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### Bryophytes Collected in the North Kazakhstan Altai Mts.

Mszaki zebrane w północnym Kazachskim Altaju

The investigated species of bryophytes were collected by A. W. Sokołowski in the area of the Teletzkoye lake in September 1990 between the two main mountain chains of Altintū and Abacchan in the north Kazakhstan Altai. The site of botanical penetration is placed about 450 km to the south-east of Novosibirsk north of Teletzkoye lake near a village called Artybash, 87° geographical length E and 44° geographical width N. The studied species of bryophytes (56 *Bryales*, 10 *Hepaticae*, 5 *Sphagnales*) complement so far scarce data of the flora of the Kazakhstan Altai (2). The earliest data about bryoflora of all the Altai were provided by Brotherus (3, 4), who enumerated 43 species of leafy mosses including one new species of *Ptychomitrium altaicum* Broth. On the basis of the collection of D. K. Zerow dating from 1940 a new monotypical genus and species of *Cephalocladium zerovii* Lazar. from the family of *Sematophyllaceae* Broth. (7) and a rare species in the area, *Neckera webbiana* (Mont.) Duell (*N. besseri* (Lob.) Jur.), were described. Next, Godwiński (5, 7) in his two articles gives the names of 28 moss species new to the Kazakhstan Altai. On the other hand, the latest data (1, 2) cite 352 species for the Altai, near the region of Teletzkoye lake including many dispersed ones of eastern reach (*Abietinella histicosa* (Mitt.) Broth., *Anomodon minor* (Hedw.) Fuerner and others) on the Asiatic continent as well as they mention 238 mosses (52%) common with the Sayans. Because of phytogeographical reasons, the province of Altai-Sayan has been distinguished as a separate one already since the end of the 19th century. The flora of the *Hepaticae* has not been examined so far.

## ECOLOGICAL SCHEME OF THE SITES

## Lower mountain part of the forest

Leafy mosses and the liverworts were collected on the western and south-western steep slopes of the mountains covered with a forest with numerous rocky walls and shelves at the height of 500 m a.s.l. The yearly precipitation is over 800 mm, while the lowest rainfall in the driest central part is only 100 mm and in the western Altai it is 1500 mm (2). The lowest temperature in January in the northern region is  $-31.5^{\circ}\text{C}$ , and the highest of July is from  $+14$  to  $+18^{\circ}\text{C}$  (2). It ensures high moisture of the environment and supports the growth of dense turf of bryophytes on the earth and on the rocks with a thin soil layer. The tree stand is formed by *Betula pubescens*, *Picea obovata*, *Abies sibirica*, *Pinus sibirica*. The shrub layer is constituted mainly by *Spiraea* sp., *Alnus fruticosa* and less frequently *Sambucus racemosa*, *Viburnum opulus*, *Padus avium*. The greenness growth is very abundant and forming a herb layer. The main elements are *Aegopodium podagraria*, *Bergenia crassifolia*, *Athyrium filix-femina*, less frequently *Impatiens noli-tangere*, *Thalictrum* sp., *Polemonium* sp., *Dactylis* sp., a few species of *Aconitum* and others. In the layer of forest mosses the following are most common: *Dicranum polysetum*, *Hylocomium splendens*, *Hypnum pallescens*, *Ptilium crista-castrensis* and *Rhytidiadelphus triquetrus*.

## High peat-bog

Peat-mosses were collected on brown high peat-bog filling the mid-forest dale lying about 4 km north of the village of Artybash. The peat-bog is grown by low tree-stand, up to 4 m high, consisting exclusively of birch-trees. The greenness growth is rich in *Vaccinium oxycoccos*, and the moss layer is created by 5 peat-mosses: *Aulacomnium palustre*, *Calliargon stramineum*, *Drepanocladus fluitans*, *Pleurozium schreberi* and *Cephalozia media*. From the bryological point of view it is the most valuable statement because according to Bardunov (2) the peat-bogs in all the Altai Mts. do not play any special role in the vertical structure of lower and higher parts of vegetation.

## A LIST OF TAXONS

Abbreviations: ep. — epiphytic, epip. — epipetric, epix. — epixilic.

## MUSCI

*Tetraphis pellucida* Hedw.  
*Atrichum undulatum* (Hedw.) P.  
 Beauv.  
*Polytrichum commune* Hedw.  
*P. juniperinum* Hedw.  
*Dicranella heteromalla* (Hedw.)  
 Schimp.  
*Dicranodontium denudatum* (Brid.)  
 Britt. — ep.  
*Dicranum fuscescens* Turn.  
*D. fragilifolium* Lindb.  
*D. polysetum* Sw.  
*Oncophorus wahlenbergii* Brid.  
*Orthodicranum montanum* (Hedw.)  
 Loeske — ep.  
*Tortella toruosa* (Hedw.) Limpr.  
*Schistidium apocarpum* (Hedw.) B. S. G.  
*Aulacomnium palustre* (Hedw.)  
 Schwaegr.  
*Bryum pseudotriquetrum* (Hedw.)  
 Schwaegr.  
*B. schleicheri* Schwaegr.  
*Pohlia nutans* (Hedw.) Lindb.  
*Rhodobryum roseum* (Hedw.) Limpr.  
*Mnium spinosum* (Voit) Schwaegr.  
*M. stellare* Reich. ex Hedw.  
*Plagiomnium cuspidatum* (Hedw.) Kop.  
 — ep.  
*P. medium* (B. S. G.) Kop.  
*Rhizomnium punctatum* (Hedw.) Kop.  
*Ulota crispa* (Hedw.) Brid. — ep.  
*Hedwigia ciliata* (Hedw.) P. Beauv.  
*Leucodon sciuroides* (Hedw.) Brid. —  
 ep.  
*Climacium dendroides* (Hedw.) Web. et  
 Mohr  
*Homalia trichomanoides* (Hedw.)  
 B. S. G. — epip.  
*Abietinella histicosa* (Mitt.) Broth.  
*Anomodon attenuatus* (Hedw.) Hüb. —  
 epip.  
*A. viticulosus* (Hedw.) Hook. et Tayl.  
 — epip.

*A. minor* (Hedw.) Fuerner — epip.  
*Thuidium delicatulum* (Hedw.) Mitt.  
*Pterigynandrum filiforme* Hedw. — epip.  
*Cratoneuron filicinum* (Hedw.) Spruce  
*Amblystegium serpens* (Hedw.) B. S. G.  
*Calliergon stramineum* (Brid.) Kindb.  
*Campylocladus stellatus* (Hedw.)  
 Kanda  
*Drepanocladus fluitans* (Hedw.)  
 Warnst.  
*Sanionia uncinata* (Hedw.) Loeske  
*Brachythecium salebrosum* (Web. et  
 Mohr) B. S. G.  
*B. populeum* (Hedw.) B. S. G.  
*B. rivulare* B. S. G.  
*Cirriphyllum piliferum* (Hedw.) Grout  
*Eurhynchium swartzii* (Turn.) Curnow  
*Plagiothecium laetum* B. S. G.  
*Hypnum lindbergii* Mitt.  
*H. pallescens* (Hedw.) P. Beauv.  
*Ptilium crista-castrensis* (Hedw.) De  
 Not.  
*Pylaisia polyantha* (Hedw.) B. S. G. —  
 ep.  
*Rhytidium rugosum* (Hedw.) Kindb.  
*Hylocomium pyrenaicum* (Spruce)  
 Lindb.  
*H. splendens* (Hedw.) B. S. G.  
*Pleurozium schreberi* (Brid.) Mitt.  
*Rhytidiadelphus triquetrus* (Hedw.)  
 Warnst.

## SPHAGNALES

*Sphagnum magellanicum* Brid.  
*S. fuscum* (Schimp.) Klinggr.  
*S. rubellum* Wils.  
*S. fallax* Klinggr.  
*S. inundatum* Russ.

## HEPATICAЕ

*Apometzgeria pubescens* (Schränk)  
 Kuwah.  
*Aneura pinguis* (L.) Dum.

<i>Ptilidium pulcherrimum</i> (Web.) Hampe	<i>Cephalozia lunulifolia</i> (Dum.) Dum.
<i>Blepharostoma trichophyllum</i> (L.) Dum.	<i>Lepidozia reptans</i> (L.) Dum. — epip.,
<i>Barbilophozia hatcheri</i> (Evans) Loeske	epix.
<i>Plagiochila porelloides</i> (Torrey ex Nees) Lindenb.	<i>Radula complanata</i> (L.) Dum. — epip.
	<i>Porella platyphylla</i> (L.) — epip.

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## STRESZCZENIE

Na 2 stanowiskach północnego Kazachskiego Altaju w dolnym piętrze lasu górskiego i na torfowisku wysokim stwierdzono 56 gatunków mchów, 10 wątrobowców i 5 torfowców. Wśród mchów i wątrobowców dominują gatunki naskalne, naziemne, martwego substratu drzewnego i epifity. Reprezentują one w 63% element borealny, w 52% leśny, w 5% arktyczno-alpejski i w 0,6% kosmopolityczny. W oznaczonym materiale brak całkowicie przedstawicieli środkowoazjatyckich. Ważnym osiągnięciem jest stwierdzenie dla obszaru Altaju 10 nowych gatunków wątrobowców i opracowanie brioflory unikalnego torfowiska wysokiego.