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A NEW SPECIES OF GRIMMIA (GRIMMIACEAE, MUSCI) FROM NORTH-EAST ASIA AND ALASKA

НОВЫЙ ВИД GRIMMIA (GRIMMIACEAE, MUSCI) ИЗ СЕВЕРО-ВОСТОЧНОЙ АЗИИ И С АЛЯСКИ

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Abstract

Grimmia jacutica is described as a new species. This species seems to be quite common in East Siberia and occurs also in some neighboring areas, ranging eastwards to Chukotka and Alaska. Many characters of *G. jacutica* are similar to *Racomitrium* species in the *R. heterostichum* group, and many specimens were found in herbaria under various names of *Racomitrium*. However the closest relative of *G. jacutica* is probably a Western North American endemic species *G. leibergii* Paris. The comparison between these two taxa and the detailed illustration of *G. jacutica* are given, and the distribution of *G. jacutica* is mapped.

Резюме

Описан новый для науки вид *Grimmia jacutica* sp. nov. Этот вид, по-видимому, нередок в Восточной Сибири и встречается также в сопредельных районах, на восток до Чукотки и Аляски. По многим признакам *G. jacutica* напоминает виды *Racomitrium* группы *R. heterostichum,* и большинство ее образцов были определены в гербариях как виды *Racomitrium*. Однако наиболее близким видом к *G. jacutica* является эндемичный вид западных районов Северной Америки *G. leibergii* Paris. Приводится подробное сравнение этих видов, а также описание и иллюстрации *G. jacutica*.

In the course of revision of Grimmiaceae from Siberia and Chukotka, a considerable number of specimens of one species was found, which we however failed to refer to any species known from the area. Most of its collections were stored in herbaria under different names of *Racomitrium* species in the *R. heterostrichum* group. This is not surprising because the species has large plant size (up to 8 cm in height, usually 4-5 cm), stem without central strand, dioicus sexual condition (so almost all the collections lack sporophytes), numerous lateral perichaetia and perigonia, a flat, bistratose and ventrally canaliculate costa (reniform in transverse section), and laminal cells with strongly sinuose walls. Naturally, at first we considered it as a species of *Racomitrium*.

These specimens share some characters both with *R. sudeticum* (Funck) B.S.G. (branching pattern) and *R. microcarpon* (Hedw.) Brid. (large area of esinuose juxtacostal cells at leaf base). However, the very loose mat-forming growth form differentiates this species from both *R. sudeticum* and *R. microcarpon*. The attempt to identify our specimens using the treatment of Frisvoll (1988) showed a closest resemblance to *R. laetum* Besch. et Card. This latter species is known from Japan, Korea and China (Frisvoll, 1988; Tong & al., 2003) and was reported also from the Russian Far East, from the Upper Bureya River (Ignatov & al., 2000) and Sikhote-Alin Mts. (Cherdantseva, 2002). The comprasion of our Siberian material with specimens from Upper Bureya River called as *R. laetum* (in MHA) showed that they are identical (while the Sikhote-Alin material is correctly identifyed).

Similar to *R. laetum*, our species has yellowish plants in loose, easily separating mats, stem slightly and irregularly branched, leaves long, slender and with reflexed hyaline hair point, not flexuose when dry. However these Siberian plants have leaves

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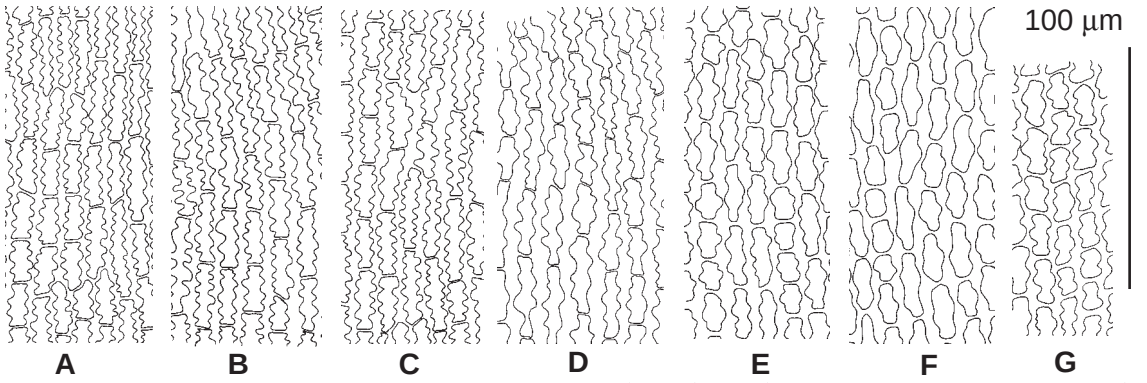

Fig. 1. Mid-leaf cell areolation of: A– *Racomitrium microcarpon* (Hedw.) Brid. (from Altai Mts., Ignatov 0/938, MHA); B –*R. laetum* Besch. et Card. (from Musci Japonici, N°290, LE); C – *R. sudeticum* (Funck) B. S. G. (from Altai Mts., Ignatov 7/169,MHA); D– *Grimmia jacutica* sp.nov.(from holotype,Akimova 6.IX.1990,MW); E – *G. decipiens* (Schultz) Lindb. (from E. Bauer, Musci Europaei Exs. N°205, MW); F – *G. elatior* Bruch ex Bals.-Griv. & De Not. (from Perm Prov., Bezgodov N°140, MW); G – *G. trichophylla* Grev. (from Rabenhorst, Flora Gothica N°91/45, MW). Scale bar: 100 µm for A-G.

with margin constantly bistratose in one row (vs. predominantly unistratose one in *R. laetum*), laminal cells wider, 9-12 µm (vs. 7-8 µm in *R. laetum*), and basal juxtacostal cells not or very slightly sinuose (vs. more or less normally *Racomitrium*-like sinuose in *R. laetum*).

However the placement of these Siberian specimens within *Racomitrium* was not without question, mainly because the thick and sinuose longitudinal cell walls are not so regularly sinuose-nodulose as is characteristic for the genus, and in certain respects intermediate between *Racomitrium* and *Grimmia* (Fig. 1). In fact, some of Siberian speciemens were called also *G. elatior* Bruch ex Bals.-Criv. et De Not. or *G. longirostris* Hook. (sub. *G. affinis* Hornsch.). Even more similar kind of lamina areolation is represented in *G. decipiens* (Schulz) Hartm.or *G. trichophylla* Grev. (Fig. 1 E, G), but in Siberian plants the mid-leaf cells have very thin transverse cell walls which are more strongly contrasting with very thick longitudinal walls.

This puzzling situation was solved when the capsules were found (only four, in three specimens from different places – and only two were terminal, while others – lateral, hidden in plant tuft). The capsule is ovate, strongly ribbed, on curved seta, with rostrate operculum and peristome without preperistome. This set of characters is well-known for the large group of *Grimmia* (e. g. *G. elatior, G. pulvinata* (Hedw.) Sm.,*G. decipiens*,etc.),which alternatively can be referred to the genus *Dryptodon* (cf. Ochyra & al., 2003). In contrast, the capsule of *Racomitrium* is always smooth, seta is straight and preperistome is typically present. Also, Siberian material has not sinuose cells of vaginula are; whereas in *Racomitrium* they are sinuose and this is an important difference of the latter from *Grimmia* (cf. Bednarek-Ochyra, 1995).

There is only one species of this group, *G. elatior,* which is common is Siberia. It also has rather tall plant habit, with ascendent shoots, forming sometimes extensive tufts. However *G. elatior* is totally different in leaf characters – lamina is 2-3-stratose above, to 5-stratose near margin, cells are papillose, sometimes also bulging, costa in transverse section is 3-5-stratose, angular at back and often constricted in transition to lamina.

The species most close to Siberian plants, however, is *G. leibergii* Paris. This endemic of Western USA (Idaho, Oregon and California) was for a long time neglected due to its synonymization with *G. trichophylla* (Lawton, 1971), and subsequently not included in North American moss check-lists (Crum & al., 1973; Anderson & al., 1990). Only recently Muñoz (1999) resurrected it as a good species, an anomalous one within the genus due to its *Racomitrium* appearance. *Grimmia leibergii* is similar to Siberian plants in the following characters: yellowish color, tall stem to 12 cm high, central strand absent, similar leaf shape, unistratose lamina (except at the margin), reniform costa (with ventral cells more than two), dioicous sexuality, perichaetia both terminal and lateral, curved seta, strongly ribbed capsule, triangular and moderately cleft peristome teeth, and spores of the same size (13-18 µm in Siberian plants, and 14-16 µm in *G. leibergii*).

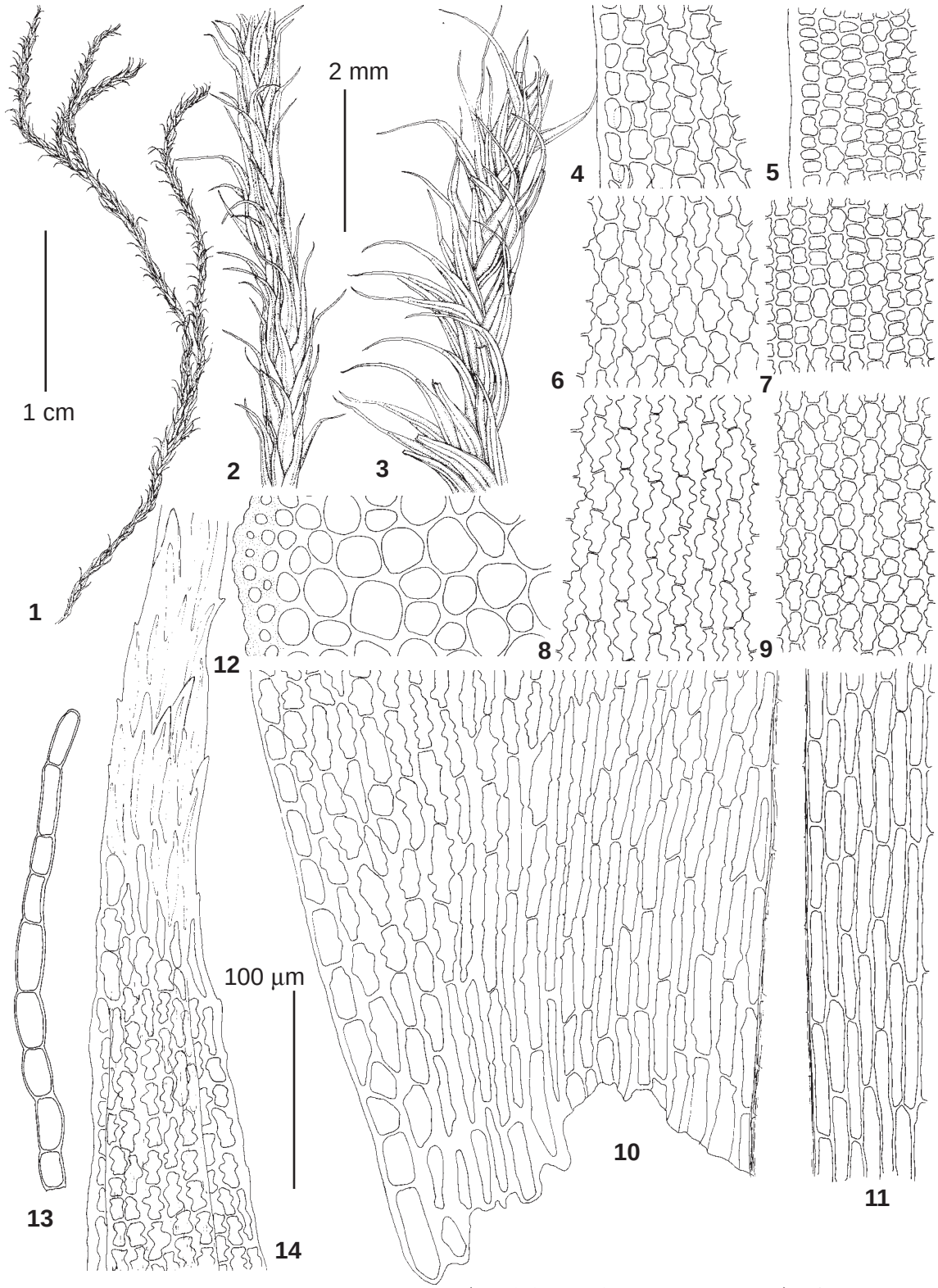

Fig. 2. 1-2, 4, 6, 8, 10, 12-14 – *Grimmia jacutica* sp. nov. (from holotype, Akimova 6.IX.1990, MW) and 3, 5, 7, 9, 11 – *G. leibergii* Paris (from holotype, Leiberg # 250, US): 1-3 – habit; 4-11 – laminal cells: pairs 4-5, 6-7, 8-9, 10-11 drawn from the same parts of leaf – 3/4, 1/2, 1/3 and at base respectively; 12 – stem transverse section; 13 – axillary hair; 14 – base of hair-point and upper leaf cells. Scale bars: 1 cm for 1; 2 mm for 2-3; 100 μm for 4-14.

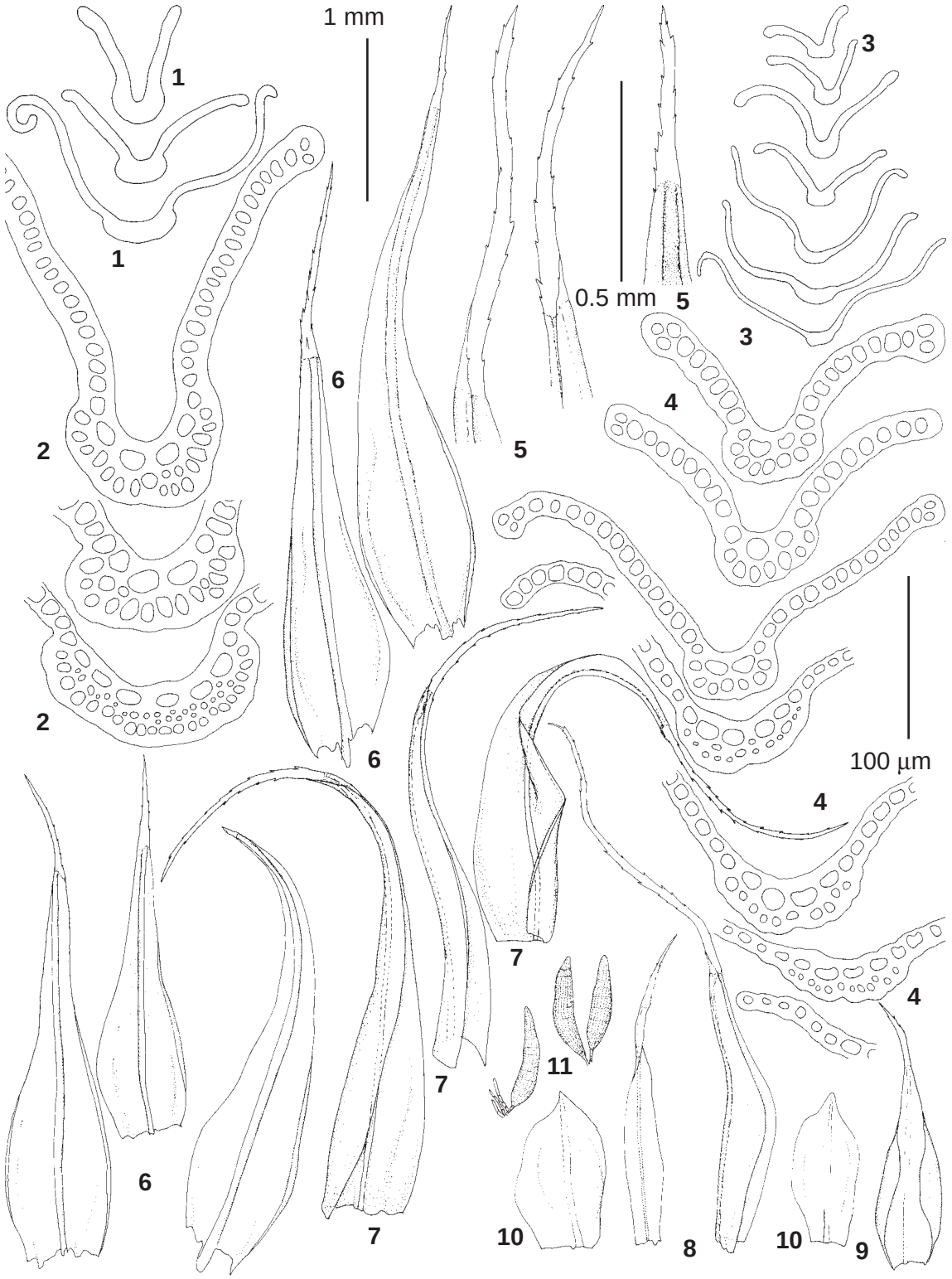

Fig. 3. 1-2 – *Grimmia leibergii* Paris (from holotype, Leiberg # 250, US) and 3-11 – *Grimmia jacutica* sp. nov. (from holotype, Akimova 6.IX.1990, MW): 1-4 – leaf transverse sections; 5 – leaf hyaline hair points; 6 – leaves; 7-8 – perichaetial leaves (8 – from immature perichaetium); 9 – outer perigonial leaf; 10 – inner perigonial leaves; 11 – anteridia with few small paraphyses. Scale bars: 1 mm for 6-11; 0.5 mm for 1, 3, 5; 100 µm for 2, 4.

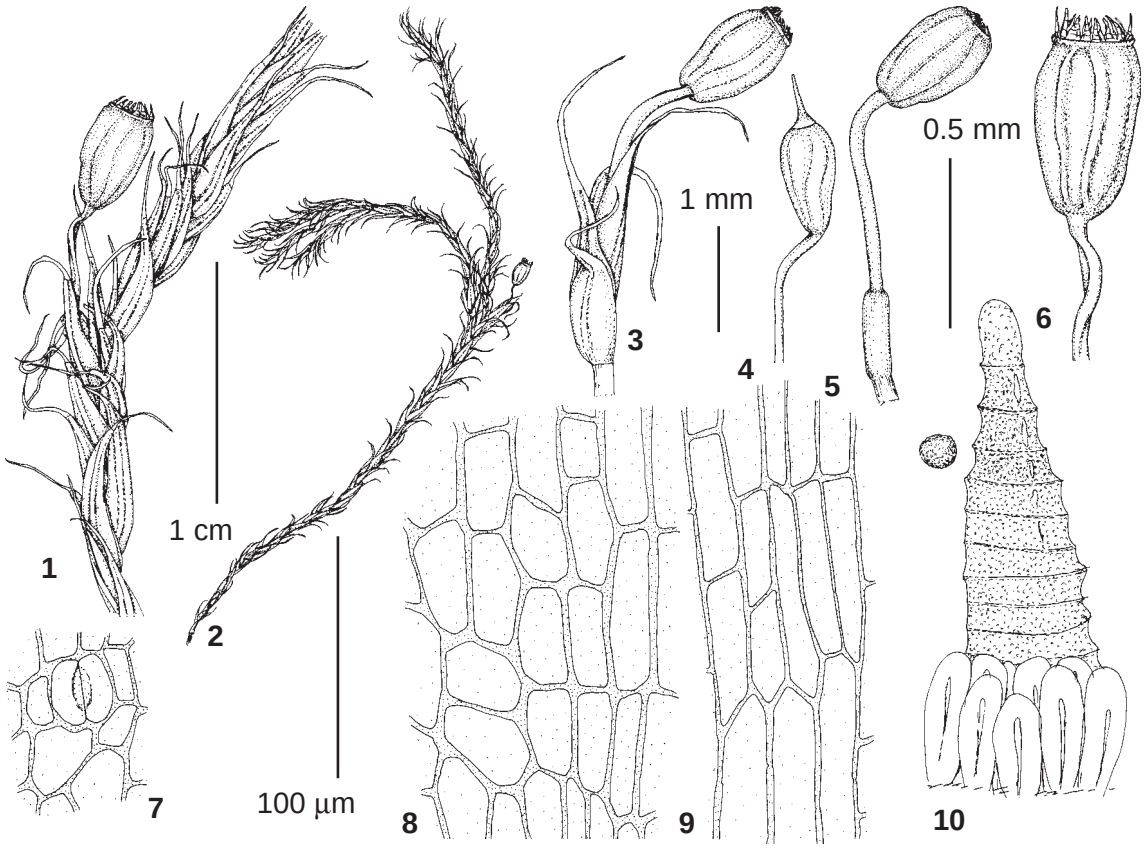

Fig. 4. *Grimmia jacutica* sp. nov. (from holotype, Akimova 6.IX.1990, MW): 1 – part of stem with perichaetium and capsule; 2 – capsule-bearing plant; 3 –perichaetium; 4-6 – capsules; 7 –stomatum; 8 – exothecial cells; 9 – epidermal cells of vaginula; 10 – part of peristome and annulus. Scale bars: 1 cm for 2; 1 mm for 1, 3-5; 0.5 mm for 6; 100 µm for 7-10.

The similarities are so numerous, that at first we faced a problem if it would be better to describe Siberian plants as a new species, or just to identify them as *G. leibergii*. However both Siberian plants and *G. leibergii* were found quite little variable allowing to reveal also a number of differences:

(1) Siberian plants are smaller in all body parts.

(2) Siberian plants have weaker costa, which is bistratose throughout, rarely with restricted spots of third layer in lower leaf (vs. constantly 3-4-stratose in lower leaf in *G. leibergii*).

(3) Costa is situated in a wide-angled fold or more commonly not in a fold (vs. in deep narrow-angled fold in *G. leibergii*).

(4) Costa is up to 80 µm wide (vs. up to 120-140 µm in *G. leibergii* – measured from cross-sections in basal part of leaf); ventral cells in lower leaf up to 4 vs. up to 6.

(5) Upper and median cells are larger with more incrassate longitudinal cell walls strongly contrasting with thinner transverse cell walls (cf. Fig. 2: 4-9).

(6) Basal juxtacostal cells are shorter, 25-60(-90) µm (vs. 50-120 µm in *G. leibergii*), and with thicker longitudinal cell walls.

(7) Leaves are smaller, 2.1-3.0 x 0.5-0.8 mm without hair point (vs. 3.0-3.5 x 0.8-0.9 mm in *G. leibergii*).

(8) Perichaetial leaves are smaller, 2.2-2.7 x 0.5-0.7 mm (vs. 3.5-4 x 1 mm in *G. leibergii*).

(9) Seta is shorter, 1.8-2.0 mm (vs. 3-5 mm long in *G. leibergii*).

The rather extensive disjunction of ca. 3000 km between the two areas of distribution, as assumed from the known data, is an additional argument in favor of recognition Siberian plants as species of its own.

Grimmia jacutica sp. nov. Figs. 1D, 2-4.

Species haec Grimmiae leibergii *proxima sed costis bistratosis angustioribusque in sulco non profundo vel nullo sitis, cellulis folii basalibus longioribus, setis brevioribus et foliis perichaetialibus minoribus facillime recedit.*

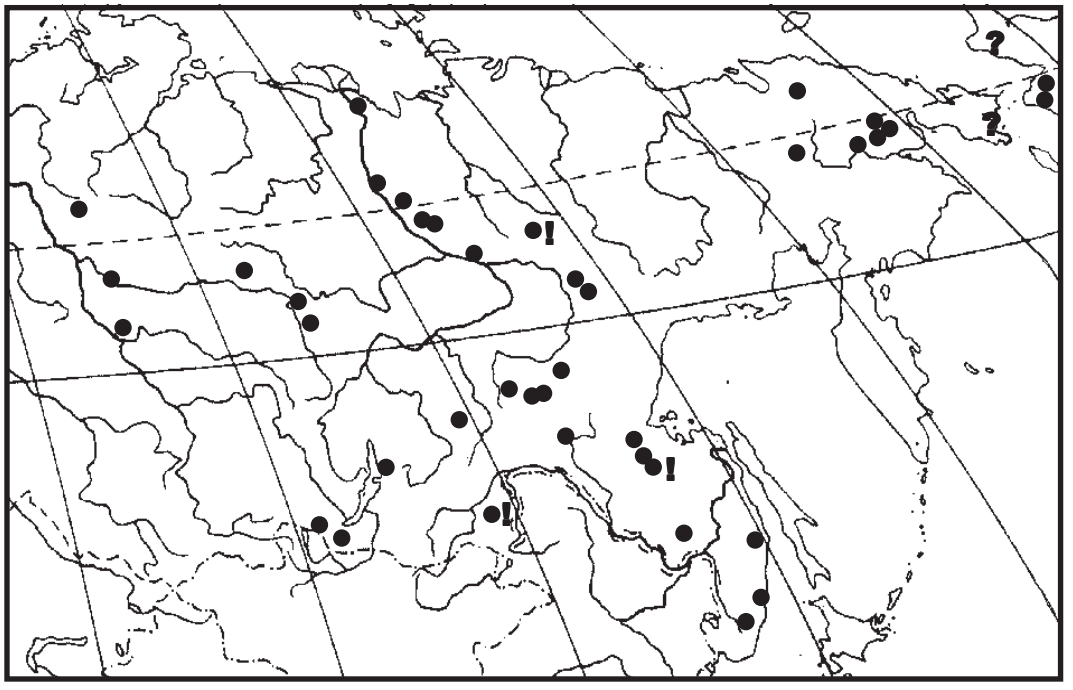

Fig. 5. Distribution of *Grimmia jacutica* sp. nov. ! – plants with sporophytes; ? – plants discussed in Poblems chapter.

Typus: Russia, Respublica Sakha/Yakutia, Distr. Tomponskij, fl. Tukulan superior, prope ostium fl. Temirdaeaekh, ad declive boreale montis "alt. 1009 m", in schistosis, 6.IX.1990, leg. E.V.Akimova (holotypus MW, isotypi MHA, LE, SASY, KRAM, MA).

Plants yellowish-olivaceous in upper part and brownish below, in loose patches or tufts. *Stem* (3-) 4-5(-8) cm, ascendent, slightly and irregularly branched, red, in cross-section without central strand. *Axillary hairs* hyaline, 9-13-celled, with short basal and longer upper cells. *Leaves* erect-spreading to secund, narrowly lanceolate to ovate-lanceolate, without distinct shoulders, 2.1-3.0 x 0.5-0.8 mm (leaf length without hair point). *Hyaline hair point* 0.1-1.2 mm long, usually 0.5-0.7 mm, capillaceous in upper part, flattened and slightly to distinctly broadened below, not decurrent or more rarely longly decurrent, not or slightly flexuose, usually reflexed when dry, distantly and slightly to sharply denticulate. *Margin* recurved on one side to 1/2–2/3 the leaf length or occasionally longer, and shortly and narrowly recurved to flat on the other side, in upper part bistratose for one cell row. *Costa* strongly convex at the dorsal side, in lower part 45-60(-80) µm broad, with 3-4(5) ventral cells, in upper and middle part 55-75 µm broad, with 2-3 ventral cells, reaching into hyaline hair point, predominantly bistratose thoughout. *Lamina* unistratose; upper cells short rectangular mixed with quadrate, 7-18 x 9-11 µm; median cells rectangular, 12-25(30) x (9)10-12 µm, with thick and sinuose longitudinal walls and very thin transverse walls; basal juxtacostal cells 25-50 (-90)x 9-11 µm, thick-walled, cell walls porose, not or very slightly sinuose; basal marginal cells not hyaline or forming distinct border, esinuose, with thick transverse and longitudinal walls.

Dioicous. Male plants usually with smaller leaves, 2.0-2.3 x 0.5-0.7 mm, and shorter hyaline hair point, 0.1-0.3(-0.5) mm. Perigonia numerous, terminal or becoming lateral after innovations are formed. Inner perigonial leaves ovate, 0.9-1.0 x 0.4-0.6 mm, obtuse. Perigonia usually without paraphyses, but sometimes few very short paraphyses were observed. Perichaetia numerous, terminal or becoming lateral due to extensive growth of innovations. Perichaetial leaves similar to vegetative leaves, recurved, 2.2-2.7 x 0.5-0.7 mm, with longer hyaline hair points, to 1.6 mm. [Perichaetial leaves surrounding not fertilised archegonia smaller, 1.2-1.6 x 0.3 mm, with hyaline hair point 0.8-1.5 mm long.] Sporophytes very rare. Seta 1.8-2.0 mm, curved when moist. Capsule about 1.0 x 0.7 mm, ellipsoidal, ribbed, when dry furrowed; annulus of 3-4 rows of large separating cells; exothecial cells irregular, with differentiated strips of longer cells forming ribs; stomata present at urn base; peristome teeth ca. 200 µm, red, finely papillose, slightly perforated. Operculum rostrate. Calyptra not seen. Spores 13-18 µm, finely papillose.

Type: Russia, Republic Sakha/Yakutia, Tomponskij District, Tukulan River upper course at

Temirdaeaekh Creek mouth, on northern slope of peak of 1009 m, rock-field, 6.IX.1990, coll. E.V.Akimova (holotype in MW, isotypes in MHA, LE, KRAM, SASY, MA, NY).

The name refers to Yakutia, the area where this species seems to be very common.

SPECIMENS EXAMINED (Specimens are in SASY and MW, unless indicated otherwise):

Grimmia jacutica sp. nov.

ASIA. RUSSIA: Republic Sakha (Yakutia). *Aldanskij Distr.*: Nizhnij Nimnyr Village, 21.VII.1995 E. Ivanova (MHA); Uchur River., Chagda Village, 28.VII.1991 E. Ivanova; Uchur River, Kurung-Khokhoe Aryt Island, 1.VIII.1991 E. Ivanova; Uchur River near Sivalga River mouth, 23.VII.1991 A.Protopopov; Ili River 45 km upstream the mouth, 8.VII.1991 E. Ivanova; Emeldjak Village, 6.IX.1991 E. Tyrylgina. *Bulun Distr.:* Sokurdakh Mt. (71°20'N–127°45'E, 750 m), 2.VII.1960 V. R. Filin (MW); Tiksi, 21.VII.1979 V.R.Filin (MW). *Kobyajskij Distr.*: Undyulyung River upper course, 13.VI.1990 A. Kazantsev; Undyulyung River upper course, 12.VI.1990 & 14.VI.1990 E. Nikolin; Kele River at Kyunkyunyur Creek mouth, 29.VII.1987 E.Nikolin; Kyunkyunyur Peak, 30.VI.1987 E.Nikolin; Kele River at Kumkandra Creek mouth, 4.VIII.1987 E.Nikolin. *Mirninskij Distr.*: Vilyuj River, 22.VII.1990 A. Isaev #1/6. *Neryungrinskij Distr.*: Tokinskij Stanovik, Utuk River, 24.VIII.1987 K. Volotovskij; Toko Lake, 10.VIII.1987 K. Volotovskij. *Suntarskij Distr.*: Chona River, Dyraj, 16.VII.1958 V. Usanova 8/2; Chona River, Dyraj, 19.VII.1958 V. Usanova #29/11 & 20/1; Vilyuj River at Lakhargaana Creek mouth, 12.VIII.1958 P. Kil'dyushevskij #101/7 (also LE, KRAM). *Tomponskij Distr.*: Tukulan River at Temirdaeaekh Creek mouth, 6.IX.1990 & 4.IX.1990 E. Akimova; Tukulan River upper course, peak 1301 m, 3.IX.1990 E.Akimova; Eastern Verkhoyan Mts., Eketchan River upper course, 23.VI.1956 L. Dobretzova #74/7; Eastern Verkhoyan Mts., Aemykchan River upper course, 13.VIII.1955 L.Dobretzova 1#89/3; Eastern Verkhoyan Mts., Barykchan River middle course, 29.V.1955 V. Ivanova #24/11; Verkhoyan Mts., Nulkasig River upper course, 27.VII.1956 V.Ivanova 105/3. *Ust-Majskij Distr.*: Allakh-Yun, Tarbagannakh Creek, 25.VIII.2000 M. Ignatov #00-350 (MHA); Allakh-Yun, Semenchi-Yuryakh Creek, 26.VIII.2000 M. Ignatov #00-356 (MHA); Solnechnyj Village, 3.IX.2000 M. Ignatov #00-355 (MHA). *Zhiganskij Distr.*: Undyulyung River at Byrandja Creek mouth, 11.VII.1990 E. Nikolin; Undyulyung River at Byrandja Creek mouth, 12.VII.1990 E.Ivanova; Sobolokh-Mayan Rver at Kuolanda Creek mouth, 26.VIII.1991 B. Borisov, S. Kirillina; Sobopol River, 2.VIII.1958 L. Dobretzova #70/8. **Krasnoyarsk Territory.** *Dolgano-Nenetzkij Autonomous Region*: Putorana Plateau, Kapchuk Lake, 3.VIII.1978 Vilde (LE); Putorana Plateau, Ayan Lake, 19.VII.1983 I. Chernyadjeva (LE). *Evenkiya* (Turukhanskij Territory): Nizhnyaya Tunguska River, 20.VII.1932 A. Rubin, I. Maskil' (LE); Podkamennaya Tunguska River, 8.VIII.1994 S. Shcherbina #281, 282 (MW). **Republic Buryatiya** [former Zabaikalskaya Oblast']: Khamney River upper course, 1912 V. Smirnov #3730 (LE); *[Barguzinskij Distr.]:* North-eastern Baikal Lake, Bolshaya Cheremshanaya Creek, 23.VII.1956 L. Bardunov (IRK, MW); *[Tunkinskij Distr.]:* Eastern Sayan Mts., Mondy Village surroundings, 22.VIII.1960 L. Bardunov (IRK, MW). **Chita Province:** *[Sretenskij Distr.]:* Transbaikalia, Shilka River, Boty Creek upper course, 30.VIII.1963 L. Bardunov (IRK, MW); [*Kolar Distr.*]: Naminga River, 1000 m, 31.VII.1989 Filin (MW). **Amurskaya Province**: *Zeya Distr.*: Zeya Nature State Reserve, 28.VIII.1979 D. Petelin #75 (MW), 2.V.1979 D. Petelin #358 (MW), 5.IX.1979 D. Petelin #128 (MW), 23.VIII.1980 L. Abramova #331 (MW), 22.VIII.1980 N. Stezura (LE); Bokongro Creek, 31.VII.1911 N. Prokhorov & O. Kuzeneva #186 (LE); *Selemdzha Distr.*: Bryus Mt., 8.VIII.1976 Cherdantseva (VLA, MW). **Khabarovsk Territory**: *Verkhnebureinskij Distr.*: Peak 1923 m, 3.VIII.1989 B. Khasanov #89-M-52, 89-M-49 (MHA); Lednikovyj Creek, 21.VIII.1987 M. Galkina (MHA); watershed of Lan & Balagankh Rivers, 24.VIII.1989 O. Grigorjeva #89-M-224 (MHA); Medvezh'e Lake, 10.VIII.1997 B. Tan #97-195, 97-368 (MHA); Medvezh'e Lake, 8-10.VIII.1997 M. Ignatov # 97-1107, 97-2002, 97-2006, 97-2013 (MHA); *Sovetskij Distr.*: Tumnin River, Aiga Mt., 15.IX.1945 B. Kolesnikov (LE). **Evreiskaya Autonomous Oblast**: *Bastak Reserve*: Bydyr Peak 1200 m, 13.VIII.2000 Rubzova (VLA). **Primorsky Territory**: *Chuguevka Distr.*: Oblachnaya Peak 1400-1855 m, 31.VII.1980 Cherdantseva (VLA); *Ternei Distr.*: Sikhote-Alin Reserve, Zakharovky Creek 11.VIII.1979 I. A. Flyagina (VLA). **Chukotka:** *Preobrazheniya Distr.*: upper reaches of Yablon River, 9.VIII.1982, Afonina (LE, KRAM); Upper reaches of Tanujrer River, Bezymjannoe Lake, Afonina 1.VIII.1978 & 6 & 9 & 14.VII.1979 (KRAM, LE); Upper reaches of Ilmyneiveem, 1.VIII.1978, Afonina (KRAM, LE); Upper reaches of Televeem-Pervaya River, 23.VII.1979 Afonina (KRAM, LE); Upper reaches of Tanuyrer River, mouth of Kujviveemkej Creek, 10.VIII.1981 & 30.VIII.1981 Afonina (KRAM, LE); upper reaches of Anadyr River, Carvaljanskaj Creek, 23.VII.1982, Afonina (LE). *Chaun Distr.:* middle reaches of Palajvaam River (Anadyr Ridge) 13 & 25.VII.1989, Afonina (KRAM, LE). *Anadyr Distr.*: middle reaches of Getlyanen River, 3.VIII.1976, Afonina (LE); Senyavin Strait, Arakamchechen Island, 11.VII.1976 Afonina (LE).

NORTH AMERICA. U.S.A. *Alaska*: Seward Peninsula, Lost firn Lava Flow (65°36'N 163°38'W), 14.VIII.1993, Afonina (KRAM, LE); Seward Peninsula, Bendeleben Mts. (64°34'N 164°24'W), 16.VII.1993, Afonina (LE).

Grimmia leibergii Paris

NORTH AMERICA. U.S.A. *Idaho*: *Kootenai Co.*: Post Falls, 47°50'N, 116°50'W, Leiberg # 250 (US!, holotype; NY (6 specimens)!, PC! isotypes); Hope, Sandberg 1169 (NY). ***California:*** see Muñoz (1999), and aslo: *Trinity Co.*: near Weaverville, 23.VIII.1879, Kleeberger s.n. (NY); Trinity River Valley between Junction-City and Weaverville, R. & I. Duell 81 (NY!); near Hyampom, 10.VI.1896, Howe s.n. (NY); along Hay Fork River, Howe 1128 (NY); *Butte Co.*, above Highway 24 above Feather River, Koch 1838 (NY); *Santa Clara Co.*: Mount Hamilton, Koch 1417 (NY); *Siskiyou Co.*: south fork of Salmon River near junction with West Fork, Norris 10083 (NY); Salmon River near Summerville, Norris 9476 (NY); Hamburg, Frye 19 (Moss Excsiccati No. 19, KRAM, NY); *El Dorado Co.*: American River, 1 Jul 1889, Ritter s.n. (NY); *Placer Co.*: Rawhide Mine, Aug 1939, MacFadden s.n. (NY); same county, Canyon Creek, Monte Vista Inn, MacFadden 8883 (NY!); *Tuolumne Co.*: Yosemite National Forest, Mirror Lake, MacFadden 17460 (NY); *Contra Costa Co.*: Mt. Diablo,

Mitchell's Canon, 29.2.1896, Howe s.n. and Koch 3341 (NY); ***Oregon***: Rooster Rock, 1880, Howell s.n. (NY); Curry Co., Eagle Mt., Ignatov 14.VIII.1989 (MHA).

Illustrations and complete description of the latter species are given by Muñoz (1999).

According to the label information *G. jacutica* grows at 350 to 1700 (-2100) m alt., in larch and spruce forests, in mountain tundra, and in the northernmost part – in rocky tundra. It was most frequently collected on rock-fields, on rocks and in crevices among them, more rarely on soil, especially in tundra.

Distribution of *G. jacutica* is shown in Fig. 5. It seems to be the common species in Yakutia. Scattered collections were seen also from some other neighboring parts of East Siberia (Putorana Plateau, Nizhnyaya Tunguska River, Podkamennaya Tunguska River), East Sayan Mts., Transbaikalia and the southern part of the Russian Far East (Sikhote-Alin Mts. and mountains north of Amur River). Also, the species is probably not rare in Chukotka, while only two collections were seen from Alaska. Thus it is known from almost all the well-collected areas in East Siberia and the northern part of Russian Far East. No one collection of *G. jacutica* was found from Kamtchatka and Altai Mts. despite many specimens of *Grimmia* and *Racomitrium* from these areas were checked, with additional attention to *G. elatior* and *Racomitrium heterostichum*-group. Only two collections were seen from the extreme West of Alaska.

PROBLEMS

Nine specimens from three coastal localities from extreme East of Chukotka and West of Alaska (shown by questionmark in Fig. 5, and listed below) differ from other collections of *G. jacutica* in more robust plants and 3-4-stratose costa. In other characters these specimens agree with *G. jacutica*, i. e. they differ from *G. leibergii* in laminal cells with more thick longitudinal walls and narrower costa (up to 80 μm wide). From both species these coastal plants differ in appressed leaves with striaght hair point. Further studies with more comprehensive Alaskan material are needed to understand their identity.

Chukotka: Penkingei Bay, Peszovaya Creek mouth, 11.VII.1978 Katenin (LE); Senyavin Strait, vicinity of Yanrakynnot settlement, 20 & 23.VII.1976 Afonina (KRAM, LE). **Alaska**: Chukchi Sea, Cape Thompson (68°06' N 165°45'W), 6.VII.1973, Steere, Inoue & Iwatsuki 73–254 (KRAM, NY).

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