Expedition to Kamchatka

August 31 to September 14, 2000

with seedlist

Elisabeth Öberg, Bo Nilsson

Arboretum Norr
Box 4097
SE-904 03 UMEÅ
SWEDEN

Collection of plant material from Kamchatka

Seed list

The seeds listed below were collected on the Kamchatka peninsula between August 31 and September 14, 2000. The expedition was organized by Arboretum Norr, Umeå, Sweden together with the Komarov Botanical Institute, St. Petersburg and the Vladivostok Botanical Institute, Vladivostok, which arranged for permits to travel and collect in Kamchatka. This expedition was made possible by support from the Royal Swedish Academy of Agriculture and Forestry and from Arboretum Norr Foundation.

Collectors: Elisabeth Öberg, Arboretum Norr, Umeå, Sweden
Bo Nilsson, Swedish University of Agricultural Sciences, Umeå, Sweden
Gennady Firsov, Komarov Botanic Institute, St. Petersburg, Russia
Ludmila M. Pshennikova, Vladivostok Botanical Institute, Vladivostok, Russia
Drivers: Alexander Novikov, Milkovo
Nikolaij Aksinovitch, Elizovo

In Kamchatka we travelled with a four-wheel drive, off-road truck. The drivers' skill and local knowledge made it possible for us to find and reach the most interesting areas, possible to reach without helicopter. Depending on the weather we slept in the truck or in tents.

The main purpose of this expedition was to supply Arboretum Norr and the Arboretum of Komarov Botanic Institute with a plant material, especially seed, of well-defined origin and Vladivostok Botanical Garden with herbarium material. Arboretum Norr, together with the Horticulture Section of the Swedish University of Agricultural Sciences in Umeå, is actively working to develop a plant material for ornamental use in northern Sweden and has been doing that since its establishment in 1975. The aim is both finding better provenances of species already in use and to find new species, which are adapted to the specific climatic- and light conditions in the north, 63°N - 67°N. Ornamental trees and shrubs used and sold in Sweden today are often not suited to grow in the north part of the country, as they almost always originate from the southern part of their natural distribution area or are cultivars developed for Holland, Denmark, Germany or England.

Due to a bad year for tree seeds no seeds of *Larix* and *Picea* and only very few seeds of *Pinus* and *Betula* could be collected this year. On the whole it was difficult to find berries and fruit on anything, which was a much bigger problem for the local people than for us, as today's troublesome economic situation have made many people more dependent on what the forest can give. Vegetative propagation material was collected only on a very small scale due to relatively short time available and the fact that we stayed in the field during the whole trip. Only some cuttings within the genera *Salix*, *Populus* and *Chosenia* were collected.

In the list the collection sites are indicated by letters A – N which corresponds to the descriptions in the text and the map (Fig. 1). The first number is the seedlist number - the number to be used when ordering - the second number is Arboretum Norr's own registration number and the last one is the collection number. As the amount of seed is very limited we will use the old rule "first come, first served". You can send in your orders to our address on the frontpage or by e-mail to:

Elisabeth.Oberg@njv.slu.se

Cover image: Volcano Ploskij Tolbachik, 3 062 m. Photo E. Öberg, 2000.

Why Kamchatka ?

It is difficult to find a reliable woody plant material for northern Sweden with its cool summers, short growing season and low winter temperatures (often below -30 – -35°C). Also the long-day conditions in the north of Scandinavia during the summer can cause problems especially in the end of the vegetation period. The fact that the climate in the north part of Sweden, say north of the latitude 64ºN, has continental features often with stable winters without warm periods, make it possible to use continental species. Plant material from Canada, continental North East Asia and Siberia can usually cope with low winter temperatures, but often demands higher temperatures during the summer season and a longer growth period to build up the essential amount of nutrients to survive the long winter. Kamchatka offers an interesting plant material, which is resistant to winter temperatures below -30 ºC, but also adapted to short growing season – not more than 4,5 months – and cool summers. The south and middle part of Kamchatka Peninsula is in fact situated beneath the 56ºN, which corresponds to Skåne in southern Sweden, so the plant material is not adapted to long-day conditions during the growing season. But to find an interesting plant material adapted to long-day growing conditions is almost impossible.

Some facts about Kamchatka

The Kamchatka Peninsula covers an area of about 270 000 km^2, and the whole region (Kamchatka Oblast) about 472 300 km^2. It is situated in the easternmost part of Siberia between the latitudes 51°N and 60°N and separated from the mainland by the Okhotsk Sea. The main city is Petropavlovsk-Kamchatskij, founded by Vitus Bering in 1740, have today about 270 000 inhabitants. The total population of the oblast is nowadays 417 000 (Foreign Investment Promotion Center, 1998) but prior to the collapse of the Soviet Union some 470 000 people lived there (Hansson, 1995).

In Petropavlovsk on the south-east coast the mean annual temperature is + 0,7 ºC, the same as in Kalix in the northernmost part of the Gulf of Bothnia (table 1.). The spring in Kamchatka often comes later compared with northern Sweden and the autumn is somewhat prolonged, especially along the coast. In the winter the cold ocean currants and iceberg on the east side and the totally frozen Okhotsk Sea on the west side delay the spring. The fact that large masses of water store warmth makes the season longer along the coast. In the inland of the peninsula the climate is more continental and the mean temperature lower. As a comparison, the north Swedish climate is dominated by westerly winds (cyclones) and depressions moving in from the Atlantic which gives the climate more maritime features. However, Sweden being on the western outskirts of a vast continent, the climate in its northeastern parts is more continental (Holmer, 1982) and seems to be comparable to the coastal climate of south Kamchatka (table 1).

Table 1. The mean temperature in some places in Kamchatka (approx. 30 years) (Hansson, 1995). Mean of the years 1961-1990 in three places in the north of Sweden (SMHI Meteorologi, 1991)

Site	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Mean
Esso (inland)	-20,1	-18,5	-13,4	-5,1	2,8	9,4	13,0	11,5	5,8	-2,1	-11,0	-17,4	-3,8
Petropavlovsk (coastal)	-9,4	-9,3	-6,4	-1,8	2,3	6,7	10,8	12,1	9,2	4,0	-2,5	-7,1	0,7
Gällivare	-14,3	-12,4	-7,9	-1,9	4,8	11,1	13,3	11,0	5,4	-0,3	-7,7	-12,3	-0,9
Kalix	-13,1	-11,8	-7,2	-0,4	6,2	12,5	14,9	12,9	7,7	2,1	-4,8	-10,3	0,7
Piteå	-10,5	-10,0	-5,7	-0,1	5,3	12,2	15,0	13,7	8,7	3,3	-3,7	-8,4	2,1

Volcanoes and seismic activity is characteristic of the Kamchatka peninsula. There is totally 160 volcanoes of which about 29 are active (Hansson, 1995) and numerous hot springs and geysirs. The Vostochnij Range (Eastern Range) is the most active mountain range with all active volcanoes except one. The largest and highest volcano is Klyuchevskaja Sopka 4750 m. a. s. l, the largest

active volcano in Eurasia, which most recently erupted in 1994 (Hansson, 1995). We visited the Plosky Tolbachik Volcanoe (3062 m), south of Klyuchevskaja, where one of the largest eruptions in the world took place during 1975 and 1976 and several new volcanoes were born. Large areas of forest were buried in layers of black ash and only *Elymus*, species of prostrate growing dwarf *Salix* and lichens have now begun to colonize the caldera.

The vegetation contains of about 1170 species of vascular plants (Hansson, 1995). Approximately 100 of these are ligneous species of which five are conifers, *Larix gmelinii* var. *japonica* (Rgl.) Pilger (syn. *Larix cajanderi* Mayr.), *Picea jezoensis* (Sieb. et Zucc.) Carr, *Pinus pumila*(Pall.) Regel, *Juniperus communis* var. *saxatilis* Pall. (syn. *Juniperus sibirica* Burgsd) and *Abies gracilis* (syn. *Abies sibirica*). When going north following the only road from Petopavlovsk you are travelling through almost entire birch forest dominated by *Betula ermanii* Cham. and with the white birch, *Betula plathyphylla* Sukaz., on lower altitude. It is strange not seeing one single coniferous tree, except thickets of *Pinus pumila*(Pall.) Regel growing here and there on the steep slopes and as undergrowth as well as above the tree limit (700-800 m a s l). Then suddenly just north of Milkovo (54º45'N), the larch appears and some 10 km north of that *Picea jezoensis* (Sieb. et Zucc.) Carr., the Yeddo spruce. The Kamchatka fir, *Abies gracilis* (syn. *Abies sibirica*), is restricted to a single, about 20 ha area large stand near the the Nikolsky Range not far from the east coast and said to be a relic from preglacial times. Some Russian botanists though find it very strange that it is limited to this only stand and have theories that the trees for some reason were planted. We decided not to visit the area as it was difficult to get there by lorry and we could not afford to rent a helicopter.

Recently the five most important areas for protection were chosen and included in the UNESCO World Heritage checklist: Kronotskij Biosphere Reserve (Zapovednik), Yuzno-Kamchatskij Zakaznik, Yuzno-Kamchatskij Nature Park, Nalychevo Nature Park and Bystrinskij Nature Park. The five protected areas cover almost all types of ecosystems characteristic of Kamchatka and includes several of the most interesting volcanoes of the peninsula (E. Lobkov, 1999).

Main collecting sites (see. map)

A. **Korjakskaja Sopka Volcano, 800 – 1200 m a s l, 53º16'N, 158º45'E**.
Alpine tundra with scattered thickets of *Alnus fruticosa* Rupr. and *Pinus pumila* (Pall.) Regel (up to 1060 m a s l). The alder and pine reached 1 – 1,5 m height up to 1000 ma s l. Prostrate growing *Salix*-species were growing everywhere on dry gravel. Several species of *Artemisia* is growing almost directly in the pumice and "volcanic gravel" together with *Dryas punctata* Juz. In more sheltered places surrounded by the alder we found *Ledum decumbens* (Ait.) Lodd ex Stend. *Vaccinium vitis-idaea* L. ssp. *minus* (Lodd.) Hultén we found up to 1100 m. *Rhododendron camtschaticum* Pall. was growing on the southern slope up to 1060 m and *Rhododendron aureum* Georgi. to 1200 m. a. s. l.

B. Avachinskij Volcanoe, 900 – 1100 m a s l, 53º15'N, 158º50'E.
On the lower part of Avachinskij, facing north-west, the thickets of alder of about 1,5 m height were denser and more difficult to walk through, here a lot of *Vaccinium uliginosum* L., *Vaccinium vitis-idaea* L. ssp. *minus* (Lodd.) Hultén, *Empetrum nigrum* L., *Phyllodoce caerulea* (L.) Bab. and *Spiraea betulifolia* Pall. var. *stevenii* (Rydb.)Kom. were growing in open "glades" but the rhododendrons were lacking. Above 900 m almost all of the ligneous vegetation had disappeared because of the eruption in 1991 and we found only herbaceous perennials. A small stream was running between the two volcanoes created a small sediment plain where dense vegetation of alder was growing almost impossible to force. Here we found *Aruncus dioicus* (Walt.) Fern and on the south edge of the thickets *Rhododendron aureum* Georgi.

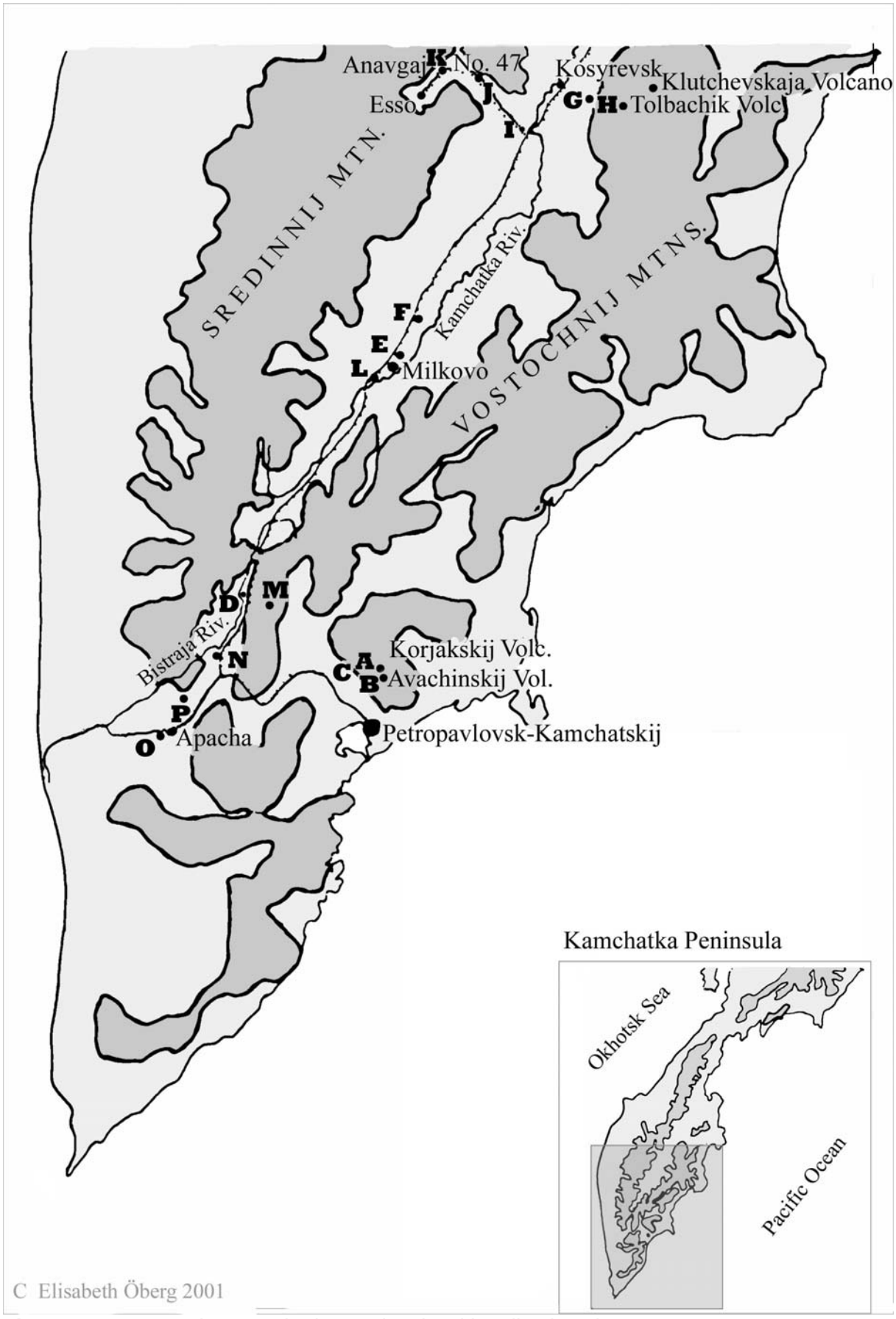

Figure 1. Map over the Kamchatka Peninsula with collecting sites A – N.

C. On the way down from Korjakskaja Sopka 600 m a s l.
Subalpine *Betula ermanii*-forest (Öberg E., Bäck J. 1995) near the treeline, on the shadowed side of a dried stream.

D. On the Bistraja River plain, 150 km north of Petopavlovsk close to a summer fishing camp by the river. 290 m a s l, 53°33'N, 157°35'E.
Moor-like vegetation with *Rosa amblyotis* C.A. Mey., *Vaccinium uliginosum*, the only 50-80 cm heigh L., *Lonicera caerulea* var. *edulis* Regel (syn. *Lonicera kamtschatica* (Sevast.) Pojark) with very tasty berries and *Spiraea sericea* Turcz. and grasses, only a few scattered trees of *Betula platyphylla* Sukaz. and *Salix*.

E. Near the main road Petropavlovsk - Ust-Kamtchatsk. 8 km north of Milkovo. 160 m a s l 54°42'N, 158°36E.
Microphyllous deciduous forest (Öberg E., Bäck J. 1995). Edge of the wood, old overgrown farmland with grass, high herbaceous perennials and scattered groups of white birch, *Chosenia arbutifolia* (Pall.) A. Skvorts, *Sorbus kamtschatcensis* Kom., *Salix schweinii* E.Wolf and *Salix udensis* Trautv. et Mey.

F. Near the main road Petropavlovsk - Ust-Kamtchatsk. 25-30 km north of Milkovo. 150 m a s l 55°30'N, 160°07'E.
Alluvial soils of the Kamtchatka River Plain. The beginning of the Light taiga (Öberg E., Bäck J. 1995) of mainly *Larix gmelinii* var. *japonica* (Rgl.) Pilger (syn. *Larix cajanderi* Mayr)., *Betula platyphylla* Sukaz. and few *Picea jezoensis* (Sieb. et Zucc.) Carr.

G. Along the forest road between Kosyrevsk and volcano Ploskij Tolbachik. 300 - 530 m a s l. 55°45'N, 160°07'E.
Light taiga. Alluvial soils of the Kamtchatka River Plain. Larch, white birch and very large specimens of *Populus maximowiczii* A. Henry (syn. *Populus komarovii* Ja. Vassil. ex Worosch) (Charkevicz, 1995) with *Pinus pumila* (Pall.) Regel as main undergrowth. Along the road we saw some plantations with *Pinus sylvestris* L. As the larch forest is very light and not very dense a lot of shrubs and smaller trees can grow under its canopy: *Prunus padus* L., *Lonicera caerulea* var. *edulis* Regel, *Juniperus communis* L. var. *saxatilis* Pall., *Sorbaria sorbifolia* (L.) A. Br., *Spiraea sericea* Turcz., roses and a lot of *Clematis ochotensis* (Pall.) Poir. were climbing in the shrubs.

H. On the southwest side of the volcano Ploskij Tolbachik. On the 700 - 1090 m a s l. 55°'46'N, 160°15'E.
Pumice, black ash and volcanic rocks. Very dry ground. At 1090 m on the alpine tundra, vegetation only in spots (patches). Several prostrate growing *Salix*-species (e.g. *Salix sphenophylla* A. Skvorts.), *Arctostaphylos alpina*(L.)Spreng., *Rhododendron aureum* and grasses. Here and there shrubberies of *Pinus pumila* along a steep bank of a stream. Just beyond the tree limit at 700 m a s l, alpine birch forest with *Alnus fruticosa* and high herbs as undergrowth.

I. Western bank of the Kamchatka River near the ferrystation Krapivnaja. 40 m a s l, 55°55'N, 159°41'E.
Alluvial soils on Kamtchatka River plain. Microphyllous deciduous forest of *Sorbus aucuparia*, *Betula platyphylla*, *Populus maximowiczii* and *Salix udensis* along the river, with high herbs as undergrowth.

J. Village No. 47 with hot springs and Spa, 10 km east of the village Anavgai. 280 m a s l. 56ºN, 159º05'E.
Secondary forest of *Betula platyphylla*, *Populus tremula* L., *Populus maximowiczii*, *Salix udensis* Trautv. et Mey and *S. schwerinii*, rich herbaceous flora of *Aconitum*, *Thalictrum*, *Actaea* and *Iris* on overgrown moist farm land in the valley. At the edge of wood *Sambucus kamtchatica*. On the steep slopes around also secondary forest after felling the larch, mostly of *Populus tremula* and *Populus maximowiczii* with undergrowth of *Pinus pumila* and *Alnus fruticosa* the field layer here was poorer and consisted of *Vaccinium vitis-idaea* L., *Ledum palustre* L.. In the beautiful primary larch forest the undergrowth contained of *Pinus pumila*, *Vaccinium uliginosum*, *Lonicera caerulea* and *Ledum palustre*.

K. Just south of Milkovo on the alluvial soils of the Kamtchatka river, in the lowland. 160 m a s l. 54º39'N,158º30'E
On the edge of an open forest of *Populus maximowiczii*, *Salix udensis* and *Chosenia arbutifolia* in the lowland near the river.

L. About 35 km north of the hot springs and wells in Malki, 5 km east of the main road. 350 - 400 m a s l. 53º30'N, 157º38'E.
Primary Betula ermanii-forest with rich undergrowth of high herbs - *Cimicifuga simplex* (DC.) Wormsk ex Turcz., *Filipendula camtschatica* (Pall.) Maxim., *Senecio cannabifolius* Less., *Cacalia hastata* L. – and shrubs – *Lonicera chamissoi* Bunge ex P.Kar, *Lonicera caerulea*, *Sorbus sambucifolia* (Cham. et Schlecht) M. Roem and *Daphne kamtschatica* (Sevast.) Pojark. In dryer areas on small heights *Juniperus communis* and *Pinus pumila*.

M. 1 km S of Malkina. On the bog around a small tarn in the *Betula ermani* forest. 280 m a s l. 53º18'N,157º29'E.
Low bush vegetation of *Betula nana* ssp. *exilis* (Sukacz.) Hultén, *Ledum palustre*, *Myrica tomentosa* (DC.) Aschers et Graebn. and *Chamaedaphne calyculata* (L.) Moench.

N. Between Apacha village and Nachikinskij pass 380 m a s l. 53º05'N, 157º48'E.
Primary *Betula ermanii*-forest with rich undergrowth of high herbs – *Cypripedium yatabeanum* Makino, *Streptopus amplexifolius* (L.) DC., *Trollius riederianus* Fisch. et May, *Aruncus dioicus* (Walt.) Fern, *Cimicifuga simplex* (DC.) Wormsk ex Turcz., *Filipendula camtschatica* (Pall.) Maxim., *Senecio cannabifolia*, *Cacalia hastata* – and shrubs – *Lonicera chamissoi*, *Lonicera caerulea* and *Sorbus sambucifolia*. Here we stopped to look for *Vaccinium praestans* Lamb. and on a north, shadowy very steep slope we found it.

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Kamtchatka 31 Aug - 13 Sept. 2000

List of collected seeds

No.	ID no.	Species	Locality	m. a. s. l.	Coll. no
		Pinaceae			
1	3477	***Pinus pumila*** (Pall.) Regel	A	1060	K20
2	3487	***Pinus pumila*** (Pall.) Regel	B	1000	K30
		Cupressaceae			
3	3494	***Juniperus communis*** L. (***J. sibirica*** Burgsd.)	D	290	K37
4	3520	***Juniperus communis*** L. (***J. sibirica*** Burgsd.)	G	320	K57
		Apiaceae			
5	3489	***Bupleurum triradiatum*** Adams ex Hoffm.	B	1100	K32
6	3492	***Heracleum dulce*** Fisch.	C	600	K35
		Asteraceae			
7	3533	***Achillea asiatica*** Serg.	J	280	K69
8	3463	***Artemisia arctica*** Less.	A	900	K6
9	3473	***Artemisia glomerata*** Ledeb.	A	1060	K16
10	3483	***Artemisia glomerata*** Ledeb.	B	1100	K26
11	3474	***Artemisia*** sp.	A	1060	K17
12	3475	***Artemisia*** sp.	A	1060	K18
13	3467	***Aster sibiricus*** L.	A	870	K10
14	3522	***Cacalia hastata*** L.	I	40	K59
15	3465	***Saussurea tilesii*** (Ledeb.) Ledeb.	A	900	K8
16	3499	***Senecio cannabifolius*** Less.	D	290	K42
17	3540	***Senecio cannabifolius*** Less.	L	350	K75
		Betulaceae			
18	3459	***Alnus fruticosa*** Rupr.	A	870	K2
19	3472	***Alnus fruticosa*** Rupr.	A	1060	K15
20	3538	***Betula ermanii*** Cham.	L	350	K73
21	3548	***Betula nana*** subsp. ***exilis*** (Sukacz.) Hultén	M	280	K83
22	3526	***Betula platyphylla*** Sukaz.	J	280	K63
		Caprifoliaceae			
23	3544	***Lonicera chamissoi*** Bunge ex P.Kar	L	400	K79
24	3496	***Lonicera kamtschatica*** (Sevast.) Pojark	D	290	K39
25	3536	***Lonicera kamtschatica*** (Sevast.) Pojark	J	100	K72
26	3500	***Sambucus kamtschatica*** E. Wolf	E	160	K43
		Convallariaceae			
27	3552	***Streptopus amplexifolius*** (L.) DC.	N	380	K86
		Ericaceae			
28	3549	***Chamaedaphne calyculata*** (L.) Moench	M	280	K84
29	3480	***Ledum decumbens*** (Ait.) Lodd ex Stend.	A	1060	K23
30	3481	***Loiseleuria procumbens*** (L.) Desv.	A	1200	K24
31	3462	***Rhododendron aureum*** Georgi.	A	900	K5
32	3478	***Rhododendron aureum*** Georgi.	A	1100	K21
33	3479	***Rhododendron aureum*** Georgi.	A	1200	K22
34	3482	***Rhododendron aureum*** Georgi.	B	900	K25
35	3510	***Rhododendron aureum*** Georgi.	H	1090	K50
36	3460	***Rhododendron camtschaticum*** Pall.	A	900	K3
37	3471	***Rhododendron camtschaticum*** Pall.	A	1060	K14
38	3555	***Vaccinium praestans*** Lamb.	N	340	K89
39	3495	***Vaccinium uliginosum*** L.	D	290	K38
40	3461	***Vaccinium vitis-idaea*** ssp. ***minus*** (Lodd.) Hultén	A	900	K4
41	3488	***Vaccinium vitis-idaea*** ssp. ***minus*** (Lodd.) Hultén	B	1000	K31

No.	ID no.	Species	Locality	m. a. s. l.	Coll. no
		Gentianaceae			
42	3464	***Gentiana algida*** Pall.	A	900	K7
		Geraniaceae			
43	3545	***Geranium erianthum*** DC.	L	400	K80
		Iridaceae			
44	3525	***Iris setosa*** Pall. ex Link	J	280	K62
45	3546	***Iris setosa*** Pall. ex Link	L	400	K81
		Myricaceae			
46	3547	***Myrica tomentosa*** (DC.) Aschers et Graebn.	M	280	K82
		Papaveraceae			
47	3486	***Papaver microcarpum*** D.C.	B	1100	K29
		Polemoniaceae			
48	3511	***Polemonium boreale*** Adams.	H	1090	K51
		Ranunculaceae			
49	3531	***Aconitum fischerii*** Reichenb.	J	280	K67
50	3532	***Aconitum maximum*** Pall. ex DC.	J	280	K68
51	3524	***Actaea erythrocarpa*** Fisch.	J	280	K61
52	3541	***Cimicifuga simplex*** (DC.) Wormsk ex Turcz.	L	400	K76
53	3508	***Clematis ochotensis*** (Pall.) Poir.	G	300	K48
54	3530	***Thalictrum contortum*** L. (enl. ??) trol. ***Thalictrum aquilegifolium*** L. var. ***sibiricum*** Regel et Tiling	J	280	K66
55	3529	***Thalictrum minus*** L. ssp. ***thunbergii*** (DC.) Worosch	J	280	K65
56	3553	***Trollius riederianus*** Fisch. et May	N	380	K87
		Rosaceae			
57	3484	***Aruncus dioicus*** (Walt.) Fern	B	900	K27
58	3551	***Aruncus dioicus*** (Walt.) Fern	N	380	K85
59	3501	***Crataegus chlorosarca*** Maxim.	E	160	K44
60	3539	***Filipendula camtschatica*** (Pall.) Maxim.	L	350	K74
61	3517	***Potentilla fruticosa*** L.	G	530	K55
62	3519	***Prunus padus*** L.	G	320	K56
63	3516	***Rosa acicularis*** Lindl.	G	530	K54
64	3493	***Rosa amblyotis*** C.A. Mey.	C	400	K36
65	3521	***Rosa amblyotis*** C.A. Mey.	I	40	K58
66	3535	***Rubus arcticus*** L.	J	280	K71
67	3534	***Rubus sachalinensis*** Levl.	J	280	K70
68	3469	***Sanguisorba officinalis*** L.	A	960	K12
69	3498	***Sanguisorba tenuifolia*** Fisch. ex Link	D	290	K41
70	3485	***Sibbaldia procumbens*** L.	B	900	K28
71	3506	***Sorbaria sorbifolia*** (L.) A. Br.	G	300	K46
72	3514	***Sorbus kamtschatcensis*** Kom. (***Sorbus sibirica*** Hedl.)	H	700	K53
73	3543	***Sorbus sambucifolia*** (Cham. et Schlecht) M. Roem	L	400	K78
74	3502	***Spiraea salicifolia*** L.	E	160	K45
75	3507	***Spiraea salicifolia*** L.	G	300	K47
76	3523	***Spiraea media*** Schmidt (***Spiraea sericea*** Turcz.)	J	40	K60
77	3497	***Spiraea media*** Schmidt (***Spiraea sericea*** Turcz.)	D	290	K40
78	3476	***Spiraea betulifolia*** Pall. var. ***stevenii*** (Rydb.)Kom. (***Spiraea stevenii*** (Schneid.) Rydb.)	A	1060	K19
		Salicaceae			
79	3458	***Salix*** sp.	A	870	K1
80	3491	***Salix sp***. (ev. arctica Pall.)	B	1100	K34
81	3490	***Salix sphenophylla*** A. Skvorts.	B	900	K33
82	3466	***Salix sphenophylla*** A. Skvorts.	A	900	K9

No.	ID no.	Species	Locality	m. a. s. l.	Coll. no
		Saxifragaceae			
83	3509	***Ribes pallidiflorum*** Pojark. (Ev. ***R. triste*** Pall.)	G	350	K49
84	3513	***Ribes pallidiflorum*** Pojark. (Ev. ***R. triste*** Pall.)	H	700	K52
		Scrophulariaceae			
85	3470	***Lagotis glauca*** Gaertn.	A	960	K13
86	3468	***Pennelianthus frutescens*** (Lamb.) Crosswhite (syn. ***Penstemon frutescens*** Lamb.)	A	870	K11
		Thymelaeaceae			
87	3527	***Daphne kamtschatica*** (Sevast.) Pojark	J	280	K64
88	3542	***Daphne kamtschatica*** (Sevast.) Pojark	L	400	K77

Note: We support the **Convention on Biological Diversity**. The seeds offered are for the use of the common good in the areas of research and development of public gardens and plant collections. They should not be used for commercial profit. If publications result from the use of this material, we expect acknowledgement as the source of the material and an unsolicited reprint of any publication.

Elisabeth Öberg, director Arboretum Norr, Sweden
Bo Nilsson, professor, Swedish University of Agricultural Sciences, Umeå, Sweden
Gennady Firsov, curator, Komarov Botanic Institute, St. Petersburg, Russia
Ludmila M. Pshennikova, curator, Vladivostok Botanical Institute, Vladivostok, Russia