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The Russian larch (*Larix archangelica*, Pinaceae) in the Kola Peninsula

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A locality of the Russian larch (*Larix archangelica*) was discovered in 2015 in 2.8 km from the mouth of the Malaya Kumzhevaya River (*Lapponia Ponojensis*) during the expedition to the southeastern coast of the Kola Peninsula. This is the second occurrence of native larch in the Kola Peninsula, which is situated in ca. 100 km westwards from its continuous range in the northeastern part of European Russia. A possible origin of this locality is considered, and the locality is treated as a relic of the formerly wider distribution in the middle Holocene. The only larch tree in this locality grows in a spruce-birch herb-rich forest on drained lands between a river bank and a swamp area. The tree is part of the plant community that is classified as association *Aconito septentrionalis – Piceetum obovatae* Zaugolnova & Morozova 2009, subassociation *filipenduletosum ulmariae* Zaugolnova & Morozova 2009 (*Vaccinio – Piceetea* Br.-Bl. in Br.-Bl., Siss. & Vlieger 1939). The conservation status of larch in Murmansk Region according to the IUCN criteria is assessed as Critically Endangered.

Introduction

The genus *Larix* L. (Pinaceae) contains important timber trees, and is represented by 8 species in Eurasia (Dylis 1981). Larch forests are developed mostly in Siberia and Far East, amounting to 40% of the forested area (Dylis 1947, 1981), whereas in Europe their distribution is restricted to the mountains of Central Europe (*Larix decidua* Mill.) and the lowland of the northeastern part of East Europe and the Urals (*Larix archangelica* P. Lawson, syn. *Larix sukaczewii* Dylis).

The larch native to East Europe has been traditionally treated as *L. sibirica* Ledeb. s.l. (Komarov 1934; Ostenfeld & Syrach Larsen 1930; Tolmachev 1960; Bobrov 1972, 1974; Jalas & Suominen 1973; Czerepanov 1995), in spite of the numerous attempts to separate the western race of this species as *L. archangelica* (Lawson 1836; Tzvelev 1994; Orlova 2011), *L. sibirica* ssp. *rossica* (Regel) Sukacz. (Sukachev 1934), or *L. sukaczewii* (Dylis 1945, 1947, 1981) on the basis of its deviating morphology. Modern genetic studies (Semerikov et al. 1999; Bashalkhanov et

al. 2003; Semerikov & Lascoux 2003; Araki et al. 2008) confirmed the species status of the East European larch. Its nomenclature is still unresolved, and we follow Tzvelev (1994) in applying the name *L. archangelica* by the recently established tradition. This species can be called Russian larch in English, leaving the name Siberian larch for *L. sibirica* s. str.

Because of the utmost historical importance of larch as timber in construction and shipbuilding, and also its role in the formation of extensive monospecific forest stands, its distribution limits have been in focus of studies since the end of 19th century. The most recent review of the distribution of the East European larch and its part in plant communities was provided by Putenikhin & Martinsson (1995). According to their data, the distribution area of *L. archangelica* covers the northeastern part of East Europe, the Urals and a part of West Siberia, reaching the limit of East Fennoscandia in the west (southeastern Karelia: Kravchenko 2007a) and the Ob and Irtysh Rivers in the east.

There has always been a considerable interest in the northwestern limit of the distribution of the East European larch because of its rarity and scattered occurrence in the west. Separate publications on this subject exist (Cajander 1901; Zinserling 1933). The present contribution aims at reviewing the data on the present-day occurrence of larch in the Kola Peninsula in connection with our latest record made during the expedition to the southeastern and eastern coasts of the Peninsula in 2015.

Materials and methods

The research material had been collected during the botanical expedition to the southeastern coast of the Kola Peninsula from the mouth of the Pyalitsa River to the Tri Ostrova Archipelago (*Lapponia Ponojensis*) in July – August 2015. The expedition run largely along the coastline near Pyalitsa village, Babya Bay, Sosnovka village, Krasnye Schelya Bay, the mouth of Ponoy River, abandoned Ponoy village, Rusinga River, and Tri Ostrova Archipelago (Fig. 1).

In a site of the occurrence of *Larix archangelica*, phytosociological data were collected according to the relevé method of sampling vegetation (Yunatov 1964) in a plot of 400 m^2 with homogeneous microtopography and moisture. The relevé data have been submitted to VegBank (Peet et al. 2012).

Voucher specimens were deposited in the Moscow State University (MW), University of Helsinki (H) and Polar-Alpine Botanical Garden-Institute (KPABG).

Results and discussion

Early records of larch from the Kola Peninsula

In mid-June of 1925 Alexander I. Tolmachev stayed in Arkhangelsk while waiting for departure to the expedition to the Vaygach Island (Baranova & Bubyreva 2013), where he had met with B. Vorontsov, a meteorologist at the weather station of the Sosnovets Island. Vorontsov provided him with a few branches of larch that he collected on 25 April 1925 at the southeastern coast of the Kola Peninsula by a place called Voronyi Sopki near Sosnovka Village. In that place Vorontsov reportedly observed a single individual of larch, which was ca 3.5 m tall with a trunk of 21 cm in diameter at a point 50 cm above the ground. The tree looked healthy and was growing on a terrace that was devoid of any tree or shrub vegetation for hundreds of meters. By that time this tree was known to the locals (Sami) for over 150 years. They held this tree sacred and sacrificed money and reindeer antiers to it (Tolmachev 1925; Zinserling 1933).

Later on, an expedition of the Main Botanical Garden (now part of the Komarov Botanical Institute of the Russian Academy of Sciences) heading to the Kola Peninsula (Zinserling 1933) discovered that very tree in 1927 (Figs. 2, 3). The only individual of larch was found on 3 September 1927 in a vast and flat tundra. The tree was about 5 m tall, with a trunk 22 cm in diameter at breast height (32 cm above ground) and the basal branches situated at ca 2 m above ground. The tree produced cones rather abundantly. The tree was mostly devoid of leaves which remained in a small amount on its southern side. At the height of 84 cm the trunk bore a cut that was 4 cm deep,

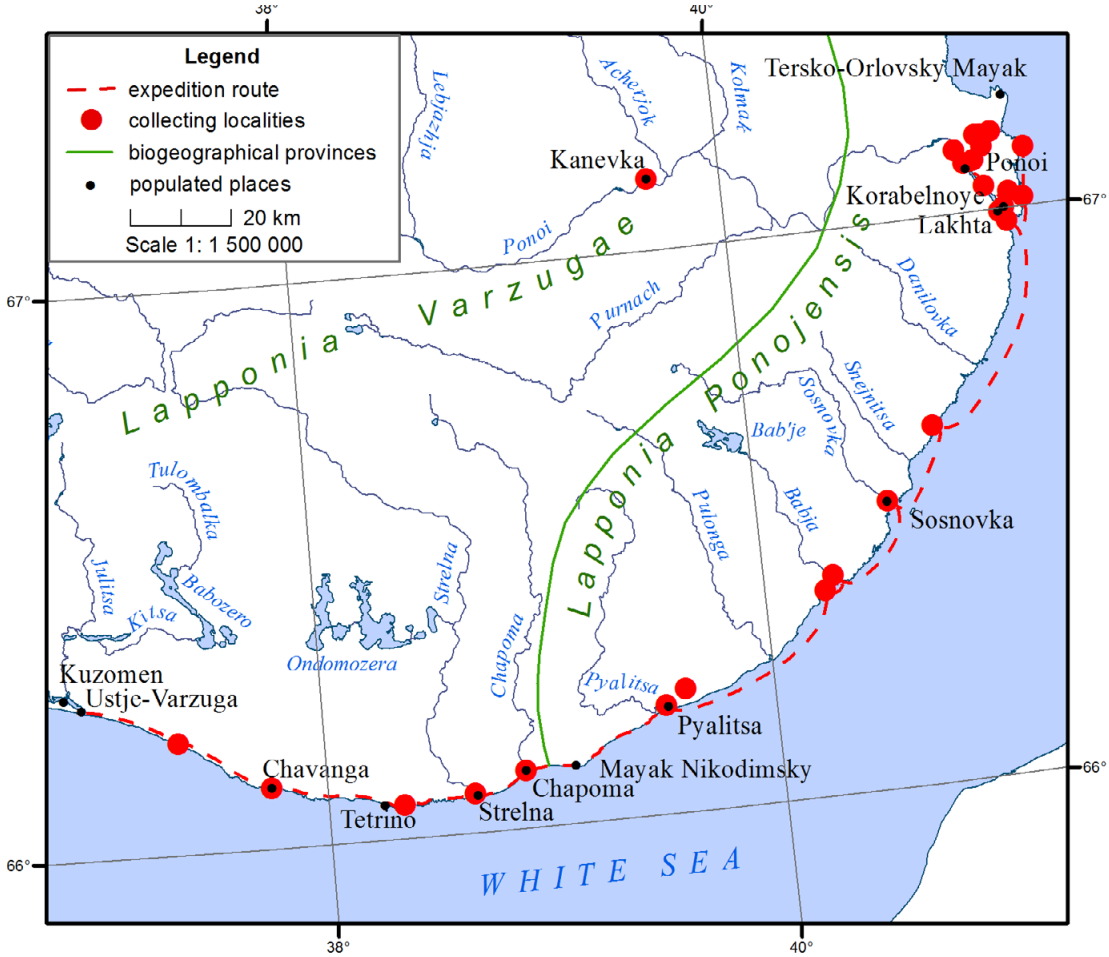
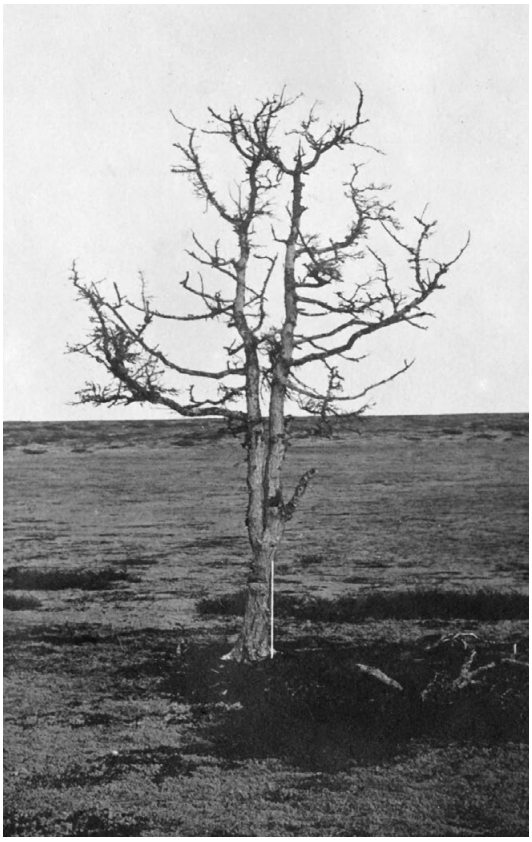


Figure 1. The route of the botanical expedition to the southeastern coast of the Kola Peninsula, July – August 2015.

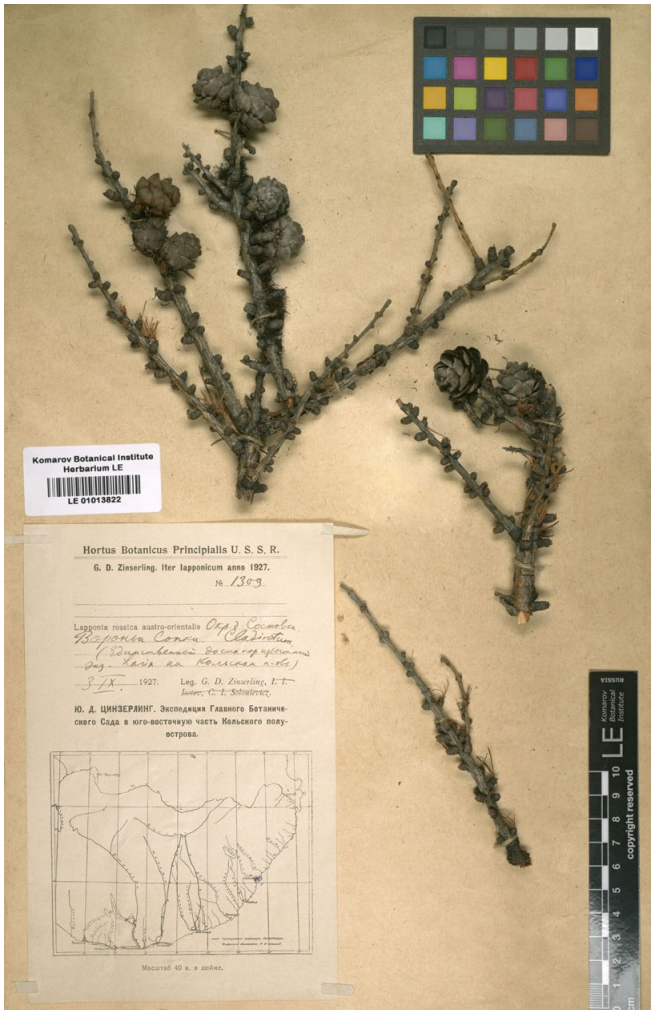
on which 108 annual rings were counted. By the time of observations the tree showed obvious signs of decline and apparently died soon after. Zinserling (1933), on the basis of his field observations and questioning local people, ascertained that the observed tree was the only individual of larch along the whole southeastern coast of the Kola Peninsula.

By the time of observations the record of larch in the Kola Peninsula was situated at the distance of ca 100 km westwards from the known limit of its continuous distribution (Dylis 1938); most of this gap is occupied by a strait connecting the White Sea and the Barents Sea. The nearest stations of the native distribution of larch are situated along the Winter Coast (Zimniy Bereg) of the White Sea in Arkhangelsk Region, where larch occurs at the distance of a few dozens of kilometers from the sea shore (Fig. 4). In Arkhangelsk Region larch is not rare; besides larch forests, it can be found mixed with spruce, pine or birch but its frequency considerably declines westward (Putenikhin & Martinsson 1995).

The record of larch from the Kola Peninsula was included in the Flora of Murmansk Region (Orlova 1953). Later compilations dealing with *Larix* in East Europe (Bobrov 1974, Orlova 2011) and in Murmansk Region and Karelia (Ramenskaya & Andreeva 1982) omitted this record without comments, although it was accepted in the Flora of the Russian Arctic (Tolmachev 1960). No further information about larch and its status in the Kola Peninsula has been traced elsewhere.



▲ Figure 2. A larch tree discovered by G. Zinserling in 1927. Reproduced from Zinserling (1933).



► Figure 3. A voucher specimen from the historical larch tree discovered by G. Zinserling in 1927, kept at LE.

Post-glacial history and factors limiting the distribution of larch

Factors limiting the northern distribution of larch in East Europe have not been determined with certainty yet, although speculations on the subject are several. Köppen (1885) published the first hypothesis that the northern and southern limits of the larch distribution are climate-dependent, whereas the western limit is caused by edaphic factors. Dylis (1938) speculated that east of the Pechora River the northern distribution of larch is limited by climate, whereas west of the Pechora larch is limited rather by the competition with spruce and pine. Kashin & Kozoborodov (1966) and Lantratova & Yakubnyak (2009) observed that the northern and western limits of the larch distribution are dependent on calcareous substrates. Another reason, supposed by Dylis (1981), is an association of larch with mycorrhizal fungi which may be uneasy to establish in new places.

The history of the postglacial recolonization of East Europe by larch and the dynamics of its distribution area is documented by palaeobotanical evidence. In the postglacial period, larch had a significantly greater distribution in Fennoscandia with a constant presence over the last 10000 years. The earliest record (10500 cal yr BP) of a small amount of larch pollen comes from the southeast of Russian Karelia (Kuosmanen et al. 2016), and Kullman (1998) documented the former presence of *Larix* in the Scandes by macro-

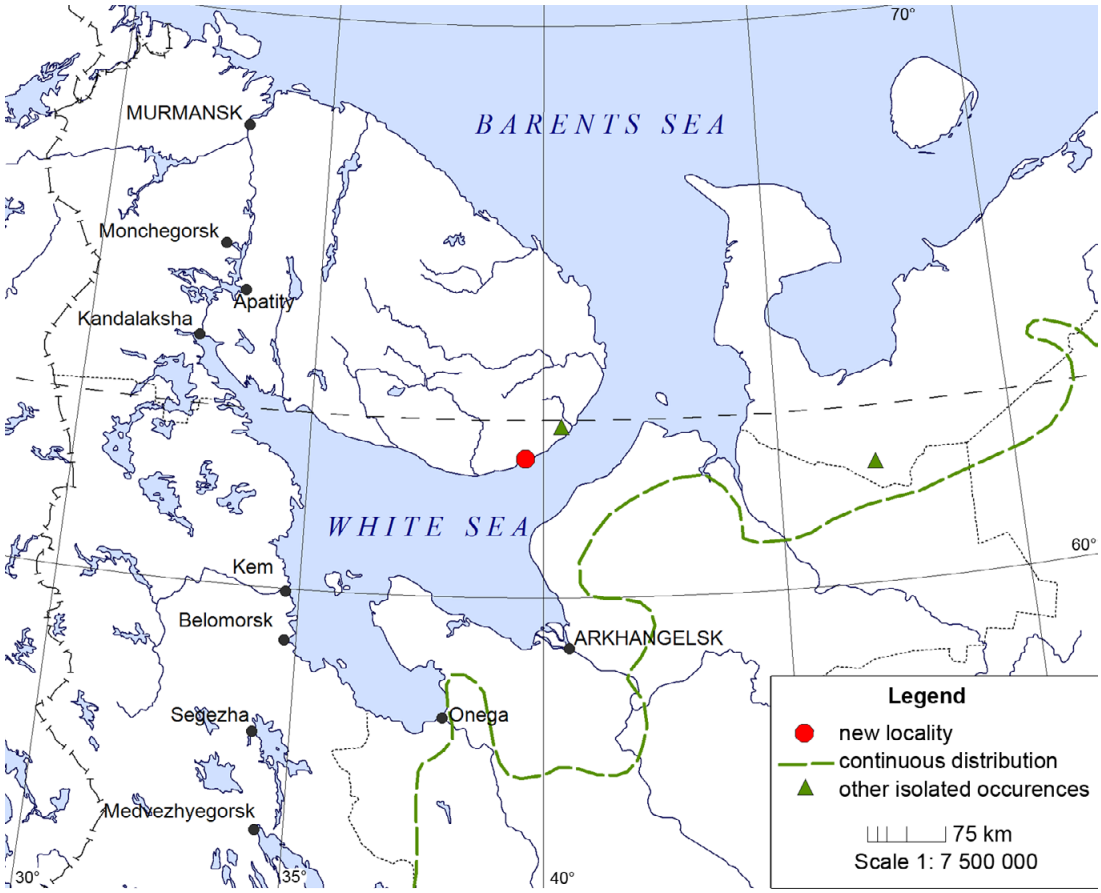


Figure 4. The northeastern limit of the distribution of larch in East Europe.

fossils (cones) dated between 8700 and 7500 BP. The fossil data suggest that larch survived during the last glacial maximum in northern regions of Eurasia close to the ice sheet, thus allowing for a rapid recolonization when the ice retreated (Binney et al. 2009). Early postglacial pine-birch-larch forests existed in the Scandinavian mountains and the east of East Fenniscandia until their retreat with the expansion of spruce between 8000 and 7000 BP (Kuosmanen et al. 2016).

From the postglacial history of larch we conclude that its current distribution is likely limited by climate and competition with other dominating forest trees. In East Europe, so far all fossil pollen records of larch were found close to the present-day limit of its distribution, although a macrofossil record from the Scandes indicates scattered remote occurrences caused by long-distance dispersal.

Larch cultivation on the Kola Peninsula

The first trees of *Larix archangelica* were introduced in the Kola Peninsula in 1930s in small plantations along the railway St. Petersburg – Murmansk. In 1932 larch seeds were sawn near the railway station Taibola. In 1933–1935 trees were planted near the station Khibiny (Makarova et al. 2003). Shortly thereafter, a program for planned introduction of larch was developed in the Polar-Alpine Botanical Garden (Kirovsk). In 1936 seeds and saplings of larch were delivered to the Botanical Garden. Since then, larch has been a permanent component of street tree planting and forest plantations. In the Kola Peninsula larch grows intensely and is resistant to frosts. Besides, it has a tendency to natural reproduction in spite of its low (30%) germinating ability (Kazakov 1993).

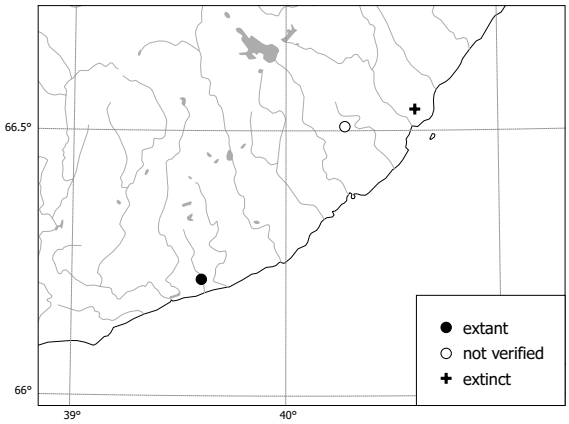


Figure 5. Localities of larch in the Kola Peninsula.

Larch was listed among main trees for street tree planting in Murmansk Region since 1956 (Kazakov 1993). Accordingly, planted larch trees which are about 50 years old are present in nearly all cities, towns and larger villages of the Kola Peninsula (Petrov 2013), and also in forests planted in the western part of the Peninsula: Kola District, Apatity District, Kirovsk District, Kandalaksha District, Terskiy District (western part) and Lovozero District (western part). In mid-1980s, 7 local protected areas were established in order to preserve cultivated forests in Murmansk Region (Makarova et al. 2003, Kobyakov 2011). At present all extensive plantations of larch are situated in the western part of Murmansk Region; they are insignificant in extent and are less than 85 years old.

Private cultivation of larch in the Kola Peninsula is insignificant. Single trees are known in some largest villages (e.g. Varzuga, Kuzreka) but they also are not older than state plantations.

The new locality

Russian larch was discovered in 2.8 km upstream from the mouth of the Malaya Kumzhevaya River during our exploration of the vicinities of Pyalitsa village in 2015 (Figs. 4–6). A solitary tree was found on a margin of a spruce-birch herb-rich forest between a river bank and a swamp (Fig. 7). It had a regular shape of the canopy and a straight trunk approximately 10 m high and 32 cm in diameter. The tree had a moderate seed set, evidenced by sparse cones of the current year and some of former years. Several dead branches were visible in the canopy but the trunk was healthy, without frost or any physical damage. No seed reproduction was spotted.

The new locality is situated in ca. 100 km from the limit of the continuous distribution in the northeast of European Russia. The locality reported by Tolmachev and Zinserling is situated at the distance of 55 km northeastwards (Fig. 4). We agree with Zinserling (1933) that the anthropogenic origin of these records is completely impossible because the trees are situated far from villages and no trees were planted in the forest in that area. Besides, the native population (Sami) never planted trees in or around their villages (Zinserling 1933).

It is tempting to speculate that the localities of larch in the Kola Peninsula originated from long-distance dispersal by seeds from the Zimniy Bereg of the White Sea in Arkhangelsk Region, along which the larch is rather common. In our opinion, this option is highly unlikely. Potentially seeds can be drifted on ice across the narrow strait separating the Kola Peninsula from the eastern mainland but this way of transportation may be obstructed by prolonged periods of open water. Besides, one may infer from the low competitive ability of larch that its natural ephemerous occurrences are more likely to appear on bare ground, rocks and fire places (where competition between plants is lower: Dylis 1981) situated close to the sea shore, but we found the larch tree in a mixed spruce-birch forest that was relatively far from the coast line.

It is also highly unlikely that the larch in our locality may have been dispersed from introduced stands because all cultivated larch forests in the Kola Peninsula are young and situated at the distance of over 200 km. Besides, in Sosnovka the larch was found well before the introduction took place in the region.

Most plausibly seems to be an assumption that the occurrences of larch in the Kola Peninsula are relic of the formerly distribution range which was much greater in the early and middle Holocene. A hint to this conclusion is provided by the habitat, a mixed spruce-birch forest that is much unlike the typical habitat of larch in its main distribution

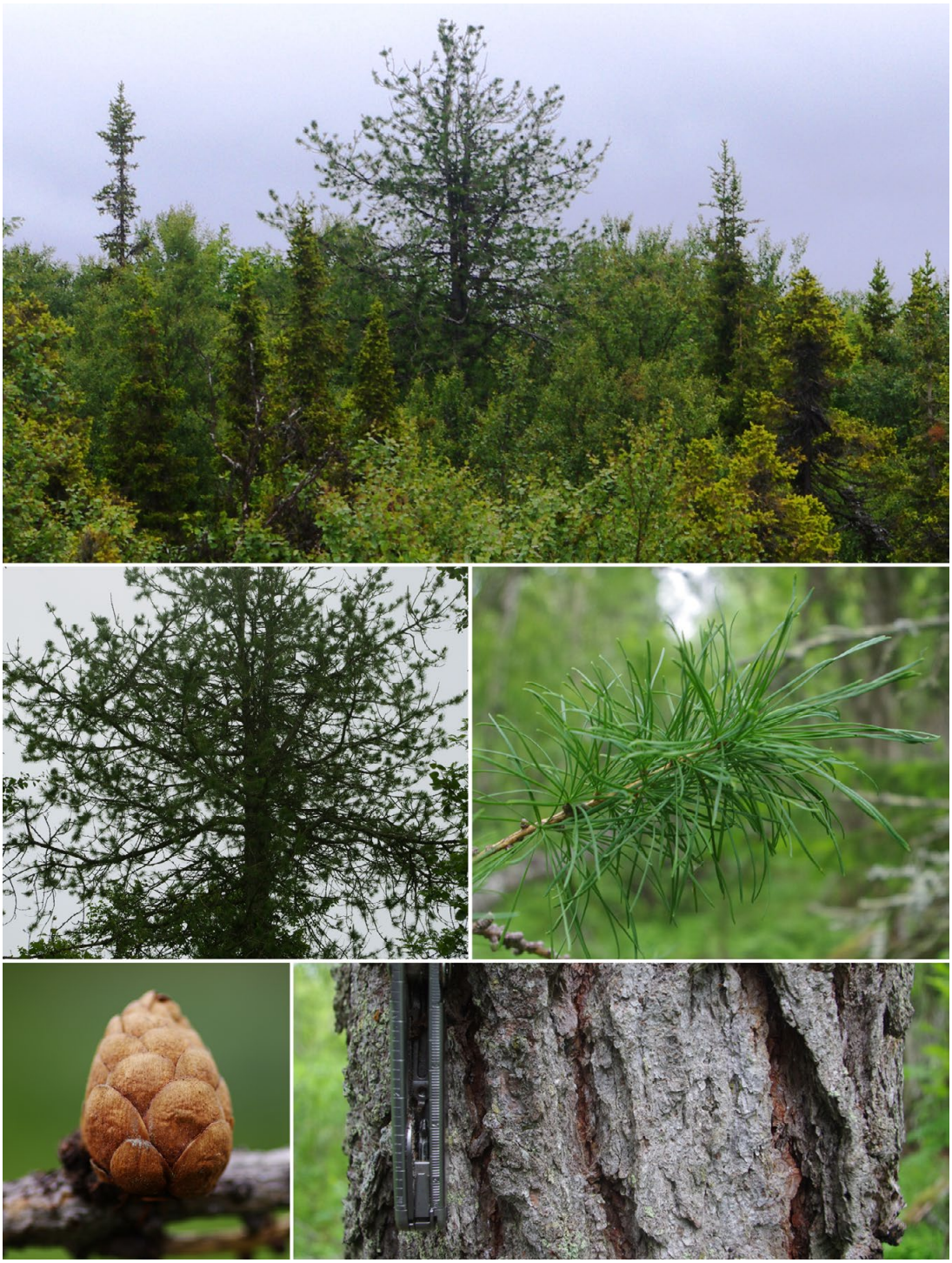


Figure 6. The individual of larch discovered in 2015 in the vicinities of Pyalitsa village. Photo: Mikhail Kozhin.

Figure 7. Spruce-birch herb-rich forest in the Kola Peninsula, the habitat of larch near Pyalitsa. Photo: Mikhail Kozhin.

area, where larch forms monospecific stands or occurs in spruce or pine forests on drained soils (Kucherov & Zverev 2010, 2011). Such soils in the southeastern part of the Kola Peninsula are occupied by spruce forests, which gradually replaced larch because of a stronger competitive ability. At present, natural dispersal or reproduction of larch in the Kola Peninsula is practically impossible because its seeds require cross pollination (Dylis 1981).

Ecology and phytocenology

Larix archangelica was discovered in a spruce-birch herb-rich forest (Table 1). The tree layer consists of two sublayers. The first tree sublayer is formed by spruce trees with straight trunks ca. 9–10 m tall. The second sublayer consists of birches with crooked trunks and multistemmed rowans ca. 7–8 m tall. The forest is rather sparse (canopy coverage 0.5). Shrubs and undergrowth are rare. The herb and shrublet layer is relatively diverse, with the dominance of *Calamagrostis phragmitoides* and *Veratrum lobelianum* and a frequent occurrence of *Geranium sylvaticum, Equisetum sylvaticum, Stellaria nemorum*, and also with patches of *Gymnocarpium dryopteris*, *Vaccinium myrtillus* and *Deschampsia cespitosa*. Moss and lichen cover is very sparse; only rare individuals of *Sciuro-hypnum* spp. and *Plagithecium laetum* were observed.

There are a number of epiphytic lichens occurring in the forest that surrounds the larch. Birches are overgrown densely with *Hypogymnia physodes* (L.) Nyl., *Melanohalea olivacea* (L.) O.Blanco, *Parmelia sulcata* Taylor; their trunk bases (and dead trunks) are inhabited by *Dicranum flexicaule* Brid., *Ptilidium ciliare* (L.) Hampe, *Pleurozium schreberi* (Brid.) Mitt. and *Cladonia* spp. Spruces harbour a lesser number of epiphytes, namely *Bryoria* sp. and *Vulpicida pinastri* (Scop.) J.-E.Mattsson & M.J.Lai on branches. The trunk of the larch is overgrown sparsely by a number of epiphytes, i.e. *Hypogymnia physodes* (L.) Nyl., *Japewia tornoënsis* (Nyl.) Tønsberg,

Table 1. Relevé of plant community with *Larix archangelica*

Association	Spruce-birch mixed herbs-woodreed forest with *Sorbus aucuparia* and *Larix archangelica*
Plot's area, m. sq.	400
Date	13.07.2015
Geographical coordinate	66.21952° N, 39.60523° E
Location	Murmansk region, Terskii district, 5 km NE from Pyalitsa Village, 2.8 km from mouth of Malaya Kumzhevaya River
Mesorelief	Elevated flatten fringe between river and superficial boggy depression
Microrelief	Billowy, slightly expressed, tree trunks increase, solitary fallen trees
Moisturization	Moderate, transition geochemical position
Zoogenic influence	Not detected

List of species

Species	Number of trees	Height, m	Diameter, cm
Forest stand: closing of leaf canopy 0.5			
Betula kusmisscheffii (Regel) Sukacz. (*B. pubescens* s.l.)	40	7–8	(10) 16 (35)
Larix archangelica Laws.	1	10	32
Picea ×fennica (Regel) Kom.	8	9–10	10–13
Sorbus aucuparia L.	6	8	10 (20)
Undergrowth: cover 3 %			
Species	Cover, %	Height, cm	Phenophase
Betula kusmisscheffii (Regel) Sukacz. (*B. pubescens* s.l.)	3	80–220	—
Sorbus aucuparia L.	+	50–230	—
Shrubs: cover 2 %			
Juniperus sibirica Burgsd.	1	50–120	—
Salix glauca L.	r	40	—
Salix hastata L.	1	50–70	—
Grasses and subshurbs: cover 50 %			
Adoxa moschatellina L.	r	7	—
Avenella flexuosa (L.) Drejer	r	10	—
Calamagrostis phragmitoides Hartm.	15	50–70	^
Chamaenerion angustifolium (L.) Scop.	r	30	—
Chamaepericlymenum suecicum (L.) Aschers. & Graebn.	5	15	O
Cirsium heterophyllum (L.) Hill	r	30	—
Deschampsia cespitosa (L.) Beauv.	5	30	—
Dryopteris expansa (C.Presl) Fraser-Jenk. & Jermy	r	60	SP
Equisetum arvense L.	+	35	—
Equisetum sylvaticum L.	+	40	—
Filipendula ulmaria (L.) Maxim.	r	40	^
Geranium sylvaticum L.	2	30	—
Geum rivale L.	r	65	O
Gymnocarpium dryopteris (L.) Newman	5 gr	20	SP
Lycopodium annotinum L.	1	10	—
Melampyrum pratense L.	+	25	O
Melampyrum sylvaticum L.	+	20	O
Milium effusum L.	+	100	(
Rubus arcticus L.	+	12	(
Rubus chamaemorus L.	r	7	—
Rumex acetosa L.	+	70	O
Solidago virgaurea L.	+	10	—

Remarks: Cover: r – solitary plants; + – cover is smaller than 1 %.
Phenophase: — – vegetation growth; ^ – flower bud; O – flowering; (– end of flowering; SP – sporulation.

Table 1 continued

Species	Cover, %	Height, cm	Phenophase
Stellaria nemorum L.	2	35	O
Trientalis europaea L.	+	7	O
Vaccinium myrtillus L.	2	20	—
Veratrum lobelianum Bernh.	10	60	—
Mosses: cover 1 %			
Plagiothecium laetum Bruch et al.	+		
Sciuro-hypnum reflexum (Starke) Ignatov & Huttunen	+		
Sciuro-hypnum starkei (Brid.) Ignatov & Huttunen	r		

Remarks: Cover: r – solitary plants; + – cover is smaller than 1 %.
Phenophase: — – vegetation growth; ^ – flower bud; O – flowering; (– end of flowering; SP – sporulation.

Lecanora cadubriae (A.Massal.) Hedl., *Lecanora chlarotera* Nyl., *Melanohalea olivacea* (L.) O.Blanco et al., *Parmeliopsis ambigua* (Wulfen) Nyl., *P. hyperopta* (Ach.) Arnold, *Pycnora sorophora* (Vain.) Hafellner; a few individuals of *Plagiothecium laetum* Bruch et al. and *Ptilidium ciliare* were found on the bark of the tree base.

The plant community in which the larch was found in the Kola Peninsula has little in common with typical communities within its main distribution area (including the westernmost part) in the type of habitat, the species composition and the structure of community (Zinserling 1934; Lantratova & Yakubnyak 2009; Kucherov & Zverev 2010, 2011; Kishchenko 2015). In its main distribution area larch forms forests on drained calcium-rich soils, often on permafrost or highly eroded surfaces. In northern boreal larch forests some species typical of spruce communities are frequently present: *Goodyera repens*, *Linnaea borealis*, *Maianthemum bifolium*, *Vaccinium myrtillus*, *V. vitis-idaea*, *Trientalis europaea*, *Dicranum polysetum*, *Hylocomium splendens*, *Pleurozium schreberi*, *Ptilium crista-castrensis*. These species are most typical of forests with developed lichen-moss and moss covers, which are almost completely absent in our larch locality. The structure of the ground layer is also largely different: whereas communities with ericoid shrublets and rather dense moss cover are common in larch forests, in our locality the ground layer is represented mainly by forbs and the moss cover is nearly lacking.

Regel (1923) and Zinserling (1934) classified a spruce-birch forest with the presence of larch in the Kola Peninsula within species-rich forb birch forests, *Betuleta herbosa*, developed on medium-thick soils with medium internal drainage. Such plant communities are not very frequent but are peculiar of floodplains in the southern part of the Kola Peninsula.

In modern phytosociological classifications (Zaugolnova et al. 2009) this plant community is referred to the association *Aconito septentrionalis – Piceetum obovatae* Zaugolnova & Morozova 2009, subassociation *filipenduletosum ulmariae* Zaugolnova & Morozova 2009 (*Piceeton excelsae* Pawłowski in Pawłowski et al. 1928, *Piceetalia excelsae* Pawłowski in Pawłowski et al. 1928, *Vaccinio – Piceetea* Br.-Bl. in Br.-Bl., Siss. & Vlieger 1939). The plant community in our locality was developed under the natural conditions that are typical of the association, and it includes a set of its diagnostic species: *Calamagrostis purpurea* s.l., *Chamaenerion angustifolium*, *Cirsium heterophyllum*, *Filipendula ulmaria*, *Geum rivale*, *Milium effusum*, *Stellaria nemorum*, *Veratrum lobelianum*). In the Kola Peninsula, as it is frequently the case in the northeastern European Russia, this plant community is dominated by birch but spruce is present regularly.

Birch forests can be frequently found belonging to the association *Aconito septentrionalis – Piceetum obovatae* in the northeast of European Russia. Like in our case, they frequently include boreonemoral species and have a lesser participation of typical boreal species, and also have a poor moss layer. Larch was also recorded from such communities in the northeastern part of European Russia. The association *Aconito septentrionalis – Piceetum obovatae* is species-rich and often includes rare vascular plants (Koroleva 2011), but it covers a minor portion of the territory of the peninsula.

Vulnerability and reference to conservation

Larix archangelica is most abundant in the northeastern part of European Russia. In Archangelsk Region it forms forests in the northern boreal and middle boreal zones, and also open woodlands in the hemiarctic zone (Kucherov & Zverev 2010, 2011, Yurkovskaya 2014). In the northeast, larch wood has a high economic value (Dylis 1981), the species is in use for wood production and is not under legal protection (Novoselov 2008).

Larch becomes sparse in the western part of its distribution area. In Karelia it does not form forests of its own but occurs as solitary trees or mingled in drained spruce or, rarely, pine forests. Its reproduction is very limited. On the basis of its rarity and limited reproductive ability, larch is legally protected in Karelia (Kravchenko 2007b). It is not included in the latest Red Data Book of Murmansk Region (Konstantinova et al. 2014), probably because of the absence of recently confirmed localities.

We assessed the conservation status of *Larix archangelica* in Murmansk Region according to the IUCN Red List categories for regional level (IUCN 2012). To date, one presumably extinct individual was registered by Zinserling in 1927, one extant individual is known to us, and two extant (but unconfirmed) individuals were reported to us by the locals (P.V. Vaganov, pers. comm. in 2015). The two individuals were said to occur in sparse spruce forest between Babya and Sosnovka Rivers; this locality was not found at an attempt of its rediscovery in 2015. All the localities, the extinct, the present and the unconfirmed one, are situated in a single compact area between Sosnovka and Pyalitsa villages (Fig. 4, 5).

The occurrence of larch in the western limit of its distribution is significantly impeded by a number of biotic and abiotic factors (Dylis 1938, 1981; Nitzenko 1959; Kashin & Kozoborodov 1966; Lantratova & Yakubnyak 2009). The localities of larch in the Kola Peninsula are most likely relic and represent remnants of a formerly greater distribution. Reproduction was not observed.

Larch should be considered Critically Endangered (CR) in Murmansk Region because the following criteria are met: A2 (population size reduction in the past), A3 (inferred population size reduction in the future), B1ab (small extent of occurrence, single location, decline), B2ab (small area of occupancy, single location, decline), C1 (less than 250 individuals known, decline), C2 (all individuals in one subpopulation, decline), D (less than 50 individuals).

On the basis of this evaluation we propose to include *Larix archangelica* into a new edition of the Red Data Book of Murmansk Region as Critically Endangered (1a). So far the localities of larch in Murmansk Region, either present or extinct, are situated outside protected areas (Kobyakov 2011).

Conclusions

The second record of larch in the Kola Peninsula confirmed its native occurrence in Murmansk Region, on the northwestern margin of its declining distribution area. Larch is extremely rare and nearly extinct in that territory, and it undoubtedly deserves strict legal protection with the status Critically Endangered.

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