

A NEW VARIETY OF RHYTIDIADELPHUS JAPONICUS  
(HYLOCOMIACEAE, BRYOPHYTA) FROM KAMCHATKA

НОВАЯ РАЗНОВИДНОСТЬ RHYTIDIADELPHUS JAPONICUS  
(HYLOCOMIACEAE, BRYOPHYTA) НА КАМЧАТКЕ

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Abstract

*Rhytidiadelphus japonicus* var. *kamchaticus* Czernyadjeva & Ignatov is described. The species has in general more southern distribution, and this is the first finding in Kamchatka, where plants are different in a number of characters, although identical with *R. japonus* var. *japonicus* by nr ITS and cp *trnL*-F sequences.

Резюме

Описана новая разновидность *Rhytidiadelphus japonicus* var. *kamchaticus* Czernyadjeva & Ignatov. Это первая находка данного, в целом более южного вида на Камчатке, где растения морфологически несколько отличаются от типовой разновидности, но имеют идентичные последовательности nrITS и cp *trnL*-F.

KEYWORDS: Hylocomiaceae, ITS, Kamchatka, mosses, new variety, *Rhytidiadelphus*, Russia, taxonomy, *trnL*-F

A check-list of mosses of Kamchatka was published rather recently (Czernyadjeva, 2005), but since then a number of additions has been made showing still an insufficient exploration of the area equal in size to Scandinavia.

Identifying recently collected mosses from Kamchatka, we have faced one specimen that did not fit any known plants from the area. It somewhat resembles *Loeskeobryum* in habit (Fig. 1) and concave plicate-rugose leaves abruptly tapered to acumen, but the stem lacks paraphyllia and leaves are not auriculate.

Leaf shape and areolation (Fig. 2) are similar to species of *Rhytidiadelphus*, especially *R. japonicus* (Reim.) T. Kop., although in the latter species leaves are reflexed, rather gradually tapered to acumen, in most cases conspicuously

smooth and more coarsely serrate, especially in branch leaves. Both the stem and branches are often attenuate in *R. japonicus*, while this is not the case for plants from Kamchatka.

Occasionally similar dense foliage is observed in proximal parts of stems of *R. japonicus*, but only in a very limited portions while the most parts of those stems are more or less remotely foliate. Plants from Kamchatka were found in just one locality, but this large specimen was rather uniformly foliate.

Due to this controversial morphology, plants from Kamchatka were tested by molecular markers. The protocol of DNA extraction, amplification and sequencing was conducted in the same way as in e.g. Gardiner et al. (2005), phylogenetic analysis was done in Nona (Goloboff, 1994), jackknife values were calculated for 2000 repli-

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Fig. 1. *Rhytidiadelphus japonicus* var. *kamchaticus* var. nov. (from holotype, LE): 1 – habit, dry; 2 – habit, wet.

cations. Resulting ITS and *trnL*-F trees are shown in Fig. 3. A relatively high jackknife support (82) indicates phylogenetic relationship of Kamchatka plants with the specimen of *R. japonicus* from the Kuril Islands, although another GenBank sequence of the latter species (without specimen data) shows close relationship to *R. subpinnetum-squarrosus* group and likely belongs to it, although we failed to find a chance to check this. This specimen is given in parenthesis in ITS tree.

Pairwise comparison shows not a single substitution between plants of *R. japonicus* from Kamchatka and Kuril Islands, assuring that they are closely related. As (1) the differences occur mainly in habit and leaf characters that are very variable in pleurocarpous mosses; and (2) the plants are known so far from a single, albeit extensive collection, we prefer to segregate it at an infraspecific level, although admit that subsequently more rich material might lead to its reconsideration.

***Rhytidiadelphus japonicus* var. *kamchaticus*** Czernyadjeva & Ignatov var. nov.

*A varietas typica folia concava dense imbricata differt.*

Typus: Russia, Kamchatka australis, 51°45' N, 158° 00' E, alt 10 m, ora Oceano Pacifico, sinus Khodutka, in rupibus humidis cum stratum soli. Coll. Czernyadjeva 20.VII.2002 (holotype LE, isotype MHA).

Plants robust, in moderately dense tufts, yellow-green, somewhat glossy. Stems prostrate to ascen-

dent, 5-10 cm, terete foliate to tumid, remotely pinnate branching, red, smooth, cortex 2-3-layered, central strand present, paraphyllia absent; branches terete foliate, 0.5-2 cm long, 2-3.5 mm wide, at apex looking “cirriphyllous” due to piliferous leaves forming bud-like branch ends. Stem leaves erect to appressed, plicate-rugose, (1.3-)1.7-2.5(-3)×(0.9-)1.2-1.8(-2) mm, length to width ratio being 1.3-1.7, from erect-appressed broadly ovate base abruptly contracted into erect to spreading narrowly lanceolate acumen 0.4-0.8 mm long, at base broadly rounded; margin flat along most of its length, but often recurved near base, serrate to serrulate, proximally subentire; costa double, reaching 0.2-0.5 of leaf length; cells smooth, linear to long-rhomboidal, with rounded ends, thick-walled, ± porose, (25)40-70(80)×5-10 μm, toward margin shorter, long-rhomboidal to rhomboidal, 17-50 μm long, near base longer, to 80-100 μm long, at insertion orange, larger, with porose cell walls, in leaf corners wider, forming small indistinctly differentiated group. Branch leaves similar to stem leaves.

The only collection of the new variety is from South Kamchatka, 51°45' N – 158°00' E, 10 m alt., in the Khodutka bay of the Pacific Ocean, on soil on a ledge, wet by permanent seepage. Coll. Czernyadjeva 20.VII.2002 (holotype LE, isotype MHA).

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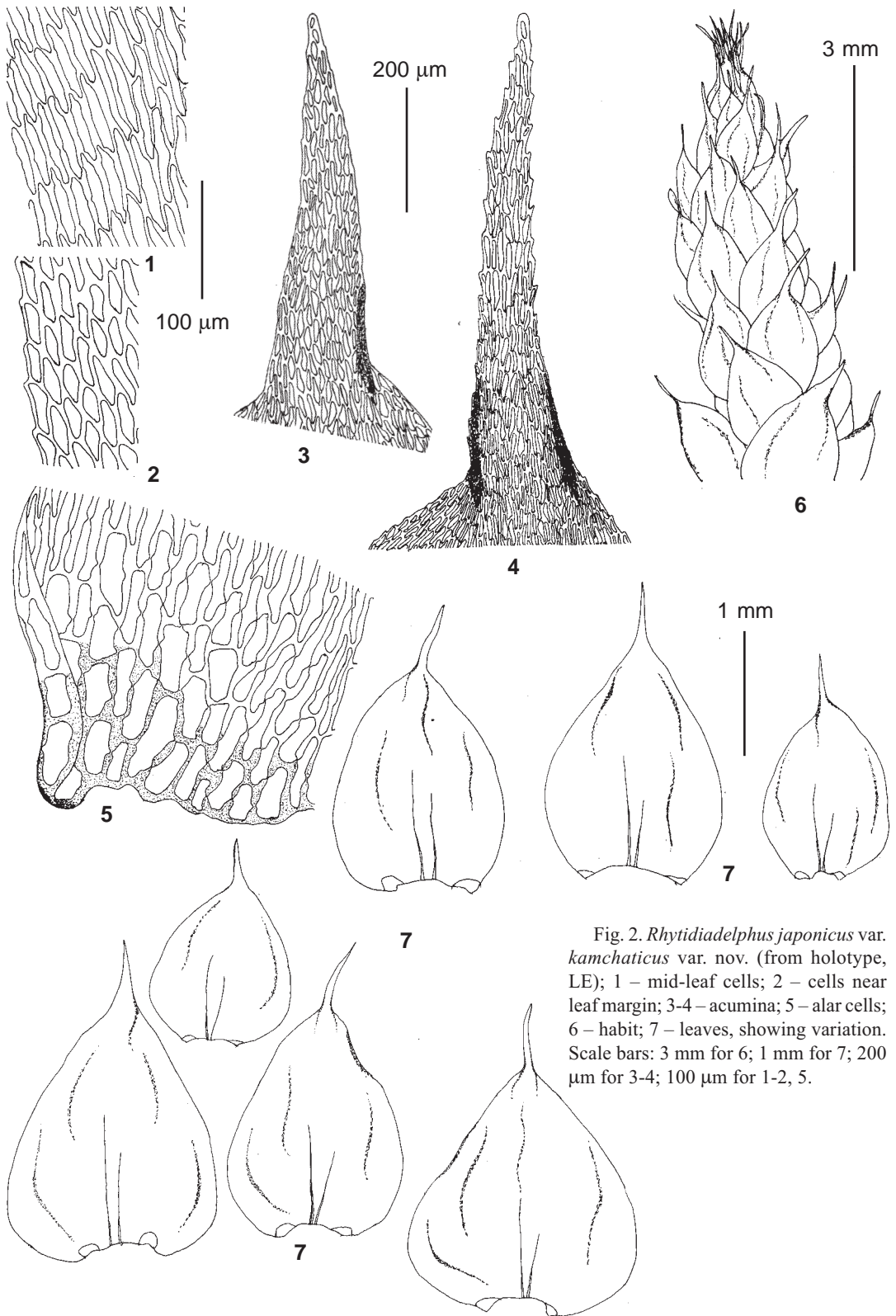


Fig. 2. *Rhytidadelphus japonicus* var. *kamchaticus* var. nov. (from holotype, LE); 1 – mid-leaf cells; 2 – cells near leaf margin; 3-4 – acumina; 5 – alar cells; 6 – habit; 7 – leaves, showing variation. Scale bars: 3 mm for 6; 1 mm for 7; 200 µm for 3-4; 100 µm for 1-2, 5.

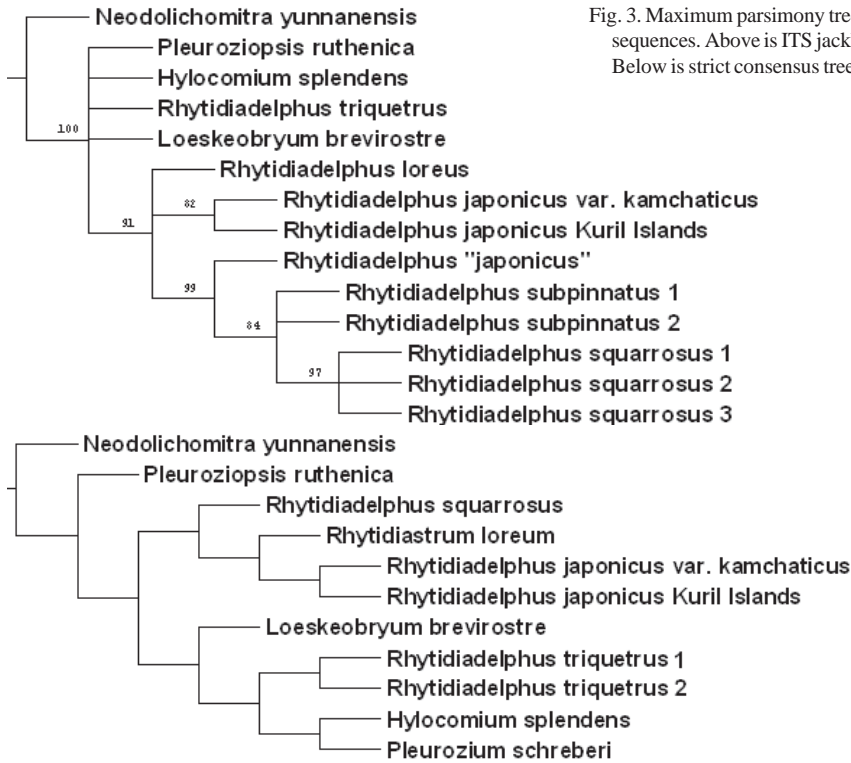


Fig. 3. Maximum parsimony trees based on ITS and *trnL-F* sequences. Above is ITS jackknife tree (2000 iterations); Below is strict consensus tree of *trnL-F*.

Appendix 1. Specimen data and Genbank accession numbers.

Species	ITS1	ITS2	<i>trnL-F</i>
<i>Hylocomium splendens</i>	AJ288336	AJ270021	AF152385
<i>Neodolichomitra yunnanensis</i>	AJ288367	AJ288581	AY683602
<i>Loeskeobryum brevirostre</i> 1*	JF280975	AJ270022	AF161172
<i>Loeskeobryum brevirostre</i> 2	AJ288341	AJ288555	-----
<i>Pleuroziopsis ruthenica</i>	AY999170	AY999170	DQ019930
<i>Pleurozium schreberi</i>	-----	-----	AF152384
<i>Rhytidiadelphus japonicus</i> Kunashir**	JF280976	JF280976	JF280982
<i>R. japonicus</i> var. <i>kamchaticus</i> ***	JF280977	JF280977	JF280978
<i>R. "japonicus"</i>	AJ288330	AJ288544	-----
<i>R. loreus</i>	AJ288328	AJ288542	AF071845
<i>R. squarrosus</i> 1****	56 JF280971	56 JF280971	AF161126
<i>R. squarrosus</i> 2	161375741	161375741	-----
<i>R. squarrosus</i> 3	161375742	161375742	-----
<i>R. subpinnatus</i> 1	161375744	161375744	-----
<i>R. subpinnatus</i> 2	161375745	161375745	-----
<i>R. triquetrus</i> 1	AJ288429	AJ277241	AF397811
<i>R. triquetrus</i> 2	-----	-----	AY524492

\* U.S.A., 2.XII.1995, Ignatov (MHA); \*\* Russia, Kuril Islands, Ignatov #06-1059 (MHA); \*\*\* Russia, Kamchatka, 20.VII.2002, Czernyadjeva #4 (LE, MHA); \*\*\*\* Russia, Vologda Province, 13.VIII.2001, Ignatov & Ignatova (MHA).

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