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NEW RECORDS OF *SCHISTIDIUM* (GRIMMIACEAE, MUSCI) IN RUSSIA

НОВЫЕ НАХОДКИ *SCHISTIDIUM* (GRIMMIACEAE, MUSCI) В РОССИИ

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Abstract

Schistidium apocarpum subsp. *canadense* (Dupret) H.H.Blom ex B.H. Allen & Pursell, *S. confusum* H.H.Blom, *S. scandicum* H.H.Blom, *S. sinensiapocarpum* (Müll. Hal.) Ochyra and *S. subflaccidum* (Kindb.) H.H. Blom comb. nov. are reported for the moss flora of Russia for the first time. The name *Grimmia subflaccida* Kindb. is lectotypified. For three of these species not included in recent publications the brief descriptions and illustrations are provided. Eleven species and two subspecies are reported as new for different regions of Russia.

Резюме

Schistidium apocarpum subsp. *canadense* (Dupret) H.H.Blom ex B.H. Allen & Pursell, *S. confusum* H.H.Blom, *S. scandicum* H.H.Blom, *S. sinensiapocarpum* (Müll. Hal.) Ochyra и *S. subflaccidum* (Kindb.) H.H. Blom comb. nov. приводятся впервые для флоры мхов России. Название *Grimmia subflaccida* Kindb. лектотипифицировано. Для трех видов, не включенных в недавние публикации, даны краткие описания и иллюстрации. Одиннадцать видов и два подвида указаны как новые для различных регионов России.

The species concepts in *Schistidium* were storngly reconsidered by Blom (1996, 1998), who studied mostly north European collections. In the course of subsequent studies of the bryophyte flora of Russia, new data on *Schistidium* species were accumulated. Some of them were published in regional floras (e. g. Afonina, 2004; Ignatov & Ignatova, 2003, etc.), but the main amount remains unpublished.

During work on the updated check-list of mosses of the East Europe and North Asia (Ignatov, Afonina, Ignatova et al., 2006) we faced a problem of lack of references to these data. Thus we present the following list, that includes vaucher specimens for regions from where species were not reported yet. Three species not included in previous publications of Blom (1996, 1998) are briefly described and illustrated.

Schistidium andreaeopsis (Müll.Hal.) Laz. – in Russia was known from Asian Arctic; newly recorded for Europaean Arctic. **Arkhangelsk Province**, Novaya Zemlya, Matochkin Schar, VIII.1891, *Ekstam s.n.* (S!).

Schistidium apocarpum (Hedw.) Bruch et al. subsp. ***canadense*** (Dupret) H.H.Blom ex B.H. Allen & Pursell – Fig. 1.

Plants medium-sized, in loose or dense tufts or mats, olivaceus-green or yellowish-green, sometimes ferrugineous. Stems (0.5-)1-2.5 cm, slightly irregularly branched, central strand absent. Leaves appressed when dry, erect-spreading to widely spreading when moist, slightly falcato-secund, ovate-lanceolate to ovate-triangular, sharply keeled in upper part, acuminate, 2.0-3.0×0.6-0.8 mm; hyaline hair-point absent; margins recurved to shortly below leaf apex, bistratose in upper part, denticulate in upper part; costa strongly projecting dorsally, smooth, excurrent, forming stout, slightly denticulate, chlorophyllose mucro; lamina unistratose, in upper part often with bistratose strips; upper lamina cells irregular in shape, subquadrate to transversly elon-

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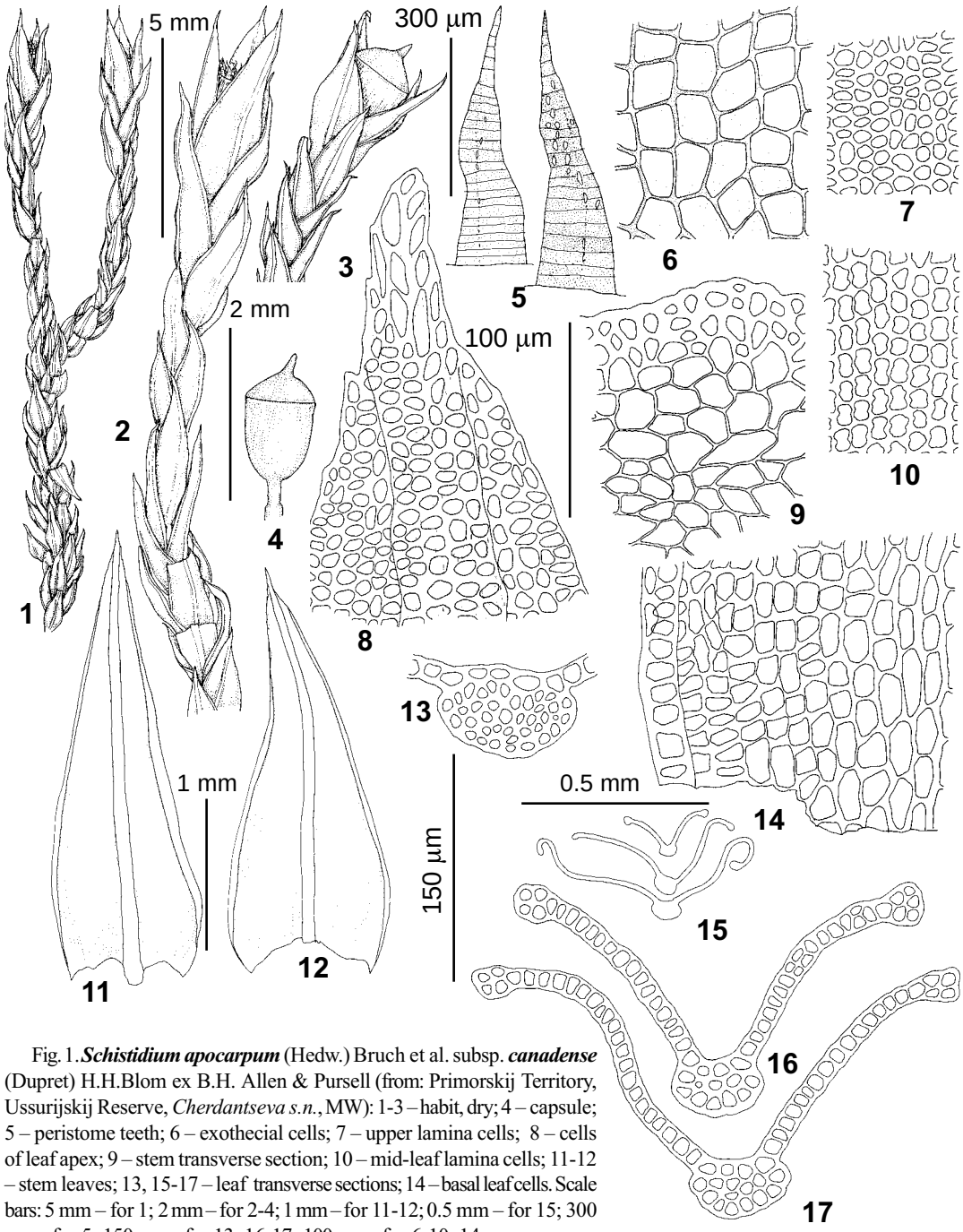


Fig. 1. ***Schistidium apocarpum*** (Hedw.) Bruch et al. subsp. ***canadense*** (Dupret) H.H.Blom ex B.H. Allen & Pursell (from: Primorskij Territory, Ussurijskij Reserve, *Cherdantseva s.n.*, MW): 1-3 – habit, dry; 4 – capsule; 5 – peristome teeth; 6 – exothecial cells; 7 – upper lamina cells; 8 – cells of leaf apex; 9 – stem transverse section; 10 – mid-leaf lamina cells; 11-12 – stem leaves; 13, 15-17 – leaf transverse sections; 14 – basal leaf cells. Scale bars: 5 mm – for 1; 2 mm – for 2-4; 1 mm – for 11-12; 0.5 mm – for 15; 300 μm – for 5; 150 μm – for 13, 16-17; 100 μm – for 6-10, 14.

gate, 7-10×8-10 μm, thick-walled, not sinuose; median cells subquadrate to short rectangular, 8-12×7-8 μm, moderately sinuose; basal cells rectangular, 12-25×11-12 μm, thick-walled, not or slightly porose, basal marginal cells subquadrate to transversely rectangular. Perichaetial leaves oblong, 3-3.5×0.6-0.9 mm. Urn shortly and broadly oblong, 0.8-0.9×0.6-0.7 mm, length/width ratio ca. 1.2; exothecial cells predominantly subquadrate to transversely rectangular; peristome teeth

ca 500 μm, slightly or strongly perforated in upper part, patent to spreading, oblique, densely papillose. Spores ca. 15-17 μm.

Differentiation. The main characters differentiating *S. apocarpum* subsp. *canadense* from the type subspecies is the absence of hyaline hair-points and costa excurrent into a stout chlorophyllose mucro (hyaline hair-points of variable length usually present in *S. apocarpum* subsp. *apocarpum*, at least in uppermost leaves), and mostly shorter urn, with length/width ratio ca. 1.2 (vs. 1.2-2.0 in subsp. *apocarpum*).

New for Russia. This species, previously known from North America, was found in collections from many places in south-eastern part of Asian Russia: Tyva and Buryatia Republics, Chita and Amur Provinces, and Primorskij Territory. It is probably not rare in this area, especially in dry areas of Transbaikalia.

Selected specimens examined: **Tyva Republic**, Todzha depression, western end of Kadysh Lake, northern shore, on rocks near the lake, 30.VIII. 1999, *Otnyukova s.n.* (MW, ex. KRAS). **Buryatia Republic**, NW shore of Baikal Lake, Kovrizhka Cape, on boulders at the lake shore, 27.VIII.1957, *Bardunov s.n*. (MW, ex. IRK). **Irkutsk Province**, Baikal Lake, Aya Gulf, on boulders at lake shore, 29.VIII.1956, *Bardunov s.n.* (MW, ex IRK). **Amurskaya Province**, Zeya District, Zeya State Reserve, Motovaya Creek upper course, on boulders, *Petelin # 157* (MW). **Primorskiy Territory**, Sikhote-Alinskij Nature Reserve, Serebryanka, S-facing slope, on rocks, IX.1980, *Flyagina s.n.* (VLA, MW).

Schistidium boreale Poelt – in Russia previously known from Karelia, Middle European Russia, Bashkortostan, South Siberia, Yakutia; newly recorded for **Chukotka Peninsula**: highway Egvekinot-Iultin (30 km), pass on Iskaten Range (66°35'N – 179°10'W), 5.VIII.1967, *Voronova s.n.* (LE); vicinity Achchen Lake, valley of Granitnaya River (64°49'N – 174°55'W), calcareous rocks, 14.VIII.1970, *Afonina s.n.* (LE); vicinity of Yanrakynnot settlement (64°53'N – 172°30'W), calcareous tundra, 20.VII.1976, *Afonina s.n.* (LE).

Schistidium confusum H.H.Blom – new for Russia, known by a single record: **Karelian Republic**, Pitkaranta District, about 4 km SE of Impilachti, above the mouth of river Sumerianjoki, Raukkianmaki, 5-50 m alt., *Huttunen & Walberg # 759* (H).

Schistidium dupretii (Thér.) W.A.Weber – sporadically distributed species in the territory of Russia, known from Karelia, central European Russia, Urals, south Siberia, Yakutia, and Kamchatka; newly found in collection from south-east European Russia: **Volgograd Province**, Kamyshin District, Shcherbakovka Ravine, at the bottom, on rock, 2.V.2004, *Suragina s.n.* (MW).

Schistidium elegantulum H.H.Blom – not rare in Russian part of Caucasus, especially at the coast of The Black Sea, known from Altai Mts.; newly recorded for Russian Far East: **Primorskiy Territory**, Ussurijskij Nature Reserve, Peishula, at the top of Zmeinaya Mt., Koryavaya Creek bank, *Cherdantseva s.n.* (VLA, MW).

Schistidium frigidum H.H.Blom – rather frequent in collections from the Asian Arctic, known from Karelia and Murmansk Province, Northern Ural Mts., and Kamchatka Peninsula; newly recorded from non-Arctic parts of Central Siberia and Yakutia, Middle Urals, Buryatia, and Khabarovsk Territory.

Selected specimens examined: **Sverdlovkaya Province**, Tylaijsko-Konzhakovsko-Serebryanskiy Mt. Ridge, Poludnevnyy Iov Creek upper course, rock outcrops, on rock surface, *Gorchakovskiy # 10* (MW, ex LE). **Taymyrskiy Autonomous District**, southern part of Putorana Mts., nival plant community among rock-fields on northern slope of the hill 1024 m, on the right bank of Dide Creek downstream Sigovoe Lake, 910 m alt., *Kuvaev #208* (MW). **Buryatia Republic**, Kurumkan District, Dzherginkiy Nature Reserve, junction of sources of Levyy Biankur Creek, subalpine belt, on rocks in stream, 1720 m alt., 12.VII.2003, *Tubanova s.n*. (MW).

Schistidium lancifolium (Kindb.) H.H.Blom – known in European part of Russia from several places in Karelia, Lipetzk Province, Caucasus and Bashkortostan, also reported from Primorskij Territory; newly recorded for southern Siberia: **Altai Republic**, Altajskiy State Reserve, Kamga River basin, Bolshoy Shaltan Creek, 530 m alt., on rocks near water, *Ignatov # 866* (MHA).

Schistidium platyphyllum (Mitt.) Perss. subsp. ***abrupticostatum*** (Bryhn) H.H.Blom (*S. apocarpum* var. *didymontoides* Loeske & L.I.Savicz) – reported from northern Siberia (Blom, 1998); lectotype of *S. apocarpum* var. *didymontoides* was collected at Vise Island (Severnaya Zemlya Islands). We found this subspecies in non-identified collections from **Novaya Zemlya Islands**: Northern Island, Russkaya Gavan Bay, rocky tundra at sea shore, *L.I. Savicz #316* (LE).

Schistidium pulchrum H.H.Blom – a common species in Asian part of Russia, from the Arctic to southern Siberia and Russian Far East, known also from Karelia and the Middle and South Urals. Newly recorded for Polar Urals, and rather many localities revealed in Chukotka.

Selected specimens examined: **Komi Republic**, Seida-Labytnangi railway, «106 km» settlement, shisty rock outcrops near the bridge across Pajpudyna River, 17.VIII.1964, *Filin s.n.* (MW)**. Chukotskiy Autonomous District**, lower course of Chegitun River, calcareous outcrops (66°30'N – 171°05'W), 11.VIII.1991, *Afonina s.n.* (LE). Anadyr basin River, Baranje Lake, outcrops on slope (66°54'N – 175°15'E), *Afonina s.n.*, 6.VIII.1980 (LE); upper course of Tanyurer River, Golubaya Creek, on rocks (66°45'N – 177°13'E), 20.VII.1981, *Afonina s.n.* (LE); southern part of Pekulney Ridge, the middle course of Yuzhnyy Pekulneiveem, riverside rocks (65°15'N – 174°31'E), 1.VIII.1979, *Afonina s.n.* (LE).

Schistidium robustum (Nees & Hornsch.) H.H.Blom – was known in Russia only from Karelia, newly reported for the West Caucasus: **Adygeya Republic**, Belaya River Basin, Inzhenernyy Range, Zhelobnaya Creek, 720 m, rock hedge along a road, 5.VIII.1997, *Akatova s.n.* (MW).

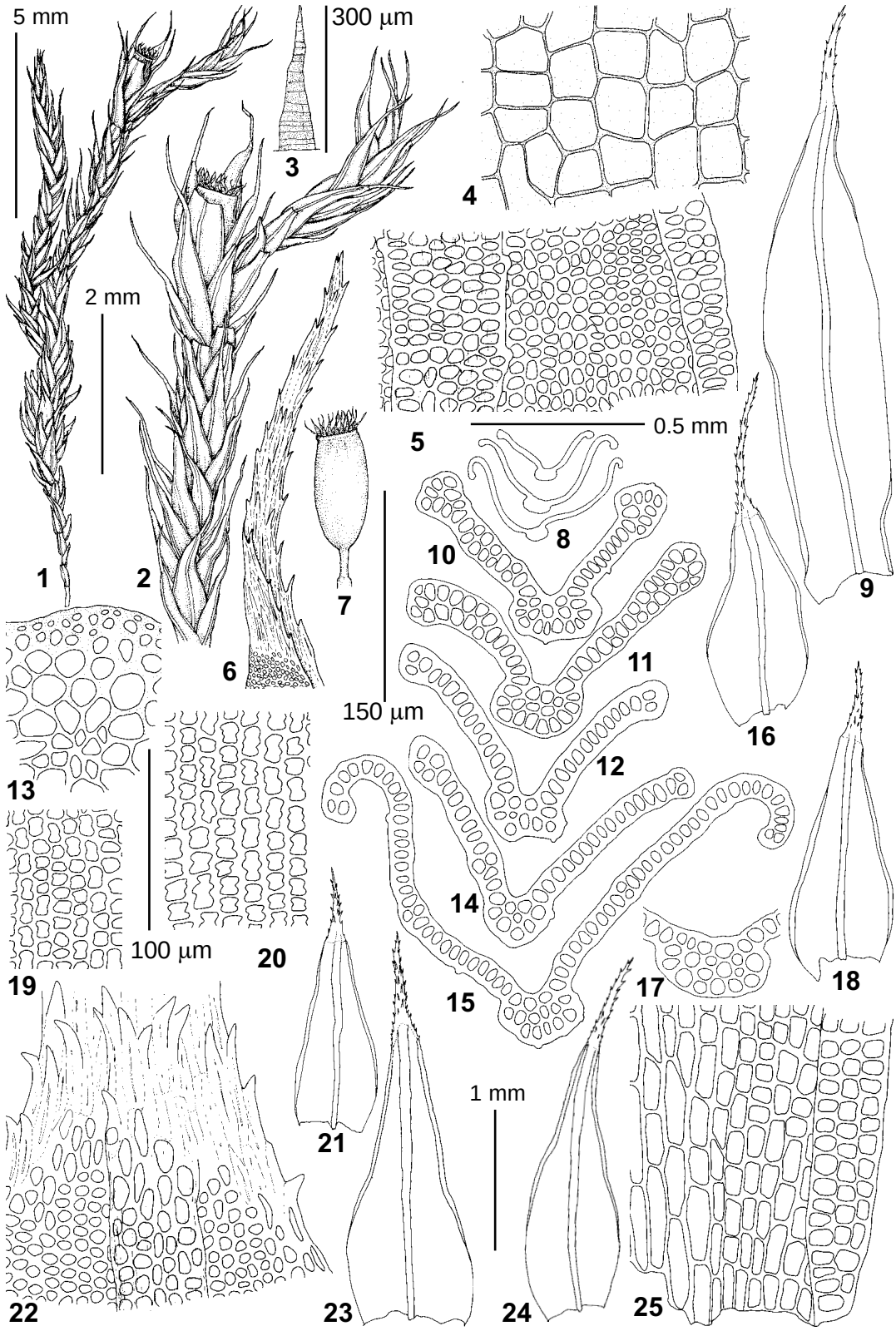
Schistidium scandicum H.H.Blom – new for Russia, found in several localities in the Middle and South Urals.

Selected specimens examined: **Perm Province**, Lysvinskij District, right bank of Chusovaya River upstream Kyn-Zavod, Kamen Denezhnyy, limestone rock outcrops in the forest, on rocks, *Bezgodov # 66* (MW). **Sverdlovsk Province**, Alapaevskij District, Koptelovo railway station surroundings, left bank of Rezh River, on rock outcrops, *Dyachenko # 2128* (MW, ex SVER). **Bashkortostan Republic**, Burzyan District, 2 km S of Magadeevo, pine forest on S-facing slope, on rock, *Ignatova # 9/37* (MW).

Schistidium sinensiapocarpum (Müll.Hal.) Ochyra – Fig. 2.

Plants medium-sized to large, in loose or dense tufts or mats, olivaceus-green or yellowish-green in upper part, sometimes ferrugineous, brownish below, often hoary. Stems 1.5-2.5 cm, slightly to strongly, irregularly branched, central strand weakly differentiated. Leaves straight, appressed when dry, erect-spreading when moist, ovate-lanceolate, sometimes with shoulders, sharply keeled in upper part, acuminate, 1.7-2.5×0.6-0.9 mm; hyaline hair-point 0.2-0.6 mm, straight, terete, slightly widened and flattened at base, not or slightly decurrent, coarsely and densely spinulose-denticulate, spinulae sharp and erect; margins recurved to shortly below leaf apex, bistratose in upper part or sometimes three- to four-stratose, smooth or rarely denticulate near apex; costa moderately to strongly projecting dorsally, papillose with low but wide, scattered papillae or occasionally almost smooth; lamina unistratose, in upper part mostly with bistratose strips, dorsally with few scattered low but wide papillae in upper part, ventrally smooth or with few papillae; upper lamina cells subquadrate and transversly shortly rectangular to short rectangular, 8-10×7-10 μm, thick-walled, slightly sinuose; median cells subquad-

Fig. 2 (p. 191). ***Schistidium sinensiapocarpum*** (Müll. Hal.) Ochyra (1-4,6-9, 13, 17-20, 22, 24, 25 – from: Buryatia Republic, Dzherginskij Reserve, *Tubanova # 105 (IV),* MW; 5, 12, 14-16 – from: Buryatia Republic, Dzherginskiy Reserve, *Tubanova # 161 (IV),* MW; 10-11, 21, 23 – from: Altai Mts., Malyy Yaloman, 4.VIII.2000, *Ignatova s.n*., MW; 24 – from: Caucasus, Teberda Reserve, *Ignatov & Ignatova* # 05-3773, MW). 1-2 – habit, dry; 3 – peristome tooth; 4 – exothecial cells; 5 – upper lamina cells and dorsal cells of costa; 6 – hyaline hair-point of stem leaf; 7 – capsule; 8, 10-12, 14-15, 17 – leaf transverse sections; 9 – perichaetial leaf; 13 – stem transverse section; 16, 18, 21, 23-24 – leaves; 19 – upper lamina cells; 20 – mid-leaf lamina cells; 22 – cells of leaf apex; 25 – basal leaf cells. Scale bars: 5 mm – for 1; 2 mm – for 2, 7; 1 mm – for 9, 16, 18. 21, 23-24; 0.5 mm – for 8; 300 μm – for 3, 6; 150 μm – for 10-12,14-15, 17; 100 μm – for 4-5, 13, 19-20, 22, 25.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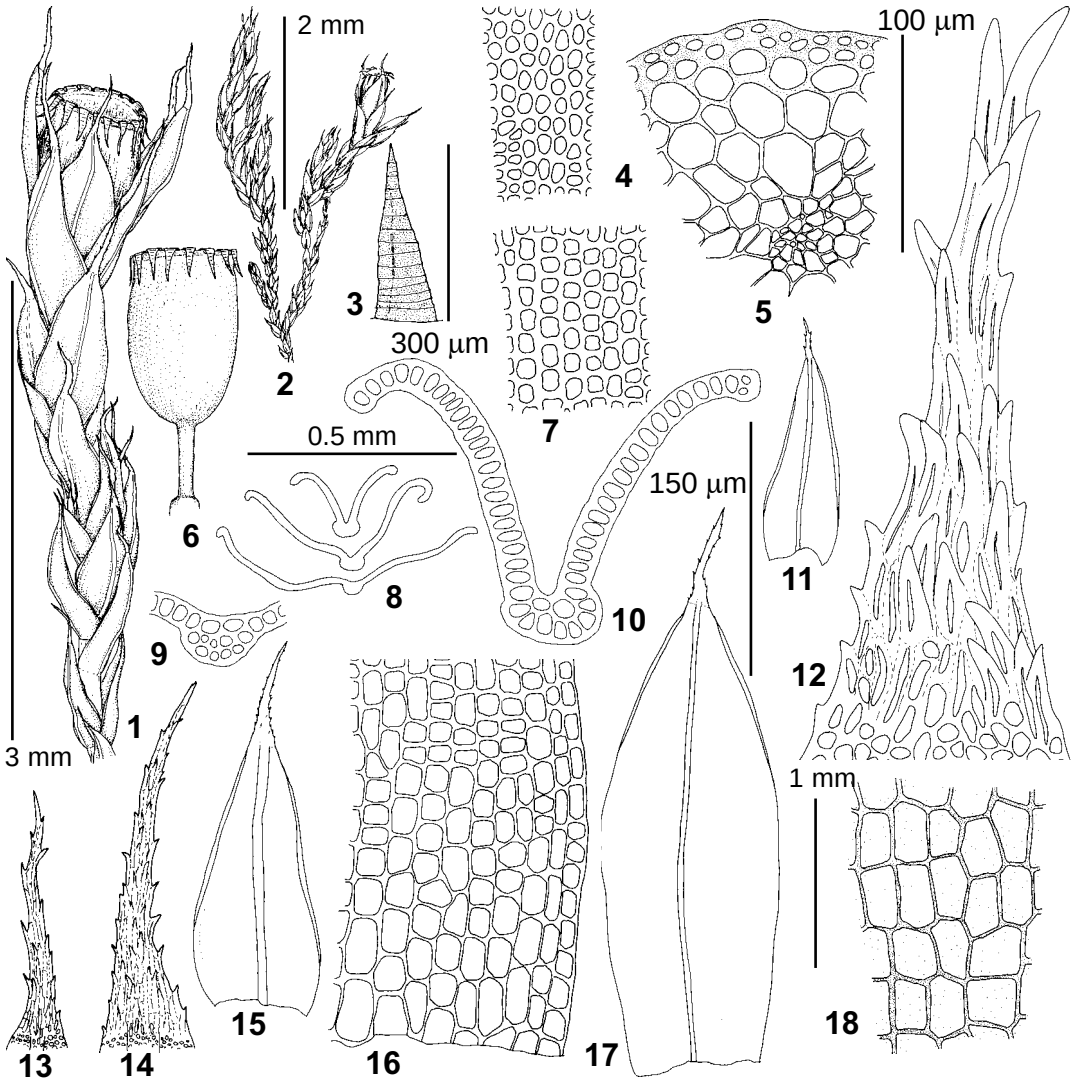

Fig. 3. ***Schistidium subflaccidum*** **(**Kindb.) H.H.Blom (from: Karachaevo-Cherkessian Republic, Teberda Reserve, *Ignatov & Ignatova # 05-3973*, MW): 1-2 – habit, dry; 3 – peristome tooth; 4 – upper lamina cells; 5 – stem transverse section; 6 – capsule; 7 – mid-leaf lamina cells; 8-10 – leaf transverse sections; 11, 15 – stem leaves; 12-13 – hyaline hair-point of stem leaf; 14 – hyaline hair-point of perichaetial leaf; 16 – basal leaf cells; 17 – perichaetial leaf; 18 – exothecial cells. Scale bars: 3 mm – for 1, 6; 2 mm – for 2; 1 mm – for 11, 15, 17; 0.5 mm – for 8; 300 µm – for 3, 13-14; 150 µm – for 9-10; 100 µm – for 4-5, 7, 12, 16, 18.

rate to short rectangular, 8-14×7-12 µm, strongly sinuose; basal cells rectangular, 17-30×11-12 µm, thick-walled, slightly porose, basal marginal cells subquadrate to transversely rectangular. Perichaetial leaves oblong, 3-3.5×0.7-0.9 mm, with longer hair-points, to 1.0-1.3 mm. Urn oblong-ovate, 1.1-1.3×0.6-0.7 mm, length/width ratio 1.6-1.8; exothecial cells predominantly subquadrate to transversely rectangular; peristome teeth 250-300 µm, subentire, patent to spreading, oblique, densely papillose. Spores ca. 9-12 µm.

Differentiation. The coarse, strongly spinulose hair-poits usually make *Schistidium sinensiapocarpum* a conspicuous plant. Further, the often rusty or brownish tufts, occurrence of leaf cell papillae and relatively short peristome teeth add to its identification. *S. papillosum* has a much weaker, usually flexuose hair-point, and possess-

es longer peristome teeth (330-500 vs. 250-300 μm in *S. sinensiapocarpum*).

The hair-point structure of *S. robustum* may be similar to that of S. *sinensiapocarpum*, although possessing much shorter spinulae. *S. robustum* has smooth leaves, and lacks the rusty-red coloration often seen in *S. sinensiapocarpum*.

In Russia *S. sinensiapocarpum* often grows in xeric habitats, but many collections were made on rocks along streams in generally xeric areas. The species grows on calcareous rocks.

New for Russia, found in the Caucasus and more southern regions of Siberia.

Selected specimens examined: **Caucasus, Karachaevo-Cherkessian Republic**, Teberda State Reserve, Dzhemagat River valley near Epchik River mouth, on rocks at slope to the brook, *Ignatov & Ignatova # 05-3773* (MW). **Republic Kabardino-Balkaria**, Nalchik surroundings, Belaya River valley near Belaya Rechka settlement, deciduous forest in flood-valley, on rock, *Ignatov et al. # 05-1703a* (MW). **Altai Republic**, AltaiMts., Kurkure Range, Kayakkatuyarykskiy Creek basin, near second lake, dry cliffs, somewhat shaded, *Ignatov # 3/281* (MW, MHA). **Tyva Republic,** Todzha depression, Azas Lake, Ilgichul Creek, rocks on S-facing steppe slope, 1.VIII.1995, *Otnyukova s.n.* (MW, ex KRS). **Buryatia Republic**, Kurumkan District, Dzherginskiy Nature Reserve, pass to Kovyli River, calcareous rock outcrops, on rock surface, *Tubanova # 105 (IV)* (MW, ex UUH). **Republic Sakha/ Yakutia**, Aldan District, left bank of Gynym River, 1 km upstream Dyulyung River, S-facing slope, steppe among pine forest, 24.VII. 1991, *Ivanova s.n.* (MW, ex SASY).

Schistidium subflaccidum **(**Kindb.) H.H.Blom comb. nov. – *Grimmia subflaccida* Kindb., Ottawa Naturalist 14: 85. 1900. – "N. Brunswick, Macoun". LECTOTYPE (nov.): "Grimmia subflaccida Kindb. Canada, N. Brunswick. Edmonston. 18 7/9 99 Leg. J. Macoun. Det. N.C. Kindberg", #S-B31761! – Fig.3.

Plants small, in dense cushions which easily fall apart, green or olivaceus-green in upper part, brownish below. Stems 10-20 mm, occasionally strongly branching, with well differentiated narrow central strand. Leaves ovate-lanceolate, sharply keeled in upper part, acute, 1.2-1.5×0.5-0.6 mm, hyaline hair-point 0.1-0.5 mm, terete, slightly widened at base, not decurrent, coarsely spinulose, spinulae long; margins plane at base, recurved to shortly below leaf apex, partially bistratose in upper part, smooth; costa slightly projecting dorsally, smooth; lamina unistratose, occasionally with bistratose strips; upper lamina cells round-oval, 7-8 μm, thick-walled, not sinuose; median cells subquadrate to short rectangular, slightly sinuose, 7-14×8 μm; basal cells rectangular, 15-50×8-11(-13) μm, basal maginal cells with slightly thickened transverse walls, subhyaline in 1-2 rows. Perichaetial leaves oblong, 2-2.5×0.7-1.0 mm, hyaline hair-point to 0.8 mm. Urn oblong-cylindrical, 1.3-1.5×0.6 mm, length/width ratio 1.5-1.6; exothecial cells predominantly rectangular; peristome teeth 220-230 μm, entire, recurved when old, densely papillose, papillae low. Spores ca. 12-14 μm.

Differentiation. *Schistidium subflaccidum* resembles *S. confertum* (Funck) Bruch et al. in small size of plants and sharply and strongly denticulate hair-point, but hair-point structure (terete vs. weak and flattened in *S. confertum*), peristome teeth (subentire vs. strongly perforated) and urn shape (oblong-cylindrical, with length/width ratio 1.5-1.6 vs. ovoid to shortly oblong, with length/width ratio 0.9-1.7) clearly differentiate these species.

Schistidium scandicum is somewhat similar to *S. subflaccidum* in habit and sporophyte characters, but is readily distinguished from *S. subflaccidum* by its finely denticulate and distinctly flatened hair-points.

The recently described *S. spinosum* H.H.Blom & Lüth has a hair-point structure similar to that of *S. subflaccidum*. This species, however, possesses an obovoid urn (length/width ratio 0.9-1.3) clearly different from the oblong-cylindrical urn in *S. subflaccidum* (length/ width ratio 1.5-1.6).

New for Russia, known by a single record from Caucasus. **Karachaevo-Cherkessian Republic**, Teberda State Reserve, right slope of Ullu-Murudzhu River, 2100 m alt., birch forest in flood valley, on rock, *Ignatov & Ignatova # 05-3973* (MW).

Schistidium submuticum Broth. ex H.H.Blom subsp. ***submuticum*** – common in European part of Russia and Urals, mostly on calcareous rocks, reported also from siberian Arctic and Yakutia.

Newly found in a collection from Transbaikalia: **Republic Buryatia**, NE Baikal, Svyatoj Nos cape, cliffs at the lake shore, on rock surface, 26.VI.1956, *Bardunov s.n.* (MW, ex IRK).

Schistidium submuticum subsp. ***arcticum*** H.H.Blom – known from Yakutia (Blom, 1996), newly recorded for Chukotka.

Selected specimens examined: **Chukotskiy Autonomous District**: Wrangel Island, bird colony on the seashore (71°10'N – 178°50'E), 24.VIII.1985, *Afonina s.n.* (LE); north-east part of north seashore of Senyavin strait, near Yanrakynnot village, on rocks (64°53'N – 172°30'W), 24.VIII.1985, *Afonina s.n.* (LE); lower course of Chegitun River, right stony slope of river, (66°30'N – 171°05'W), 9.VIII. 1991, *Afonina s.n.* (LE).

Schistidium trichodon (Brid.) Poelt var. ***nutans*** H.H.Blom – all the records of this species from Russia are represented by var. *nutans*. It was reported previously from Caucasus, Altai Mts. and Kamchatka (Blom, 1996). Newly recorded from southern part of Russian Far East.

Selected specimens examined: **Khabarovsk Territory**, Verkhne-Bureinskiy District, Dusse-Alin Mt. Range, Bureinskij State Reseve, watershed of Levaya Bureya and Kuraigagna Rivers, S-facing rocky slope, birch subalpine stand, 10.VIII.1992, *Borisov s.n.* (MW). **Sakhalinskaya Province**, Sakhalin Island, Smirnykh District, Nature Reserve «Vaida Mountain», 500 m alt., left bank of Vitnitsa Creek, rather dry limestone cliffs, 20.VIII.2006, *Ignatov & Teleganova s.n.* (MHA).

Schistidium venetum H.H.Blom – in Russia previously known from Murmansk Province (Blom, 1996); newly recorded from **Chukotskiy Autonomous District**: Anadyr district, east-facing slope of Pekulnei Range, upper course of Televeem River (65°50'N – 175°05'W), on rocks, 24.VII.1979, *Afonina s.n.*(LE).

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