



# Distribution of alpine endemic plants of northern Asia: a dataset

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## Abstract

### Background

We describe a dataset providing information on the geographic distribution of northern Asian endemic alpine plants. It was obtained by digitising maps from the atlas “Endemic alpine plants of Northern Asia”. Northern Asia includes numerous mountain ranges which may have served as refugia during the Pleistocene ice ages, but there have been no studies that analysed this question. We suggest that this dataset can be applied for better understanding of the alpine endemism in northern Asia.

### New information

The dataset includes 13709 species distribution records, representing 211 species from 31 families and 106 genera. Each record provides data regarding the distribution of an individual species. These data provide a foundation for studying northern Asia's endemic alpine species and conducting research on the factors concerning their distribution.

## Keywords

dataset, endemic alpine plants, northern Asia, digitising printed maps

## Introduction

Being climatically and topographically heterogeneous, mountain ecosystems are characterised by a high degree of plant species diversity (López-Pujol et al. 2011, Hassan et al. 2005). They are often considered to have been potential refugia or buffering zones that either prevented extinction or promoted speciation during the Quaternary glacial-interglacial shifts because of their high spatiotemporal climatic stability (Sandarov et al. 2020, Harrison and Noss 2017, Feng et al. 2016, Sandel et al. 2011). During the Pleistocene glacial periods, ice sheets expanded greatly throughout northern Asia, mountainous regions contributed to the preservation of a number of alpine species (Harrison and Noss 2017, Volkova and Baranova 1980). Malyshev considered nine mountain areas in northern Asia that served as refugia during ice ages of Pleistocene for at least 231 alpine endemic species (Malyshev 1979, Vodopyanova et al. 1974). Alpine endemism was studied for mountain ranges of Siberia, Far East and northern part of Asia (Malyshev 1972, Krasnoborov 1974, Yurtzev 1981, Schlothauer 1990). In more recent studies, it was revealed that Far East has seven centres of endemism (Kozhevnikov 2007). However, despite numerous studies on endemism of northern Asia's alpine plants, it is not considered as an endemism hot spot on a global scale (Harrison and Noss 2017, Hobohm et al. 2019). Moreover, to this date, there have been no studies that quantitatively assess the correlation amongst climate, topography and alpine endemism in northern Asia. We consider the lack of baseline species distribution data is the main reason for this lack. We have developed and are sharing this dataset to address this need and to encourage the quantitative analyses required for developing a better understanding of the alpine endemism in northern Asia (Brianskaia et al. 2021).

## General description

**Purpose:** Our primary goal was to digitise species distribution maps of alpine endemics of northern Asia and to encourage use of the data developed.

**Additional information:** Studies of the geographic distribution of endemic alpine plants were very significant in the Soviet botany of the 60s-70s (Tolmachev 1962, Malyshev 1965, Yurtzev 1966, Yurtzev 1968). In 1965, the Soviet commission of the flora and vegetation history sponsored a project on the study of northern Asia's endemic plants, particularly the endemic species. The printed atlas was the result of teamwork by the Siberian and All-Soviet Union botanists. The data for the atlas were compiled from the Leningrad (LE), Moscow (MW), Ural (SVER), Siberian (NSK, NS, TK, IRK, SASY) and Far East (VLA) herbaria. The atlas includes a list of the endemic alpine plant species of northern Asia with their habitat characteristics, geographic range and cartographic materials. The distribution maps (Figs 1, 2) were prepared from herbarium specimens whose identification had been

checked (Vodopyanova et al. 1974). The list of editors of the atlas includes Vodopyanova N.S., Malyshev L.I., Siplivinskiy V.N., Tolmachev A.I. and Yurtsev B.A. Many different cartographers were involved in preparing the published maps (Table 1). Taxonomy of species in the GBIF dataset is given both as published in the atlas (Vodopyanova et al. 1974) in scientificName column and verified according to the Catalogue of Life (Roskov et al. 2019) and Checklist of Asian Russia Flora (Baikov 2012). The final verified taxonomy was checked with GBIF species matching tool and given in the acceptedNameUsage column.

Table 1. List of cartographers of each species distribution map.		
*in acceptedNameUsage, column numbers are given for the type of the map the species are drawn in: 1) the entire northern Asia maps; 2) the northern Asia maps from 120 <sup>0</sup> to 170 <sup>0</sup> E; 3) South Siberia maps from 75 <sup>0</sup> to 120 <sup>0</sup> E; d) Far East maps including Kamchatka Peninsula, Sakhalin Island and Kuril Islands.		
scientificName	acceptedNameUsage*	Cartographer
<i>Cryptogramma raddeana</i> , <i>Dracocephalum fragile</i> , <i>Rhaponticum carthamoides</i> , <i>Crepis polytricha</i>	<i>Cryptogramma raddeana</i> (1), <i>Dracocephalum fragile</i> (3), <i>Fornicium carthamoides</i> (3), <i>Crepis polytricha</i> (3)	Busik V.V.
<i>Microbiota decussata</i>	<i>Microbiota decussata</i> (4)	Gurzenkov N.N., Gorovoy P.G.
<i>Juniperus pseudosabina</i>	<i>Juniperus pseudosabina</i> (3)	Krasnoborov I.M. in consultation with Bardunov L.V., Goloskokov V.P., Kamelin R.V., Kashina L.I., Matsenko A.V.
<i>Ptilagrostis junatovii</i> , <i>Koeleria geniculata</i> , <i>Poa ivanoviae</i> , <i>Festuca sichotensis</i> , <i>Roegneria sajanensis</i> , <i>Delphinium sajanense</i> , <i>Eutrema parviflorum</i> , <i>Draba pygmaea</i> , <i>Rhodiola pinnatifida</i> , <i>Saxifraga brachypetala</i> , <i>Chrysosplenium albertii</i> , <i>Ch. peltatum</i> , <i>Oxytropis jurtzevii</i> , <i>O. sajanensis</i> , <i>Pinguicula algida</i> , <i>P. spathulata</i> , <i>Pyrethrum lanuginosum</i> , <i>Saussurea squarrosa</i>	<i>Ptilagrostis junatovii</i> (3), <i>Koeleria geniculata</i> (3), <i>Poa ivanoviae</i> (3), <i>Festuca sichotensis</i> (1), <i>Elymus sajanensis</i> (3), <i>Delphinium sajanense</i> (3), <i>Eutrema edwardsii</i> (3), <i>Draba pygmaea</i> (3), <i>Rhodiola pinnatifida</i> (3), <i>Saxifraga brachypetala</i> (3), <i>Chrysosplenium albertii</i> (3), <i>Ch. peltatum</i> (3), <i>Oxytropis jurtzevii</i> (3), <i>O. sajanensis</i> (3), <i>Pinguicula algida</i> (1), <i>P. spathulata</i> (1), <i>Pyrethrum lanuginosum</i> (3), <i>Saussurea squarrosa</i> (3)	Malyshev L.I.
<i>Helictotrichon krylovii</i> , <i>Poa lanatiflora</i>	<i>Helictotrichon krylovii</i> (2), <i>Hyalopoa lanatiflora</i> (2)	Yurtsev B.A. in consultation with Mikhalyova V.M.
<i>Helictotrichon mongolicum</i>	<i>Helictotrichon mongolicum</i> (3)	Malyshev L.I. in consultation with Vodopyanova N.S.
<i>Koeleria atrovioleacea</i>	<i>Koeleria atrovioleacea</i> (3)	Gudoshnikov S.V.

scientificName	acceptedNameUsage*	Cartographer
<i>Poa altaica</i>	<i>Poa altaica</i> (3)	Vodopyanova N.S., Gudoshnikov S.V., Penkovskaya E.F. in consultation with Busik V.V., Goloskokov V.P., Ivanova M.M., Malyshev L.I.
<i>Poa ircutica</i> , <i>Salix nasarovii</i> , <i>S. torulosa</i> , <i>Chrysosplenium baicalense</i> , <i>Oxytropis</i> <i>kusnetzovii</i> , <i>O. oxyphyloides</i> , <i>Swertia</i> <i>baicalensis</i>	<i>Poa ircutica</i> (3) , <i>Salix nasarovii</i> (3), <i>S.</i> <i>torulosa</i> (3), <i>Chrysosplenium baicalense</i> (3), <i>Oxytropis kusnetzovii</i> (3), <i>O.</i> <i>oxyphyloides</i> (3), <i>Swertia baicalensis</i> (3)	Ivanova M.M.
<i>Poa pseudobreviata</i>	<i>Poa pseudobreviata</i> (1)	Matveeva N.V. in consultation with Yurtsev B.A., Malyshev L.I.
<i>Colpodium altaicum</i>	<i>Paracolpodium altaicum</i> (3)	Bardunov L.V. in consultation with Gudoshnikov S.V.
<i>Festuca chionobia</i>	<i>Festuca chionobia</i> (3)	Siplivinskiy V.N. in consultation with Busik V.V.
<i>Leymus interior</i>	<i>Leymus interior</i> (1)	Matveeva N.V.
<i>Eriophorum humile</i>	<i>Eriophorum humile</i> (1)	Petrovskiy V.V., Taraskina N.N. in consultation with Krasnoborov I.M. & Petrochenko Yu.N.
<i>Baethryon uniflorum</i>	<i>Kreczetoviczia uniflora</i> (1)	Petrochenko Yu.N.
<i>Scirpus maximowiczii</i>	<i>Scirpus maximowiczii</i> (1)	Taraskina N.N. in consultation with Alyanskaya N.S., Bogdanova T.V., Maximova M.M., Malyshev L.I. & Yurtsev B.A.
<i>Carex alticola</i> , <i>Saxifraga</i> <i>kruhsiana</i>	<i>Carex alticola</i> (1) , <i>Saxifraga kruhsiana</i> (4)	Siplivinskiy V.N.
<i>Carex karacolica</i> , <i>Oxytropis sumneviczii</i>	<i>Carex caucasica</i> (3), <i>Oxytropis</i> <i>sumneviczii</i> (3)	Polozhiy A.V.
<i>Carex ledebouriana</i>	<i>Carex ledebouriana</i> (1)	Siplivinskiy V.N. in consultation with Busik V.V., Kashina L.I., Mikhalyova V.M., Penkovskaya E.F.
<i>Luzula unalaschkensis</i> ssp. <i>kamtschadalorum</i>	<i>Luzula arcuata</i> (1)	Ivanova M.M. in consultation with Siplivinskiy V.N.

scientificName	acceptedNameUsage*	Cartographer
<i>Salix berberifolia</i> ssp. <i>berberifolia</i> , <i>S. berberifolia</i> ssp. <i>brayi</i> , <i>S. berberifolia</i> ssp. <i>fimbriata</i> , <i>S. berberifolia</i> ssp. <i>kamtschatica</i>	<i>Salix berberifolia</i> ssp. <i>berberifolia</i> (3), <i>S. myrsinites</i> (3), <i>S. fimbriata</i> (1), <i>S. kamtschatica</i> (4)	Ivanova M.M., Gudoshnikov S.V. in consultation with Malyshev L.I. & Vodopyanova N.S.
<i>Salix divaricata</i>	<i>Salix divaricata</i> (3)	Ivanova M.M. in consultation with Vodopyanova N.S., Derviz-Sokolova T.G. & Malyshev L.I.
<i>Salix jurtzevii</i> , <i>S. khokhrjakovii</i> , <i>Cardamine conferta</i> , <i>C. pedata</i> , <i>C. victoris</i> , <i>Arabis turczaninonii</i> , <i>Saxifraga redowskii</i> , <i>Oxytropis semiglobosa</i> , <i>Androsace gorodkovii</i> , <i>A. semiperennis</i> , <i>Taraxacum soczavai</i>	<i>Salix jurtzevii</i> (2), <i>S. khokhrjakovii</i> (2), <i>Corydalis gorodkovii</i> (2), <i>Cardamine conferta</i> (2), <i>C. pedata</i> (4), <i>C. victoris</i> (2), <i>Arabis turczaninonii</i> (2), <i>Saxifraga redofskyi</i> (2), <i>Oxytropis ajanensis</i> ssp. <i>semiglobosa</i> (2), <i>Androsace gorodkovii</i> (2), <i>A. semiperennis</i> (2), <i>Taraxacum soczavae</i> (2)	Yurtsev B.A.
<i>Salix rectijulis</i>	<i>Salix rectijulis</i> (3)	Ivanova M.M., Gudoshnikov S.V. in consultation with Krasnoborov I.M. & Derviz-Sokolova T.G.
<i>Salix sajanensis</i>	<i>Salix sajanensis</i> (3)	Ivanova M.M. in consultation with Vodopyanova N.S. & Penkovskaya E.F.
<i>Salix sphenophylla</i>	<i>Salix sphenophylla</i> (1)	Petrovskiy V.V. & Taraskina N.N.
<i>Salix tschuktschorum</i>	<i>Salix tschuktschorum</i> (2)	Derviz-Sokolova T.G. in consultation with Taraskina N.N., Khokhryakov A.P. & Yurtsev B.A.
<i>Salix turczanonowii</i>	<i>Salix turczanonowii</i> (3)	Ivanova M.M., Krasnoborov I.M. in consultation with Malyshev L.I. & Siplivinskiy V.N.
<i>Betula middendorffii</i>	<i>Betula middendorffii</i> (1)	Ogureeva G.N.
<i>Betula rotundifolia</i>	<i>Betula nana</i> ssp. <i>rotundifolia</i> (3)	Vodopyanova N.S., Krasnoborov I.M. in consultation with Goloskokov V.P., Ivanova M.M., Kashina L.I. & Malyshev L.I.

scientificName	acceptedNameUsage*	Cartographer
<i>Claytonia acutifolia</i>	<i>Claytonia acutifolia</i> (1)	Matveeva N.V., Volkova E.V. in consultation with Yurtsev B.A. & Taraskina N.N.
<i>Claytonia arctica</i>	<i>Claytonia arctica</i> (2)	Matveeva N.V. in consultation with Volkova E.V. & Yurtsev B.A.
<i>Claytonia eschscholtzii</i>	<i>Claytonia eschscholtzii</i> (1)	Matveeva N.V., Volkova E.V. in consultation with Taraskina N.N. & Yurtsev B.A.
<i>Claytonia joanneana</i>	<i>Claytonia joanneana</i> (1)	Matveeva N.V., Volkova E.V. in consultation with Krasnoborov I.M. & Malyshev L.I.
<i>Claytoniella vassilievii</i>	<i>Claytonia vassilievii</i> (2)	Yurtsev B.A. in consultation with Petrovskiy V.V. & Taraskina N.N.
<i>Stellaria fischeriana</i>	<i>Stellaria fischeriana</i> (1)	Plieva T.V. & Yurtsev B.A. in consultation with Sandomirskaya S.I.
<i>Stellaria sibirica</i>	<i>Stellaria sibirica</i> (4)	Yurtsev B.A. in consultation with Khokhryakov A.P.
<i>Arenaria redowskii</i> , <i>A. tschuktschorum</i>	<i>Arenaria redowskii</i> (1), <i>Eremogone tschuktschorum</i> (2)	Petrovskiy V.V. & Taraskina N.N.
<i>Silene chamarensis</i>	<i>Silene chamarensis</i> (3)	Penkovskaya E.F., Siplivinskiy V.N. in consultation with Kashin L.I.
<i>Silene paucifolia</i>	<i>Silene chamarensis</i> ssp. <i>paucifolia</i> (1)	Matveeva N.V., Yurtsev B.A. in consultation with Taraskina N.N.
<i>Silene stenophylla</i>	<i>Silene stenophylla</i> (1)	Matveeva N.V., Yurtsev B.A. in consultation with Taraskina N.N. & Filipjeva E.O
<i>Melandrium triste</i>	<i>Gastrolychnis tristis</i> (3)	Bardunov L.V. in consultation with Penkovskaya E.F.

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<i>Gypsophila sambukii</i>	<i>Gypsophila sambukii</i> (1)	Plieva T.V., Yurtsev B.A. in consultation with Busik V.V., Petrochenko Yu.N. & Sandomirskaya S.I.
<i>Gypsophila uralensis</i>	<i>Gypsophila uralensis</i> (1)	Igoshina K.N. in consultation with Latsenkova A.N. & Storozhevaya M.M.
<i>Gypsophila violaceae</i>	<i>Gypsophila violaceae</i> (4)	Shreter A.I. in consultation with Khokhryakov A.P.
<i>Trollius apertus</i>	<i>Trollius apertus</i> (1)	Igoshina K.N. in consultation with Storozheva M.M.
<i>Callianthemum isopyroides</i>	<i>Callianthemum isopyroides</i> (3)	Vodopyanova N.S. in consultation with Malyshev L.I.
<i>Callianthemum sajanense</i>	<i>Callianthemum sajanense</i> (3)	Vodopyanova N.S. in consultation with Goloskokov V.P., Ivanova M.M., Kashina L.I., Krasnoborov I.M. & Malyshev L.I.
<i>Schibateranthis sibirica</i>	<i>Eranthis sibirica</i> (3)	Ivanova M.M. in consultation with Krasnoborov I.M.
<i>Aquilegia borodinii</i>	<i>Aquilegia borodinii</i> (3)	Vodopyanova N.S., Gudoshnikov S.V., Krasnoborov I.M., Penkovskaya E.F. in consultation with Kashina L.I. & Malyshev L.I.
<i>Aconitum desoulavyi</i>	<i>Aconitum desoulavyi</i> (4)	Gurzenkov N.N. & Gorovoy P.G.
<i>Aconitum pascoi</i>	<i>Aconitum pascoi</i> (3)	Krasnoborov I.M. in consultation with Penkovskaya E.F.
<i>Aconitum sajanense</i>	<i>Aconitum sajanense</i> (3)	Gudoshnikov S.V.
<i>Anemone biarmiensis</i>	<i>Anemonastrum biarmiensis</i> (1)	Igoshina K.N. in consultation with Storozhevaya M.M. & Laschenkova A.N.

scientificName	acceptedNameUsage*	Cartographer
<i>Anemone sibirica</i>	<i>Anemonastrum sibiricum</i> (1)	Siplivinskiy V.N. in consultation with Kiseleva A.A., Krasnoborov I.M., Pavlov E.I. & Yurtsev B.A.
<i>Miyakea integrifolia</i>	<i>Miyakea integrifolia</i> (4)	Gorovoy P.P., Gurzenkov N.N & Egorova E.M.
<i>Oxygraphis glacialis</i>	<i>Oxygraphis glacialis</i> (1)	Kiseleva A.A. in consultation with Korobkov A.A., Petrovskiy V.V., Taraskina N.N. & Yurtsev B.A.
<i>Papaver canescens</i>	<i>Papaver canescens</i> (3)	Vodopyanova N.S., Penkovskaya E.F. in consultation with Goloskokov V.P., Ivanova M.M., Malyshev L.I. & Siplivinskiy V.N.
<i>Papaver nivale</i>	<i>Papaver nivale</i> (2)	Yurtsev B.A. in consultation with Khokhryakov A.P.
<i>Dicentra peregrina</i>	<i>Dicentra peregrina</i> (1)	Pimenov M.G. in consultation with Gorovoy P.P., Taraskina N.N. & Yurtsev B.A.
<i>Corydalis arctica</i>	<i>Corydalis arctica</i> (1)	Plieva T.V., Yurtsev B.A. in consultation with Sandomirskaya S.I. & Taraskina N.N.
<i>Corydalis pauciflora</i>	<i>Corydalis pauciflora</i> (3)	Vodopyanova N.S., Krasnoborov I.M. in consultation with Goloskokov V.P., Ivanova M.M. & Malyshev L.I.
<i>Macropodium nivale</i>	<i>Macropodium nivale</i> (3)	Kiseleva A.A. in consultation with Polozhiy A.V.
<i>Smelovskia inopinata</i> , <i>Crepis burejensis</i>	<i>Smelovskia inopinata</i> (4), <i>Crepis burejensis</i> (4)	Gorovoy P.G.
<i>Parrya grandiflora</i>	<i>Pachyneurum grandiflorum</i> (3)	Gudoshnikov S.V.
<i>Ermania parryoides</i>	<i>Ermania parryoides</i> (1)	Taraskina N.N. & Yurtsev B.A.



scientificName	acceptedNameUsage*	Cartographer
<i>Gorodkovia jacutica</i>	<i>Gorodkovia jacutica</i> (2)	Yurtsev B.A. in consultation with Galaktionova T.V. & Taraskina N.N.
<i>Borodinia baicalensis</i>	<i>Borodinia baicalensis</i> (3)	Petrochenko Yu.N.
<i>Draba ochroleuca</i>	<i>Draba ochroleuca</i> (1)	Malyshev L.I. in consultation with Vodopyanova N.S., Goloskokov V.P., Mikhalyova V.M., Taraskina N.N. & Tolmachev A.I.
<i>Draba turczaninovii</i>	<i>Draba turczaninovii</i> (3)	Malyshev L.I. in consultation with Vodopyanova N.S. & Penkovskaya E.F.
<i>Rhodiola quadrifida</i>	<i>Rhodiola quadrifida</i> (1)	Bardunov L.V. in consultation with Penkovskaya E.F. & Petrochenko Yu. N.
<i>Bergenia crassifolia</i>	<i>Bergenia crassifolia</i> (3)	Ivanova M.M. in consultation with Krasnoborov I.M., Vodopyanova N.S., Goloskokov V.P., Kashina L.I. & Malyshev L.I.
<i>Bergenia pacifica</i>	<i>Bergenia pacifica</i> (4)	Gorovoy P.G & Gurzenkov N.N.
<i>Saxifraga algisii</i>	<i>Saxifraga algisii</i> (1)	Petrochenko Yu. N. & Siplivinskiy V.N.
<i>Saxifraga androsacea</i>	<i>Saxifraga androsacea</i> (3)	Kiseleva A.A.
<i>Saxifraga dahurica</i>	<i>Micranthes davurica</i> (1)	Petrochenko Yu. N. in consultation with Siplivinskiy V.N., Taraskina N.N., Yurtzev B.A.
<i>Saxifraga merkii</i>	<i>Saxifraga merkii</i> (1)	Siplivinskiy V.N. in consultation with Kiseleva A.A., Yurtzev B.A.
<i>Saxifraga melaleuca</i>	<i>Saxifraga melaleuca</i> (3)	Petrochenko Yu. N., Krasnoborov I.M. in consultation with Siplivinskiy V.N.

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<i>Saxifraga multiflora</i>	<i>Saxifraga omolojensis</i> (2)	Yurtsev B.A. in consultation with Khokhryakov A.P., Voroshilov V.N., Petrovskiy V.V. & Taraskina N.N.
<i>Saxifraga redowskiana</i>	<i>Saxifraga punctata</i> (1)	Korobkov A.A., Yurtsev B.A. in consultation with Gorovoy P.G & Khokhryakov A.P.
<i>Saxifraga terekensis</i>	<i>Saxifraga terekensis</i> (3)	Siplivinskiy V.N. in consultation with Kiseleva A.A., Penkovskaya E.F.
<i>Ribes altissimum</i>	<i>Ribes altissimum</i> (3)	Vodopyanova N.S. in consultation with Goloskokov V.P., Ivanova M.M., Kashina L.I. & Malyshev L.I.
<i>Ribes fragrans</i>	<i>Ribes fragrans</i> (1)	Siplivinskiy V.N. in consultation with Kiseleva A.A., Petrochenko Yu.N., Taraskina N.N., Khokhryakov A.P. & Yurtsev B.A.
<i>Ribes graveolens</i>	<i>Ribes graveolens</i> (3)	Vodopyanova N.S., Gudoshnikov S.V. & Krasnoborov I.M.
<i>Potentilla altaica</i> , <i>Saussurea poljakovii</i>	<i>Potentilla altaica</i> (3), <i>Saussurea poljakowii</i> (3)	Vodopyanova N.S.
<i>Potentilla biflora</i>	<i>Potentilla biflora</i> (1)	Busik V.V. in consultation with Taraskina N.N. & Yurtsev B.A.
<i>Potentilla elegans</i>	<i>Potentilla elegans</i> (1)	Petrovskiy V.V., Taraskina N.N. in consultation with Krasnoborov I.M. & Malyshev L.I.
<i>Sieversia pentapetala</i> , <i>S. pusilla</i>	<i>Sieversia pentapetala</i> (4), <i>S. pusilla</i> (1)	Rebristaya O.V.
<i>Novosieversia glacialis</i>	<i>Acomastylis glacialis</i> (1)	Rebristaya O.V. in consultation with Vodopyanova N.S., Malyshev L.I., Petrochenko Yu. N. & Taraskina N.N.

scientificName	acceptedNameUsage*	Cartographer
<i>Dryas crenulata</i>	<i>Dryas crenulata</i> (1)	Plieva T.V., Yurtsev B.A. in consultation with Galaktionova T.B., Sandomirskaya S.I. & Taraskina N.N.
<i>Dryas grandis</i>	<i>Dryas grandis</i> (1)	Plieva T.V., Yurtsev B.A. in consultation with Bylova T.V., Kiseleva A.A., Sandomirskaya S.I. & Taraskina N.N.
<i>Dryas oxyodonta</i>	<i>Dryas oxyodonta</i> (3)	Malyshev L.I. in consultation with Vodopyanova N.S., Goloskokov V.P., Kashina L.I., Krasnoborov I.M. & Polozhiy A.V.
<i>Dryas tschonokii</i>	<i>Dryas tschonokii</i> (4)	Gorovoy P.G. in consultation with Egorova E.M. & Voroshilov V.N.
<i>Sanguisorba alpina</i>	<i>Sanguisorba alpina</i> (3)	Kiseleva A.A. in consultation with Kashina L.I., Goloskokov V.P., Krasnoborov I.M. & Polozhiy A.V.
<i>Rosa sichotealinensis</i> , <i>Oxytropis ajanensis</i>	<i>Rosa sichotealinensis</i> (4), <i>Oxytropis ajanensis</i> (4)	Gorovoy P.G. & Gurzenkov N.N.
<i>Trifolium eximium</i>	<i>Trifolium eximium</i> (1)	Ivanova M.M., Krasnoborov I.M., Polozhiy A.V. in consultation with Vodopyanova N.S.
<i>Astragalus saralensis</i>	<i>Astragalus saralensis</i> (3)	Malyshev L.I. in consultation with Vodopyanova N.S., Penkovskaya E.F.
<i>Oxytropis altaica</i>	<i>Oxytropis altaica</i> (3)	Ivanova M.M., Polozhiy A.V. in consultation with Krasnoborov I.M.
<i>Oxytropis heterotricha</i> , <i>O. kodarensis</i>	<i>Oxytropis heterotricha</i> (3), <i>O. kodarensis</i> (3)	Malyshev L.I. & Yurtsev B.A.
<i>Oxytropis mertensiana</i>	<i>Oxytropis mertensiana</i> (1)	Plieva T.V. in consultation with Bylova T.V., Sandomirskaya S.I. & Yurtsev B.A.

scientificName	acceptedNameUsage*	Cartographer
<i>Oxytropis nigrescens</i>	<i>Oxytropis nigrescens</i> (1)	Plieva T.V., Yurtsev B.A. in consultation with Bylova T.V., Sandomirskaya S.I. & Tolmachev A.I.
<i>Oxytropis ochotensis</i>	<i>Oxytropis ochotensis</i> (2)	Taraskina N.N., Yurtsev B.A. in consultation with Khokhryakov A.P.
<i>Hedysarum inundatum</i>	<i>Hedysarum inundatum</i> (3)	Ivanova M.M. in consultation with Vodopyanova N.S. & Taraskina N.I.
<i>Linum boreale</i>	<i>Linum boreale</i> (1)	Igoshina K.N.
<i>Bupleurum euphorbiodes</i> , <i>B. triradiatum</i> , <i>Primula cuneifolia</i>	<i>Bupleurum euphorbiodes</i> (4), <i>B. triradiatum</i> (1), <i>Primula cuneifolia</i> (1)	Gorovoy P.G.
<i>Bupleurum martjanovii</i>	<i>Bupleurum martjanovii</i> (3)	Krasnoborov I.M. in consultation with Gudoshnikov S.V.
<i>Libanotis monstrosa</i>	<i>Sajanella monstrosa</i> (3)	Gudoshnikov S.V.
<i>Schultzia crinita</i>	<i>Schultzia crinita</i> (3)	Busik V.V. in consultation with Gudoshnikov S.V. & Krasnoborov I.M.
<i>Tilingia ajanensis</i>	<i>Tilingia ajanensis</i> (1)	Belyj N.F., Gorovoy P.G., Pimenov M.G.. in consultation with Tikhomirov V.N.
<i>Lithosciadium multicaule</i>	<i>Lithosciadium multicaule</i> (3)	Ivanova M.M. & Siplivinskiy V.N.
<i>Ligusticum mongolicum</i>	<i>Hansenia mongolica</i> (3)	Busik V.V. & Pimenov M.G.
<i>Conioselinum victoris</i>	<i>Magadania victoris</i> (4)	Gorovoy P.G. & Belyj N.F.
<i>Angelica saxatilis</i>	<i>Angelica saxatilis</i> (1)	Pimenov M.G.
<i>Phlojodicarpus villosus</i>	<i>Phlojodicarpus villosus</i> (1)	Pimenov M.G. in consultation with Gorovoy P.G. & Taraskina N.N.
<i>Phlojodicarpus eryngiifolium</i>	<i>Kitagawia eryngiifolia</i> (4)	Gorovoy P.G. in consultation with Sakhno V.G.
<i>Rhododendron adamsii</i>	<i>Rhododendron adamsii</i> (1)	Ivanova M.M., Krasnoborov I.M. in consultation with Galaktionova T.F., Mikhalyova V.M. & Plieva T.V.

scientificName	acceptedNameUsage*	Cartographer
<i>Rhododendron aureum</i>	<i>Rhododendron aureum</i> (1)	Krasnoborov I.M. in consultation with Busik V.V., Gorovoy P.G., Kashina L.I., Mikhalyova V.M. & Taraskina N.N.
<i>Rhododendron redowskianum</i>	<i>Rhododendron redowskianum</i> (1)	Siplivinskiy V.N. in consultation with Busik V.V., Mikhalyova V.M., Taraskina N.N. & Yurtsev B.A.
<i>Phyllodoce aleutica</i>	<i>Phyllodoce aleutica</i> (4)	Gorovoy P.G. in consultation with Voroshilova V.N. & Egorova E.M.
<i>Bryanthus gmelinii</i> , <i>Arctericia nana</i> , <i>Campanula chamissonis</i> , <i>Popoviocodonia stenocarpa</i> , <i>P. uyemurae</i>	<i>Bryanthus gmelinii</i> (4), <i>Arctericia nana</i> (4), <i>Campanula chamissonis</i> (4), <i>Popoviocodonia stenocarpa</i> (4), <i>Campanula uyemurae</i> (4)	Shreter A.I.
<i>Cassiope lycopodiodes</i>	<i>Cassiope lycopodiodes</i> (4)	Pimenov M.G. in consultation with Gorovoy P.G.
<i>Cassiope redowskii</i>	<i>Cassiope redowskii</i> (4)	Pimenov M.G.
<i>Diapensia obovata</i>	<i>Diapensia obovata</i> (1)	Siplivinskiy V.N. in consultation with Busik V.V., Mikhalyova B.M. & Taraskina N.N.
<i>Androsace ochotensis</i>	<i>Androsace ochotensis</i> (2)	Petrovskiy V.V. & Taraskina N.N.
<i>Gentiana falcata</i>	<i>Comastoma falcatum</i> (3)	Vodopyanova N.S. in consultation with Goloskokov V.P.
<i>Gentiana grandiflora</i>	<i>Cimnialis grandiflora</i> (3)	Bardunov L.V. in consultation with Krasnoborov I.M. & Petrochenko Yu.N.
<i>Gentiana uniflora</i>	<i>Calathiana uniflora</i> (1)	Vodopyanova N.S. in consultation with Goloskokov V.P., Kashina L.I. & Malyshev L.I.
<i>Swertia komarovii</i>	<i>Swertia komarovii</i> (3)	Ivanova M.M. in consultation with Vodopyanova N.S.
<i>Polemonium pulchellum</i> , <i>Mertensia stylosa</i>	<i>Polemonium pulchellum</i> (3), <i>Mertensia stylosa</i> (3)	Ivanova M.M. in consultation with Krasnoborov I.M.

scientificName	acceptedNameUsage*	Cartographer
<i>Mertensia rivularis</i>	<i>Mertensia rivularis</i> (4)	Shreter A.I. in consultation with Krasnoborov I.M.
<i>Dracocephalum popovii</i>	<i>Dracocephalum popovii</i> (3)	Busik V.V. & Siplivinskiy V.N.
<i>Phlomis koraiensis</i>	<i>Phlomis koraiensis</i> (4)	Gorovoy P.G. & Gurzenkov N.N.
<i>Veronica sajanensis</i>	<i>Veronica sajanensis</i> (3)	Krasnoborov I.M. in consultation with Kashina L.I.
<i>Pedicularis adamsii</i>	<i>Pedicularis alopecuroides</i> (1)	Vodopyanova N.S. in consultation with Malyshev L.I., Mikhalyova V.M., Taraskina N.N. & Yurtsev B.A.
<i>Pedicularis amoena</i>	<i>Pedicularis amoena</i> (1)	Plieva T.V., Yurtsev B.A. in consultation with Busik V.V., Ivanina L.I. & Sandomirskaya S.I.
<i>Pedicularis arguserrata</i>	<i>Pedicularis anthemifolia</i> (3)	Krasnoborov I.M. in consultation with Kashina L.I. & Malyshev L.I.
<i>Pedicularis brachystachys</i>	<i>Pedicularis brachystachys</i> (3)	Gudoshnikov S.V. in consultation with Malyshev L.I.
<i>Pedicularis compacta</i>	<i>Pedicularis compacta</i> (1)	Vodopyanova N.S. in consultation with Goloskokov V.P., Ivanova M.M., Kashina L.I., Krasnoborov I.M., Malyshev L.I. & Storozhevaya M.M.
<i>Pedicularis eriophora</i>	<i>Pedicularis eriophora</i> (4)	Plieva T.V. & Yurtsev B.A.
<i>Pedicularis fissa</i>	<i>Pedicularis fissa</i> (3)	Vodopyanova N.S. in consultation with Ivanova M.M., Kashina L.I., Krasnoborov I.M. & Malyshev L.I.

scientificName	acceptedNameUsage*	Cartographer
<i>Pedicularis tristis</i>	<i>Pedicularis tristis</i> (1)	Vodopyanova N.S. in consultation with Goloskokov V.P., Gorovoy P.G., Ivanova M.M., Kashina L.I., Malyshev L.I., Mikhalyova V.M., Penkovskaya E.F., Plieva T.V. & Yurtsev B.A.
<i>Valeriana turczaninowii</i>	<i>Valeriana altaica</i> (3)	Ivanova M.M., Penkovskaya E.F., Siplivinskiy V.N. in consultation with Kashina L.I.
<i>Campanula dasyantha</i>	<i>Campanula dasyantha</i> (1)	Vodopyanova N.S. in consultation with Galaktionova G.F., Gorovoy P.G., Ivanova M.M., Kashina L.I., Krasnoborov I.M. & Malyshev L.I.
<i>Astrocodon expansus</i>	<i>Astrocodon expansus</i> (4)	Shreter A.I. in consultation with Gorovoy P.G., Taraskina N.N. & Yurtsev B.A.
<i>Erigeron flaccidus</i>	<i>Erigeron flaccidus</i> (1)	Vodopyanova N.S. in consultation with Ivanova M.M., Malyshev L.I., Penkovskaya E.F. & Petrochenko Yu.N.
<i>Pyrethrum pulchellum</i>	<i>Pyrethrum pulchellum</i> (3)	Vodopyanova N.S., Gudoshnikov S.V. in consultation with Ivanova M.M., Kashina L.I. & Krasnoborov I.M.
<i>Artemisia flava</i>	<i>Artemisia flava</i> (2)	Korobkov A.A.
<i>Artemisia furcata</i>	<i>Artemisia furcata</i> (1)	Plieva T.V., Yurtsev B.A. in consultation with Galaktionova G.F., Korobkov A.A. & Sandomirskaya S.I.
<i>Artemisia glomerata</i>	<i>Artemisia glomerata</i> (1)	Pimenov M.G.
<i>Artemisia kruhsiana</i> , <i>A. senjavinensis</i>	<i>Artemisia kruhsiana</i> (2), <i>A. senjavinensis</i> (2)	Korobkov A.A.

scientificName	acceptedNameUsage*	Cartographer
<i>Artemisia lagopus</i>	<i>Artemisia lagopus</i> (1)	Plieva T.V., Yurtsev B.A. in consultation with Galaktionova G.F., Korobkov A.A. & Sandomirskaya S.I.
<i>Nardosmia glacialis</i> , <i>N. gmelinii</i>	<i>Petasites glacialis</i> (2), <i>P. sibiricus</i> (2)	Petrovskiy V.V. & Taraskina N.N.
<i>Nardosmia saxatilis</i>	<i>Petasites rubellus</i> (1)	Krasnoborov I.M. in consultation with Kashina L.I. & Kiseleva A.A.
<i>Senecio jacuticus</i>	<i>Tephroseris jacutica</i> (1)	Yurtsev B.A. in consultation with Gorovoy P.G, Kiseleva A.A., Malyshev L.I., Mikhalyova V.M. & Khokhryakov A.P.
<i>Aconitum sichotense</i> , <i>Senecio sichotensis</i> , <i>Lugularia sichotensis</i> , <i>Saussurea ajanensis</i> , <i>S. porcellanea</i> , <i>S. sovietica</i> , <i>Hieracium coreanum</i>	<i>Aconitum sichotense</i> (4), <i>Tephroseris sichotensis</i> (4), <i>Lugularia sichotensis</i> (4), <i>Saussurea ajanensis</i> (4), <i>S. porcellanea</i> (4), <i>S. sovietica</i> (4), <i>Hieracium coreanum</i> (4)	Gurzenkov N.N. & Gorovoy P.G.
<i>Senecio tuczananovii</i>	<i>Tephroseris turczananovii</i> (3)	Vodopyanova N.S. in consultation with Ivanova M.M., Krasnoborov I.M. & Malyshev L.I.
<i>Saussurea baicalensis</i>	<i>Saussurea baicalensis</i> (3)	Vodopyanova N.S., Ivanova M.M. & Malyshev L.I.
<i>Saussurea congesta</i>	<i>Saussurea congesta</i> (3)	Vodopyanova N.S. in consultation with Ivanova M.M., Kashina L.I., Krasnoborov I.M. & Malyshev L.I.
<i>Saussurea frolovii</i> , <i>S. sajanensis</i> , <i>Taraxacum altaicum</i>	<i>Saussurea frolovii</i> (3), <i>S. sajanensis</i> (3), <i>Taraxacum altaicum</i> (3)	Gudoshnikov S.V.
<i>Saussurea latifolia</i>	<i>Saussurea latifolia</i> (3)	Gudoshnikov S.V., Vodopyanova N.S., Krasnoborov I.M. in consultation with Goloskokov V.P., Ivanova M.M. & Kashina L.I.



scientificName	acceptedNameUsage*	Cartographer
<i>Saussurea schanginiana</i>	<i>Saussurea schanginiana</i> (1)	Vodopyanova N.S. in consultation with Goloskokov V.P., Ivanova M.M., Kashina L.I., Krasnoborov I.M., Malyshev L.I., Mikhalyova V.M. & Yurtsev B.A.
<i>Saussurea uralensis</i>	<i>Saussurea uralensis</i> (1)	Igoshina K.N. in consultation with Storozhevaya M.M.
<i>Taraxacum glabrum</i>	<i>Taraxacum glabrum</i> (3)	Malyshev L.I. in consultation with Vodopyanova N.S., Goloskokov V.P. & Krasnoborov I.M.
<i>Crepis chrysantha</i>	<i>Crepis chrysantha</i> (1)	Krasnoborov I.M. in consultation with Kashina L.I., Kiseleva A.A.
<i>Crepis gmelinii</i>	<i>Crepis gmelinii</i> (1)	Yurtsev B.A. in consultation with Galaktionova T.V.

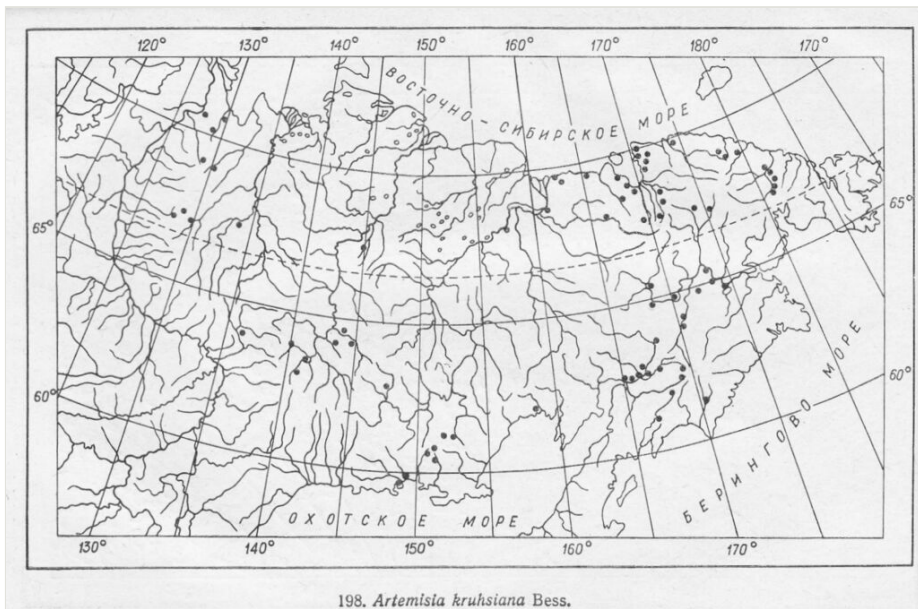


Figure 1. [doi](#)

Example of the distribution map scan – *Artemisia kruhsiana*.

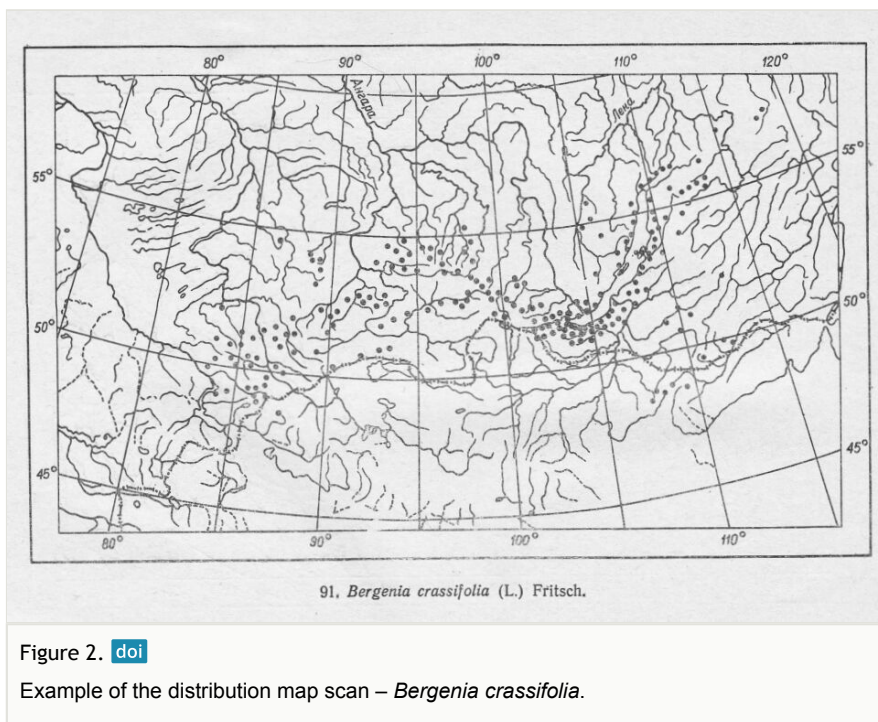


Figure 2. [doi](#)

Example of the distribution map scan – *Bergenia crassifolia*.

## Project description

**Title:** № 121030900138-8 «Biota of terrestrial ecosystems of Baikal Region: composition, structure, eco-geographic patterns»

**Personnel:** Elena Brianskaia, Denis Sandanov

**Study area description:** Baikal Region, Russia

**Design description:** The project carries out studies in different disciplines: flora and plant taxonomy, plant biology and population ecology, vegetation of Baikal Region, fauna and ecology of insects, ecology and geography of vertebrates.

**Funding:** Russian Federal Budget

## Sampling methods

**Study extent:** Northern Asia is an extensive area, stretching from the Ural Mountains in the west to the Pacific Ocean in the east; from the Arctic Ocean in the north to Central and East Asia in the south. According to Malyshev (Malyshev 1979), there are nine areas with alpine flora which includes mountains of Russian Far East, south-eastern Siberia, Ural and Putorana (Fig. 3).

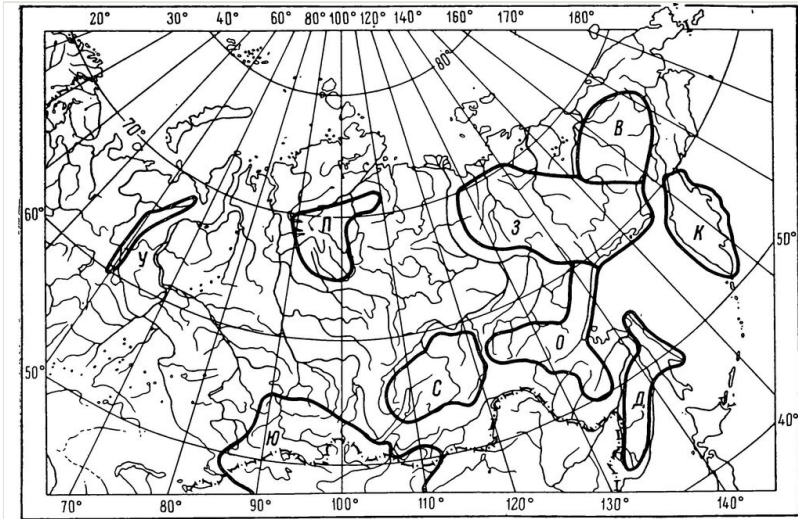


Figure 3. [doi](#)

The territory of northern Asia and areas with alpine flora (Malyshev 1979): У – Urals; П – Putorana Plateau; 3 – the western part of Verkhoyano-Kolymskaya mountain range; B – the eastern part of Verkhoyano-Kolymskaya mountain range; K – Kamchatka; Ю – Southern Siberia and Mongolia; C – Stanovoy highlands; O – Priokhotskiy highlands: Stanovoy, Dzhugzhur, Ezop mountain ranges etc.; Д – the southern part of Russian Far East: Primor'e and Sakhalin.

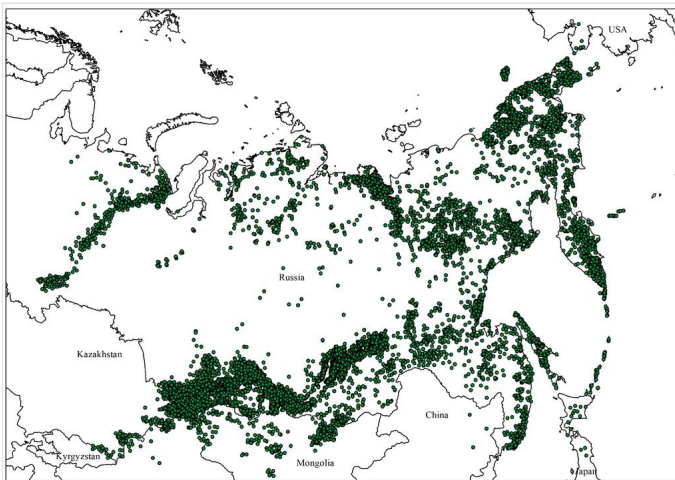


Figure 4. [doi](#)

Geographic coverage of distribution records.

**Sampling description:** In total, 231 maps were scanned from the atlas Endemic Alpine Plants of Northern Asia (Vodopyanova et al. 1974). All maps were adjusted to the same size and horizontal position in order to obtain standardised images of the maps.

Digitalisation was performed in QGIS 3.10 software by means of a georeferencing tool. Source raster distribution maps were georeferenced by snapping control points to the destination vector shapefile, which, in our case, was the border of Russia. This transformed all the maps to the WGS84 spatial projection. Subsequently, species distribution locations were digitised from each map. Coordinates of each location were calculated by QGIS and displayed in the attribute table.

**Quality control:** Final examination of the digitised species distribution maps was performed in QGIS 3.10. This step took most of the time and efforts in the entire digitising process. Each digitised map was compared to the original print map and the habitat of each digitised record compared with the habitat characteristics and geographic range of the species concerned reported in literature. Major sources for this part of the review were the Flora of Siberia (Krasnoborov et al. 1997, Lomonosova et al. 1992, Malyshev et al. 1990, Peshkova et al. 1994, Peshkova et al. 1990, Pimenov et al. 1996, Polozhiy et al. 1994, Polozhiy et al. 1996, Timokhina et al. 1993, Vlasova et al. 1987, Vydrina et al. 1998, Doronkin et al. 1997, Kashina et al. 1988) and Vascular Plants of Soviet Far East (Kharkevich 1985, Kharkevich 1987, Kharkevich 1988, Kharkevich 1989, Kharkevich 1991, Kharkevich 1992, Kharkevich 1995, Kharkevich 1996). Almost all (97%) of the digitised maps were consistent with the printed maps. Those that were not included records from near the ocean and in the Far East. They were manually adjusted to match the printed maps. For example, such records were adjusted for *Betula middendorffii* for which distribution goes along the sea of Okhotsk (Figs 5, 6, 7, 8). *оклонения от речной сети размер точек.*

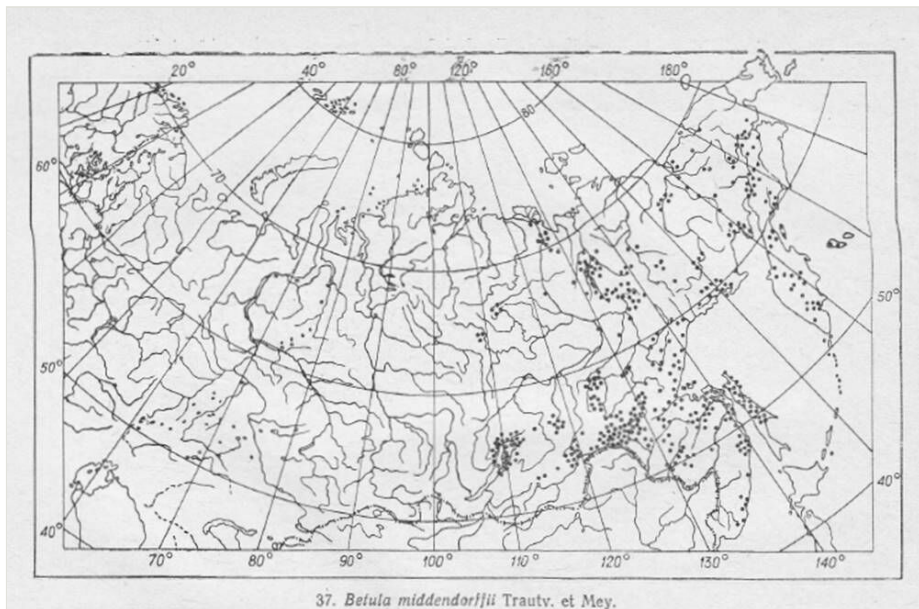


Figure 5. [doi](#)

*Betula middendorffii* distribution map scan.

Coordinate uncertainty in metres was calculated, based on three types of uncertainties (Chapman and Wieczorek 2020). The first type is the coordinate uncertainty of the species occurrence from the herbarium locality description. As mentioned earlier, the maps in the atlas were drawn, based on the herbaria specimen. In order to test this type of coordinate uncertainty, the occurrence dataset from the Moscow University Herbarium (MW) was used as the reference (Seregin 2021). A total of 1500 random occurrences from the Asian part of Russia were taken from MW herbarium and analysed. Generally, the coordinate uncertainty for all analysed occurrences ranges from 0.1 to 60 km. All the data were divided in three random groups by 500 occurrences. The mean coordinate uncertainty for each group equals to 3.86, 5.66 and 2.96 km. Thus, the mean value amongst these three groups was close to 4 km. Based on this result, we established approximately 5 km as the coordinate uncertainty.

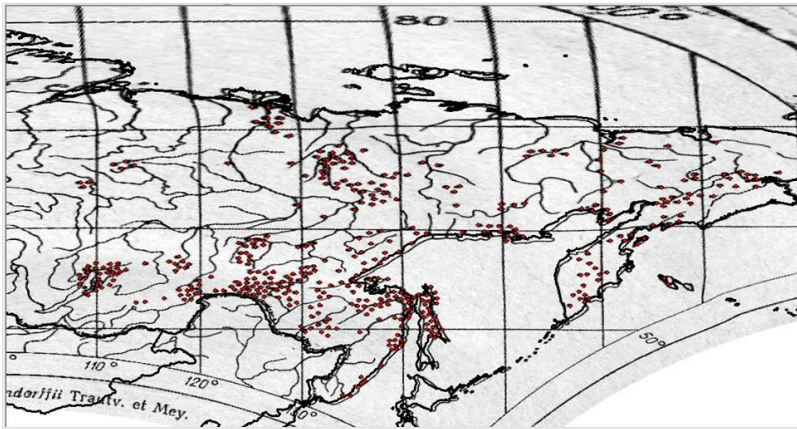


Figure 6. [doi](#)

Georeferencing of *Betula middendorffii* distribution map in QGIS 3.10.

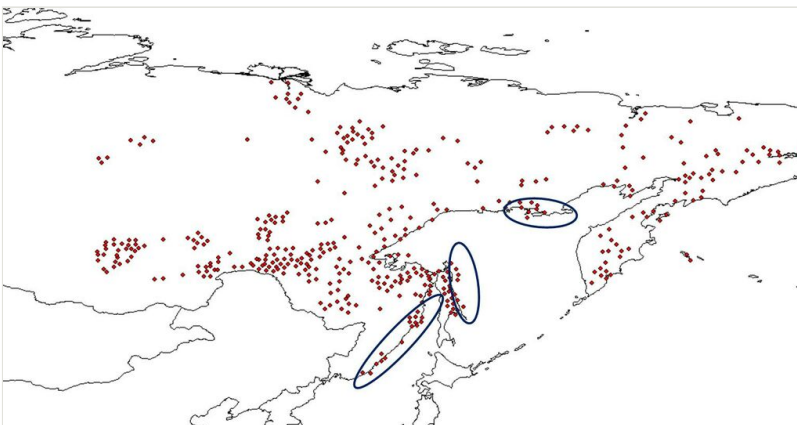


Figure 7. [doi](#)

The example of *Betula middendorffii* distribution records being digitised out of the shapefile in QGIS 3.10.

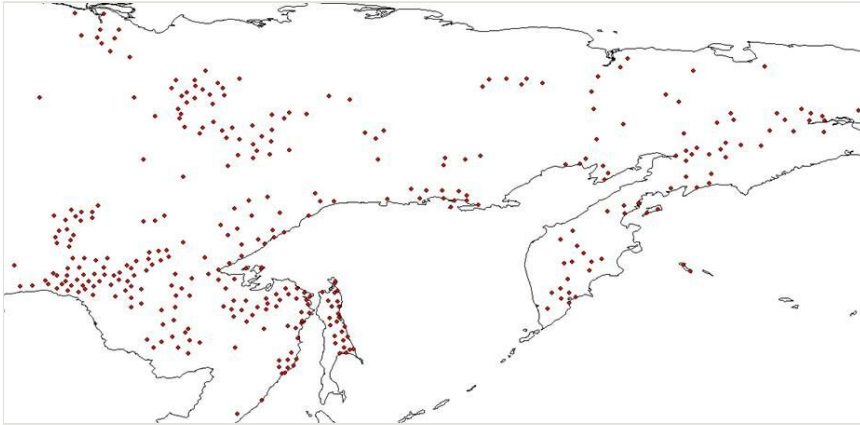


Figure 8. [doi](#)

The result of *Betula middendorffii* distribution records adjusted by reference to their original location in QGIS 3.10.

The second type is the coordinate uncertainty of the drawn maps. The endemic plants of the northern Asia atlas includes four types of maps: a) for the entire northern Asia; b) for northern Asia from 120<sup>0</sup> to 170<sup>0</sup> E; c) for south Siberia from 75<sup>0</sup> to 120<sup>0</sup> E; d) for Far East including Kamchatka Peninsula, Sakhalin Island and Kuril Islands. The coordinate uncertainty of distribution records on each type of the map varies due to its scale. The calculation of coordinate uncertainty of the drawn maps was performed by measuring the distance between species distribution records and the closest river drainage in QGIS 3.10. River drainage was crucial in Soviet botanical mapping as it was used as the reliable feature for species occurrence location. In order to calculate the average coordinate uncertainty, each distance was summarised and divided by the number of measurements. Thus, a) 30 km is the uncertainty for distribution records of the entire northern Asia maps; b) 25 km for the northern Asia maps from 120<sup>0</sup> to 170<sup>0</sup> E; c) 20 km for the south Siberia maps from 75<sup>0</sup> to 120<sup>0</sup> E; d) 15 km for the Far East maps including Kamchatka Peninsula, Sakhalin Island and Kuril Islands.

The third type is the coordinate uncertainty of the map digitalisation in QGIS 3.10. To test the coordinate uncertainty of the map digitalisation, three experts independently performed it on their computers for each of four types of the maps. As a result, the coordinate uncertainty was less than 5 km in all cases in all types of the maps by three experts.

The final coordinate uncertainty was calculated by summarising all three above-mentioned uncertainties for four types of maps.

## Geographic coverage

**Description:** The majority of the records were located within Russia (12762 records – 93.1%; Fig. 4), but a few came from other countries: Mongolia (440 records – 3.2%),

Kazakhstan (414 records – 3%), China (58 records – 0.4%), Japan (16 records – 0.1%), USA, Alaska (12 records – 0.1%) and Kyrgyzstan (7 records – 0.05%).

**Coordinates:** 38.723405 and 77.563972 Latitude; 179.986717 and -179.985022 Longitude.

## Taxonomic coverage

**Description:** In total, the dataset includes 231 species with 13709 distribution records from 31 families and 106 genera. The top 10 families hold 64% (8783 records) of the total number of endemic alpine species distribution records (Table 2). Additionally, a number of species distribution records were compiled for each species (Table 3). There are 44 species with distribution records > 10; 31 species > 20; 29 species >30; 32 species > 50; 46 species > 100; 49 species < 100.

Table 2.

Taxonomic distribution of endemic alpine species of northern Asia in the dataset. Families are listed in descending order of the number of species.

№	Family	Num. of species	Num. of records
1	Asteraceae Bercht. & J. Presl	37	2054
2	Fabaceae Lindl.	17	484
3	Poaceae Barnhart	16	579
4	Saxifragaceae Juss.	16	860
5	Brassicaceae Burnett	14	396
6	Salicaceae Mirb.	14	978
7	Ranunculaceae Juss.	13	725
8	Rosaceae Juss.	12	854
9	Apiaceae Lindl.	11	958
10	Caryophyllaceae Juss.	11	895
11	Scrophulariaceae Juss.	9	721
12	Ericaceae Juss.	8	735
13	Cyperaceae Juss.	6	424
14	Papaveraceae	6	387
15	Campanulaceae Juss.	5	200
16	Gentianaceae Juss.	5	298
17	Portulacaceae Juss.	5	317
18	Primulaceae Batsch ex Borkh.	4	137

№	Family	Num. of species	Num. of records
19	Grossulariaceae D.C.	3	249
20	Lamiaceae Martinov	3	39
21	Betulaceae Gray	2	595
22	Boraginaceae Juss.	2	49
23	Crassulaceae J.St.-Hil.	2	131
24	Cupressaceae Gray	2	206
25	Lentibulariaceae Rich.	2	47
26	Pteridaceae E.D. M. Kirchn.	1	28
27	Diapensiaceae Lindl.	1	213
28	Juncaceae Juss.	1	59
29	Linaceae DC. ex Perleb	1	22
30	Polemoniaceae Juss.	1	27
31	Valerianaceae Batsch	1	42

Table 3.

Species and its number of distribution records in the dataset. Species records are listed in descending order.

<i>Betula middendorffii</i>	415	<i>Artemisia glomerata</i>	103	<i>Paracolpodium altaicum</i>	57
<i>Rhododendron aureum</i>	401	<i>Rhodiola quadrifida</i>	103	<i>Salix sajanensis</i>	56
<i>Schulzia crinita</i>	306	<i>Ribes altissimum</i>	103	<i>Tephrosia jacutica</i>	56
<i>Anemonastrum sibiricum</i>	290	<i>Salix tschuktschorum</i>	103	<i>Salix torulosa</i>	55
<i>Silene chamarensis</i>	276	<i>Dryas grandis</i>	102	<i>Taraxacum glabrum</i>	55
<i>Crepis chrysantha</i>	239	<i>Corydalis arctica</i>	101	<i>Saxifraga terekensis</i>	54
<i>Pedicularis amoena</i>	220	<i>Oxytropis nigrescens</i>	96	<i>Poa pseudoabbreviata</i>	53
<i>Diapensia obovata</i>	213	<i>Hedysarum inundatum</i>	93	<i>Crepis polytricha</i>	52
<i>Carex ledebouriana</i>	209	<i>Silene chamarensis</i> ssp. <i>paucifolia</i>	91	<i>Callianthemum isopyroides</i>	51
<i>Bergenia crassifolia</i>	204	<i>Corydalis pauciflora</i>	90	<i>Oxytropis altaica</i>	50
<i>Salix sphenophylla</i>	191	<i>Dicentra peregrina</i>	90	<i>Saxifraga androsacea</i>	50
<i>Betula rotundifolia</i>	180	<i>Leymus interior</i>	90	<i>Trifolium eximium</i>	49
<i>Juniperus pseudosabina</i>	179	<i>Claytonia joanneana</i>	88	<i>Saxifraga algizii</i>	49
<i>Acomastylis glacialis</i>	171	<i>Petasites glacialis</i>	86	<i>Primula cuneifolia</i>	47
<i>Pedicularis compacta</i>	164	<i>Poa altaica</i>	86	<i>Salix fimbriata</i>	47
<i>Potentilla elegans</i>	161	<i>Oxygraphis glacialis</i>	85	<i>Draba ochroleuca</i>	46



<i>Tilingia ajanensis</i>	160	<i>Papaver canescens</i>	85	<i>Salix nasarovii</i>	46
<i>Petasites sibiricus</i>	139	<i>Stellaria fischeriana</i>	85	<i>Ermania parryoides</i>	45
<i>Artemisia furcata</i>	136	<i>Saussurea congesta</i>	83	<i>Gorodkovia jacutica</i>	44
<i>Cimnialis grandiflora</i>	135	<i>Gypsophila uralensis</i>	81	<i>Hyalopoa lanatiflora</i>	43
<i>Claytonia acutifolia</i>	135	<i>Artemisia kruhsiana</i>	77	<i>Pedicularis anthemifolia</i>	43
<i>Fornicium carthamoides</i>	135	<i>Gastrolychnis tristis</i>	76	<i>Pedicularis fissa</i>	43
<i>Macropodium nivale</i>	132	<i>Saxifraga merkii</i>	75	<i>Valeriana altaica</i>	42
<i>Bupleurum triradiatum</i>	130	<i>Hansenia mongolica</i>	74	<i>Sieversia pentapetala</i>	41
<i>Rhododendron adamsii</i>	129	<i>Tephroses turczaninowii</i>	74	<i>Sieversia pusilla</i>	41
<i>Salix rectijulis</i>	125	<i>Eremogone tschuktschorum</i>	73	<i>Pedicularis brachystachys</i>	40
<i>Salix turczaninowii</i>	125	<i>Saxifraga punctata</i>	73	<i>Lithosciadium multicaule</i>	39
<i>Phlojodicarpus villosus</i>	124	<i>Rhododendron redowskianum</i>	72	<i>Taraxacum altaicum</i>	39
<i>Campanula dasyantha</i>	121	<i>Sajanella monstrosa</i>	72	<i>Aquilegia borodinii</i>	37
<i>Eriophorum humile</i>	117	<i>Pyrethrum pulchellum</i>	70	<i>Helictotrichon mongolicum</i>	37
<i>Sanguisorba alpina</i>	116	<i>Angelica saxatilis</i>	69	<i>Oxytropis kusnetzovii</i>	37
<i>Saussurea schanginiana</i>	115	<i>Callianthemum sajanense</i>	65	<i>Ribes graveolens</i>	36
<i>Salix divaricata</i>	114	<i>Potentilla biflora</i>	65	<i>Salix brayi</i>	36
<i>Saussurea latifolia</i>	114	<i>Saxifraga redofskyi</i>	65	<i>Saussurea frolovii</i>	36
<i>Pedicularis tristis</i>	113	<i>Androsace ochotensis</i>	64	<i>Trollius apertus</i>	36
<i>Silene stenophylla</i>	112	<i>Artemisia lagopus</i>	63	<i>Draba turczaninowii</i>	35
<i>Anemonastrum biarmiense</i>	111	<i>Scirpus maximowiczii</i>	61	<i>Aconitum pascoi</i>	33
<i>Calanthe uniflora</i>	110	<i>Claytonia arctica</i>	60	<i>Saussurea baicalensis</i>	33
<i>Dryas oxydonta</i>	110	<i>Salix berberifolia</i>	60	<i>Saussurea poljakowii</i>	32
<i>Ribes fragrans</i>	110	<i>Gypsophila sambukii</i>	59	<i>Saxifraga davurica</i>	32
<i>Saxifraga melaleuca</i>	110	<i>Luzula arcuata</i>	59	<i>Pinguicula spathulata</i>	31
<i>Petasites rubellus</i>	105	<i>Cassiope lycopodioides</i>	58	<i>Bryanthus gmelinii</i>	30
<i>Erigeron flaccidus</i>	104	<i>Pedicularis alopecuroides</i>	58	<i>Claytonia eschscholtzii</i>	30
<i>Dracocephalum fragile</i>	30	<i>Chrysosplenium peltatum</i>	17	<i>Oxytropis heterotricha</i>	7
<i>Mertensia stylosa</i>	30	<i>Draba pygmaea</i>	17	<i>Aconitum desoulavyi</i>	6
<i>Ptilagrostis junatovii</i>	30	<i>Kitagawia eryngiifolia</i>	17	<i>Magadania victoris</i>	6
<i>Oxytropis ochotensis</i>	29	<i>Saxifraga kruhsiana</i>	17	<i>Swertia baicalensis</i>	6
<i>Saxifraga brachypetala</i>	29	<i>Festuca chionobia</i>	16	<i>Taraxacum soczavae</i>	6
<i>Campanula chamissonis</i>	28	<i>Kreczetoviczia uniflora</i>	16	<i>Cardamine pedata</i>	5

<i>Cryptogramma raddeana</i>	28	<i>Pinguicula algida</i>	16	<i>Dracocephalum popovii</i>	5
<i>Eranthis sibirica</i>	28	<i>Poa ircutica</i>	16	<i>Salix khokhrjakovii</i>	5
<i>Rhodiola pinnatifida</i>	28	<i>Chrysosplenium alberti</i>	15	<i>Poa ivanoviae</i>	4
<i>Crepis gmelinii</i>	27	<i>Koeleria geniculata</i>	15	<i>Phlomis koraiensis</i>	4
<i>Microbiota decussata</i>	27	<i>Pedicularis eriophora</i>	15	<i>Cardamine conferta</i>	4
<i>Polemonium pulchellum</i>	27	<i>Potentilla altaica</i>	15	<i>Claytonia vassilievii</i>	4
<i>Saxifraga multiflora</i>	27	<i>Phyllodoce aleutica</i>	14	<i>Crepis burejensis</i>	4
<i>Bupleurum matranovii</i>	26	<i>Salix kamtschatica</i>	13	<i>Miyakea integrifolia</i>	4
<i>Comastoma falcatum</i>	26	<i>Borodinia baicalensis</i>	12	<i>Oxytropis ajanensis</i> ssp. <i>semiglobosa</i>	4
<i>Astragalus saralensis</i>	25	<i>Arctera nana</i>	12	<i>Oxytropis kodarensis</i>	4
<i>Astrocodon expansus</i>	25	<i>Arenaria redowskii</i>	12	<i>Oxytropis oxyphyloides</i>	4
<i>Veronica sajanensis</i>	25	<i>Cardamine victoris</i>	12	<i>Oxytropis sumneviczii</i>	3
<i>Androsace gorodkovii</i>	24	<i>Oxytropis sajanensis</i>	12	<i>Aconitum sichotense</i>	3
<i>Chrysosplenium baicalense</i>	23	<i>Saussurea uralensis</i>	12	<i>Artemisia flava</i>	3
<i>Gypsophila violacea</i>	23	<i>Arabis turczaninowii</i>	11	<i>Delphinium sajanense</i>	3
<i>Helictotrichon krylovii</i>	23	<i>Corydalis gorodkovii</i>	11	<i>Ligularia sichotensis</i>	3
<i>Oxytropis mertensiana</i>	23	<i>Oxytropis jurtzevii</i>	11	<i>Saussurea porcellanea</i>	3
<i>Pachyneurum grandiflorum</i>	23	<i>Saussurea squarrosa</i>	11	<i>Tephroses sichotensis</i>	3
<i>Linum boreale</i>	22	<i>Artemisia senjavinensis</i>	10	<i>Rosa sichotealinensis</i>	2
<i>Swertia komarovii</i>	21	<i>Papaver nivale</i>	10	<i>Androsace semiperennis</i>	2
<i>Dryas crenulata</i>	21	<i>Dryas tschonokii</i>	9	<i>Hieracium coreanum</i>	2
<i>Bergenia pacifica</i>	20	<i>Aconitum sajanense</i>	9	<i>Salix jurtzevii</i>	2
<i>Carex alticola</i>	20	<i>Bupleurum euphorbioides</i>	9	<i>Saussurea sovietica</i>	2
<i>Pyrethrum lanuginosum</i>	20	<i>Koeleria atrovioleacea</i>	9	<i>Smelowskia inopinata</i>	2
<i>Cassiope redowskii</i>	19	<i>Elymus sajanensis</i>	8	<i>Carex caucasica</i>	1
<i>Mertensia rivularis</i>	19	<i>Eutrema edwardsii</i>	8	<i>Oxytropis ajanensis</i>	1
<i>Popoviocodonia stenocarpa</i>	19	<i>Stellaria sibirica</i>	7	<i>Saussurea ajanensis</i>	1
<i>Festuca sichotensis</i>	18	<i>Campanula uyemurae</i>	7	<i>Saussurea sajanensis</i>	1
Total number of records: 13709					

## Temporal coverage

**Notes:** Dates of records range from 1913 to 1972 and were published in 1974.

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## Data resources

**Data package title:** Endemic Alpine Plants of Northern Asia

**Resource link:** <https://www.gbif.org/dataset/8ee10704-0472-4b5b-aa95-99748552c09c>

**Alternative identifiers:** [https://doi.org/ 10.15468/96hq83](https://doi.org/10.15468/96hq83)

**Number of data sets:** 1

**Data set name:** Endemic Alpine Plants of Northern Asia

**Data format:** Darwin Core

**Data format version:** 1.0

**Description:** We describe a dataset providing information on the geographic distribution of northern Asian endemic alpine plants. It was obtained by digitising maps from the atlas “Endemic alpine species of Northern Asia” (1974). The dataset includes 13709 species distribution records, representing 211 species from 31 families and 106 genera. Each record provides data regarding the distribution of an individual species.

Column label	Column description
eventDate	The date-time or interval during which an Event occurred. For occurrences, this is the date-time when the event was recorded. Not suitable for a time in a geological context. <a href="http://rs.tdwg.org/dwc/terms/eventDate">http://rs.tdwg.org/dwc/terms/eventDate</a>
eventRemarks	Comments or notes about the Event. <a href="http://rs.tdwg.org/dwc/terms/eventRemarks">http://rs.tdwg.org/dwc/terms/eventRemarks</a>
type	The nature or genre of the resource. <a href="http://purl.org/dc/elements/1.1/type">http://purl.org/dc/elements/1.1/type</a>
continent	The name of the continent in which the Location occurs. <a href="http://rs.tdwg.org/dwc/terms/continent">http://rs.tdwg.org/dwc/terms/continent</a>
acceptedNameUsage	The full name, with authorship and date information if known, of the currently valid (zoological) or accepted (botanical) taxon in the online version. <a href="http://rs.tdwg.org/dwc/terms/acceptedNameUsage">http://rs.tdwg.org/dwc/terms/acceptedNameUsage</a>

scientificName	The full scientific name as in the "Endemic alpine plants of Northern Asia" 1974. <a href="http://rs.tdwg.org/dwc/terms/scientificName">http://rs.tdwg.org/dwc/terms/scientificName</a>
occurrenceID	An identifier for the Occurrence (as opposed to a particular digital record of the occurrence). In the absence of a persistent global unique identifier, construct one from a combination of identifiers in the record that will most closely make the occurrenceID globally unique. <a href="http://rs.tdwg.org/dwc/terms/occurrenceID">http://rs.tdwg.org/dwc/terms/occurrenceID</a>
kingdom	The full scientific name of the kingdom in which the taxon is classified. <a href="http://rs.tdwg.org/dwc/terms/kingdom">http://rs.tdwg.org/dwc/terms/kingdom</a>
phylum	The full scientific name of the phylum or division in which the taxon is classified. <a href="http://rs.tdwg.org/dwc/terms/phylum">http://rs.tdwg.org/dwc/terms/phylum</a>
class	The full scientific name of the class in which the taxon is classified. <a href="http://rs.tdwg.org/dwc/terms/class">http://rs.tdwg.org/dwc/terms/class</a>
order	The full scientific name of the order in which the taxon is classified. <a href="http://rs.tdwg.org/dwc/terms/order">http://rs.tdwg.org/dwc/terms/order</a>
family	The full scientific name of the family in which the taxon is classified. <a href="http://rs.tdwg.org/dwc/terms/family">http://rs.tdwg.org/dwc/terms/family</a>
genus	The full scientific name of the genus in which the taxon is classified as in the "Endemic alpine plants of Northern Asia" 1974. <a href="http://rs.tdwg.org/dwc/terms/genus">http://rs.tdwg.org/dwc/terms/genus</a>
specificEpithet	The name of the first or species epithet of the scientificName as in the "Endemic alpine plants of Northern Asia" 1974. <a href="http://rs.tdwg.org/dwc/terms/specificEpithet">http://rs.tdwg.org/dwc/terms/specificEpithet</a>
taxonRank	The taxonomic rank of the most specific name in the scientificName. <a href="http://rs.tdwg.org/dwc/terms/taxonRank">http://rs.tdwg.org/dwc/terms/taxonRank</a>
decimalLatitude	The geographic latitude (in decimal degrees, using the spatial reference system given in geodeticDatum) of the geographic centre of a Location. <a href="http://rs.tdwg.org/dwc/terms/decimalLatitude">http://rs.tdwg.org/dwc/terms/decimalLatitude</a>
decimalLongitude	The geographic longitude (in decimal degrees, using the spatial reference system given in geodeticDatum) of the geographic centre of a Location. <a href="http://rs.tdwg.org/dwc/terms/decimalLongitude">http://rs.tdwg.org/dwc/terms/decimalLongitude</a>
geodeticDatum	The ellipsoid, geodetic datum or spatial reference system (SRS) upon which the geographic coordinates given in decimalLatitude and decimalLongitude are based. <a href="http://rs.tdwg.org/dwc/terms/geodeticDatum">http://rs.tdwg.org/dwc/terms/geodeticDatum</a>
coordinateUncertaintyInMetres	The horizontal distance (in metres) from the given decimalLatitude and decimalLongitude describing the smallest circle containing the whole of the Location. <a href="http://rs.tdwg.org/dwc/terms/coordinateUncertaintyInMeters">http://rs.tdwg.org/dwc/terms/coordinateUncertaintyInMeters</a>
verbatimCoordinateSystem	The coordinate format for the verbatimLatitude and verbatimLongitude or the verbatimCoordinates of the Location. <a href="http://rs.tdwg.org/dwc/terms/verbatimCoordinateSystem">http://rs.tdwg.org/dwc/terms/verbatimCoordinateSystem</a>

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countryCode	The standard code for the country in which the Location occurs. <a href="http://rs.tdwg.org/dwc/terms/countryCode">http://rs.tdwg.org/dwc/terms/countryCode</a>
language	A language of the resource. <a href="http://purl.org/dc/elements/1.1/language">http://purl.org/dc/elements/1.1/language</a>
licence	A legal document giving official permission to do something with the resource. <a href="http://purl.org/dc/terms/license">http://purl.org/dc/terms/license</a>
associatedReferences	A list (concatenated and separated) of identifiers (publication, bibliographic reference, global unique identifier, URI) of literature associated with the Occurrence. <a href="http://rs.tdwg.org/dwc/terms/associatedReferences">http://rs.tdwg.org/dwc/terms/associatedReferences</a>
basisOfREcords	The specific nature of the data record. <a href="http://rs.tdwg.org/dwc/terms/basisOfRecord">http://rs.tdwg.org/dwc/terms/basisOfRecord</a>
infraspecificEpithet	The name of the lowest or terminal infraspecific epithet of the scientificName as in the "Endemic alpine plants of Northern Asia" 1974. <a href="http://rs.tdwg.org/dwc/terms/infraspecificEpithet">http://rs.tdwg.org/dwc/terms/infraspecificEpithet</a>

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