

## Additamenta on distribution and population status of highly endangered plant species on Kunashir Island (Southern Kurils)

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*Summary:* Many vascular plant species endangered or rare in Russia are known only from the Southern Kurils which are the northern edge of these species range. Because some of them had been mentioned insufficiently in the last edition of the Red Book of Russia, we aimed for an actualization. Here, the current status of *Hydrocotyle ramiflora*, *Bothrocaryum controversum*, *Daphniphyllum humile*, *Rhododendron tschonoskii*, *Schizophragma hydrangeoides*, *Magnolia hypoleuca*, *Amitostigma kinoshitae*, *Tilia maximowicziana* and *Athyriopsis japonica* on the Kunashir Island is described.

*Keywords:* endangered and rare species, Kuril Islands, Red Book, vascular plants

It is clear that detailed knowledge of species range and their population status is necessary for estimation of vulnerability and effective protection of biodiversity. However, in some cases no information even for rare and endangered species is available and that makes their effective protection more complicate. Usually such ‘mysterious’ species have a limited habitat range in regions hard to reach where detailed studies are difficult because of lack of resources. The Kuril Islands located on the south-eastern border of Russia give a good example of this situation. Complex geological history, connections with different parts of a continent and some other factors determine the uniqueness and richness of the Kuril flora. Flora of the Northern Kurils has been formed under the influence of Beringian center of florogenesis and has much in common with flora of Kamchatka. Flora of Southern Kurils has been formed influenced by the Japanese center of florogenesis, thus, it is unique for a huge territory of Russia (BARKALOV 2009). Many plant species rare in Russia are known only from the Southern Kurils which are the northern edge of these species range. Several species have been mentioned insufficiently in the last edition of the Red Book of Russia (TRUTNEV & KAMELIN 2008) although many of them can be found only on the Kunashir Island which has the richest flora of all Kuril Islands (BARKALOV 2009).

Below we describe the current population status of rare plant species on Kunashir Island which we have explored in July–August 2014 (for project details see: [http://www.rufford.org/projects/polina\\_volkova](http://www.rufford.org/projects/polina_volkova)). A part of the island is protected as nature reserve Kurilsky (Fig. 1). All information on the general species distribution and protection status was taken from Red Book of Russia (TRUTNEV & KAMELIN 2008). It was difficult to distinguish already known populations from newly discovered ones because of imprecise information about localities in the available literature.

### *Hydrocotyle ramiflora* Maxim. (Umbelliferae)

The northern edge of the species range is in Russia. In addition to Kunashir Island this rare species has also been found on the Iturup Island (Southern Kurils) and (as adventive species) in the Krasnodar Region. Outside the borders of Russia *H. ramiflora* has a wide range in Eastern Asia.

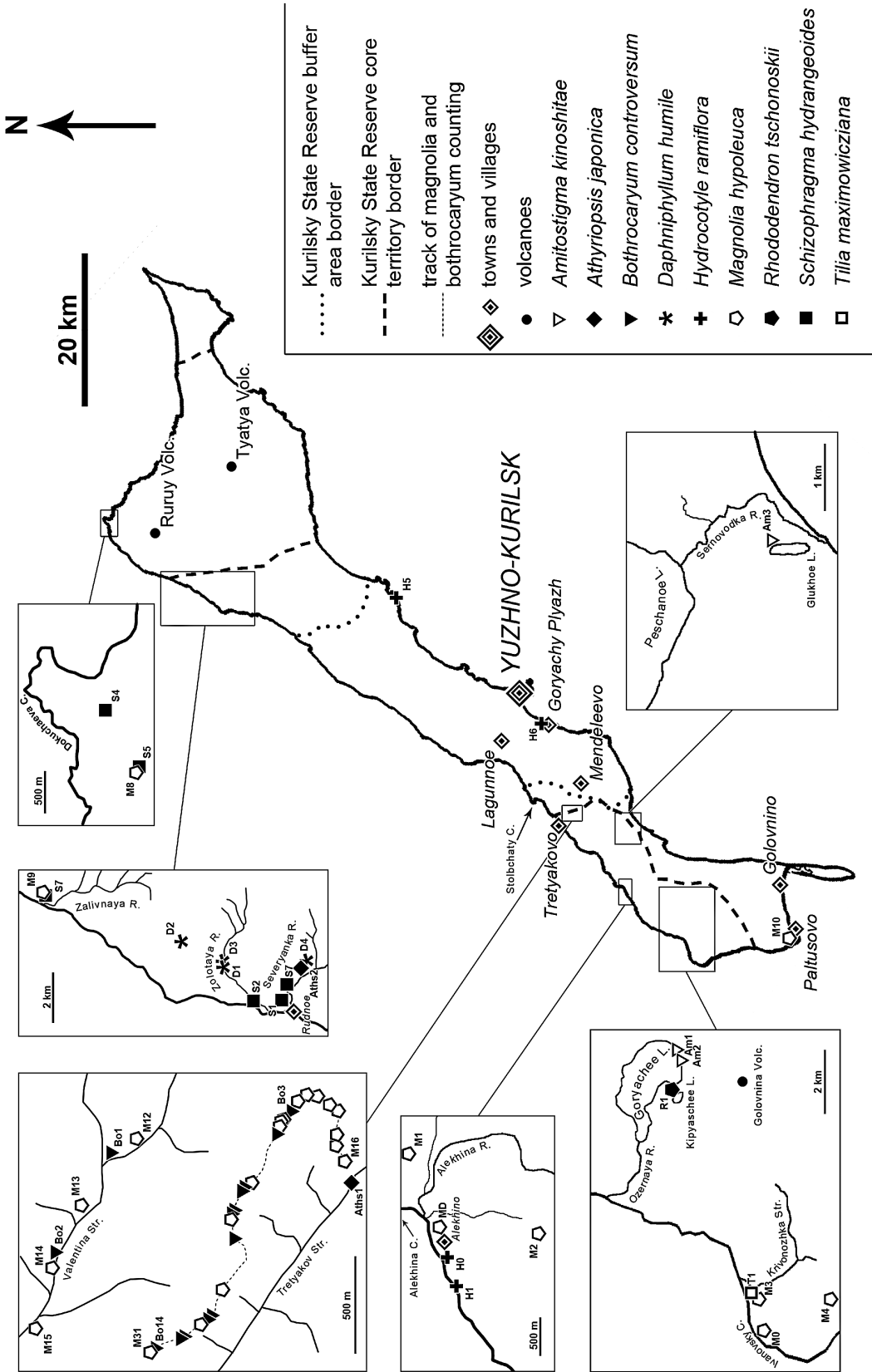


Figure 1. Location of the investigated populations of rare plant species on the island Kunashir.

This species grows near thermal springs (TRUTNEV & KAMELIN 2008). It is vulnerable because these springs are often used as pools by local people. Our observations correct this information. First, it turned out that *H. ramiflora* does not only grow densely near the Alyokhin Springs (N 43°54'57.01", E 145°31'16.63", 10 m<sup>2</sup> on the right bank of the stream), but also plenty in damp places far from springs. For instance, we found a new population of the species on a damp wasteland road near the mouth of the Filatova River (N 44°10'58.93", E 146°01'29.82", 20 m<sup>2</sup>; plants with lots of flowers and fruits). We did not find other specimens of *H. ramiflora* growing near other thermal springs. Second, fortunately, *H. ramiflora* is more resistant to external influences than it was previously thought (TRUTNEV & KAMELIN 2008). The species forms a continuous carpet near the spring on the territory of the Alekhino frontier post (N 43°55'01.18", E 145°31'34.59") although the spring was turned into a pool often used by people. On the outskirts of the Goryachy Plyazh village we found *H. ramiflora* growing sparsely at the site of ruined greenhouses (N 43°59'54.78", E 145°48'04.83", about 150 m<sup>2</sup>) although cows intensively pasture on this meadow.

Our observations allow to disprove the information about *Hydrocotyle* in matters of 'scanty and irregular' fruiting stated in the Red Book of Russia (TRUTNEV & KAMELIN 2008). Quite the contrary, numerous plants of the examined populations had flowers or fruits.

***Bothrocaryum controversum* (Hemsl. ex Prain) Pojarkova (Cornaceae)**

This rare species in Russia grows only on the Kunashir Island, on the north-eastern edge of its range. It is mainly distributed in China, Korea and Japan.

In addition to the ecological trail to cape Stolbchaty *Bothrocaryum* grows in the middle reaches of Valentina Stream (we found two trees at: N 43°58'52.68", E 145°40'03.06"; N 43°59'03.01", E 145°39'39.00") and along the road leading to the cottages near the Tretyakovo frontier post (twelve trees per 1.5 km: N 43°58'24.15", E 145°40'11.33" to N 43°58'45.92", E 145°39'18.63"). All trees had plenty of fruits.

***Daphniphyllum humile* Maxim. (Daphniphyllaceae)**

A decreasing number of *D. humile* grows in Russia only on the Southern Kurils (in the north of Kunashir Island and in the south of Iturup Island), the northern border of its range. It can also be found in Korea and Japan.

In the north of Kunashir we found *D. humile* in the undergrowth of fir forests in valleys of the rivers Severyanka (N 44°19'53.17", E 146°01'37.81", a thicket of about 10×20 m on the steep bank of the stream) and Zolotaya (N 44°21'44.49", E 146°01'32.73", a few plants without flowers or fruits in the lower part of a steep slope; N 44°21'44.10", E 146°01'40.12", a thicket of fruiting plants not less than 200 m<sup>2</sup>), where it quite often forms continuous thickets. Both localities are not mentioned in the Red Book of Russia (TRUTNEV & KAMELIN 2008). Exploration (trenching of prospecting pits) in the upper reaches of the stream Moristy are now abandoned and therefore no more threat to the population of *D. humile* (N 44°22'34.27", E 146°02'20.17", a dense thicket not less than 400 m<sup>2</sup>) as it was stated in the Red Book. The population on the edge of prospecting pits we examined was in excellent condition, many plants had lots of fruits, the species intensively reproduces itself even in continuous thickets of bamboo.

***Rhododendron tschonoskii* Maxim. (Ericaceae)**

This rare species can be found in Russia only in the southern part of Kunashir Island on the north-eastern edge of its range. *R. tschonoskii* is also spread in northern Japan and in the south of Korea.

The population of *Rhododendron* we found on the rocky upper part of the eastern slope of the central dome in the caldera of Golovnina Volcano (N 43°51'55.80", E 145°30'08.45") comprised numerous shrubs. They were growing one by one and had many fruits and solitary flowers (5 August 2014). They are of minor height due to the wind exposed habitat.

***Schizophragma hydrangeoides* Siebold & Zucc. (Hydrangeaceae)**

This endangered species in Russia can only be found on Kunashir Island on the north-eastern edge of its range. *S. hydrangeoides* also grows in Japan and in the south of Korea.

Large specimens of *S. hydrangeoides* with abundant fruiting can often be found in valleys of Severyanka (N 44°20'23.14", E 146°00'31.83"; N 44°20'17.73", E 146°00'52.34"), Zolotaya (N 44°21'02.60", E 146°00'21.75") and Zalivnaya (N 44°25'26.56", E 146°03'37.33") rivers and in the environs of cape Dokuchaeva (N 44°30'28.11", E 146°09'51.77"; N 44°30'16.98", E 146°09'24.22") in fir and mixed forests.

***Magnolia hypoleuca* Siebold & Zucc. (Magnoliaceae)**

This endangered species in Russia is found only on Kunashir Island on the northern edge of its range. *M. hypoleuca* is also spread in China and Japan.

This species commonly grows on ecological trail to cape Stolbchaty and in the valley of Valentina Stream (N 43°58'49.52", E 145°40'05.45"; N 43°58'58.19", E 145°39'51.02", tree had one fruit, but was wrenched off; N 43°59'03.09", E 145°39'34.37"). A large tree with several trunks grows right next to the abandoned thermal spring close to cottages near the Tretyakovo frontier post (N 43°59'06.15", E 145°39'21.49", tree had six fruits). Numerous trees grow the roadside to the cottages: N 43°58'15.56", E 145°40'01.17" to N 43°58'46.96", E 145°39'18.19".

In addition to the mentioned localities we found *M. hypoleuca* in different parts of the island: in the environs of cape Alyokhina (N 43°55'20.50", E 145°32'33.40"; N 43°54'24.35", E 145°31'53.14"), in the environs of cape Ivanovsky (N 43°50'23.66", E 145°24'39.43"; N 43°50'30.04", E 145°25'24.50"; N 43°49'17.92", E 145°25'23.94"), near the former village Paltusovo (N 43°43'42.39", E 145°26'06.95"), in the mouth of Zalivnaya River (N 44°25'28.76", E 146°03'39.32"; tree with fruits) and in the environs of cape Dokuchaeva (N 44°30'18.17", E 146°09'23.06"). The last location is the most northern locality where *M. hypoleuca* has ever been found.

Outside the reserve *M. hypoleuca* may suffer from human activity. We saw a young tree with a broken top near the Alekhino frontier post (N 43°55'07.47", E 145°31'50.69").

***Amitostigma kinoshitae* (Makino) Schlechter (Orchidaceae)**

This rare species, endemic to the Kurils and Japan (Hokkaido and Honshu) grows in Russia only in the southern part of Kunashir Island on the northern edge of its range.

We found *A. kinoshitae* on the south-eastern shore of lake Goryachee (N 43°51'53.59", E 145°31'03.51", about 100 plants; N 43°51'49.10", E 145°30'51.58", about 10 plants) and

on the north-eastern shore of lake Glukhoe (N 43°54'25.94", E 145°38'11.77", 5 plants), where it occurs in sedge-moss bogs. Populations are in good condition, plenty of flowers and fruits.

*Tilia maximowicziana* Shirasawa (Tiliaceae)

This endangered species is known in Russia only from few localities in the south of Kunashir Island on the northern edge of its range. It is also recorded for the Japanese islands Hokkaido and Honshu.

*Tilia maximowicziana* is extremely difficult to find because it usually grows as single trees in remote mixed forests with thickets of bamboo. We managed to find at least one tree in the environs of cape Ivanovsky (N 43°50'35.22", E 145°25'26.75"). The specimen had several trunks but we did not observe any fruit or root shoot.

*Athyriopsis japonica* (Thunb.) Ching. (Athyriaceae)

This endangered species in Russia was known only from one locality on Kunashir Island, on its northern range. It is also recorded for China, Himalayas, southern Korea and Japan.

We found numerous plants in the valley of the Tretyakov Stream (N 43° 58.230' E 145° 39.926') from where the species has already been reported. Additionally, we found a new locality in the northern part of the island – several plants in the vicinities of vil. Rudnoe (N 44° 19.887' E 146° 01.841').

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