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New and rare alien vascular plant species in the Republic of Karelia (European Russia)

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Summary. The article reports data about alien vascular plant species that are new (two species) or rare (five species) for the flora of Karelia. The first-time findings are *Tilia platyphyllos*, an escape from cultivation, growing in a forest community on the outskirts of Petrozavodsk, and *Verbascum densiflorum* in a crack habitat inside the city. Accidentally introduced *Verbascum densiflorum* was found at its northernmost location in Russia. New locations are reported also for the alien species previously known from 1–3 places in the Republic of Karelia. These include the invasive *Erigeron annuus* and the potentially invasive *Vinca minor*. The rest, namely *Cornus sericea*, *Malus mandshurica*, and *Pinus sibirica*, were encountered within natural boreal communities, with the former two bearing fruit. Comments on the distribution in adjacent regions, in Fennoscandia, and sometimes beyond are provided for each species. The possible introduction pathways and the invasion status are discussed.

Новые и редкие для Карелии чужеродные виды сосудистых растений

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Ключевые слова: беглецы из культуры, древесные культивируемые виды, инвазионные виды, флористические находки, чужеродные виды.

Аннотация. Приведены сведения о двух новых и пяти редких для флоры Карелии чужеродных видах сосудистых растений. Впервые выявлены *Tilia platyphyllos* как одичавшее в лесном сообществе на окраине г. Петрозаводска и *Verbascum densiflorum* в основании фундамента здания на территории города. Непреднамеренно занесённый *Verbascum densiflorum* найден в самом северном в России пункте. Также сообщается о новых местонахождениях чужеродных видов, ранее известных из 1–3 пунктов в Республике Карелия. Среди них – инвазионный вид *Erigeron annuus* и потенциально инвазионный вид *Vinca minor*. Остальные, *Cornus sericea*, *Malus mandshurica* и *Pinus sibirica*, найдены в естественных таёжных сообществах, причём два первые в плодоносящем состоянии. Для каждого вида приведены комментарии о распространении в смежных регионах, в Фенноскандии, а иногда и за её пределами. Обсуждаются возможные способы заноса и инвазионный статус видов.

Introduction

The environmental and climatic conditions play an important role in the territorial expansion of alien species (Vinogradova et al., 2010). Karelia is a typical boreal region in the north-west of European Russia, where boreal forest communities are “antagonistic” toward alien species (Kravchenko et al., 2011). The most susceptible to alien invasions in the region are transformed (e. g., urbanized or agricultural) areas, as well as urban and suburban forests (Kravchenko et al., 2020). These are the most common target habitats invaded by alien vascular plant species as casual aliens or escapes from cultivation, with evidence available in the literature, including that published in the past decade (Kravchenko et al., 2016, 2018, 2019, 2020a, b; Rudkovskaya, 2022, 2024, 2026; Sukhov, Kravchenko, 2024).

Novel floristic data for Karelia were obtained in 2022–2026. One new alien species was spotted as the author surveyed the part of the Solomennoye district of Petrozavodsk that lies east of the strait connecting Lake Logmozero to the Petrozavodsk Bay of Lake Onego. It has preserved the traditional built-up environment of single-family houses formed before the area became incorporated into the city in 1977. The owners commonly grow both ornamental and edible non-native plants in their grounds, some of which can potentially become sources of escaping to nearby forest areas. Another possible source of alien plant diaspores is the arboretum of the Petrozavodsk State University’s Botanical Garden, situated in the immediate vicinity of the residential neighborhood. The second of the two newly detected alien species was found in a crack habitat in the central part of the city. A specimen of the rare in the Russian part of Eastern Fennoscandia species *Erigeron annuus* s. l. was discovered when working with past years’ herbarium. In the following, information sourced from herbarium labels will be provided for alien plant species new for Karelia and for rare species known from few locations in the republic. Comments are given on the distribution of the species in neighboring Russian regions, in Northern Europe or, where necessary, on a wider scope. Putative introduction pathways are stated for each species. Species names are according to the WFO Plant List (<https://wfoplant-list.org>). Acronyms of the herbaria containing the cited specimens are indicated: Altai State University, Barnaul (ALTB), Komarov Botanical Institute of Russian Academy of Sciences, Saint-Petersburg (LE), Karelian Research Centre of Russian Academy of Sciences, Petrozavodsk (PTZ).

Species new for the Republic of Karelia

***Tilia platyphyllos* Scop.:** “Petrozavodsk, Solomennoye district environs, moist bilberry-forbs pine stand, 1 vegetative individual 0.73 m high, 130 m away from the presumed nearest cultivated tree, 61°50′45.9″N, 34°23′6.4″E. 25 VIII 2023. O. Rudkovskaya. No. 4007” (ALTB 1100104047, PTZ). – This W-European-SW-Asian species (Browicz, 1968) has not previously been reported for the flora of Karelia outside cultivation. The distance of *Tilia* spp. seed dispersal by anemochory is estimated to be 200–250 m from the seed tree (Levina, 1957). However, this dispersal mode is ruled out in our case, for otherwise there would be abundant self-sown progeny near the mother tree, and there is none. Apparently, for fruit of this species to sprout successfully in the climatic conditions of the southern boreal vegetation zone (Ahti et al., 1968), they need to be placed underneath the forest floor, like acorns that *Garrulus glandarius* stash in topsoil, under moss, downed deadwood, roots, and rocks (Nechaev, 2015). This is exactly the type of foraging behavior demonstrated when feeding on lime tree fruit by the Eurasian nuthatch (*Sitta europaea* L.) (Nechaev, 2020), which was encountered in the study area, where it likely breeds and overwinters (Tolstoguzov et al., 2022). In the neighboring Finland, *Tilia platyphyllos* occurs as casual in natural communities (Kurtto et al., 2019). The northernmost record of this species in Fennoscandia is the escaped plant in Umea, Sweden (63°49′21″N, 20°16′55.7″E) (Lampinen, Laiho, 2024). In the Leningrad Region, *Tilia platyphyllos* is regarded as a potentially invasive species since it has been found in natural forest communities, e. g. adjoining the arboretum of the Otradnoye Experimental Research Station (Byalt et al., 2019). In Karelia, it is a casual alien.

***Verbascum densiflorum* Bertol.:** “Petrozavodsk, Titov St., 4, cracked concrete apron between building wall and lawn, 1 fl. ind. 2.2 m tall and 4 young rosette plants, 61°47′25.88″N, 34°22′44.19″E. 25 VI 2026. O. Rudkovskaya” (ALTB 1100104055, PTZ). – The introduction source for the diaspores is not known. Not found cultivated anywhere near or in the city blocks. Reported for southern Karelia as a rarely cultivated species (Antipina, Rokhlova, 2015). Native in southern Scandinavia, southern half of Europe, the Caucasus, with isolated locations found also in the Baltic states and the Pskov Region (Fedchenko, 1955; Tzvelev, 2000; Mossberg, Stenberg, 2003). The only known case of the species sampled in the Pskov Region occurred over 100 years

ago ("Pskov Uyezd, limestone cliffs along Velikaya River. VII 1913. V. Komstadius", det. by N. N. Tzvelev. 1996. LE). As for European Russia, the few records from Moscow and the Moscow Region are the northernmost locations of the species growing naturally (Seregin, 2026). In the vast territory of Siberia, there are only singular occurrences within the alien flora (Ebel et al., 2024). In the Russian Far East, it was spotted for the first time in the Partizansky District in the middle of the past century (Prokopenko, 2021). Seventy years later, it was resampled in the same administrative district, but in other habitats (Prokopenko, 2021). Reported for southern Finland as a casual alien until 1979, with no subsequent records (Kurtto et al., 2019). Apart from being decorative, *Verbascum densiflorum* is a medicinal plant, included in "The State pharmacopoeia of the Russian Federation" (*Verbascum densiflorum*..., 2026). In Karelia, it is a casual alien, with the northernmost record outside cultivation in Russia.

Species rare in the Republic of Karelia

***Erigeron annuus* (L.) Desf. s. l.**: "Petrozavodsk, Universitetskaya St., start of the turn to Petrozavodsk University's Institute of Physics and Technology campus, road-side lawn near a car parking, 61°46'20.2"N, 34°17'10.9"E. 07 IX 2015. O. Rudkovskaya. No. 4005" (ALTB 1100103449, PTZ). – Unintentionally introduced species. Previously known for Karelia also only as a casual from 3 locations in Petrozavodsk (Sennikov, Kurtto, 2019; PTZ). The species is listed among the TOP-100 invasive species of the Russian Federation (Dgebuadze et al., 2018). The species is invasive in the Leningrad, Novgorod, and Pskov regions (Saidov et al., 2025). Furthermore, it is actively expanding its range in neighboring Vologda Region (Philippov et al., 2025). The North American species *Erigeron annuus* is listed among the most widespread alien plant species in Europe (Greuter, 2006; Lambdon et al., 2008). The species is considered as an established alien in Norway and in Sweden (Weidema, 2000; NOBANIS. URL: <http://www.NOBANIS.org/>). In Finland it is found as a locally established but not invasive alien plant (Sennikov, Kurtto, 2019). In Fennoscandia, the northernmost finding of *Erigeron annuus* as a casual plant is known from Norway at 69°06'43.6"N, 18°37'36.4"E (Arnesen, 2022). In Karelia, it is considered a casual alien plant.

***Cornus sericea* L. (*Swida stolonifera* (Michx.) Rydb.)**: "Petrozavodsk, Solomennoye district environs, Chertov Stul Geological Nature Monument, western slope of Mt. Bolshaya Vaara, bilberry-forbs

pine stand, overgrown shrub, ca. 5 m², 61°50'34.1"N, 34°23'32.1"E, 26 VIII 2023. O. Rudkovskaya. No. 4008" (ALTB 1100103865, LE, PTZ). – Presumably introduced by ornithochory. This North American species (Murrell, Poindexter, 2016) is widely cultivated in European Russia, from Karelia and Arkhangelsk to the country's southern borders (Pilipenko, 1960). To wit, it is fairly common in the Northwest, where it sometimes escapes cultivation (Tzvelev, 2000). According to the latest data (Saidov et al., 2025), the species is classified as potentially invasive within the North-West of Russia (Leningrad, Pskov, and Novgorod Regions). Similar to the previous species, it is actively spreading in neighboring Vologda Region (Philippov et al., 2025). In Karelia, the species is cultivated throughout the republic (Andreev, 1977; Lantratova, 1991) but escapes are rare: Sortavala (V. Timofeeva, PTZ), nameless islet in the Kivach State Nature Reserve (Kuchеров et al., 2000). In the neighboring Finland, the species is an alien spreading in the wild (Kurtto et al., 2019); it has become naturalized in the southwest (Bengt, 2010). In Sweden, *Cornus sericea* is listed as invasive (Bánki et al., 2026). This is where the northernmost for Northern Europe records of this species as naturalized in the wild come from (at about 63°06'38"N, 16°21'14"E, Hammarstrand); further north, in Västertotten and Norrbotten provinces, it only occurs casually (Bengt, 2010). In Karelia, it is currently considered a colonophyte.

***Malus mandshurica* (Maxim.) Kom. ex Skvortsov**: "Petrozavodsk, Solomennoye district, Botanicheskaya St., opposite house No. 31, rupicolous cowberry pine stand, moss-covered rock ledge near the flattened top of a rocky ridge, 3 individuals with fruit 2, 2.5, and 3 m high, 61°50'37.3"N, 34°22'24.9"E. 15 VIII 2023. O. Rudkovskaya. No. 4009" (ALTB 1100104215, PTZ). – Presumably introduced by ornithochory. This is the second record of the species as an escaped plant in Karelia. Previously, 20 years ago, one individual was also found in the Solomennoye district of Petrozavodsk, on roadside rock by the floating bridge (Kravchenko, 2007). *Malus mandshurica* is recommended for cultivation in southern and middle Karelia (Andreev, 1977). The singular cases of escaping are probably due to the exceptionally rare cultivation of this East-Asian species in Karelia. It is also cultivated in the north of European Russia and bears fruit in the Leningrad Region (Tzvelev, 2000; Svyazeva et al., 2011) and in Arkhangelsk (Fedorov, Poletiko, 1954). Quite rarely cultivated in the Baltic region and the central floristic district of Eastern Europe (Tzvelev, 2001). Encountered as casual in Moscow (Mayorov,

2012). *Malus mandshurica* is not known as casual or escaped species in the neighboring Finland (Kurtto et al., 2019). In Karelia, it is currently considered a colonophyte.

***Pinus sibirica* Du Tour:** “Petrozavodsk, Solomennoye district environs, Chertov Stul Geological Nature Monument, upper southern slope of Mt. Bolshaya Vaara, bilberry pine stand, 1 individual 0.3 m high, 61°50′33.4″N, 34°23′41.8″E. 3 IX 2022. O. Rudkovskaya. No. 4011” (ALTB 1100104207, LE, PTZ), verified by L. Orlova (LE). – Clearly introduced by zoochory, likely via squirrels or muroid rodents. Both were encountered during fieldwork. Previously, in Karelia, self-sawn plants of the species have been found in the Kivach State Nature Reserve (Kucherov et al., 2000), on Valaam Island (Andreev, Kuchko, 1990) and on islands in the White Sea: Krasnyi (Abramova et al., 2003), Nemetsky Kuzov (Kravchenko, 2007), and Pechak (Andreev, 1977). In the adjacent Leningrad Region, selfsowing of *Pinus sibirica* was recorded in the city of Zelenogorsk (Ignatenko, 1984), on the grounds of the Otradnoye Scientific Experimental Station (Firsov, Byalt, 2024). The natural distribution of this Euro-Siberian species in Europe reaches up to 66°20′N in the north, in Usa River catchment, Komi Republic (Martynenko, 1974). The northernmost finding in European Russia as a casual alien is not far from the City of Kola, 68°52′01.2″N, 32°57′00.0″E (Seregin, 2026). In Finland, where dozens of cases of escaping from cultivation are known in central and southern parts of the country (Bánki et al., 2026), *Pinus sibirica* is recognized as a casual alien species (Kurtto et al., 2019). In Scandinavia, there are two locations where the species is locally established: one is in the northernmost county of Sweden (Norrbotten province), and the other is in the far north-eastern part of Norway (Øst-Finnmark province), which borders Russia (Christensen, 2000). In Fennoscandia, the northernmost record of *Pinus sibirica* as a casual plant is known from Norway at 69°06′43.6″N, 18°37′36.4″E (Arnesen, 2022). In Karelia, it is currently considered a colonophyte.

***Vinca minor* L.:** “Petrozavodsk, Solomennoye district, Botanicheskaya St., opposite house № 31, a clump comprising *Padus avium*, *Salix* sp. and

young regeneration of *Pinus sylvestris*, 3 patches, the largest one covering 2 m²; across the path, in a grass-forbs pine stand, at the foot of a ridge, population covering some 15 m², 61°50′36.5″N, 34°22′21.2″E. 24 VIII 2024. O. Rudkovskaya. No. 4012” (ALTB 1100104330, LE, PTZ). – It actively spreads under the forest canopy. In June 2026, abundant flowering of *Vinca minor* was recorded. The second record of this species is in the status of an escape in Karelia. Previously, this European-SW-Asian species was found as escaped in a rupicolous pine stand in the Sortavalsky Botanical Reserve (Kravchenko, 2007). Further south, in the Leningrad, Pskov and Novgorod Regions, escaped plants grow in urban forests, parks, gardens and cemeteries, and the number of escape cases has been growing lately (Byalt et al., 2012, 2019, 2022; Firsov et al., 2020). In the neighboring Finland, *Vinca minor* has become naturalized (Kurtto et al., 2019). Northern Europe’s northernmost record of this species as escaped also comes from Finland – from Raahe, 64°40′10.2″N, 24°32′58.3″E (Lampinen, Laiho, 2024). In Northern Europe in general, the species is known from quite many locations up to about 62°N in the north (Lampinen, Laiho, 2024). The species is listed as invasive in Norway and Sweden (Bánki et al., 2026). *Vinca minor* is recommended for inclusion in the Black List of invasive species in European Russia, since it shows a tendency to actively expand its secondary range (Vinogradova et al., 2010, 2015). It is reported as an escaped species for the flora of Belarus (Lunina, 2010). In Karelia, it is currently considered a colonophyte.

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