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MOSSES OF THE KORNEVKA CREEK (KALININGRAD PROVINCE, RUSSIA)

МХИ ДОЛИНЫ РЕКИ КОРНЕВКА (КАЛИНИНГРАДСКАЯ ОБЛАСТЬ, РОССИЯ)

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Abstract

The moss flora of an old broadleaved forest in Kaliningrad Province including 85 species is compared with historical data, showing possible changes in species occurrence. Some species likely remained under-revealed in the province (*Loeskeobryum brevirostre, Bryum violaceum, B. rubens*, etc.), whereas there is some evidence of the expansion of others – *Kindbergia praelonga, Fissidens taxifolium, Sciuro-hypnum reflexum,* and *Orthotrichum pallens*.

Резюме

Изучена флора мхов старого широколиственного леса в Калининградской области, которая включает 85 видов. Она сравнивается с историческими данными, что позволяет выявить возможные изменения встречаемости мхов. Некоторые из ранее приводившихся видов не были найдены и, возможно, остаются недовыявленными (*Loeskeobryum brevirostre, Bryum violaceum, B. rubens* и др.), тогда как есть свидетельство расширения ареалов некоторых других видов – *Kindbergia praelonga, Fissidens taxifolium, Sciuro-hypnum reflexum* и *Orthotrichum pallens*.

KEYWORDS: Bryophytes, flora, Kaliningrad Province, historical changes

INTRODUCTION

Kaliningrad Province is an isolated territory of the Russian Federation, between Poland and Lithuanua. Extensive agriculture during recent centuries strongly reduced its forested areas, which covered after the Second World War only 13% of its territory, now reaching 17% (Orlenok, 2008), which is still the lowest value among forest zone provinces in Russia. Many forests were planted in the recent past, but the sylviculture concentrated mostly on fast growing *Pinus sylvestris.* Old deciduous plantation and, the more so, almost primeval broadleaved forest became rare in the province.

The forest "Zimovniki" in the valley of Kornevka Creek (Fig.1) is one of the best preserved in the province. It is situated in the northern edge of the Varmiyskaya Upland (50-100 m elev.), with moraine hills alternating to semi-open and closed depressions, at transiting to a lowland (ca. sea level). Kornevka Creek at most of its course is surrounded by agricultural lands, but in its middle part it crosses the forest which covers ca. 2000 hectars. Main trees are *Tilia cordata, Quercus robur, Acer platanoides, Fraxinus excelsior, Carpinus betulus, Pinus sylvestris,* and rarely *Picea abies.* On the bank of the river *Alnus glutinosa* grows. Age structure of trees on average makes 70-80 years. However, quite old oaks, hornbeams, lindens, and pines reach by age 100-130 years. The territory is rich in rare plants, *e.g. Equisetum telmateia* and *Lunaria rediviva,* and animals. Protection of the Kornevka River valley is considered by Dedkov & Grishanova (2010).

The climate is transitional from oceanic to continental, with relatively mild winter, mean January temperature being -3°C, mean July t= +17.3°C, mean annual t= +8°C, mean annual precipitation 665 mm. Frostless period is 150 days (Orlenok, 2008).

The area was studied mostly by the first author in 2005-2011, voucher specimens are deposited in KLGU, with duplicates of most species in MHA. The study area involved the forest itself and also arable fields along its edges.

LIST OF SPECIES

Amblystegium serpens (Hedw.) Bruch et al. – frequent in forest on rotten logs and occasionally on soil.

Anomodon attenuatus (Hedw.) Huebener – rather common on rocks and trunk bases.

A. longifolius (Brid.) Hartm. – frequent in the same habitats and often together with previous species.

Atrichum undulatum (Hedw.) P. Beauv. – common on bare soil in forest.

Barbula unguiculata Hedw. – sporadic on soil in disturbed places at forest edges.

Brachytheciastrum velutinum (Hedw.) Ignatov et Huttunen – rare on tree bases.

Brachythecium glareosum (Bruch ex Spruce) Bruch et al. – rare on large granitic boulders in valley of Kornevka River.

B. rivulare Bruch et al. – common on soil in wet places.

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Fig. 1. The study area is shown in the map in the middle. Map on the right shows position of the study area in Preussisch Eylau District in the end of XIX and the beginning of XX century, the dash line approximates the current political border of Russia and Poland.

B. rutabulum (Hedw.) Bruch et al. – very common and abundant on trunk bases, rotten logs, rocks.
B. salebrosum (F. Weber et D. Mohr) Bruch et al. – common on soil and rotten logs.
Bryum caespiticium Hedw. – rare on edges of forest and arable fields.
B. moravicum Podp. – rare on tree trunks.
B. rubens Mitt. – sporadic in arable fields along forest edge.
B. violaceum Crundw. et Nyh. – rare in arable fields.
Cirriphyllum piliferum (Hedw.) Grout – rather common on soil in forest.
Climacium dendroides (Hedw.) F. Weber et D. Mohr – rare on soil in forest.
Cratoneuron filicinum (Hedw.) Spruce – common on soil and rocks along Kornevka Creek and its tributaries.
Dicranella heteromalla (Hedw.) Schimp. – common on soil banks and occasionally on logs covered by alluvium.
D. schreberiana (Hedw.) Hilp. ex H.A. Crum &L.E. Anderson – rare on soil in fields.
D. staphylina H. Whitehouse – sporadic on soil in arable fields.
Dicranum flagellare Hedw. – few collections from trunks.
D. montanum Hedw. – very common on tree trunks and rotten logs in forest.
D. scoparium Hedw. – moderately common on tree trunks and fallen logs in forest.
Eurhynchium angustirete (Broth.) T.J. Kop. – widespread on soil, climbing to trunk bases and occasionally on rotten logs.
Fissidens bryoides Hedw. – on soil in forest, rarer than the next species.
F. taxifolius Hedw. – moderately frequent on bare soil in forest.
Fontinalis antipyretica Hedw. – in Kornevka Creek on rocks, growing both submerged or climbing on creek-facing boulders.
Funaria hygrometrica Hedw. – frequent on soil in open disturbed places.
Hedwigia ciliata (Hedw.) P. Beauv. – sporadic on boulders.
Herzogiella seligeri (Brid.) Z. Iwats. – rather common on rotten logs.
Homalia trichomanoides (Hedw.) Bruch et al. – not rare on lower parts of trunks of old deciduous trees.
Homalothecium sericeum (Hedw.) Bruch et al. – on one inclined trunk of old maple tree at creek bank.
Hygroamblystegium fluviatile (Hedw.) Loeske – common on rocks along river.
H. humile (P. Beauv.) Vanderpoorten, A.J.Shaw et Goffinet – common on rotten logs in wet forest.
H. tenax (Hedw.) Jenn. – common on rocks along river.
Hypnum cupressiforme Hedw. – probably the most abundant moss in the area, growing on tree trunks and rotten logs and less common on boulders.
Isothecium alopecuroides (Lam. ex Dubois) Isov. – very common on tree trunks, rotten logs and boulders
Kindbergia praelonga (Hedw.) Ochyra – sporadic on soil in damp places, usually in not very dense forest along tributaries of Kornevka
Leptobryum pyriforme (Hedw.) Wils. – very common in arable fields along forest edge.
Loeskeobryum brevirostre (Brid.) M. Fleisch. – on several nearby big boulders in valley of Kornevka River tributary.
Leptodictyum riparium (Hedw.) Warnst. – rare on logs in river and its low banks.
Leskea polycarpa Hedw. – very common on tree trunks and less common on rotten log.
Leucodon sciuroides (Hedw.) Schwaegr. – sporadic on tree trunks.
Mnium hornum Hedw. – sporadic on damp soils in forest.
Neckera complanata (Hedw.) Huebener – one finding on trunk on steep slope in forest.
Orthotrichum affine Brid. – very common on tree trunks.
O. anomalum Hedw. – rare on rather dry rocks in forest.
O. lyellii Hook. & Taylor – on only one maple trunk of oak in forest, but in big quantity there.
O. pallens Bruch ex Brid. – rare on tree trunks.
O. patens Bruch ex Brid. – two collection on aspen trunks.
O. pumilum Sw. – relatively rare on trunks in not very dense forest.
O. speciosum Nee – common on trunks of different trees,

and occasionally on rocks.

Oxyrrhynchium hians (Hedw.) Loeske – very common on soil and rotten logs.

Physcomitrium pyriforme (Hedw.) Hampe – eroded soil at forest edges.

Plagiomnium affine (Bland.) T.J. Kop. – common on soil and rotten logs.

P. cuspidatum (Hedw.) T.J. Kop. – common on soil and rotten logs.

P. ellipticum (Brid.) T.J Kop. – rare on damp soil.

P. rostratum (Schrad.) T.J. Kop. – sporadic on rocks.

P. undulatum (Hedw.) T.J. Kop. – very common on soil in forest, occasionally with sporophytes.

Plagiothecium cavifolium (Brid.) Iwats. – rather rare of soil and rocks.

P. denticulatum (Hedw.) Bruch et al. – common on rotten wood.

P. laetum Bruch et al. – widespread on trunks and fallen logs.

P. nemorale (Mitt.) Jaeg. – sporadic on rocks and eroded slopes.

Platygyrium repens (Brid.) Bruch et al. – rather common on tree trunks.

Pleuridium subulatum (Hedw.) Rabenh. – sporadic on bare soil on fields at forest edge.

Polytrichum juniperinum Hedw. – rare on rotten logs

Polytrichastrum formosum (Hedw.) G.L. Smith – rather common on soil in forest.

Pylaisia polyantha (Hedw.) Bruch et al. – widespread on tree trunks and occasionally rotten logs.

Racomitrium canescens (Hedw.) Brid. – rare on boulders along creek bank.

Rhizomnium punctatum (Hedw.) T.J. Kop. – rather common on wet soil in valley and ravine bottoms.

Rhynchostegium riparioides (Hedw.) Cardot – sporadic on rocks submerged in running water and occasionally on inundated rocks along Kornevka Creek.

Rhytidiadelphus triquetrus (Hedw.) Warnst. – rare on soil.

Sanionia uncinata (Hedw.) Loeske – on boulders along banks of Kornevka Creek.

Schistidium apocarpum (Hedw.) Bruch et al. – common on boulders.

Sciuro-hypnum curtum (Lindb.) Ignatov – rather rare on soil, litter and strongly decomposed wood.

S. populeum (Hedw.) Ignatov et Huttunen – widespread on granitic boulders and trunks of broad-leaves trees.

S. reflexum (Starke) Ignatov et Huttunen – common on tree trunks.

Tetraphis pellucida Hedw. – sporadic on rotten logs.

Thuidium delicatulum (Hedw.) Bruch et al. – rare on rocks.

T. tamariscinum (Hedw.) Bruch et al. – very common of soil in forest in moderately moist places, on rocks and trunk bases.

Tortula acaulon (With.) Zander – not rare on soil at forest edge in grasslands and extensively used arable fields.

T. caucasica Lindb. ex Broth. (*T. modica* Zander) – rather rare on soil in the same habitats as *T. truncata*.

T. muralis Hedw. – rare on rocks.

T. truncata (Hedw.) Mitt. – common on soil at forest edge in grasslands and extensively used arable fields.

Ulota bruchii Hornsch. ex Brid. – rather common on various tree trunks.

Discussion

Thus 85 species were revealed in the area, which is a rather low number. Probably it reflects a quite natural state of the forest with practically no trails, where eroded soil banks occur only on quite shady and mostly rather gentle ravine slopes.

There are no historical records of mosses immediately available for this forest, however, the Klinggraeff's "Die leber- und laubmoose West- und Ostpreussens" (1893) includes numerous references for the Preussisch Eylau, a bigger territory, now partly situated in Poland, partly in Russia. There are several areas in the Russian part of the former Östpreussian, mentioned by Klinggraeff, but the areas of Königsberg and Preussische Eylau have the highest number of records. As much as 180 species were mentioned for the latter by Klingraeff (1893). Many species, for example, *Sphagnum spp.*, *Aulacomnium palustre*, *etc*. were obviously collected outside the forest, and not discussed in the present paper, as there are simply no suitable places for any peatland in the Kornevka forest. Other non-findings of species reported by Klingraeff cannot be interpreted with confidence.

However, the findings of species which were not recorded in Preussisch Elau by Klingraeff are more interesting. As the data for the area looks more or less complete, the absence of species in this publication can be assumed as an evidence of a changed abundance within the period of ca.120 years.

Of course, this does not likely concern rare species growing in limited areas, for example, *Loeskeobryum brevirostris*, which was found only on a few big boulders in a small area of the valley. *Orthotrichum lyellii* was also probably not recorded because of its overall rarity in the area, as well as in Kaliningrad Province as a whole.

The absence in Klinggraeff (1893) publication of *Bryum moravicum, Plagiomnium ellipticum, Ulota bruchii, Plagiothecium laetum, Brachythecium glareosum, Hygroamblystegium fluviatile, Plagiothecium cavifolium* can be explained by nomenclatural/taxonomic/status changes.

The rural epigeic species, *Bryum caespiticum, B. rubens, B. violaceum, Dicranella schreberiana, D. Staphyllina, etc*., became probably a recent addition to the flora, spread along the secondary habitats. Some of them, however, can be suspected as really spreading, like *D. staphyllina* (Rozhina *et al*., 2010), although careful search in older collections reveals its occurrence in Europe at least in the end of XIX century.

The most intriguing are species which are common or sporadic now, but not reported earlier. Of course, the

explanation that they were occasionally not recorded, being too rare or otherwise too common, can never be excluded in such situation. However, parallels with other regions with better documented historical data may confirm that the changes really take place. Congruence in changes with some other areas in European Russia, *e.g*. with Moscow Province, being not fully equivalent, indicates that these cases require special attention, and accumulation of data on their frequency in different regions of the world may bring more reliable results.

There are five examples from this Kornevka forest story.

1. *Orthotrichum pallens* became in a recent decade rather common in Moscow and its surroundings (from personal observations), while it was not reported for the province by Zickendrath (1900), and in 1980s Ignatov & Ignatova (1990) were able to find it only in three localities. In Ostpreussia, *Orthotrichum pallens* was recorded by Klingraeff (1893) only in Memel (now Klaipeda) in Lithuania. In recent years it was found in many places of the province, including the forest along Kornevka.

2. *Kindbergia praelonga* was not mentioned for East Prussia at all, and found only in West Prussia. The first records of this species in the province were done by Napreenko (msc. Cited by Ignatov *et al*., 2006) and Dolnik & Napreenko (2007). In the latter publication on Curonian Spit, *Kindbergia* was annotated as a common species. In Kornevka it is not very common, but sporadically occurs along the valley, among not dense herbaceous vegetation. Interestingly, in Finland this species was discovered also quite recently (Huttunen, pers. comm.).

3. *Fissidens taxifolius* was mentined in Ostpreussia only in Lyck (now Elk), in Poland.

4. *Sciuro-hypnum reflexum* was found only in Königsberg,

5. *Platygyrium repens occurs* in a number of places (Köningsberg, Pillkallen, Helingebeil), but not in Preussische Eylau.

Cases #3-5 are more difficult to interpret, as we see no parallels with other florae where similar changes observed. However, they call to such search.

RARE SPECIES

Loeskypnum brevirostre, a rare spieces was found in the Russian part of Ostpreussen only in Königsberg in the XIX century, where it had not been collected again until now . In Russia there are very few places where this species was collected: in Vologda Province (a single old collection in the places where we failed to find it again) and the Caucasus, Abrau-Dyurso, last known collection made on 0000. After an expanded disjunction the species appears in Russia Far East, where it was known in Kamchatka (by old literature records only, cf. Czernyadjeva, 2012) and in Sakhalin (also old literature data only, Pisarenko *et al*., 2012). So the locality in Kornevka is possibly the only existing now in Russia.

Orthotrichum patens. The species was repoted by Klingraeff in Pr. Eylau and Königsberg and recently found in Kornevka, on only two trunks, and in one place outside it on old beech stand, also in a very small quantity. Aside from Kaliningrad Province in Russia this species is known only in the Caucasus where it is also very rare.

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LITERATURE CITED

[ORLENOK, V.V., ED.] В.В. ОРЛЁНОК (РЕД) 2008. География янтарного края России. – [Geography of ‘amber region’ of Russia] *Калининград: ОАО «Янтарный сказ» [Kaliningrad, OAO “Yantarny Skaz”], 424 pp.*

[Dedkov, V.P. & G.V. Grishanov (eds.)] Дедков В. П., Г. В. Гришанов 2010. Красная книга Калининградской областию – [Red Data Book of Kaliningrad Province] *Калининград: Изд-во РГУ им. И. Канта, [Kaliningrad, Russ. Gos. Univ.], 334 c.*

DOLNIK, C. & M.G. NAPREENKO 2007. The Bryophytes of the Southern Curonian Spit (Baltic Sea coast). – *Arctoa* **16**: *35-46*.

KLINGGRAEFF, H. V. Leber- und Laubmoose West- und Ostpreussens. – *Danzig, 1893. 317 S.*

[IGNATOV, M.S. & E.A. IGNATOVA] ИГНАТОВ М.С., Е.А. ИГНАТОВА 1990. Материалы к познанию бриофлоры Московской области. – [Contribution to bryoflora of Moscow Province] *В кн: Флористические исследования в Московской области (ред. А.К.Скворцов). М., Наука [In: Skvortsov, A.K. (ed) Floristicheskie issledovaniya v Moskovskoi Oblasti, Moscow, Nauka]: 121-179.*

IGNATOV M.S., AFONINA O.M., E.A. IGNATOVA, A. ABOLINA, T.V. AKATOVA, E.Z. BAISHEVA, L.V. BARDUNOV, E.A. BARYAKINA, O.A. BELKINA, A.G. BEZGODOV, M.A.BOYCHUK, V.YA. CHERDANTSEVA, I.V. CZERNYADJEVA, G.YA. DOROSHINA, A.P. DYACHENKO, V.E. FEDOSOV, I.L. GOLDBERG, E.I. IVANOVA, I. JUKONIENE, L. KANNUKENE, S.G. KAZANOVSKY, Z.KH. KHARZINOV, L.E. KURBATOVA, A.I. MAKSIMOV, U.K. MAMATKULOV, V.A. MANAKYAN, O.M. MASLOVSKY, M.G. NAPREENKO, T. N. OTNYUKOVA, L.YA. PARTYKA, O.YU. PISARENKO, N.N. POPOVA, G.F. RYKOVSKY, D.YA. TUBANOVA, G.V. ZHELEZNOVA & V.I. ZOLOTOV 2006 [2007]. Check-list of mosses of East Europe and North Asia. – *Arctoa* **15:** *1-130*.

ROZHINA, V.I., M.S. IGNATOV, E.A. IGNATOVA & M.G. NAPREENKO 2010. Dicranella staphylina (Dicranaceae, Bryophyta) in Russia. – *Arctoa* **19**: *135-138.*

ZICKENDRATH, E. 1900. Beiträge zur Kenntniss der Moosflora Russlands. II. – Bull. Soc. Natur. Moscou **3**, **n.s.**: 241-366.