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NEW RECORDS OF TORTELLA ALPICOLA DIX. IN EURASIA
НОВЫЕ НАХОДКИ TORTELLA ALPICOLA DIX. В ЕВРАЗИИ

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Abstract

Tortella alpicola Dix. is revealed in several localities in different regions of Russia (Urals, Altai, Taimyr Peninsula, South-Eastern Yakutia, and Chukotka), and also in Uzbekistan, Kyrgyzstan and Mongolia. The description and illustrations are provided, the known records in Northern Eurasia are mapped.

Резюме

Tortella alpicola Dix. выявлена в ряде мест в разных частях России (Урал, Алтай, Таймыр, юго-восток Якутии, Чукотка), а также Узбекистана, Киргизстана и Монголии. Приводятся описание и иллюстрации вида, а также карта его распространения в Северной Евразии.

In the course of study of *Didymodon* species with fragile leaf tips, the first author found in Altaian collections a puzzling specimen of *Totrella* with the structure of the upper leaf much like that of *Didymodon gaochenii* B. C. Tan et Jia Yu. We could not identify it with standard keys for Siberia, Mongolia and China, but then found that it perfectly fits the description of *Tortella alpicola* Dix. given by Eckel (1998). Subsequent expanded search of this species in LE, MHA and MW (mostly among superficially the similar *Tortella fragilis*) succeeded in finding more localities, quite distant from each other. The junior author (VF) found this species in 2004 in two localities in Taimyr Peninsula.

Until recently *T. alpicola* was considered a mostly North American species, from recent careful studies of this genus in the U.S.A. and Canada by Eckel (1997, 1998). Outside this region, *Tortella alpicola* was reported from single localities in Antarctic, Hawaii, and Columbia. The only occurrence of this species in Eurasia has been in India, from the type locality. Our results show, however, that this species is not very rare in Eurasia, but was much overlooked in previous studies, not excluding previous publications by ourselves.

Tortella alpicola was described by Dixon in 1930 from the Himalayas. Later Greene described it from the Antarctic as *Sarconeuron tortelloides* S. W. Greene (Greene & al., 1970), which soon was transferred to *Tortella* (Robinson, 1972). Then Zander found this taxon in collections of Hoe from Hawaii, and accepted it as a variety, *T. fragilis* var. *tortelloides* (S.W.Greene) Zander & Hoe (Zander & Hoe, 1979). Subsequent studies of North American material changed his mind and, in a world monography of Pottiaceae, Zander treated *T. tortelloides* as a separate species, conspecific with *T. alpicola*, the latter name having priority (Zander, 1993).

The detailed description and illustration of *Tortella alpicola* were given by Eckel (1997, 1998), along with a taxonomic discussion and distiction from related species. Below is a description based on specimens from Northern Eurasia.

Tortella alpicola Dix., Ann. Bryol. 3:54. 1930. – *Sarconeuron tortelloides* S.W.Greene, Sci. Rep. Brit. Antarct. Surv. 64:38. 1970. – *Tortella tortelloides* (S.W.Greene) Robins. in Liano, Antarct. Terr. Biol., Antarct. Res. Ser. 20:170. 1972. – *Tortella fragilis* var. *tortelloides* (S.W.Greene) Zand. & Hoe, Bryologist 82:84. 1979.

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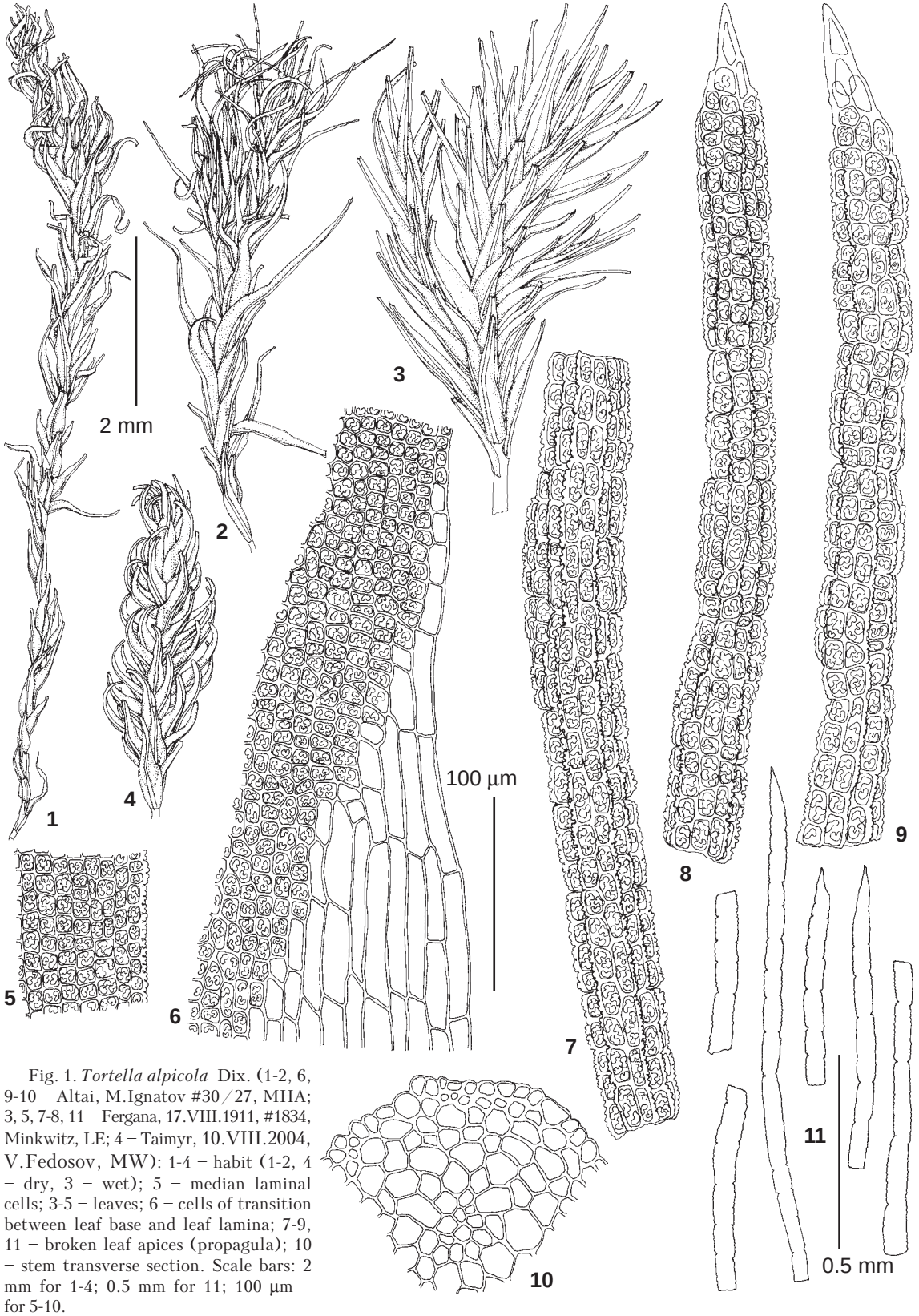

Fig. 1. *Tortella alpicola* Dix. (1-2, 6, 9-10 – Altai, M.Ignatov #30/27, MHA; 3, 5, 7-8, 11 – Fergana, 17.VIII.1911, #1834, Minkwitz, LE; 4 – Taimyr, 10.VIII.2004, V.Fedosov, MW): 1-4 – habit (1-2, 4 – dry, 3 – wet); 5 – median laminal cells; 3-5 – leaves; 6 – cells of transition between leaf base and leaf lamina; 7-9, 11 – broken leaf apices (propagula); 10 – stem transverse section. Scale bars: 2 mm for 1-4; 0.5 mm for 11; 100 µm – for 5-10.

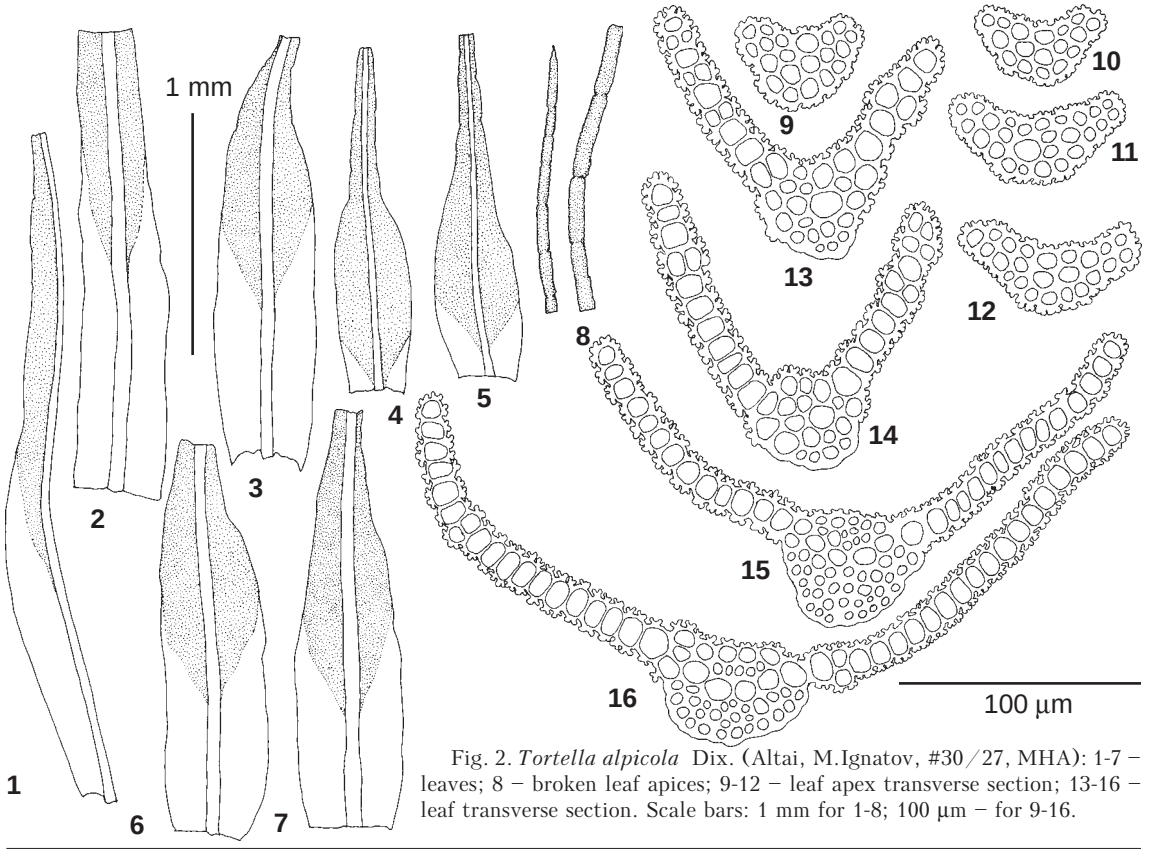

Fig. 2. *Tortella alpicola* Dix. (Altai, M.Ignatov, #30/27, MHA): 1-7 – leaves; 8 – broken leaf apices; 9-12 – leaf apex transverse section; 13-16 – leaf transverse section. Scale bars: 1 mm for 1-8; 100 µm – for 9-16.

Plants small, in rather dense tufts, not glossy, usually pure green (without brownish pigmentation), with contrasting glossy distinctive costae, and sometimes conspicuous glossy snow-white leaf bases. Stem poorly branched, 3-7 mm long, without dense rhizoidal tomentum, with central strand. Leaves nearly always with broken tips, in this state 1.4-2.0(-2.8) x 0.3-0.4 mm, flexuose to incurved when dry, ±erect when wet, lanceolate, gradually acuminate, keeled above, slightly concave below, with plane margins; costa ca. 70 µm wide, ventral epidermis composed by quadrate papillose cells with many chloroplasts; dorsal epidermal cells elongate, smooth, with pale cell walls, almost without chloroplasts; cells between guide cells and dorsal epidermis homogeneous and in transverse section similar to cells of dorsal epidermis, having incrassate cell walls and rather wide lumens ("substereids"); in upper leaf guide cells poorly differentiated, below – in one row; ventral substereid band small; laminal cells mostly unistratose, distally with scattered bistratose patches (usually one cell wide), quadrate, thin-walled, densely papillose, obscure, 11-13 µm; papillae low, branched; cells of leaf base elongate-rectangular, thin-walled, smooth, translucent, show-white, sharply delimited from laminal cells; basal cells expanding up along the margin, forming a triangular, pellucid base extension. Gametangia and sporophytes not seen in collections from Northern Eurasia. Vegetative reproduction by means of caducous leaf tips, easily broken off and retaining in collections only in the uppermost immature leaves (retained somewhat down in one collection from Altai, Ignatov #30/27, MHA). Leaf tips composed of rather regular ovate-rectangular segments, usually (3-)4-5(-6) cells long, 3-5 cells wide (50-65 x 30-45 µm), separated by narrow constrictions, in transverse section trapezoid to slightly channeled ventrally, formed mostly by costa, in transverse section cells undifferentiated, containing chloroplasts, surface cells all papillose, except 1-5 smooth apical cells. Broken off fragments usually composed by several ovate-rectangular segments, thus separated fragments are up to 1.3 mm long.

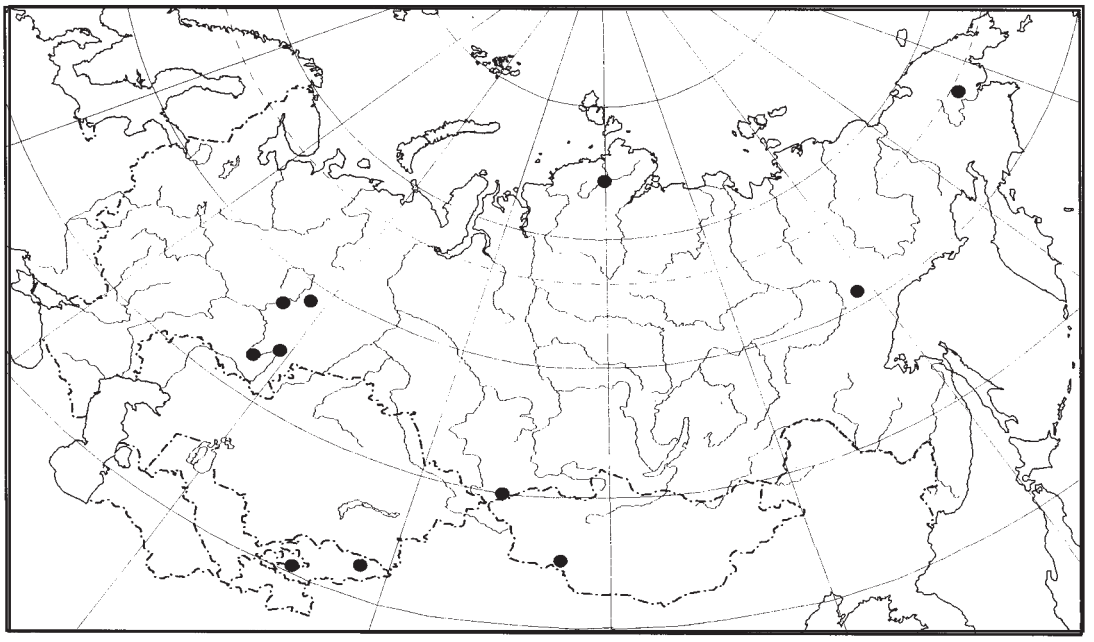

Fig. 3. Distribution of *Tortella alpicola* Dix. in Russia and adjacent countries.

Specimens examined: **RUSSIA**: *URALS:* **Perm Province**, Gremyachinsk District, Basegi State Reserve, Yuzhnyj Baseg First, 58° 47'N, 58° 28'E, 600 m alt., wet overhangs, 7.VI.1994, #427, *M.Ignatov & A.Bezgodov*)MW); 10 km S of Kungur, Sylva River right bank, Strizhevoj cliff, limestone outcrops, 23.IX.1988, *M.Ignatov* (MHA); **Bashkortostan Republic**, Beloretzk District, Mendegulovo Village, at Belaya River, at base of linden-tree trunk covered by soil, 3.VII.1993, *E.Z.Baisheva* (MW); Burzyan District, Shulgan-Tash Reserve, Kapova Cave, on rocks, 4.VI.2001, *V.I.Zolotov*, #01-100 (MHA); *SIBERIA:* **Altai Republic**, Kosh-Agach District, Kuraiskij Range, Tabozhok Creek valley, 2450 m alt., in rock crevices, 29.VII.1992, *M.Ignatov* (MHA); Tabozhok Creek, 50° 5'N, 88° 45'E, 2200 m alt., open Larix stand on steep slope, rock outcrops, 7.VI.1992, *M.Ignatov*, #30/27 (MHA); **Taimyr Autonomous Okrug**, Dikson Distr., Ledyanaya Bay of Taimyr Lake, 74° 46' 54''N, 99° 79' 7''E, shistose range at south extremity of Byrranaga Mts., in rock crevice, 10.VIII.2004, *V.Fedosov* (MW); Ledyanaya Bay, 74° 46' 2''N, 99° 70' 72''E, aleurolite rock outcrops at Pereval'nyj Creek, on wet slope, 12.VIII.2004, *V.Fedosov* (MW); **Republic Saha/Yakutia**, Ust-Maya District, Yugorenok, 59° 48'N, 137° 58'E, 450 m alt., Shchel Creek, on soil at base of dry rocks, 8.IX.2000, *M.Ignatov*, #00-393 (MHA); **Chukotskij Autonomous Okrug**, Continental Chukotka, low current of Chegitun River, 11.VIII.1991, O.M.Afonina (LE, MW).

UZBEKISTAN: Fergana, Urpa-Tushty Ravine, on apple-tree trunk, 17.VIII.1911, #1834, *Minkvitz* (LE). **KYRGYZSTAN:** Turkestan, Issikkul [Lake], VIII.1877, *A.Regel*, N 3243a (LE). **MONGOLIA:** Gobi-Altai Province, Altai Somon, Aj Bogd Mt., 1-5 km NNE of 3802 m peak, 3500 m alt., in rock crevices, 5.VII.2001, *M.Ignatov*, #01-420 (MHA).

Distribution in Russia and adjacent territories. All the above cited specimens were collected in mountain regions, at 120 m (Byrranga Mts. in Taimyr Peninsula, ca. 75° N), up to 3500 m elev. in mountains of Mongolia, ca. 45°N). We greatly expected to also find this species in the Caucasus and Kola Peninsula, but after restudying numerous collections in MW, MHA, LE, and KPABG there was no positive result.

The most common habitat of *T. alpicola* is rock crevices, usually in rather sheltered faces. Rocks are usually calcareous to about neutral, being limestones, as well as schists. Habitats of *T. alpicola* in North America are rather similar: both montane and valley habitats, wet tundras, on shaded or exposed, wet or dry rocks, granites, schists, sandstones, calcareous rock outcrops, etc., and one collection in U.S.A., Montana was gathered from a wet log (Eckel, 1997). In Eurasia rare habitats were: (1) *Malus* trunk (specimen from Uzbekistan); (2) on *Tilia* trunk base (specimen from South Ural Mts., coll. Baisheva).

Differentiation of *Tortella alpicola* from *Tortella tortuosa* var. *fragilifolia* and *Tortella*

fragilis was discussed by Eckel (1998). Among other, she mentioned large cell size of upper laminal cells, mostly 14 μm. Eurasian specimens, however, have upper laminal cells 11-13 μm. The rest of differentiating characters of *T. alpicola* given by Eckel (1998) fits perfectly to what we have observed in material from Northern Eurasia.

In *Torella alpicola*: (1) central strand is present (vs. absent in *T. tortuosa* and *T. fragilis*); (2) rhizoid tomentum is also absent (often well developed in *T. tortuosa* and *T. fragilis*); (3) leaf bases have peculiar very white, "snow-white" color (in *T. tortuosa* and *T. fragilis* leaf bases are pale-yellowish to almost colorless, but without specific bright-white aspect); (4) leaf tips are rather regularly segmented, very easily broken off, composed by papillose cells from all sides (in *T. fragilis* caducous leaf apices have no regular constrictions and thus not segmented, and also lateral faces of propagula are formed by non-papillose cells, which can be seen simply under stereomicroscope; in *T. tortuosa* leaves are often fragile, but separating fragments are flat, wide, have developed lamina); (5) colorless cells in *T. alpicola* extend upward moderately high (about the same as in *T. tortuosa*, whereas in *T. fragilis* colorless smooth cells reaching almost fragile tip of leaf); plants of *T. alpicola* are usually much smaller than those in *T. tortuosa* and *T. fragilis*; by plant size *T. alpicola* is more similar to *Oxystegus* (*Trichostomum*) *tenuirostris* (Hook. et Tayl.) A.J.E. Smith, but in the latter species colorless basal cells never extend upward along the margin.

Eckel (1998) found that there is a sound difference between sterile plants of *T. alpicola* and plants with perichaetia (found in 2 populations). The latter are in many respects similar to *T. fragilis* (rhizoid tomentum abundant, leaf bases yellowish), but a central strand is present, whereas tips of stem leaves are all broken off,so segmentation is impossible to evaluate. Unfortunately we are not able to comment on this, as we failed to find any perichaetiate plants. This problem needs further studies.

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