 46°41'19"E, 2200 m, south-facing cliffs (8.IV.2011, coll. M.S. Ignatov), with *Indusiella thianschanica* Broth. & Müll. Hal. Previously, the type variety was recorded from one locality on the Gunib Plateau (Potemkin et al., 2010).

Pellia endiviifolia (Dicks.) Dumort. (per., andr.) – 1: bank of Sana River, 42°19'39"N – 47°09'53"E, 1100 m, on loamy soil (K1-1a-11), mixed with *Aneura pinguis*; 5: sporadic, on wet rocks and decaying wood in deep canyons near running water. Large populations of this species covering several square meter are near the waterfalls in Gunib Settlement (K53-11). Earlier, this species was recorded from several localities on Gunib Plateau (Potemkin et al., 2010).

Plagiochila porelloides (Torr. ex Nees) Lindb. – 1-6 (1200-2200 m): on soil, rocks, decaying wood in shaded places, under grasses and rocks in mountain steppe communities, in deep ravines with streams, in crevices and on ledges on rock outcrops, on loamy and sandy soil on banks of streams, between boulders in rock fields. The most common and often most abundant hepatic growing in the study areas. Apart from the localities cited, this species has been recorded in Dagestan from Tlyarskiy District at 3500 m alt., Gunib Plateau (Potemkin et al., 2010), and Tabasaranskiy, Tsuntinskiy and Rutulskiy Districts (Abramov & Abachev, 1968, as *Plagiochila asplenioides* (L.) Dumort.).

Porella platyphylla (L.) Pfeiff. (per., andr., spor.) – 1-6 (1200-2245 m): at base of *Juniperus sp.* and *Berberis vulgaris* L. on north-facing slopes, at base of *Fagus orientalis*, *Alnus sp.*, and *Salix spp.* in deep ravines and on slopes, on humus and fine earth in crevices and on ledges of rock outcrops on stream banks, on rocks shaded by grasses in subalpine meadows. Very frequent, one of the most common hepatics in Dagestan. Often in thick, pure mats without admixture of other hepatics or mixed with *Frullania spp.*, *Plagiochila porelloides*, *Radula complanata* and rarely with *Conocephalum salebrosum*, *Lophocolea minor*, *Reboulia hemisphaerica* subsp. *australis*. Apart from the localities cited, this species is reported as very common on Gunib Plateau, and in Tabasaranskiy District (Abramov & Abachev, 1968; Potemkin et al., 2010) and for Tlyarskiy District (Abramov & Abachev, l.c.).

Preissia quadrata (Scop.) Nees – 1: depression on north-facing slope, 42°19'26"N – 47°09'45"E, 1270 m, under rock on wet soil (K5-1-11); 5: on wet loamy soil under rocks, on shaded ledges of rock outcrops, at the base of cliffs. Sporadic, often as several thalli on the substrate, often mixed with *Conocephalum salebrosum*, *Jungermannia atrovirens*, *Plagiochila porelloides*, *Reboulia hemisphaerica* ssp. *australis*. Earlier, this species was recorded as rather common on Gunib Plateau (Potemkin et al., 2010).

**Ptilidium ciliare* (L.) Hampe – 3: edge of pine-birch grass *Vaccinium vitis-idaea* mossy forest on slope, 42°17'39"N – 46°45'10"E, 2170 m, on side of hillock under shrubs and grasses (K39-1-11), several stems with mosses and *Barbilophozia barbata*.

Radula complanata (L.) Dumort. (per., andr., spor.) – 1-6 (1200-2245 m): at base of *Juniperus sp.* and *Berberis vulgaris* L. on north-facing slopes, on bark at bases of tree trunks and shrubs in deep ravines and on slopes, on humus and fine earth in crevices and on ledges of rock outcrops on banks of streams, on rocks shaded by grasses in subalpine meadows. One of the most common hepatics in studied areas. Often in thin mats without admixture of another hepatics or mixed with *Frullania spp.*, *Lophocolea minor*, *Plagiochila porelloides*, *Porella platyphylla*. Earlier, it was recorded for Gunib Plateau and Tabasaranskiy

District (Potemkin et al., 2010) and Buinakskiy District (Abramov & Abachev, 1968).

***Reboulia hemisphaerica* subsp. *australis* R.M. Schust. (per., andr., autoicous) – 5: north-west-facing rock outcrops, 42°24'01"N – 46°54'09"E, 2090 m, in shaded habitat on moist loamy soil under rock (K60-2-11), on humus in crack (K60-4-11), with *Preissia quadrata*, in deep niches (K60-5, 14-11); in gorge at the source of Gunibka River, on right bank, 42°24'27"N – 46°54'10"E, 1930 m, on sandy soil between rocks in dry stream bed (K68-2-11); *Alchemilla* meadow on slope of narrow canyon, 42°23'47"N – 46°53'36"E, 2065 m, at the base of rock (K62-1a-11), with *Conocephalum salebrosum*, *Plagiochila porelloides*, *Porella platyphylla*; rocky shaft, 42°23'47"N – 46°53'36"E, 2065 m, among mosses on rock steps (K63-2-11), with *Conocephalum salebrosum*, and in cracks (K63-3-11), with *Conocephalum salebrosum*, *Plagiochila porelloides*.

Scapania calcicola (Arnell & J. Perss.) Ingham (gem.) – 1: rock field near the top of mountain, 42°19'33"N – 47°09'17"E, 1460 m, at the base of rock (K12-11) and on soil between boulders (K14-11), mixed with *Plagiochila porelloides*; 5: deep ravine with stream in central part of Gunib Plateau, lower part of north-facing slope, fragment of hornbeam-alder forest, on log (K47-3-11), with *Lophocolea minor*. Earlier, this species was recorded from two localities on Gunib Plateau (Potemkin et al., 2010)..

S. cuspiduligera (Nees) Müll. Frib. (gem.) – 4: north-facing schist outcrops with flat rocks, 42°13'30"N – 46°41'19"E, 2020 m, on wet fine earth under grasses, on schist (K41-2a-11), mixed with *Cephaloziella divaricata*; 5: in deep ravine with stream in the central part of the Gunib Plateau, on decaying log on bank of stream (K50-3-11), with *Lophocolea minor*, *Plagiochila porelloides*. Earlier, this species was recorded from several localities on Gunib Plateau (Potemkin et al., 2010).

**S. praetervisa* Meyl. (per., andr., gem.) – 3: north-west-facing cliffs on left side of stream, 42°17'09"N – 46°45'55"E, 1890 m, in crevices among mosses (K29-4-11), mixed with *Cephaloziella divaricata*; rock outcrops on bank of stream, 42°17'42"N – 46°45'46"E, 1930 m, in

crevices covered by grasses (K31-2-11), with *Barbilophozia barbata*; birch forest at the bottom of north-facing slope, 42°17'39"N – 46°45'10"E, 2170 m, on loam with detritus (K38-1d-11), with *Lophocolea minor*, *Plagiochila porelloides*, *Solenostoma confertissimum*.

S. verrucosa Heeg (gem.) – 3: cliffs at the base of slope, 42°17'50"N – 46°45'09"E, 2090 m, under moss mats on cliff (K36-2,3-11), with *Barbilophozia barbata*, *Cephaloziella divaricata*, *Plagiochila porelloides*, *Tritomaria quinquedentata*, in crack of rock at the bottom of slope (K36-4a-11), with *Plagiochila porelloides*, *Tritomaria quinquedentata*, and in niche under hillock in moss community (K37-1-11), among *Hylacomium splendens*. Previously, this species was recorded from Gunib Plateau (Abramov & Abachev, 1968).

**Solenostoma confertissimum* (Nees) Schljak. (per., andr., spor.) – 3: birch forest at the bottom of a north-facing slope, 42°17'39"N – 46°45'10"E, 2170 m, on loam with fine earth (K38-1a-11), with *Lophocolea minor*, *Plagiochila porelloides*, *Scapania praetervisa*.

**Tritomaria quinquedentata* (Huds.)H. Buch – 3: rock outcrops on north-west-facing slope on left bank of stream, 42°17'09"N – 46°45'55"E, 1890 m, on ledges of rock (K29-3-11) and on wet cliffs (K29-6b-11), with *Frullania tamarisci*, *Plagiochila porelloides*; rock outcrops on bank of stream, 42°17'42"N – 46°45'46"E, 1930 m, in cracks shaded by grasses (K31-1,2-11), with *Barbilophozia barbata*, *Frullania tamarisci*, *Lophocolea minor*, *Plagiochila porelloides*, *Scapania praetervisa*; cliffs at the base of slope, 42°17'50"N – 46°45'09"E, 2090 m, on soil-covered rock under moss mats (K36-2,3,4-11), with *Barbilophozia barbata*, *Cephaloziella divaricata*, *Frullania tamarisci*, *Plagiochila porelloides*, *Scapania verrucosa*; 4: north-facing shale cliffs in valley of stream, 42°13'30"N – 46°41'19"E, 2020 m, on soil in niche under grasses (K41-1a,b-11), with *Barbilophozia barbata*, *Cephaloziella divaricata*; valley of right tributary, north-facing rock outcrops with flat rocks, 42°12'56"N – 46°41'21"E, 2170 m, on rock in wet niche covered by grasses (K44-3-11), with *Frullania jackii*, on open rock (K44-4a-11), with *Frullania tamarisci*, *Plagiochila porelloides*.

DISCUSSION

During this short trip, I was fortunate to visit some outlying, inaccessible areas in inner Dagestan (localities 1-4). Most of species new for Dagestan were collected in these areas. In total, 35 species, including eight new to Dagestan and one taxon new to Russia, were revealed. The majority of the new records are more or less widespread species: *Chiloscyphus pallescens*, *Ptilidium ciliare*, *Scapania praetervisa*, *Solenostoma confer-tissimum*, and *Tritomaria quinquedentata*.

Several taxa are either poorly known or rare worldwide or in Russia. One of the most striking discoveries is *Reboulia hemisphaerica* subsp. *australis*, which is new for Russia and the Caucasus. Earlier, *R. hemisphaerica* subsp. *dioica* R.M. Schuster was recorded from two localities on Gunib Plateau (Potemkin et al., 2010). I collected *R. hemisphaerica* in several localities on Gunib Plateau, but in most of the specimens examined, the plants were clearly autoicous. These plants also are characterized by lobulate-crispate, and usually only slightly elevated, thallus margins. In some plants, most segments have female receptacles and just one segment has also male structures. In other plants male branches prevail. However, basal parts of thalli can be destroyed with age, and branches of one plant are readily separated during preparation. As a result, plants can look as dioicous. Such pseudodioicous plants were described by R.M. Schuster from some Iberian populations (Schuster, 1992b). In some collections from Gunib, only several (or single) and mostly sterile thalli were present, and as a result exact identification was impossible. *Reboulia hemisphaerica* subsp. *australis* was described from New Zealand and then reported from Europe (Spain, Portugal) and eastern North America (Schuster, 1992b). Later it was also recorded from Denmark (Damsholt, 2002).

Another impressive record is that of *Cololejeunea calcarea*. It is not rare in western and southern Europe; however, in Russia, it is restricted to the Caucasus (fig. 1). The species was recorded earlier from several localities on sea-facing slopes of the Western Caucasus (Konstantinova et al., 2009, Konstantinova & Savchenko, 2011) and a single locality in Republic of Kabardino-Balkaria (Konstantinova et al., 2009), as well as

in Republic of Karachaevo-Cherkessia (Konstantinova & Savchenko, 2010). The locality in Dagestan is presently the easternmost one of this species. It is possibly overlooked because of its minute size.

Frullania jackii is another interesting finding. In the Russian part of Caucasus (fig. 1), this species was previously known from one locality in the Republic of Kabardino-Balkaria (Konstantinova et al., 2009) and one from the Republic of Karachaevo-Cherkessia (Potemkin & Doroshina, 2009). This species is restricted to rock outcrops and cliffs near or along streams in the upper forest zone at elevations of 1600-2200 m.

Lophocolea bidentata is a more or less widespread temperate species, but in the Russian part of Caucasus this taxon was known earlier from a single locality (Ignatova et al., 2008).

Three European red-listed species were collected in the course of my study. One of these species, *Frullania parvistipula*, is endangered in Europe (Schumacker & Matryny, 1995), where it is known from several localities in Austria, the Czech Republic, Sicily and Italy (Söderström et al., 2002). In contrast, it was recorded from most of the study localities, and on Gunib Plateau it is rather common. Probably, this hepatic is not rare in Asia, particularly in Siberia and Japan. The second species that is the red-listed in Europe is *Frullania inflata* (with status of vulnerable species in the Red Data Book of Europe, l.c.). It is not rare in Tsudakhar hornbeam wood near the Tsudakhar Settlement and was gathered as well on Gunib Plateau. This hepatic is mainly an Asiatic species that seems to be not rare in Siberia. In Europe, it is known from Albania, Switzerland, Hungary, the Czech Republic and Italy (Söderström et al., 2002). One more species that is red-listed in Europe is *Frullania riparia*, which has the status of insufficiently known in the Red Data Book of Europe (Schumacker & Matryny, 1995). According to Schuster (1992a), this species has "basically amphi-Atlantic distribution with restricted and scattered range in western Europe." This hepatic was recently reported for Russia (fig. 1) from two localities in Dagestan (Potemkin et al. 2010) and one locality in Karachaevo-Cherkessia (Konstantinova & Savchenko, 2010). The new records of this species in Tsudakhar hornbeam wood extend its range in the Caucasus.

Altogether 50 species are known from Dagestan at present; this figure does not reflect even approximately the diversity of hepatics of Dagestan. For sure, the actual number of species is at least two to three times higher. Most hepatics known from the republic were collected in the middle forest zone of inner Dagestan. Nothing is known about hepatics in either the alpine or steppe zones.

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