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Osnabrück Botanical Expeditions to Mongolia

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Abstract

Three botanical expeditions to Mongolia have been undertaken by the Botany Department of the University of Osnabrück in cooperation with the Botany Department of the National Mongolian University of Ulaanbaatar. The first expedition in 2000 took us to the Mongolian Altay, the second in 2001 to the Gobi and Gobi Altay, and the third in 2010 to East Mongolia including the Khingan Mts. (Numrug). In 2000, we were the first botanists being allowed to enter the border area between China and Russia in the Mongolian Altay since a long time, because this had been a prohibited area for decades. We were again lucky in 2010 getting the permission to visit the Numrug protected area in East Mongolia, which has rarely been visited by botanists so far. In the course of the three expeditions, a total of 1650 specimens of vascular plants were collected for the herbarium OSBU of the University of Osnabrück, and a similar amount of taxa for the herbarium UBU of the Botany Dept. of the National University of Mongolia. Some of the collected specimens were first records for the country of Mongolia, and others were new for certain floristic regions and Aymags of Mongolia, thus widening the knowledge on distribution areas of many species. We also collected material for the LOKI SCHMIDT Gene Bank for Wild Plants, for the Brassiceae Seed Gene Bank, and for the *Allium* collection housed at the Botanical Garden of the University of Osnabrück. Seed and living material were also collected for the Botany Dept. of the University of Ulaanbaatar.

Key words: Mongolia, vascular plants, collection records, Brassicaceae, *Allium*

Introduction

Three botanical expeditions to Mongolia have been undertaken by the Botany Dept. of the University of Osnabrück in cooperation with the Botany Dept. of the National Mongolian University of Ulaanbaatar: to the Mongolian Altay in 2000 which had been a prohibited area for decades before; to Gobi and Gobi Altay in 2001; and to East Mongolia and Khingan mountains in 2010.

Results of the expedition to the Mongolian Altay in 2000 were already published (GERMAN et al. 2003, NEUFFER et al. 2003). Here, we present a map (fig. 1) and lists of collecting sites of our 2001 and 2010 expeditions (table 1, 3) as well as lists (tables 2, 4) of specimens and species collected for Herbarium OSBU (Acronym Index Herbariorum, Herbarium of the University of Osnabrück). These represent a number of species new for provinces of Mongolia, or even for the entire country (table 5), some accessions remained undetermined.

We would like to emphasize that our standards for comparison refer to GRUBOV (1982 in Russian, English translation 2001) and GUBANOV (1996). We are fully aware of the progress made since GRUBOV and GUBANOV. Number of species, for instance, of ca. 1800 reported by GRUBOV and GUBANOV has considerably increased. A new Flora of Mongolia is in progress. As long as this Flora is not completed, GRUBOV will remain the generally accepted and most comprehensive reference work for the vascular plants of Mongolia.

Results and discussion

For Brassicaceae listed in table 4 the following new findings are listed in GUBANOV 1996:
- *Arabis borealis* is mentioned as *A. sagittata* (Bertol.) DC., and was observed in region 5;
- *Descurainia sophia* and *Dontostemon micranthus* are mentioned for region 9;

- *Stevenia cheiranthoides* occurs in region 5;
- *Ptilotrichum dahuricum* is listed for regions 4, 5, and 9.

Dontostemon micranthus has firstly been mentioned in GERMAN & OYUNTSETSEG (2008) occurring in region 5. The same authors listed *Sisymbrium volgense* for region 4.

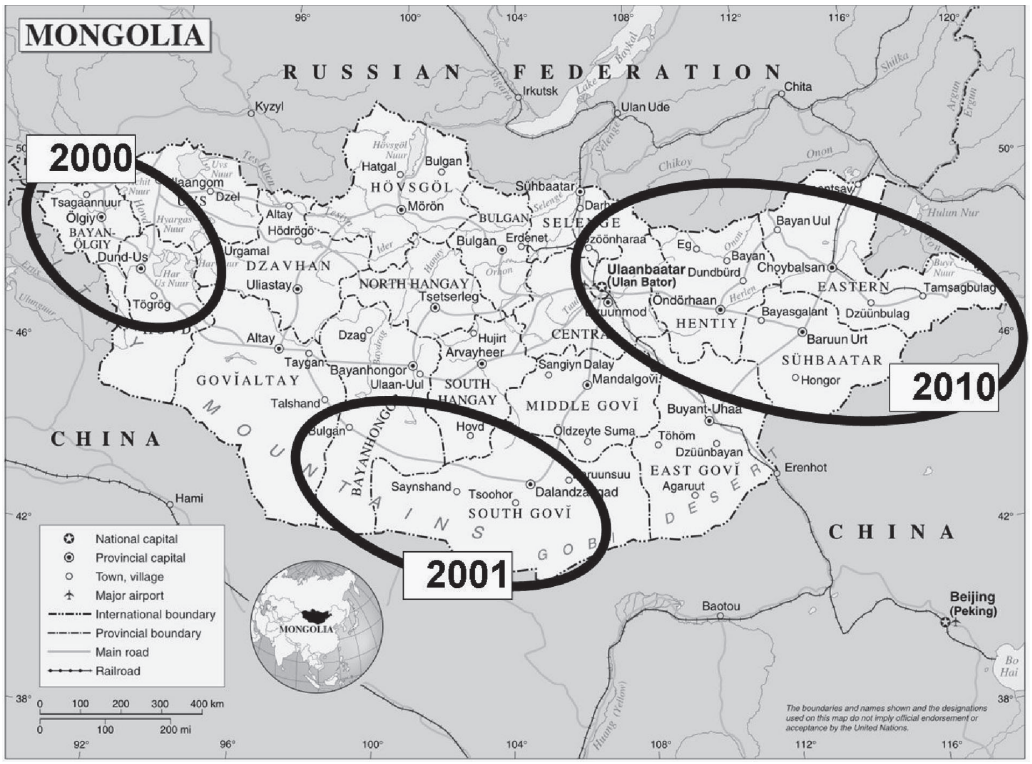

Fig. 1: Regions of Mongolia visited by Osnabrück Botanical expeditions. Map after http://www.weltkarte.com/uploads/pics/politische-karte-mongolei.png, modified.

Table 1: Expedition in 2001 to Gobi and Gobi Altay. Collecting sites (OSBU 11705-12289), provinces in GRUBOV (2001)

Collecting site number	Collecting date	Collecting site, Provenance	Coordinates, elevation	Provinces in GRUBOV (2001)
1	10.08.2001	Ulaanbaatar, Bogd Khan Museum	47°54' N,107°00' E, 1337 m	4
2	11.08.2001	Tuv Aymag, Bayan-Önjuul sum, south of Ulaanbaatar, Stop 1A	47°07' N,105°57' E, 1260 m	8
3	11.08.2001	Tuv Aymag, Bayan-Önjuul sum, south of Ulaanbaatar, Stop 2B	47°07' 07" N, 105°57'16" E, 1260 m	8
4	11.08.2001	Tuv Aymag, Bayan-Önjuul sum, Zorgol Khairhan mountain south of Ulaanbaatar, Stop 3C	46°55'10" N, 105°52'16" E, ca. 1300 m	8
5	13.08.2001	Dundgobi Aymag, Saikhan Ovoo, sum, Ongi river, along the river, ruins of monastery	45°20'04" N, 104°00'30" E, ca. 1290 m	8

6	13.08.2001	Dundgobi Aymag, Mandal Ovoo sum, Ongi river. Gobi, Stop 1	44°59’24” N, 104°09’06” E, ca. 1250 m	8
7	13.08.2001	Dundgobi Aymag Mandalgobi sum, *Anabasis-Salsola-Zygophyllum* Gobi, Stop 2	44°49’13” N, 104°04’05” E, ca. 1140 m	8
8	13.08.2001	Dundgobi Aymag Mandalgobi sum, *Anabasis* Gobi, Stop 3	44°29’18” N, 103°47’59” E, ca. 1000 m	8
9	14.08.2001	Ömnögobi Aymag, Bulgan sum, Bayan-Zag, *Haloxylon*-forest	44°11’06” N, 103°41’42” E, ca. 1150 m	12
10	15.08.2001	Ömnögobi Aymag, Khurmen sum, Zuun Saikhan Uul, East Gobi-Altay, Gobi Gurvan National Park	43°29’16” N, 104°03’40” E, 2250–2500 m	13
11	16.08.2001	Ömnögobi Aymag, Bayandalai sum, Dund Saikhan Uul, Middle Gobi-Altay	43°36’46” N, 103°46’30” E, ca. 2300 m	13
12	17.08.2001	Ömnögobi Aymag, Bayandalai sum, Dund Saikhan-uul, between Middle Gobi-Altay and West Gobi-Altay	43°39’09” N, 103°29’09” E, ca. 1900 m	13
13	17.08.2001	Ömnögobi Aymag, Bayandalai sum, Dund Saikhan-uul West Gobi-Altay	43°50’53” N, 103°10’14” E, ca. 1940 m	13
14	19.08.2001	Ömnögobi Aymag, Sevrey sum, between West Gobi-Altay and Sevrey Mountain	43°43’37” N, 102°22’27” E, ca. 1500 m	13
15	18.08.2001	Ömnögobi Aymag, Sevrey sum, *Caragana* Gobi, Sevrey mountain	43°35’21” N, 101°57’49” E, ca. 2000 m	13
16	20.08.2001	Ömnögobi Aymag, Sevrey sum, north of Nemegt-uul.	43°40’20” N, 101°07’34” E, ca. 1600-1900 m	13
17	20.08.2001	Ömnögobi Aymag, Sevrey sum, between Sevrey-uul and the north of Nemegd-uul	43°35’12” N, 101°43’40” E, ca. 1800 m	13
18	21.08.2001	Ömnögobi Aymag, Sevrey sum, between the north of Nemegt mountain and Bayan Gobi	44°45’20” N, 100°49’34” E, ca. 1500 m	13
19	21.08.2001	Ömnögobi Aymag, Sevrey sum, between the north of Nemegt mountain and Bayan Gobi	43°57’58” N, 100°56’41” E, ca. 1130 m	13
20	21.08.2001	Ömnögobi Aymag, Sevrey sum. between the north of Nemegt mountain and Bayan Gobi	43°52’01” N, 101°03’44” E, ca. 1100 m	13
21	21.08.2001	Ömnögobi Aymag, Sevrey sum, between the north of Nemegt mountain and Bayan Gobi	43°40’ N, 101°4’ E, ca. 1500 m	13
22	21.08.2001	Ömnögobi Aymag, Sevrey sum, Nemegt mountain	43°40’15” N, 101°05’43” E, ca. 1700 m	13
23	21.08.2001	Bayankhongor Aymag, Bayangobi sum, Ikh Bogd mountain	44°49’00” N, 100°29’43” E, ca. 2000 m	13
24	22.08.2001	Bayankhongor Aymag, Bayangobi sum, Ikh Bogd mountain, Gobi Altay	44°56’23” N, 100°22’44” E, 1900-3500 m	13
25	24.08.2001	Bayankhongor Aymag, Bayangobi sum, Ikh Bogd mountain, Gobi Altay	44°56’38” N, 100°23’05” E, ca. 3000-3100 m	13
26	24.08.2001	Bayankhongor Aymag, Bayangobi sum, river-canyon near Ikh Bogd mountain	44°57’13” N, 100°38’13” E, ca. 1750 m	13

27	25.08.2001	Bayankhongor Aymag, Bogd sum, south of Orog Nuur lake	45°05'39" N, 100°48'47" E, ca. 1200 m	13
28	25.08.2001	Bayankhongor Aymag, Bogd sum, Baga Bogd mountain	44°51'45" N, 101°32'19" E, ca. 2000-3500 m	13
29	27.08.2001	Bayankhongor Aymag, Jinst sum Gobi; ca. 20 km north of sum Bogd, near sum Jinst, Tuin river	45°24'18" N, 100°35'55" E, 1200-1800 m	13
30	28.08.2001	Bayankhongor Aymag, Khangai mountains east of Bayan Khongor	46°10'32" N, 101°02'49" E, ca. 2000 m	11
31	28.08.2001	Bayankhongor Aymag, Ölziit sum, Shargaldjuud spring.	46°20'27" N, 101°13'32" E, ca. 2150 m	11
32	29.08.2001	Övörkhangai Aymag, Nariinteel sum.	45°56'36" N, 101°26'31" E, ca. 1860 m	11
33	30.08.2001	Övörkhangai Aymag, Nariinteel sum.	45°56'28" N, 101°31'38" E, ca. 2000 m	11
34	29.08.2001	Bayankhongor Aymag Ölziit sum	45°59'18" N, 100°56'26" E, ca. 1850 m	11
35	30.08.2001	Övörkhangai Aymag, Kharakorum sum, near of Kharakorum	47°10'19" N, 102°47'47" E, ca. 1500 m	3
36	30.08.2001	Övörkhangai Aymag, Kharakorum sum, direction to Kharakorum	45°56'26" N, 101°31'38" E, ca. 2000 m	11
37	30.08.2001	Övörkhangai Aymag, Kharakorum sum, Ochon river near Kharakorum	47°10'19" N, 102°47'47" E, ca. 1500 m	3
38	01.09.2001	Bulgan Aymag, Rashaant sum, Khegen Khaan mountain. Tourist Camp	47°24'58" N, 103°42'22" E, ca. 1360 m	3
39	01.09.2001	Bulgan Aymag, Rashaant sum	47°24'58" N,103°42'22" E, ca. 1360 m	3
40	01.09.2001	Tuv Aymag, Altanbulag sum, Hustai National Park	47°45'15'' N,105°58' 0'' E, ca. 1330 m	8

Table 2: Plant records from the Mongolia expedition in 2001 housed in the herbarium OSBU. For collecting sites see tab. 1. Collectors: B. NEUFFER, H. HURKA, N. FRIESEN. Determination of plants predominantly followed GRUBOV (2001); Pteridophyta revised by A. SCHMAKOV (Barnaul), Asteraceae by S. SMIRNOV (Barnaul), Brassicaceae bei D. GERMAN (Barnaul, Heidelberg), Chenopodiaceae by H. FREITAG (Kassel). Number = new for region according to tab. 1, + = new for Mongolia, ° = undecribed species or recently published, * = FRIESEN (1995)

Pamily, species	Collecting site	OSBU
Athyriaceae		
Cystopteris fragilis (L.) BERNH.	25	12132
Woodsia ilvensis (L.) R.BR.	38	12276
Polypodiaceae		
Cystopteris fragilis (L.) BERNH.	24	12033
Selaginellaceae		
Selaginella sanguinolenta (L.) P.B.	4	11760
Cupressaceae		
Juniperus sabina L.	4	11749

Ephedraceae		
Ephedra monosperma G.G.GMEL. ex C.A. MEY.	15, 28	11977, 2182
[13]*Ephedra przewalskii* STAPF	21, 29	11992, 12228
Ephedra sinica STAPF	3, 13	11734, 11937
Alliaceae		
Allium altaicum PALL.	10	11884
Allium amphibolum LDB.	11, 24	11923, 12027
Allium anisopodium LDB.	10, 38	11875, 12280
Allium bidentatum FISCH. ex PROKH	3, 38	11730, 12281
Allium burjaticum FRIESEN	5, 38	11806, 12283
Allium eduardii STEARN.	4, 10, 11, 28, 38	11746, 11766, 1870, 11927, 12223, 12284
[11]*Allium leucocephalum* TURCZ. ex LEDEB.	31, 38	12238, 12285
Allium mongolicum RGL.	5, 21, 23	11807, 11996, 2025
Allium polyrrhizum TURCZ. ex RGL.	4, 5, 23	11761, 11833, 12007
[11]*Allium prostratum* TREV.	10, 11, 31, 38	11888, 11922, 12239, 12282
Allium ramosum L. (= *A. odorum* L.)	1	11715
Allium senescens L.	5	11787
Allium strictum SCHRAD.	28	12205
[3]*Allium tenuissimum* L.	2, 38	11728, 12286
**Allium tytthocephalus* SCHULTES et SCHULTES	11	11921
Allium vodopjanovae FRIESEN	4, 13	11762, 11950
Apiaceae		
Bupleurum bicaule HELM.	4	11777
[13]*Bupleurum scorzonerifolium* WILLD.	4, 10, 13, 38	11744, 11891, 11953, 12275
Carum carvi L.	37	12258
Heracleum dissectum LDB.	10	11895
[13]*Pachypleurum alpinum* LDB.	10	11896
Peucedanum baicalense (REDOW. ex WILLD.) KOCH	4	11742
Peucedanum hystrix BGE.	4, 28	11769, 12164, 12172
Asclepiadaceae		
Vincetoxicum sibiricum (L.) DECNE	5	11808
Asteraceae		
[8]*Ajania fruticulosa* (LDB.) POLJAK.	5, 11	11811, 11929
[13]*Artemisia adamsii* BESS.	2, 13	11724, 11955
Artemisia anethifolia WEB. ex STECHM.	3	11736
[13]*Artemisia desertorum* SPRENG.	10	11903
Artemisia dracunculus L.	1, 2, 4, 10, 33	11711, 11729, 11750, 11878, 12252
Artemisia freyniana (PAMP.) KRASCH.	4	11755
Artemisia frigida WILLD.	4, 13	11751, 11951
[13]*Artemisia integrifolia* L.	10	11893
Artemisia intricata FRANCH.	23	12024
Artemisia macrocephala JACQUEM.	1, 24	11709, 12102
Artemisia messerschmidtiana BESS.	4, 28	11773, 12174
Artemisia mongolica FISCH. ex NAKAI	1	11713
Artemisia obtusiloba LDB.	28	12199
Artemisia palustris L.	3	11732
Artemisia pectinata PALL.	5	11816
Artemisia rutifolia STEPH. ex SPRENG.	13, 38	11969, 12278
Artemisia santolinifolia TURCZ. ex BESS.	11	11930
Artemisia scoparia WALDST. et KIT.	1, 17	11712, 11975
Artemisia spec.	18, 19, 22	11982, 11987, 12004
[8, 13]*Artemisia sublessingiana* (KELLER) KRASCH. ex POLJAK.	4, 14, 21	11779, 11958, 11962, 11963, 12000

Artemisia xerophytica KRASCH.	9, 14, 27	11851, 11960, 12152
Aster alpinus L.	28	12198
Asterothamnus centrali-asiaticus NOVOPOKR.	5, 21	11799, 11994
[12]*Brachanthemum mongolicum* KRASCH.	9	11855
Chrysanthemum zawadskii HERB.	38	12272
Cirsium esculentum (SIEV.) C.A. MEY.	37	12259
[13]*Crepis multicaulis* LDB.	28	12204
Echinops gmelinii TURCZ.	5	11809
[11]*Echinops latifolius* TAUSCH.	31	12235
[13]*Erigeron eriocalyx* (LEDEB.) VIERTH.	24	12030
[13]*Erigeron lonchophyllus* HOOK.	24	12031
[13]*Gnaphalium baicalense* KIRP.	27	12153
Heteropappus altaicus (WILLD.) NOVOPOKR.	2, 23	11718, 11719, 12022
[2]*Heteropappus biennis* (LDB.) TAMAMSCH	4	11754
[8]*Inula britannica* L.	5, 37	11803, 12257
Ixeridium gramineum (FISCH.) TZVEL.	5	11801
[8]*Lactuca sibirica* (L.) BENTH. ex MAXIM.	5	11805
Lactuca tatarica (L.) C.A. MEY.	27	12141
Leontopodium ochroleucum BEAUVD.	24, 28	12061, 12062, 12178
Leuzea uniflora (L.) HOLUB.	4	11771
[13]*Pyrethrum lanuginosum* (SCH. BIP. ex HED.) KOM.	28	12167, 12196
[13]*Pyrethrum pulchrum* LDB.	24	12093
Saussurea amara (L.) DC.	1, 5	11706, 11795
[13]*Saussurea dahurica* ADAMS	27	12142, 12143
°*Saussurea herbertii* S.SMIRNOV	25	12130
[13]*Saussurea involucrata* (KAR. et KIR.) SCH. BIP.	24, 28	12129, 12220
Saussurea laciniata LDB.	18	11983
[13]*Saussurea leucophylla* SCHRENK.	24	12118
Saussurea pricei SIMPS.	13	11940, 11941
Saussurea saichanensis KOM. ex LIPSCH.	28	12180, 12190
Saussurea salicifolia (L.) DC.	2, 3, 4, 38	11722, 11733, 11756, 12261
[13]*Saussurea subacaulis* (LDB.) SERG.	24, 28	12050, 12179
Scorzonera capito MAXIM.	5	11828
Scorzonera divaricata TURCZ.	5	11800
Senecio dubius LDB.	31	12236
Senecio pricei SIMPS.	24	12094
Senecio pricei SIMPS.	28	12202
Serratula centaurioides L.	3, 40	11737, 12290
[13]*Taraxacum armeriifolium* SOEST	24	12075
Taraxacum brevirostre HAND.-MAZZ.	27	12154
[13]*Taraxacum collinum* DC.	5, 28	11785, 12206
[13]*Taraxacum eriopodum* (D.DON.) DC.	28	12208, 12209
Taraxacum leucanthum (LDB.) LDB.	11, 23, 31	11916, 12010, 12248
Youngia tenuifolia (WILLD.) BABC. et STEBB.	4	11770
Betulaceae		
Betula fusca PALL. ex GEORGI	10	11858
[13]*Betula platyphylla* SUKACZ.	10, 38	11857, 12287
Boraginaceae		
[8]*Arnebia decumbens* (VENT.) COSS. et KRAL.	5	11818
Eritrichium pauciflorum (LDB.) DC.	24, 28	12119, 12197
[13]*Hackelia deflexa* (WAHLENB.) OPIZ	10	11865
[13]*Lappula myosotis* MOENCH	23	12020
Myosotis sylvatica EHRH. ex HOFFMANN	24	12026
Tournefortia sibirica L.	9	11852
Brassicaceae		
Alyssum obovatum (C.A. MEY.) TURCZ.	4	11775

Aphragmus involucratus (BUNGE) O.E. SCHULZ	24	12042
+*Arabidopsis mongolica* (BOTSCH.) MELICEK et SOJÁK	28	12176
[8]*Arabis pendula* L.	40	12291
Arabis rupicola KRYL.	10, 13	11885, 11947
[13]*Cardamine bellidifolia* L.	24	12084
Dontostemon integrifolius (L.) C.A. MEY.	4, 32, 36, 39	11763, 12237, 12256, 12270
[3]*Dontostemon pectinatus* (DC.) LDB.	38, 39	12268, 12279
+*Dontostemon pinnatifidus* (WILLDENOW) AL-SHEBAZ & H. OHBA	39	12263
[8]*Dontostemon senilis* MAXIM.	5, 15, 20	11810, 11812, 11970, 11974, 11999
Draba hirta L.	24	12041, 12081
Draba lanceolata REYLE	24, 28	12092, 12177, 12183, 2216, 12217, 12219
Draba nemorosa L	24, 28	12045, 12210
Draba ochroleuca BGE.	24	12043, 12044, 12082, 12083, 12085, 12086, 12121, 12124, 12125
Draba spec.	24, 28	12126, 12127, 12128, 12222
Draba subamplexicaulis C.A. MEY.	24	12123
Erysimum cheiranthoides L.	10, 37	11880, 12260
Erysimum flavum (GEORGI) BOBR.	4 , 38	11768, 12271
Eutrema edwardsii R. BR.	24	12120, 12122
Galitzkya macrocarpa (IK.-GAL.) V. BOCZ.	10, 11, 13, 15, 16, 22, 26	11869, 11926, 11956, 11972, 11973, 12005, 12134
Lepidium apetalum WILLD. (= *L. densiflorum* SCHRAD.)	7, 13, 17	11839, 11952, 11976
Ptilotrichum canescens C.A. MEY.	2, 6, 10, 14, 21	11723, 11834, 11886, 11967, 12003
Ptilotrichum canescens (DC.) C.A. MEY. var *elongatiformis* A.L. EBEL	13	11945
[8]*Rorippa islandica* ssp. *fernaldiana* (OED.) BORB.	5	11794
Rorippa islandica (OED.) BORB.	27, 30	12156, 12232
Sisymbrium heteromallum C.A. MEY.	5, 13	11804, 11935
Smelowskia calycina (STEPH.) C.A. MEY.	25, 28	12131, 12218
[11]*Thlaspi cochleariforme* DC.	4, 10, 31	11776, 11887, 12247
Campanulaceae		
Adenophora stenanthina (LDB.) KITAG.	4, 38	11741, 12269
Campanula turczaninovii FED.	24, 28	12052, 12207
Caprifoliaceae		
Lonicera altaica PALL.	10	11859
Lonicera microphylla WILLD.	10	11862, 11863, 11864
Caryophyllaceae		
Arenaria capillaris POIR.	4, 10, 28, 29	11764, 11883, 12181, 12224
Arenaria meyeri FENZL.	10, 24, 28	1907, 12073, 12189
Cerastium arvense L.	24	12069
[13]*Cerastium lithospermifolium* FISCH.	24, 28	12072, 12193
[13]*Dianthus hoeltzeri* WINKL.	28	12171
Dianthus versicolor FISCHER ex LINK	4, 28	11765, 12170
Gypsophila desertorum (BGE.) FENZL.	12	11933
Melandrium apetalum (L.) FENZL	24	12038
Pseudostellaria rupestris (TURCZ.) PAX	24	12070
Silene jenisseensis WILLD.	10, 28	11910, 12185, 12212
Silene repens PATRIN ex PERS.	10	11909
[13]*Stellaria crassifolia* EHRH.	10	11908
Stellaria dichotoma var. *americana*	14	11961

Stellaria dichotoma L.	24	12068
Stellaria graminea L.	28	12214
Stellaria petraea BGE.	24	12115
Chenopodiaceae		
Agriophyllum pungens (WAHL.) LINK ex A. DIETR.	9, 14	11847, 11959
[8]*Anabasis brevifolia* C.A. MEY.	6, 20	11838, 11998
[13]*Axyris amaranthoides* L.	14	11965
Axyris prostrata L.	24	12077
Bassia dasyphylla (FISCH. et MEY.) KTZE.	3, 23	11731, 12017
Chenopodium acuminatum WILLD.	23	12019
Chenopodium aristatum L.	2, 23	11727, 12016
Chenopodium glaucum L.	27	12144
Chenopodium prostratum BUNGE	2	11720
Corispermum mongolicum ILJIN	5	11821
Haloxylon ammodendron (C.A. MEY.) BGE.	9	11845
Kalidium gracile FENZL.	18	11988
Krascheninnikovia ceratoides (L.) GUELDENST. (= *Eurotia ceratoides* (L.) C.A. MEY.)	13, 33	11936, 12250
Micropeplis arachnoidea (MOQ.) BUNGE	9, 17	11853, 11978
Salsola collina PALLAS	1, 2	11710, 11716
+*Salsola jacquemontii* MOQ	2, 5, 13, 23	11725, 11814, 11827, 11949, 12018
Salsola laricifolia TURCZ. ex LITW.	16, 20	11979, 11990
[8]*Salsola passerina* BGE.	8	11843
[13]*Suaeda kossinskyi* ILJIN	27	12145
Convolvulaceae		
Convolvulus ammanii DESR.	5	11831
[8]*Convolvulus gortschakovii* SCHRENK.	7	11841
Crassulaceae		
Orostachys fimbriata (TURCZ.) BERGER	13	11939
Orostachys malacophylla (PALL.) FISCH.	38	12288
Orostachys spinosa (L.) C.A. MEY.	4, 28	11774, 12175
Rhodiola quadrifida (PALL.) FISCH. et MEY.	24	12053
Rhodiola rosea L.	10	11866
Sedum hybridum L.	38	12266
Cuscutaceae		
Cuscuta europaea L.	10	11905
[8]*Cuscuta monogyna* VAHL.	5	11832
Cyperaceae		
[8]*Carex caryophyllea* LATOURR.	4	11778
[13]*Carex kirilowii* TURCZ.	24	12034, 12110
Carex melananthiformis LITV.	28	12191
Carex pediformis C.A. MEY.	10	11879
Carex pseudofoetida KUK.	24	12049
Carex rupestris BELL. ex ALL.	28	12168
[13]*Carex supermascula* V. KRECZ.	28	12166
Kobresia bellardii (ALL.) DEGL.	28	12169
Dipsacaceae		
Scabiosa comosa FISCH.	38	12274
Euphorbiaceae		
Euphorbia humifusa WILLD.	23	12015
[12]*Euphorbia mandshurica* MAXIM.	9	11846
Fabaceae		
[8]*Astragalus argutensis* BGE.	5	11796

[4]*Astragalus danicus* var. *dasyglottis* (FISCH. ex DC.) BOIVIN	1	11714
Astragalus laguroides PALL.	5, 24	11786, 12089
[8]*Astragalus monophyllus* BGE.	6	11835
Astragalus tenuis TURCZ.	5	11797
Astragalus variabilis BGE. ex MAXIM.	23	12014
Caragana korshinskii KOM.	14	11964
Caragana leucophloea POJARK.	3	11735
Caragana microphylla (PALL.) LAM.	2	11726
Caragana pygmaea (L.) DC.	2, 11, 20	11717, 11917, 12002
Chesneya mongolica MAXIM.	9	11849
Glycyrrhiza uralensis FISCH.	5, 27	11790, 12135
Hedysarum fruticosum PALL.	14	11966
Hedysarum spec.	21	11997
Oxytropis bungei KOM.	28	12195
Oxytropis filiformis DC.	23	12012
Oxytropis fragililoba ULZIJ	28	12203
[8]*Oxytropis glabra* (LAM.) DC.	5, 23	11783, 12013
Oxytropis pavlovii B. FEDTSCH. et BASIL.	24	12111
[13]*Oxytropis salina* VASS.	5, 27	11782, 12150
Oxytropis spec.	27	12149
Oxytropis tragacanthoides FISCH.	11	11931
[11]*Thermopsis grubovii* CZEFR.	33	12251
[13]*Thermopsis hirsutissima* CZEFR.	27	12136
Trifolium eximium STEPH. ex FISCH. et STEV.	28	12201
Gentianaceae		
Gentiana azurea BGE.	24	12065
Gentiana decumbens L.	31	12240
Gentiana falcata TURCZ.	24	12106
[11]*Gentiana squarrosa* LDB.	24, 31	12074, 12243
[13]*Gentiana tenella* ROTTB.	10, 24	11874, 12064
[11, 13]*Lomatogonium carinthiacum* (WULFEN) A. BR.	28, 31	12184, 12242
[13]*Lomatogonium rotatum* (L.) FRIES ex FERN.	28	12194
Geraniaceae		
Erodium stephanianum WILLD.	5, 13, 24	11820, 11948, 12090
[8]*Erodium tibetanum* EDGEW.	5, 18	11813, 11985
Geranium pratense L.	28	12200
Iridaceae		
Iris lactea PALL.	31	12233
Iris potaninii MAXIM.	11	11924
Iris tenuifolia PALL.	29	12226
Juncaceae		
Juncus bufonius L.	11	11920
[13]*Juncus triceps* ROSTKOV.	24	12108
[13]*Juncus triglumis* L.	24	12057, 12109
Juncaginaceae		
Triglochin palustre L.	27	12146
Lamiaceae		
Amethystea coerulea L.	23	12023
Dracocephalum bungeanum SCHISCHK. et SERG.	24	12104
Dracocephalum foetidum BGE.	5	11823
Dracocephalum fruticulosum STEPH.	10	11897
Dracocephalum grandiflorum L.	24	12114
Dracocephalum origanoides STEPH. ex WILLD.	28	12161
Lagochilus ilicifolius BGE.	5	11817

Lagopsis marrubiastrum (STEPH.) IK.-GAL.	24	12103
Lophanthus chinensis (RAF.) BENTH.	4, 11, 13, 23	11747, 11919, 11942, 12021
Nepeta sibirica L.	10	11894
Schizonepeta annua (PALL.) SCHISCHK.	5	11822
Schizonepeta multifida (L.) BRIQ.	35	12255
Thymus gobicus TSCHERN.	31	12241
Thymus mongolicus (RONNIG.) RONNIG.	11	11932
Thymus serpyllum L. ssp.*alpestris* TAUSCH. cf.	28	12163
Liliaceae		
Asparagus dahuricus FISCH ex LINK	5	11819
Lloydia serotina (L.) REICHENB.	10	11911
Polygonatum odoratum (MILL.) DRUCE	4	11752
Onagraceae		
[11]*Epilobium davuricum FISCH. ex HORNEM.*	31	12234
Epilobium palustre L.	10	11899
Papaveraceae		
Corydalis adunca MAXIM.	10	11882
[13]*Papaver nudicaule* L.	10	11881
Papaver pseudocanescens M. POP.	24	12098
Papaver pseudotenellum GRUB.	24	12040
Plantaginaceae		
Plantago depressa WILLD.	5, 24	11788, 12088
[13]*Plantago komarovii* PAVL.	24	12087
Plumbaginaceae		
[11]*Goniolimon speciosum* (L.) BOISS.	2, 4, 13, 31, 38	11721, 11772, 11946, 12249, 12264
Limonium aureum (L.) HILL ex KTZE.	8	11842
Limonium tenellum (TURCZ.) KTZE.	16, 21, 22	11971, 11995, 12006
Poaceae		
Achnatherum inebrians (HANCE) KENG	10	11913
Achnatherum splendens (TRIN.) NEVSKI	1	11705
[12]*Agropyron aegilopoides* DROB.	1, 9	11707, 11856
[13]*Agropyron sibiricum* (WILLD.) P.B.	27	12138
[13]*Agrostis trinii* TURCZ.	27	12137
Alopecurus alpinus SMITH.	24	12035
[8]*Aristida heymannii* RGL.	5	11830
[13]*Bromus korotkyi* DROB.	24	12097, 12113
Bromus pumpellianus SCRIBN.	28	12186
Chloris virgata SW.	7	11840
Cleistogenes squarrosa (TRIN.) KENG	34	12254
[13]*Echinochloa crus-galli* (L.) P.B.	27	12140
Elymus dahuricus TURCZ. ex GRISEB.	1	11708
Elymus komarovii (NEVSKI) TZVEL.	24	12058
Enneapogon borealis (GRISEB.) HONDA	5	11798
Eragrostis minor HOST.	5	11829
Festuca ovina L.	24	12117
Hordeum brevisubulatum (TRIN.) LINK	5	11784
Koeleria mukdenensis DOMIN	4	11780
Melica virgata TURCZ. ex TRIN.	38	12273
Poa altaica TRIN.	24	12039
Poa attenuata TRIN.	24	12080
Poa botryoides TRIN.	24	12096
Poa ochotensis TRIN.	28	12165
Poa tibetica MUNRO ex STAPF	11	11914
Psammochloa villosa (TRIN.) BOR	14	11957

Puccinellia distans (L.) PARL.	23, 27	12008, 12139
Puccinellia nudiflora (HACK.) TZVEL.	24	12051
Setaria viridis (L.) P.B.	4	11753
Stipa gobica ROSHEV.	5	11815
Stipa krylovii ROSHEV	13	11968
Trisetum spicatum (L.) RICHTER	24	12037
Polygonaceae		
Atraphaxis frutescens (L.) K. KOCH	29	12227
Calligonum mongolicum TURCZ.	9, 18	11850, 11991
[13]*Koenigia islandica* L.	24	12060
Oxyria digyna (L.) HILL	24	12029
Polygonum angustifolium PALL.	4, 33	11757, 12253
Polygonum aviculare L.	27	12147
[13]*Polygonum hydropiper* L.	27	12148
[8]*Rheum nanum* SIEVERS	5	11825
Primulaceae		
Androsace maxima L.	24	12071
Androsace septentrionalis L.	24	12076, 12116
Glaux maritima L.	23	12009
Primula farinosa L.	24	12032
Ranunculaceae		
[13]*Aconitum altaicum* STEINB.	24	12095
Aconitum chasmanthum STAPF	28	12211
Aquilegia viridiflora PALL.	10	11902
Atragene sibirica L.	10	11861
Batrachium spec.	30	12231
Clematis fruticosa TURCZ.	10	11868
Clematis tangutica (MAXIM.) KORSH.	5	11789
Delphinium barlykense KOMMONOROVA et CHANMINCHUN	25, 28	12133, 12162
Halerpestes ruthenica (JACQ.) OVCZ. (= *H. salsuginosa* (PALL.) GREENE	11	11915
Halerpestes sarmentosa (ADAMS) KOM.	23	12011
Halerpestes spec.	27	12155
Leptopyrum fumaroides (L.) REICHB.	28	12230
[13]*Oxygraphis glacialis* (FISCH.) BUNGE	24	12079
[13]*Pulsatilla ambigua* (TURCZ.) JUZ.	28	12215
Pulsatilla spec.	38	12289
[13]*Ranunculus altaicus* LAXM.	24	12067
[8]*Ranunculus natans* C.A. MEY.	5, 24	11793, 12063
Ranunculus spec.	10, 24	11889, 12099, 12100, 12101, 12105
spec.	10	11876
Thalictrum alpinum L.	24	12036
Thalictrum foetidum L.	4, 10, 11	11743, 11892, 11918
Rosaceae		
Amygdalus mongolica MAXIM.	16	11980
Amygdalus pedunculata PALL.	4, 20	11745, 11993
Chamaerhodos erecta (L.) BUNGE	38	12277
Comarum salesovianum (STEPH.) ASCHERS. et GR.	10	11867, 12160
[8]*Cotoneaster uniflora* BGE.	4, 28	11781, 12157
Dasiphora fruticosa (L.) RYDB.	10	11900
Potaninia mongolica MAXIM.	21	12001
[13]*Potentilla acaulis* L.	12	11934
Potentilla bifurca L.	24, 31	12059, 12245
Potentilla desertorum BGE.	10	11912

Potentilla gelida C.A. MEY.	24	12048
Potentilla ikonnikovii JUZ.	10, 13	11871, 11938
Potentilla multifida L.	24	12056
Potentilla nivea L.	10, 24	1877, 12047, 12055
[13]*Potentilla sericea* L.	10	11872
Potentilla strigosa PALLAS ex PURSH.	24	12054
[13]*Potentilla tanacetifolia* WILLD. ex SCHLECHT.	11, 38	11925, 12265
+*Rosa acicularis* LINDL.	10	11904
Spiraea aquilegifolia PALL.	4	11739
Spiraea flexuosa FISCH.	28	12158
[8]*Spiraea media* F. SCHMIDT	4, 10	11767, 11901
Rubiaceae		
[3]*Rubia cordifolia* L.	4, 38	11738, 12262
Rutaceae		
Haplophyllum dauricum (L.) G. DON.	4, 11, 13	11759, 11928, 1954
Salicaceae		
Salix bebbiana SARG.	28	12173
Salix berberifolia PALL.	24	12091
Salix glauca L.	28	12159
[13]*Salix hastata* L.	10	11860
Populus laurifolia LDB.	28	12225
Saxifragaceae		
Grossularia acicularis (SMITH) SPACH.	10	11898
Parnassia palustris L.	31	12244
Saxifraga cernua L.	24	12046
[13]*Saxifraga macrocalyx* TOLM.	24	12066
Saxifraga hirculus L.	24	12078
Saxifraga sibirica L.	28	12187
Scrophulariaceae		
[13]*Euphrasia syreitschikovii* GOVOR.	10	11890
Lagotis altaica (WILLD.) SMIRN.	24	12028
Lagotis integrifolia (WILLD.) SCHISCHK.	24	12112
[13]*Limosella aquatica* L.	5	11792
Linaria acutiloba FISCH. ex REICHB.	4, 13	11758, 11943
[13]*Linaria pedicellata* KUPR.	28	12192
Pedicularis abrotanifolia M.B. EX STEV.	10, 28	11873, 12221
Veronica anagallis-aquatica L.	5, 27	11791, 12151
[11]*Veronica incana* L.	10, 13, 28, 31	11906, 11944, 12188, 12246
Tamaricaceae		
Reaumuria soongorica (PALL.) MAXIM.	8, 19	11844, 11986
Tamarix ramosissima LEDEB.	19	11989
Ulmaceae		
Ulmus pumila L.	4	11748
Valerianaceae		
Valeriana petrophila BGE.	24, 28	12107, 12213
Patrinia rupestris (PALL.) DUFR.	38	12267
Verbenaceae		
Caryopteris mongholica BGE.	4, 5	11740, 11802
Zygophyllaceae		
Nitraria sibirica PALL.	9, 18	11848, 11981
Peganum nigellastrum BGE.	5, 29	11826, 12229
Tribulus terrestris L.	9	11854
[8]*Zygophyllum rosovii* BGE.	6	11836
[8]*Zygophyllum xanthoxylon* (BGE.) MAXIM.	5, 6, 18	11824, 11837, 11984

Table 3: Expedition to East Mongolia in 2010. Collecting sites (OSBU 20108–20775) and provinces in provinces in GRUBOV (2001)

Collecting site number	collecting date	Collecting site, provenance	Coordinates, elevation	Province in GRUBOV (2001)
1	07.08.2010	Tov Aymag, Bayandelger sum, at the river Kherulen, 115 km southeast of Ulaanbaatar	47°36'18" N, 108°24'14" E, 1270-1500 m	4
2	08.08.2010	Khentey Aymag, Tsenhermandal sum, near lake Khokh-nuur, 150 km east of Ulaanbaatar	48°01'2" N, 108°57'4" E, 1616 m	4
3	08.08.2010	Khentey Aymag, Tsenhermandal sum, valley of Yulgeen-gol, 155 km east of Ulaanbaatar	48°02'29" N, 108°57'58" E, 1654 m	4
4	09.08.2010	Khentey Aymag, Tsenhermandal sum, 155km east of Ulaanbaatar; mountain ridge along the valley of Yulgeen-gol	48°03'28" N, 108°57'19" E, 1800 m	4
5	10.08.2010	Khentey Aymag, Tsenhermandal sum, 170km east of Ulaanbaatar; river Uver-Elgijn-gol	48°04'26" N, 109°13'44" E, 1420 m	4
6	10.08.2010	Khentey Aymag, Tsenhermandal sum, 170km east of Ulaanbaatar; river Uver-Elgijn-gol	48°08'01" N, 109°22'55" E, 1330 m	4
7	10.08.2010	Khentey Aymag, Omnodelger sum, 190km east of Ulaanbaatar; Monastery Bereeven	48°13'13" N, 109°26'33" E, 1330 m	2
8	12.08.2010	Khentey Aymag, Batshireet sum, 250 km east of Ulaanbaatar; Oglog-chiyn Herem	48°24'25"N, 110°11'53"E, 1200 m	2
9	12.08.2010	Khentey Aymag, Binder sum, 295 km northeast of Ulaanbaatar; 10 km east of Binder	48°34'56" N, 110°45'21" E, 1030 m	2
10	12.08.2010	Khentey Aymag, Bayan-Ardaga sum, 330 km northeast of Ulaanbaatar; river Onon-gol	48°40'11" N, 111°14'38" E, 970 m	2
11	13.08.2010	Khentey Aymag, Dadal sum, 380 km eastnortheast of Ulaanbaatar; 8 km southeast of Dadal	48°59'37" N, 111°44'41" E, 975 m	2
12	14.08.2010	Khentey Aymag, Norovlin sum, 375 km northeast of Ulaanbaatar; west of Norovlin, pass between Onon bridge and Norovlin	48°46'17" N, 111°48'28" E, 1130 m	2
13	14.08.2010	Khentey Aymag, Norovlin sum, 370 km northeast of Ulaanbaatar; west of Norovlin, between Onon bridge and Norovlin	48°47'55" N, 111°42'57" E, 985 m	2
14	14.08.2010	Khentey Aymag, Dadal sum, 365 km northeast of Ulaanbaatar; 20 km south of Dadal, bridge of Onon Gol	48°50'25" N, 111°38'38" E, 925 m	4

15	14.08.2010	Khentey Aymag, Dadal sum, 365 km nordeast of Ulaanbaatar; 12 km south of Dadal	48°55’54” N, 111°35’52” E, 980 m	4
16	14.08.2010	Khentey Aymag, Norovlin sum, 400 km northeast of Ulaanbaatar; between Norovlin and Bayan-uul, river Ulzaa-gol	48°52’16” N, 112°12’58” E, 975 m	4
17	15.08.2010	Khentey Aymag, Norovlin sum, 400 km northeast of Ulaanbaatar; between Norovlin and Bayan-uul, river Ulzaa-gol	48°52’22” N, 112°14’12” E, 1100 m	4
18	15.08.2010	East Mongolia, Dornod Aymag, Bayan-uul sum, between Bayan-uul and Choybalsan; 45 km southeast of Bayan-uul and 135 km northwest of Choybalsan	48°43’59” N, 113°00’26” E, 900 m	4
19	15.08.2010	East Mongolia, Dornod Aymag, Tsagan-Ovoo sum, 70 km northwest of Choybalsan, river Galyn-gGol	48°23’5” N, 113°41’25” E, 780 m	8
20	16.08.2010	East Mongolia, Dornod Aymag, City of Choybalsan	48°04’14” N, 114°31’44” E, 740 m	8
21	16.08.2010	East Mongolia, Dornod Aymag, Bayantumen sum, 7 km northwest of Choybalsan	48°05’30” N, 114°24’59” E, 740 m	8
22	17.08.2010	East Mongolia, Dornod Aymag, Bayantumen sum, 7 km west of Choybalsan, bridge over river Kherulen	48°02’27” N, 114°24’46” E, 750 m	8
23	17.08.2010	East Mongolia, Dornod Aymag, Matad sum, 110 km eastsoutheast of Choybalsan, Border Troop Station	47°37’9” N, 115°52’48” E, 600 m	9
24	17.08.2010	East Mongolia, Dornod Aymag, Matad sum, 75 km eastsoutheast of Choybalsan	47°46’53” N, 115°27’3” E, 700 m	9
25	17.08.2010	East Mongolia, Dornod Aymag, Matad sum, 25 km eastsoutheast of Choybalsan	47°58’30” N, 114°49’48” E, 800 m	9
26	18.08.2010	East Mongolia, Dornod Aymag, Sumber (= Khalkin-gol) sum, Menengiyn Steppe, 220 km eastsoutheast of Choybalsan	47°36’5” N, 117°24’14” E, 500 m	9
27	18.08.2010	East Mongolia, Dornod Aymag, Matad sum, Menengiyn Steppe, 165 km eastsoutheast of Choybalsan	47°40’34” N, 116°39’57” E, 630 m	9
28	18.08.2010	East Mongolia, Dornod Aymag, Sumber (= Khalkin-gol) sum, northeastern shore of the lake Buyr-nuur, 60 km northwest of Sumber, 800 km east of Ulaanbaatar	47°53’5” N, 117°24’14” E, 585 m	9
29	19.08.2010	East Mongolia, Dornod Aymag, Sumber (= Khalkin-gol) sum, 15 km northwest of Sumber	47°44’2” N, 118°31’40” E, 750 m	9
30	19.08.2010	East Mongolia, Dornod Aymag, Sumber (= Khalkin-gol) sum, Ih-Burhan, 30 km north of Sumber	47°52’20” N, 118°27’18” E, 650 m	9

31	19.08.2010	East Mongolia, Dornod Aymag, Sumber (= Khalkin-gol) sum, river Halghun-gol near lake Buyr-nuur, 55 km northwest of Sumber, 800 km east of Ulaanbaatar	48°0'47" N, 118°6'49" E, 600 m	9
32	19.08.2010	East Mongolia, Dornod Aymag, Sumber (= Khalkin-gol) sum, 40 km northwest of Sumber	47°56'37" N, 118°17'47" E, 720 m	9
33	20.08.2010	East Mongolia, Dornod Aymag, Sumber (= Khalkin-gol) Sum, 20 km southeast of Sumber	47°26'49" N, 118°44'42" E, 760 m	9
34	21.08.2010	East Mongolia, Dornod Aymag, Sumber (= Khalkin-Gol) sum, Khinggan mountains, Numrug, 100 km southeast of Sumber, 950 km east of Ulaanbaatar, river Numregijn-gol	46°56'50" N, 119°31'17" E, 1050 m	9
35	21.08.2010	East Mongolia, Dornod Aymag, Sumber (= Khalkin-gol) Sum, 45 km southeast of Sumber	47°17'16" N, 118°56'52" E, 890 m	9
36	21.08.2010	East Mongolia, Dornod Aymag, Sumber (= Khalkin-gol) sum, 30 km southeast of Sumber	47°23'30" N, 118°52'33" E, 820 m	9
37	21.08.2010	East Mongolia, Dornod Aymag, Sumber (= Khalkin-gol) sum, 70 km southeast of Sumber	47°06'07" N, 119°09'40" E, 900 m	9
38	21.08.2010	East Mongolia, Dornod Aymag, Sumber (=Khalkin-gol) sum, Khinggan mountains, Numrug, 100 km southeast of Sumber, 950 km east of Ulaanbaatar, river Numregijn-gol	46°56'32" N, 119°30'36" E, 900 m	5
39	21.08.2010	East Mongolia, Dornod Aymag, Sumber (=Khalkin-gol) sum, Khinggan mountains, Numrug, 100 km southeast of Sumber, 950km east of Ulaanbaatar, river Numregijn-gol	46°56'50" N, 119°31'17" E, 1050 m	5
40	22.08.2010	East Mongolia, Dornod Aymag, Sumber (=Khalkin-gol) sum, Khinggan mountains, Numrug, 100 km southeast of Sumber, 950 km east of Ulaanbaatar, river Numregijn-gol	47°01'2" N, 119°37'32" E, 1380 m	5
41	24.08.2010	East Mongolia, Dornod Aymag, Sumber (= Khalkin-gol) sum, Khinggan mountains, Numrug, 100 km southeast of Sumber, 950 km east of Ulaanbaatar	46°59'5" N, 119°21'23" E, 870 m	5
42	24.08.2010	East Mongolia, Dornod Aymag, Sumber (= Khalkin-gol) sum, Khinggan mountains, Numrug, 100 km southeast of Sumber, 950 km east of Ulaanbaatar	46°45'43" N, 118°14'34" E, 940 m	9
43	25.08.2010	East Mongolia, Dornod Aymag, Sumber (= Khalkin-gol) sum, Dornod Mongolyn Steppe, 110 km south of Sumber, frontier to China, border post	46°42'49" N, 118°02'33" E, 970 m	9

44	25.08.2010	East Mongolia, Suhbaatar Aymag, Erdenetsagaan sum, Arian Khundi Valley (=Tarianiy Khundi), 220 km southsoutheast of Choybalsan, 50 km northeast of Erdenetsagaan	46°15’53”N, 115°43’57” E, 880 m	9
45	27.08.2010	East Mongolia, Suhbaatar Aymag, Dariganga sum, Shiliyn Bogd-uul, plateau Dariggyn Tegshondorog, 290 km south of Choybalsan	45°28’21” N, 114°35’21” E, 1780 m	9
46	27.08.2010	East Mongolia, Suhbaatar Aymag, Erdenetsagaan sum	45°55’12” N, 115°23’16” E, 1010 m	9
47	27.08.2010	East Mongolia, Suhbaatar Aymag, Erdenetsagaan sum, Arian Khundi Valley (=Tarianiy Khundi), 225 km southsoutheast of Choybalsan, 30 km northeast of Erdenetsagaan	46°8’45” N, 115°35’34” E, 925 m	9
48	27.08.2010	East Mongolia, Suhbaatar Aymag, Erdenetsagaan sum, Dariggyn Tegshondorog, 265 km southeast of Choybalsan, 35 km southwest of Erdenetsagaan	45°38’22” N, 114°47’11” E, 1350 m	9
49	27.08.2010	East Mongolia, Suhbaatar Aymag, Dariganga sum, saltlake Ganga-nuur, inland dune near Dariganga, 300 km south of Choybalsan, 12 km eastsoutheast of Dariganga	45°16’0” N, 113°59’52” E, 1290 m	9
50	27.08.2010	East Mongolia, Suhbaatar Aymag, Ongon sum, 75 km south of Baruun-Urt	46°0’28” N, 113°26’28” E, 1245 m	9
51	27.08.2010	East Mongolia, Suhbaatar Aymag, Dariganga sum, Shiliyn Bogd-uul, Dariggyn Tegshondorog, 290 km south of Choybalsan, 650 km southeast of Ulaanbaatar	45°28’47” N, 114°32’43” E, 1510 m	9
52	27.08.2010	East Mongolia, Suhbaatar Aymag, near Baruun-Urt, 500 km eastsoutheast of Ulaanbaatar	46°41’51” N, 113°11’5” E, 1030 m	8
53	28.08.2010	East Mongolia, Suhbaatar Aymag, Talbulag sum, 17 km westnorthwest of Baruun-Urt, 480 km eastsoutheast of Ulaanbaatar	46°43’23” N, 113°3’34” E, 1010 m	8
54	29.08.2010	Khentey Aymag, Tsenhermandal sum, Pass Ondorhaan-Ulaanbaatar, 140 km east of Ulaanbaatar	47°47’44” N, 108°45’37” E, 1640 m	4
55	29.08.2010	Khentey Aymag, Bayandelger sum, river Kherulen, between Ondorhaan and Ulaanbaatar, 120 km east of Ulaanbaatar	47°41’48” N, 108°28’33” E, 1305 m	4
56	31.08.2010	Ulaanbaatar city, Suchbaatar place, near Natural History Museum	47°55’7” N, 106°54’58” E, 1300 m	4
57	01.09.2010	Ulaanbaatar city, Natsagdoriy Street, near Suchbaatar place and Blue Sky Building	47°54’55” N, 106°54’46” E, 1300 m	4

Table 4: Plant records collected for Herbarium OSBU during the expedition 2010 to East Mongolia. For collecting site see table 3. Collectors: B. NEUFFER, H. HURKA, N. FRIESEN. Determination of plants predominantly followed GRUBOV (2001); Asteraceae revised by S. SMIRNOV (Barnaul), Brassicaceae bei D. GERMAN (Barnaul, Heidelberg), Chenopodiaceae by H. FREITAG (Kassel). [Number] = new for region according to tab. 1 and GRUBOV (2001), + = new for Mongolia according to GRUBOV (2001), ° = undecribed species or recently published, * = FRIESEN (1995)

Family, species	collecting site	OSBU
Aspleniaceae		
Asplenium spec.	1, 7	20151, 20303
Dryopteridaceae		
Dryopteris fragrans (L.) SCHOTT	7	20302
Equisetaceae		
Equisetum fluviatile L.	38	20652
Woodsiaceae		
[5]*Woodsia subcordata* TURCZ.	39	20633
Ephedraceae		
Ephedra dahurica ssp. *sinica* (STAPF) FREITAG & MAIER-STOLTE	1, 26, 33, 49	20139, 20502, 20553, 20735
Alismataceae		
Alisma gramineum LEJ	38, 31	20660, 20775
Alliaceae		
Allium anisopodium LEDEB.	1, 9, 13, 16, 24, 27, 28, 33, 35, 39	20154, 20338, 20401, 20430, 20478, 20497, 20520, 20560, 20567, 20645
Allium bidentatum FISCH. ex PROKH.	1, 2, 3, 4, 5, 7,8, 9 11, 13, 16, 24, 25, 29, 39, 42, 50, 52	20129, 20182, 20204, 20240, 20254, 20273, 20311, 20339, 20432, 20473, 20479, 20546, 20363, 20398, 20641, 20697, 20724, 20759
Allium condensatum TURCZ.	33, 43, 38, 48	20559, 20703, 20705, 20720
Allium leucocephalum TURCZ. ex LDB.	1, 35, 49	20152, 20156, 20566, 20721
[4]*Allium maximoviczii* RGL.	2, 3, 17	20184, 20206, 20427
Allium mongolicum REGEL	24, 26, 44	20475, 20493, 20706
Allium polyrrhizum TURCZ. ex REGEL	19, 21, 24, 26, 31 44, 50, 52	20445, 20456, 20480, 20494, 20527, 20707, 20723, 20760, 20761
Allium prostratum TREV.	1, 4, 5, 7, 8, 9,13,17,	20109, 20239, 20252, 20278, 20310, 20333, 20399, 20424
Allium ramosum L. (= *A. odorum* L.)	1, 7, 9, 14, 17, 24, 25, 31, 33, 41, 42, 48	20153, 20157, 20277, 20335, 20394, 20429, 20474, 20476, 20534, 20562, 20695, 20698, 20718
Allium senescens L. ssp. *glaucum*	1, 5, 7, 16, 42, 48	20155, 20256, 20276, 20433, 20696, 20719
Allium senescens L.	3, 7, 9, 11, 17, 35	20207, 20275, 20336, 20361, 20425, 20565
[4, 5]*Allium splendens* WILLD. ex SCHULT.	2, 5, 7, 17, 39, 40	20183, 20253, 20271, 20428, 20640, 20686
[4]*Allium strictum* SCHRAD.	3, 7, 11	20205, 20274, 20360

[2, 4, 5]*Allium tenuissimum* L.	1, 5, 7, 8, 9, 11, 13, 16, 24, 25, 27, 29, 33, 35, 39, 43, 48	20108, 20128, 20255, 20272, 20309, 20337, 20362, 20397, 20402, 20431, 20472, 20477, 20496, 20547, 20561, 20568, 20644, 20701, 20717
+*Allium tuberosum* non auct. (new species see BATLAI et al. in this issue)	39	20642
Amaranthaceae		
Amaranthus retroflexus L.	31	20537
Apiaceae		
[2]*Bupleurum bicaule* HELM.	11, 26, 33	20365, 20489, 20548
Bupleurum scorzonerifolium WILLD.	3	20195
Bupleurum spec.	39	20629
Carum carvi L.	1, 3	20124, 20216
Ferula bungeana KITAG.	49	20742
Ferula spec.	26	20490
[4]*Pachypleurum alpinum* LDB.	3	20218
Peucedanum spec.	31, 36	20540, 20569
[4]*Schultzia crinita* (PALL.) SPRENG.	3	20202
Sium suave WALT.	1, 14	20167, 20390
spec.	1, 3, 11, 40, 49	20123, 20149, 20203, 20354, 20369, 20674, 20748,
Asclepiadaceae		
[2]*Vincetoxicum sibiricum* (L.) DECNE	9	20326
Asteraceae		
[5]*Achillea acuminata* (LDB.) SCH. BIP.	38	20659
Achillea alpina L.	36	20573
Achillea asiatica SERG.	3, 38	20200, 20663
[2, 4]*Achillea ptarmicoides* MAXIM.	11, 16	20370, 20434
[9]*Ajania fruticulosa* (LDB.) POLJAK.	23	20464
Artemisia adamsii BESS.	50	20722, 20750
Artemisia anethifolia WEB. ex STECHM.	1, 19	20111, 20438
Artemisia commutata BESS.	17	20414
[8]*Artemisia compacta* FISCH. ex DC.	21	20462
[5]*Artemisia desertorum* SPRENG.	40	20684
Artemisia dracunculus L.	39, 40	20638, 20687
Artemisia frigida WILLD.	17, 26, 39	20412, 20498, 20603
Artemisia halodendron TURCZ. ex BESS.	28	20508
Artemisia integrifolia L.	4, 39, 38	20224, 20626, 20656
Artemisia laciniata WILLD.	1, 3	20119, 20210
Artemisia macrocephala JACQUEM.	19	20439
Artemisia mongolica FISCH. ex NAKAI	1, 4, 7	20110, 20219, 20772
Artemisia palustris L.	7, 24	20291, 20467
Artemisia pectinata PALL.	20	20453
[5]*Artemisia selengensis* TURCZ. ex BESS.	38	20657
Artemisia sericea WEB.	4, 40	20220, 20675
Artemisia sieversiana WILLD.	26	20486
Artemisia tanacetifolia L.	7	20290
Artemisia xanthochroa KRASCH.	49	20738
Aster tataricus L. f.	11, 36, 38, 40	20367, 20574, 20662, 20679
[9]*Bidens tripartita* L.	31	20530
Chrysanthemum zawadskii HERB.	3, 40	20192, 20670
Crepis bungei LEDEB.	1	20116
Echinops gmelinii TURCZ.	28	20506
Echinops latifolius TAUSCH.	1	20134
Filifolium sibiricum (L.) KITAM.	1, 4	20141, 20226
Galatella dahurica DC.	4, 17	20221, 20421

Heteropappus altaicus (WILLD.) NOVOPOKR.	1, 24	20133, 20465
[9]*Hieracium umbellatum* L.	17, 36, 35	20407, 20571, 20583
Hieracium virosum PALLAS	17	20408
Inula britannica L.	1	20170
Ixeridium gramineum (FISCH.) TZVEL.	11	20355, 20364
Lactuca sibirica (L.) BENTH. ex MAXIM.	36	20570
Leontopodium ochroleucum BEAUVD.	17	20420
[9]*Ligularia sagitta* (MAXIM.) LING	36	20575
Ligularia sibirica (L.) CASS.	3	20217
Olgaea lomonosowii (TRAUTV.) ILJIN	51	20749
Picris japonica THUNBG.	38	20594
Saussurea alpina (L.)DC.	2	20181
Saussurea amara (L.) DC.	1, 18, 19, 28, 36	20162, 20435, 20436, 20515, 20576
[4]*Saussurea elongata* DC.	4, 7	20244, 20287
[9]*Saussurea pulchella* (FISCH.) DC.	37	20587
Saussurea salicifolia (L.) DC.	1, 12, 48	20142, 20380, 20715
Scorzonera albicaulis BGE.	39	20625
Senecio cannabifolius LESS.	38	20593
[4]*Senecio erucifolius* L.	14	20391
Serratula centaurioides L.	7, 11, 33, 43	20297, 20352, 20556, 20700
Synurus deltoides (AIT.) NAKAI	39	20602
Taraxacum spec.	1, 49	20117, 20743
+*Xanthium sibiricum* PATRIN ex WILLD.	28	20507
Youngia tenuifolia (WILLD.) BABC. et STEBB.	7, 12	20308, 20377
Betulaceae		
[4]*Betula humilis* SCHRANK	4	20223
Betula platyphylla SUKACZ.	4	20232
Boraginaceae		
Tournefortia sibirica L.	20	20450
Brassicaceae		
Alyssum lenense ADAMS	12, 49, 17, 45	20374, 20728, 20410, 20709
Alyssum obovatum (C.A. MEY.) TURCZ.	1, 4, 17, 33	20148, 20236, 20410, 20555
[5]*Arabis borealis* ANDRZ. ex C.A. MEY.	40	20667, 20682
Arabis pendula L.	39	20611
[+]*Berteroa incana* (L.) DC.	56	20764
Brassica juncea (L.) CZERN.	46, 57	20710, 20771
Capsella bursa-pastoris (L.) MEDIK.	56, 57	20765, 20768, 20770
[9]*Descurainia sophia* (L.) WEBB ex PRANTL	50, 57	20753, 20769, 20754
Dontostemon integrifolius (L.) C.A.M.	5, 7, 9, 13, 17	20247, 20280, 20327, 20382, 20404
	19, 15, 43	20441, 20773, 20704
[5, 9]*Dontostemon micranthus* C.A. MEY.	35, 39, 40	20586, 20612, 20678
Draba nemorosa L.	17	20403
[°]*Erysimum amplexicaule* WIILD.	38	20693
Erysimum cheiranthoides L.	37	20581
Erysimum flavum (GEORGI) BOBR.	1, 4, 7, 12, 54	20131, 20225, 20268, 20375, 20762
[9]*Lepidium amplexicaule* WIILD.	26, 47	20481, 20713
Lepidium apetalum WILLD.	18	20443
[°]*Noccaea thlaspioides* (PALL.) F.K. MEY.	40, 45	20668, 20708
[+]*Ptilotrichum dahuricum* PESCHKOVA	39, 40, 1, 53, 5	20630, 20680, 20150, 20755,
	11, 12, 17, 48	20246, 20346, 20372, 20406, 20716
Ptilotrichum tenuifolium (STEPHAN ex WILLD.) C.A. MEYER	24, 26, 47	20470, 20501, 20714
Rorippa palustris (L.) BESS.	6, 14, 38, 56	20257, 20389, 20648, 20767

Sisymbrium polymorphum (MURRAY) ROTH	30, 50	20519, 20752
Sisymbrium polymorphum (MURR.) ROTH	47	20712
[+]*Sisymbrium volgense* M.BIEB. ex FOURN.	56	20766
[9]*Stevenia cheiranthoides* DC.	40, 50	20669, 20668, 20754
Butomaceae		
Butomus umbellatus L.	16, 31	20393, 20533
Campanulaceae		
[4]*Adenophora crispata* (KORSH.) KITAG.	2	20180
Adenophora gmelinii (SPRENG.) FISCH.	39	20634
Adenophora stenanthina (LDB.) KITAG.	1, 31	20168, 20543
Adenophora tricuspidata (FISCH.) DC.	39, 40	20600, 20666
Campanula glomerata L.	3	20199
Cannabaceae		
Cannabis ruderalis JANISCH.	11	20366
Caryophyllaceae		
Arenaria capillaris POIR.	2, 4	20176, 20235
Arenaria juncea M.B.	39	20624
Arenaria spec.	40	20683
Cerastium cerastioides (L.) BRITTON	40	20671
[9]*Dianthus superbus* L.	37	20580
Gypsophila dahurica TURCZ.	3	20198
Gypsophila patrinii SER.	1	20143
Silene jenisseensis WILLD.	4, 39	20228, 20635
Silene repens PATRIN ex PERS.	7, 28, 38	20300, 20514, 20694
[5]*Spergularia marina* (L.) GRISEB.	39	20639
[5]*Stellaria graminea* L.	38	20592
Chenopodiaceae		
Atriplex sibirica L.	21	20460
Axyris hybrida L.	6	20258
Bassia scoparia (L.) A.J.SCOTT (= *Kochia scoparia* (L.) SCHRAD.)	26, 53	20500, 20757
Chenopodium acuminatum WILLD.	19	20455
Chenopodium album L.	19, 39	20442, 20620
Chenopodium aristatum L.	6, 21	20265, 20459
Chenopodium glaucum L.	6, 49	20259, 20744
Chenopodium hybridum L.	17	20423
Corispermum mongolicum ILJIN	28, 49	20509, 20510, 20517, 20737, 20740
Micropeplis arachnoidea (MOQ.) BUNGE	21	20457
Salsola collina PALLAS	24, 26	20774, 20482
Salsola monoptera BUNGE	21, 26	20449, 20491
spec.	49	20726
Suaeda corniculata (C.A. MEY.) BGE. ssp. *mongolica*	21, 19	20461, 20446
Convolvulaceae		
Convolvulus ammanii DESR.	26	20499
Convolvulus arvensis L.	28	20516
Cornaceae		
Cornus alba L.	38	20588
Crassulaceae		
Orostachys malacophylla (PALL.) FISCH.	4	20222
Orostachys spinosa (L.) C.A. MEY.	33	20552
Orostachys thyrsiflora FISCH.	17	20415
Sedum aizoon L.	1, 7	20132, 20295
Sedum hybridum L.	39	20628
Sedum purpureum (L.) J.A. SCHULTES	3	20214

Cyperaceae		
[4]*Bolboschoenus planiculmis* (FR. SCHMIDT) EGOR.	2	20177
[2]*Carex alba* SCOP.	7	20286
[4]*Carex rostrata* STOKES	3	20211
Carex spec.	1, 3, 7, 35	20122, 20196, 20215, 20284, 20285, 20584
[9]*Cyperus fuscus* L.	31	20525
[9]*Eleocharis acicularis* (L.) ROEMER & J.A. SCHULTES	31	20535
Eleocharis quinqueflora (F.X.HARTMANN) SCHWARZ cf.	31	20536
Eriophorum brachyantherum TRAUTV. & C.A. MEY.	3	20189
Kobresia spec.	1	20121
Scirpus spec.	6	20264
Trichophorum spec.	3	20208
Dipsacaceae		
Scabiosa comosa FISCH.	1, 33, 39	20130, 20551, 20621
Ericaceae		
Rhododendron dahuricum L.	40	20672
Euphorbiaceae		
Euphorbia discolor LDB.	49	20736
Fabaceae		
Astragalus adsurgens PALLAS	31	20539
[4]*Astragalus argutensis* BGE.	4	20241
[9]*Astragalus fruticosus* PALL.	49	20729
Astragalus membranaceus (FISCH.) BGE.	4	20233
Astragalus spec.	1, 5, 11, 19, 33	20120, 20248, 20353, 20444, 20557
[2]*Astragalus tenuis* TURCZ.	8, 24, 26, 33	20312, 20471, 20485, 20550
Caragana microphylla (PALL.) LAM.	28, 49	20505, 20730
[8]*Caragana stenophylla* POJARK.	19	20437
Glycyrrhiza uralensis FISCH.	24	20466
Hedysarum alpinum L.	3	20212
Hedysarum fruticosum PALL.	35	20579
Hedysarum spec.	40	20688
Lespedeza hedysaroides (PALL.) KITAG.	9	20318
Medicago falcata L.	28	20511
[2, 8]*Medicago ruthenica* (L.) LDB.	9, 19	20324, 20440
Medicago spec.	20	20447, 20448
Oxytropis myriophylla (PALL.) DC.	39	20617
Oxytropis spec.	9, 28, 31, 39	20320, 20512, 20528, 20637
spec.	9, 11, 17	20325, 20358, 20411
Trifolium lupinaster L.	1	20172
Vicia cracca L.	9	20321
Vicia unijuga A.BR.	4, 7	20234, 20306
Gentianaceae		
Gentiana barbata FROEL.	1, 7, 14, 41	20114, 20294, 20388, 20691
Gentiana dahurica FISCH.	37	20582
Gentiana decumbens L.	1, 9	20144, 20328
Gentiana macrophylla PALL.	15	20392
Gentiana squarrosa LDB.	7	20281
Halenia corniculata (L.) CORNAZ	2, 38	20187, 20591
Lomatogonium carinthiacum (WULFEN) REICHENB.	5	20245
Geraniaceae		
Erodium stephanianum WILLD.	10	20331
[4]*Erodium tibetanum* EDGEW.	17	20409

Geranium pratense L.	11	20344
Geranium sibiricum L.	7	20282
[9]*Geranium vlassovianum* FISCH.	1, 36	20166, 20577
Haloragaceae		
[5]*Myriophyllum verticillatum* L.	38	20649
Hypericaceae		
Hypericum attenuatum CHOISY	39	20599
Iridaceae		
[5]*Iris bungei* MAXIM.	39	20632
Iris dichotoma PALL.	9	20314
Iris flavissima PALL.	4	20238
Iris spec.	49	20741
Juncaceae		
Juncus spec.	2, 3	20178, 20191, 20201
Juncus bufonius L.	6, 31	20262, 20541
Juncaginaceae		
Triglochin maritimum L.	2	20185
Triglochin palustre L.	2, 6	20179, 20307
Lamiaceae		
[5]*Amethystea caerulea* L.	7, 39	20279, 20610
Dracocephalum foetidum BGE.	53	20758
[4]*Dracocephalum origanoides* STEPH. ex WILLD.	4	20243
Dracocephalum ruyschiana L.	40	20673
Leonurus sibiricus L.	46	20711
Leonurus spec.	39	20606
+*Mentha aquatica* L.	14	20384
Mentha arvensis L.	31	20523
Schizonepeta multifida (L.) BRIQ.	3	20193
Scutellaria baicalensis GEORGI	33	20549
Scutellaria galericulata (A.HAMILTON) JORDAL var. *epilobiifolia*	38	20653
Scutellaria scordifolia FISCH. ex SCHRANK.	7	20301
[2]*Thymus gobicus* TSCHERN.	4, 9, 12	20227, 20330, 20376
Lemnaceae		
[9]*Lemna trisulca* L.	31, 34	20542, 20564
Liliaceae		
Asparagus dahuricus FISCH.	26, 49	20492, 20727
Asparagus spec.	33	20558
[5]*Hemerocallis lilio-asphodelus* L.	38	20664
Hemerocallis minor MILL.	12, 43	20379, 20699
Lilium buschianum LODD.	39	20636
Lilium dahuricum KER-GAWL.	38	20595
Lilium pumilum DC.	1, 9, 39	20329, 20631, 20137
Maianthemum cf. bifolium (L.) F. SCHMIDT	38	20590
Polygonatum odoratum (MILL.) DRUCE	11, 39	20341, 20616
[5]*Polygonatum sibiricum* DELAROCHE	39	20608
Veratrum nigrum L.	17	20422
Linaceae		
Linum sibiricum DC.	1, 9	20169, 20322
Papaveraceae		
Chiazospermum erectum L.	22, 53	20463, 20756
Corydalis sibirica (L.FIL.)PERS.	7	20269
[4, 5]*Papaver pseudocanescens* POPOV.	1, 38	20160, 20596

Parnassiaceae		
Parnassia palustris L.	1	20115
Plantaginaceae		
Plantago major L.	38	20658
Plantago salsa PALL.	1	20112
Plumbaginaceae		
Goniolimon speciosum (L.) BOISS.	1	20164
Limonium aureum (L.) HILL ex KTZE.	20, 26	20454, 20488
Limonium bicolor (BGE.) KTZE.	26	20487
[4]*Limonium tenellum* (TRUCZ.) KTZE.	1	20163
Poaceae		
Achnatherum splendens (TRIN.) NEVSKI	26	20484
Agropyron christatum (L.) P.B.	4	20229
Agropyron spec.	1, 7, 10, 49	20127, 20298, 20332, 20725
Agrostis mongholica ROSHEV.	1	20126
Beckmannia spec.	1	20165
Bromus inermis LEYSS.	38	20650
Chloris virgata SW.	20	20452
Cleistogenes squarrosa (TRIN.) KENG	9, 17	20316, 20419
Eragrostis minor HOST	24, 50	20469, 20751
Festuca spec.	12	20378
Hordeum brevisubulatum (TRIN.) LINK	1	20125
Koeleria macrantha (LEDEB.) J.A. SCHULTES	4	20230
Panicum miliaceum L.	31	20522
Phleum spec.	14	20387
Poa attenuata TRIN.	3, 4, 17	20209, 20231, 20413
Poa subfastigiata TRIN.	6	20261
[4]*Ptilagrostis mongholica* (RYDB.)BARKWORTH ssp. *porteri*	2	20175
Setaria viridis (L.) BEAUV.	17	20416
spec.	7, 17, 35, 49	20283, 20299, 20418, 20585, 20731, 20733
Stipa baicalensis ROSHEV	38	20692
Stipa grandis P. SMIRN.	27	20503
Stipa krylovii ROSHEV	11, 27	20351, 20504
Stipa sibirica (L.) LAM.	1, 41	20158, 20689
Polemoniaceae		
Polemonium racemosum (RGL.) KITAM.	38	20651
Polygonaceae		
Polygonum alpinum ALL.	11	20340
Polygonum amphibium L.	31	20521
Polygonum angustifolium PALL.	1	20140
Polygonum aviculare L.	1	20159
Polygonum alopecuroides TURCZ. ex MEISSN.	5	20250
Polygonum convolvulus L.	6, 9	20266, 20319
Polygonum divaricatum L.	29	20518
Polygonum hydropiper L.	6	20270
Polygonum spec.	26	20483
Potamogetonaceae		
Potamogeton spec.	31	20532
Primulaceae		
Androsace septentrionalis L.	12	20373
Primula farinosa L.	1	20113

Ranunculaceae		
Aconitum barbatum PERS.	3, 7	20197, 20305
Aconitum czekanovskyi STEINB.	3	20194
Aconitum kuznezoffii REIHB.	39	20601
[5]*Batrachium divaricatum* (SCHRANK.) SCHUR.	31, 38	20529, 20531, 20661
Cimicifuga dahurica (TURCZ.) MAXIM.	40	20665
Clematis hexapetala PALL.	8, 11, 17, 33	20313, 20347, 20405, 20554
Delphinium grandiflorum L.	3	20190
Halerpestes salsuginosa (PALLAS ex GEORGI) GREENE	49	20745
[2]*Paeonia lactiflora* PALLAS	11	20348
Ranunculus gmelinii DC.	38	20647
[9]*Ranunculus natans* C.A. MEY.	31, 49	20524, 20746
Ranunculus radicans DC.	1, 6	20174, 20260
Thalictrum baicalense TURCZ. ex LDB.	39	20609
Thalictrum foetidum L.	1	20135
Thalictrum minus L.	12	20381
Thalictrum simplex L.	4, 36	20237, 20572
[2]*Thalictrum squarrosum* STEPH. ex WILLD.	9	20317
Rosaceae		
Amygdalus pedunculata PALL.	49	20732
Cotoneaster melanocarpus FISCH. ex BLYTT	17	20417
Crataegus dahurica KOEHNE	38	20589
Dasiphora fruticosa (L.) RYDB.	1	20146
Geum aleppicum JACQ.	39	20604
Malus baccata L.) BORKH.	14, 39	20395, 20623
Padus asiatica KOM.	14	20396
[9]*Potentilla anserina* L.	49	20747
Potentilla leucophylla PALL.	1	20136
Potentilla multifida L.	31	20538
Potentilla tanacetifolia WILLD. ex SCHLECHT.	4, 36	20242, 20578
Rosa davurica PALL.	11, 41	20350, 20690
Rubus sachalinensis LÉV.	7	20292
Sanguisorba officinalis L.	1	20171
Spiraea aquilegifolia PALL.	39	20627
Spiraea media F.SCHMIDT	7	20289
Spiraea salicifolia L.	38	20605
Rubiaceae		
Galium boreale L.	39	20619
Galium verum L.	1	20161
Rubia cordifolia L.	39	20607
Rutaceae		
Dictamnus dasycarpus TURCZ.	39	20598
Haplophyllum dauricum (L.) G. DON	1, 24	20147, 20468
Salicaceae		
[2]*Populus pilosa* REHD.	7	20293
Salix repens L. cf.	3	20213
Salix spec.	39, 49	20622, 20734
Santalaceae		
Thesium refractum WEDEB.	5, 40	20251, 20685
Thesium spec.	11	20359
Saxifragaceae		
[4]*Saxifraga hirculus* L.	2	20186
Saxifraga spinulosa ADAMS.	7	20288, 20296

Scrophulariaceae		
Cymbaria dahurica L.	21	20458
[5]*Euphrasia hirtella* JORD. ex REUT.	40	20677
Euphrasia spec.	3	20188
Euphrasia tatarica FISCH. ex SPRENG.	5, 14	20249, 20383
Limosella aquatica L.	55	20763
Linaria acutiloba FISCH. ex REICHB.	1, 6, 11	20173, 20267, 20368
Linaria buriatica TURCZ.	9	20315
Odontites rubra (BAUMG.) OPIZ	1, 14	20118, 20385
Pedicularis spec.	11, 39	20371, 20618
Pedicularis striata PALL.	11	20349
[5]*Pedicularis verticillata* L.	40	20681
Rhinanthus songaricus (STERNECK) B.FEDTSCH.	14	20386
Scrophularia spec.	38	20655
Veronica anagallis-aquatica L.	31	20526
Veronica daurica STEV.	6	20263
Veronica incana L.	9	20323
Veronica linariifolia PALL. ex LINK	39, 40	20614, 20676
Veronica longifolia L.	7, 11, 38	20304, 20356, 20357, 20654
Veronica sibirica L.	39	20613
Solanaceae		
[9]*Solanum depilatum* KITAG.	28	20513
Thymelaeaceae		
Stellera chamaejasme L.	11	20343
Ulmaceae		
[5]*Ulmus pumila* L.	11, 39, 49	20342, 20597, 20739
spec.	1	20145
Valerianaceae		
Patrinia spec.	11	20345
Verbenaceae		
Caryopteris mongholica BGE.	1	20138
Violaceae		
Viola brachysepala MAXIM.	39	20615
Viola variegata FISCH. ex LINK	39	20646
Zygophyllaceae		
Nitraria sibirica PALL.	20	20451

Table 5: Number of species new for provinces in GRUBOV (2001), new for Mongolia and undescribed or recently published new species

Province after Grubov 2001	Number of Species	Questionable, now confirmed
2 Khentei	10	1
3 Khangai	3	
4 Mongol-Daurian	21	
5 Great Khingan	18	2
8 Middle Khalkha	30	
9 East Mongolia	18	
11 Valley of the Lakes	9	
12 East Gobi	3	
13 Gobi Altay	58	1
New for Mongolian regions	169	4
New for Mongolia		10
Undescribed or recently published new species	2	

Based on material collected during the Mongolia expeditions and housed in OSBU, supplemented by material from other herbaria (altogether 184 species from 121 genera), we contributed to the ITS phylogeny of the Brassicaceae with special reference to Asian taxa (GERMAN et al. 2009).

The genus *Allium* in Mongolia comprises a high number of species and is one of the most diverse genera in the country's flora (FRIESEN 1995). Onion species dominate the floristic aspect at many places. The evolution, phylogeny and biogeography have long been a main focus of Nikolai Friesen's research. New aspects are also presented in this proceedings volume (OYUNTSETSEG et al).

Some of our specimens were first records for the entire country of Mongolia, and others were new for certain floristic regions and Aymags (tab. 5; NEUFFER et al. 2003, GERMAN et al. 2003). New for Mongolia are e.g. *Capsella orientalis* KLOKOV, seed material was collected in Altay region 2001. This new species holds a key position in understanding the evolutionary history of the genus *Capsella* (HURKA et al. 2012). *Xanthium sibiricum* and *Berteroa incana* have been collected in East Mongolia and came obviously as colonizing weedy species. Ten species were new for the Mongolian Altay including *Thalictrum schischkinii* N. FRIESEN, *Hedysarum consanguineum* DC., and *Veronica schmakovii* Kossatschev. In the Ikh Bogd Mountains (Gobi Altay) we collected one undescribed *Saussurea* species named *Saussurea herbertii* Smirnov.

Currently a 'Virtual Guide to the Flora of Mongolia' (http://greif.uni-greifswald.de/floragreif/) is under construction. The aim of this initiative is to present a virtual guide as an introduction to the flora of Mongolia. This webproject intends to provide an information source for botanists, plant ecologists and students of botany or ecology working in applied projects. Our Herbarium OSBU contributed several herbarium sheets to widen the information.

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Discussion during the symposium, from left: Annegret Stubbe (University of Halle), Nikolai Friesen (University of Osnabrück) and Frank Blattner (IPK Gatersleben).