

Some woody plants of Kamchatka

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We arrived in Petropavlovsk-Kamchatsky on a gloomy July morning, after a nine-hour direct flight from Moscow. The primary purpose of this botanical expedition being to replenish the holdings of the herbaria of RBG Kew, UK, and the Komarov Botanical Institute, St Petersburg, Russia, we had decided that the optimum time to travel, from the point of view of flowering plants, would be in the middle of the short northern summer. [An account of an autumn seed-collecting trip to this area can be found in the *IDS Yearbook:2000*, pp.114-118].

A unique volcanic region, Kamchatka is very attractive to dendrologists as it is one of the few remaining unspoilt regions of the world - a land of contrasts, of snow and fire. Out of the total of 1,168 vascular plant species of Kamchatka, 232 species of ligneous plants represent

54 genera of 19 families, with low shrubs and dwarf subshrubs the most numerous. There are a significant number of endemic or nearly endemic, rare, and threatened arboreal species, many of which are still little-known in cultivation. Woody plants such as *Abies gracilis*, *Daphne kamtschatica*, *Empetrum kardakovii*, *Sambucus kamtschatica*, *Sorbus kamtschatcensis* and *Thymus novograbenovii* are all endemic to the Kamchatka peninsula. *Salix erythrocarpa* grows only in the Sredinny and Vostochny Ranges of Kamchatka and in the southern part of the Magadan region. There are also endemics of the Russian Far East, such as *Salix kurilensis* (found only in southern Kamchatka and the Kuril Islands) and *Sieversia pusilla* (only in the north of the Russian Far East). There are endemics of the flora of Russia: *Salix recurvigemmis* (from the Urals to Chukotka), *Salix saxatilis* (the mouth of the Yenisey river to Chukotka), *Salix boganidensis* (north of Siberia and north of Russian Far East), and *Artemisia kruhseana* (endemic to north-eastern Siberia and the north of the Russian Far East). *Vaccinium ovalifolium*, an American species, occurs in Russia only on the Komandor Islands of Kamchatka. Species such as *Rhododendron parvifolium* and *Salix nummularia*, meanwhile, are not endemics, but are rare in the wild. Kamchatka also supports an abundance of ericaceous plants, which form peculiar landscapes both at the upper level of vegetation on high mountains and also sometimes on lowlands near the sea. Species such as *Alnus hirsuta*, *Crataegus chlorosarca*, *Padus asiatica*, *Rosa rugosa*, and *Vaccinium praestans* are all at the northern limit of their distribution in Kamchatka.

We planned our route so as to cover different landscapes, giving us the chance to see the greatest possible diversity of plants, and decided to spend some time travelling along the Kamchatka river valley, an area with few good roads and bridges. Bears are ubiquitous, and although of a non-aggressive, salmon-eating, race are always unpredictable and can be dangerous if startled at close range. We declined the use of firearms and other aggressive deterrents however, and decided to treat the bears with respect should we encounter them. In the end we saw only one and it ran away from us, as good wild bears normally do.

During the first day we drove 130 km, before stopping for the night in this sparsely populated area at a picturesque meadow on the bank of the Bistraya river. There are thickets of willows and *Alnus hirsuta* along the only main road, from Petropavlovsk to Milkovo. Kamchatka is rich in willows, with 33 species of the genus *Salix* growing everywhere from sea level to the upper limit of vegetation at 1,600 – 1,800 m

above sea level, and nearly all the ones we saw had ripe seed. The main woody species, however, forming vast forests throughout the peninsula, is *Betula ermanii*, the stony birch, named after E. Erman who travelled in Kamchatka in the 1820's. *Betula platyphylla* is the next most common tree, and this grows mostly in alluvial river valleys; in the Kamchatka river valley it forms large groves. These two species look superficially similar, but in fact they belong to different sections of the genus. In *B. ermanii* (section *Costatae*), the wings of the seeds are narrower than the nuts, and there are 7-10 pairs of nerves on the surface of its leaf blade. In contrast, *B. platyphylla* (section *Betula*), has wings wider than, or the same width as, the nuts, and there are 4-7 pairs of nerves. During our visit glorious red lilies, *Lilium debile* and *L. dauricum*, were in full bloom in the birch woods.

Here, on the bank of the Bistraya river, we saw *Crataegus chlorosarca*, which has black fruits, greenish inside. This is the only species of this genus in Kamchatka and it also flourishes on the Kuril Islands, Sakhalin and Japan, but is absent on the continent. According to the literature, this usually reaches 6-7 m in height; most specimens we saw were no more than 5 m, but the largest tree we saw was about 8 m, with a trunk of about 15 cm in diameter. In the meadow the black-purple bells of *Fritillaria camschatcensis*, one of the characteristic plants of Kamchatka, were just finishing flowering; in the past the bulbs were an important wild food crop for the local Kamchedal people.

The next day we climbed to the mountains via a track alongside a small river, the Vaktan Malkinsk. At 430 m we reached a picturesque alpine meadow, brightly spotted with the bluish-purple flowers of *Iris setosa*, the only *Iris* of Kamchatka. *Geranium erianthum* might be considered the national flower of Kamchatka, as it grows nearly everywhere, and in the middle of summer it imparts a peculiar bluish tinge to the mountainous slopes, meadows and glades. *Chamerion angustifolium*, with numerous pink flowers is also widely distributed through forest clearings, burnt out places and forest edges.

Ganalskaya Tundra, an open plain with tundra vegetation, punctuated by low, crooked specimens of *Betula exilis*, *Juniperus communis* var. *saxatilis* and *Pinus pumila*, is a very beautiful place. The wide valley is surrounded by dramatic mountain ranges whose slopes and gorges are covered with perpetual snow. In the autumn the birches and other trees and shrubs turn beautiful shades of purple, yellow and red. *Padus asiatica*, rare in Kamchatka, occurs around the Milkovo settlement. This species is close to the European bird cherry, *Prunus padus*,

differing only a little in its more pubescent shoots, and strange smell, and the two are considered synonymous by some botanists.

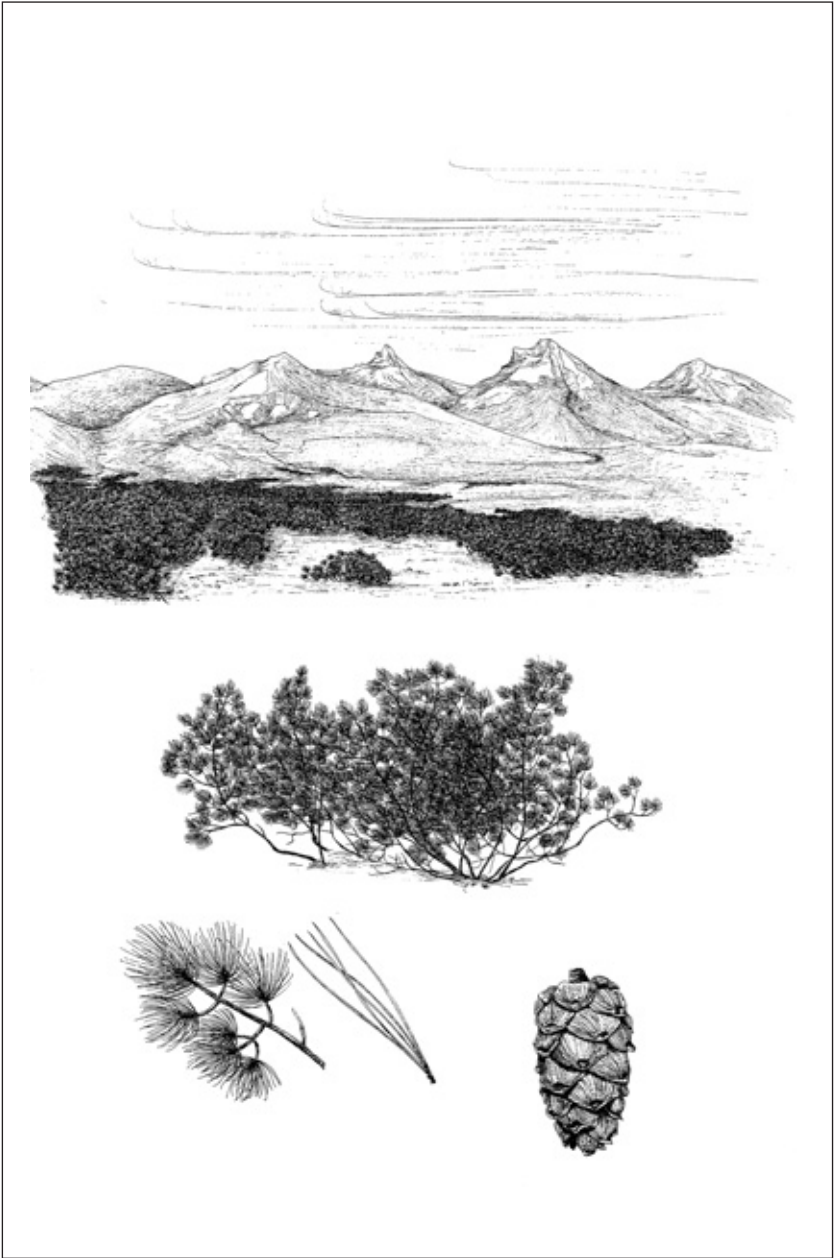
On the fringes, and under the canopy of the forest, on the river and stream banks and in burnt-out places we saw the ripening fruits of the Sakhalin raspberry, *Rubus sachalinensis*. We also saw *Picea jezoensis* and *Larix gmelinii* for the first time near Milkovo, and observed the serious effects of forest fires, some resulting from burning lava flows.

After a night on the bank of the Kamchatka river near the small village of Kirganik, we moved on, stopping for lunch in a forest clearing, where we saw four native conifers, *Larix gmelinii*, *Picea jezoensis*, *Pinus pumila* and *Juniperus communis* var. *saxatilis*. *Pinus sylvestris*, possibly naturalised, could be seen from the windows of our lorry as we travelled along, but appears to be restricted to roadsides.

Tree growth is apparently rather slow in this climate, with its short summers and long winters, yet trees can reach a considerable age, as demonstrated by the 280 rings we saw on the stump of a felled larch. The larches are the tallest trees, followed by spruces, then *Pinus pumila* and finally, near the ground, junipers. This isolated, peninsular part of the taiga occurs only in the central part of Kamchatka, and stretches no more than 200 km from north to south. It is likely to be a relict forest, isolated in the past by the continuing winters of the ice ages.

The next day we crossed the Kamchatka River by ferry, just south of the village of Kozyrevsk. The river lies in a very wide floodplain and is framed on either side by impenetrable, mosquito-infested thickets of willow, such as *Salix udensis*. We drove some 180 km this day and camped on the dry bed of the Studenaya River, which we had to cross the next morning on our way to Tolbachik Volcano. On the horizon the snow peak of Tolbachik was impressive in the evening light, whilst behind it the huge and perfect cone of Kluchevskaya Sopka, the largest active volcano in Eurasia, belched out smoke, alternately black and white.

During the night the Studenaya river diminished in size, a common feature of Kamchatka mountain rivers and streams as the snowmelt ceases during cold nights; thanks to this, and our experienced driver, we were able to cross in the morning without much difficulty. The river bed was scattered with logs, washed down from the mountains, and numerous seedlings and saplings of *Alnus kamtschatica* and *Populus maximowiczii*. Both trees are widely distributed pioneers that colonize open, unvegetated terrain, such as parts of the river bed that have become more or less stable and are flooded only occasionally.



Pinus pumila, showing habitat in Kamchatka. Drawing by Aljos Farjo.

We continued on our way, climbing up along a poor forest road edged with thickets of *Sorbaria sorbifolia*, a rare shrub in Kamchatka, occurring only in the central part of the peninsula, in woods near Kozyrevsk. *Ribes triste* also grew here, and was visible from a distance, thanks to its edible red berries. At 600 m we stopped at the edge of the forest, flattened by ash from the huge eruption of Tolbachik in 1975-6. We established our camp at 1,050 m, and explored the vast ash fields as well as the lower slopes of the volcano, finding many alpiners and dwarf shrubs, including *Arctous alpina*, *Dryas punctata* and *Vaccinium minus*, that had begun to establish on the black expanse of hardened lava and slag. Climbing up to 1,850m on the surrounding slopes, we reached the base of the glaciers, and found many dwarf ericaceous shrubs and subshrubs, such as *Cassiope lycopodioides*, *Loiseleuria procumbens*, and *Phyllodoce caerulea*. Two of the three species of rhododendrons endemic to Kamchatka also grow here; *Rhododendron aureum*, which grows up to 50 cm, and *Rh. camtschaticum*, a low-growing species, just 10-15 cm high, with bright pink or purple flowers. The third species, *Rh. parvifolium*, occurs further north.

Also of interest was *Pinus pumila*, which was fruiting prolifically. The nuts or seeds of this shrubby five-needled pine are a staple food for birds and mammals, including bears. In some places *P. pumila* formed dense, almost impassable, thickets (see previous page), while near our tents we saw the endemic *Salix tschuktschorum* subsp. *kamtschatica*, a dwarf creeping willow with a thick crown, and leaves with very sharp teeth.

After our stay here, we set off northwards for the Kluchevskoy Volcano, an inaccessible place, but fortunately our driver knew of a rough road leading to former seismological and volcanological research stations, north and east from the great volcano. The road was overgrown with *Alnus hirsuta*, *A. kamtschatica* and *Betula ermanii*, but we finally reached the alpine meadow and the first research station. Here we saw single shrubs of *Pentaphylloides fruticosa*, with yellow flowers and *Dryas punctata*, with ripe seeds. The herbarium specimens collected here should be of considerable scientific interest, as there are very few from this mountain in international collections.

The descent from the mountain was almost as tortuous as the ascent, but from the track we saw some very old trees of *Betula ermanii*, measuring 80-100 cm in diameter, and, as some later ring-counting indicated, possibly 250-300 years old. In the lower part of the forest belt, at around 50-200 m altitude, it was possible to distinguish three distinct

layers of forest, the first of which consisted of mighty trees of *Populus maximowiczii*, 30-35 m high and up to 100-120 cm in diameter. Interestingly, only old trees were seen, standing far apart from each other, regeneration being apparently absent here, despite the fact that, in open places and on volcanic ash this poplar regenerates intensively. It is possible that these old trees are remnants of a past cohort of colonization after an eruption, and the age of the trees might give an indication of the date of this event.

The second layer of this forest is formed of *Betula ermanii*, 15-18 m high, while the third layer consists of *Alnus hirsuta*, *Padus asiatica*, *Sorbus kamtschatica* and *Salix* species reaching 10-12 m. Common shrubs seen here included *Juniperus communis* var. *saxatilis* (some of them with bluish or yellowish foliage), *Lonicera edulis* (syn.? *L. kamtschatica*), *Rosa amblyotis*, *Spiraea salicifolia* and different willows.

The primary forests of Kamchatka are still largely intact, enabling us to study features such as the effects of naturally destructive factors (e.g. heavy snowfall, rising water levels and volcanic activity) on certain species, inter-species relationships, and plant communities and productivity of the natural forest. The conservation of such primaevial forests, excluding any form of exploitation or active management, is paramount. Large expanses are needed, not only to provide a greater understanding of natural forest dynamics, but also as habitats necessary for the survival of valued wildlife.

From Kluchevskaya Sopka we travelled east to the central Sredinny Range, where massive peaks reach 2,500 m with the highest point, Ichinsky volcano, at 3,621 m. We stayed in the spa town of Esso, surrounded by conifer taiga woods, mostly spruce mixed with larch, birch and aspen (*Populus tremula* var. *dauriana*), and here we found *Daphne camtschatica*, with white fragrant flowers. Another interesting and rare endemic shrub, *Sambucus kamtschatica*, grew nearby. Alongside rivers and roads a strange-looking tree, *Chosenia arbutifolia* (the third genus of Salicaceae besides *Salix* and *Populus*), with glaucous foliage, grew 15-17 m high (see p.102). Though superficially similar to *Salix*, there are many important differences in morphology and biology. It cannot be propagated vegetatively and is rare in gardens, wild collected seedlings being the source of introduction into cultivation. The remainder of our expedition was spent on the coast of the Sea of Okhotsk in the southern part of the peninsula. Here there are cotton-grass moors, a common feature of the lower reaches of the larger rivers in Kamchatka, and freshwater swamps where we saw *Sieversia penta-*

petala (Rosaceae), an interesting dwarf subshrub. This has pinnate dentate leaves, decorative fruits, and large single white flowers borne about 15 cm above the ground. Another attractive shrub in this area is *Myrica tomentosa*, related to the European *M. gale*. This grows to about 1m high, has a characteristic resinous smell and flowers before the pubescent young shoots and leaves appear. Also here are numerous tiny orchids of the genera *Hammarbya*, *Platanthera*, and *Listera*, which in most parts of Europe are rare or endangered, and, on the black beach, the pale blue, funnel-shaped flowers of *Mertensia maritima*.

On the shores of Lake Nachikinsky (360 m above sea level) we had an unforgettable view of thousands of bright red, spawning sockeye salmon. From here we travelled on to the eastern, Pacific coast of Kamchatka, where the sand on the deserted beach was almost black, and the water considerably warmer than on the west coast. Here we camped behind a range of low semi-overgrown sandy dunes, which ran parallel to the ocean prior to merging inland into a large flat plain with heath-like vegetation, with tundra and aquatic species, especially along streams and in hollows. This was the only place where we found *Rosa rugosa*, growing among scattered bushes of *Pinus pumila*.

We ended our expedition high in the mountains, on the slopes of the Avachinsky and Korjaksy volcanoes, where perennial snowfields gave rise to numerous streams, an uncommon sight in the volcanic landscape of Kamchatka. Here, well above the tree line, the flora was again decidedly alpine, and this was the only place where we encountered the unusual evergreen dwarf ericaceous shrub, *Bryanthus gmelinii*, with spikes of small pink flowers.

On this, the first Kew expedition to Kamchatka, we collected more than 2,500 sheets of herbarium specimens, many species of which are little known.