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BIODIVERSITY STUDIES

Flora of the Nenets Autonomous Okrug (European Russia): contribution to the checklist of vascular plants

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ABSTRACT

The Nenets Autonomous Okrug (NAO), an Arctic region of European Russia, currently lacks a comprehensive checklist of vascular plants; its flora is the most species-poor among all first-level administrative units of the Russian Federation. As a baseline for this study, we compiled a list of 685 vascular plant taxa recorded within the NAO based on dot-distribution maps from "Flora of the North-East of the European Part of the USSR" (Tolmachev 1974–1977), subsequently publishing this as a GBIF-mediated dataset. The present contribution synthesises reliable data on an additional 113 species identified through references, digitised herbarium collections, and verified iNaturalist observations. Six of these taxa had not been previously reported for the NAO in any published references: four native species or hybrids (*Potamogeton* × *nitens*, *Draba oxycarpa*, *Drosera* × *obovata*, and *Alchemilla transpolaris*) and two alien species (*Galeopsis bifida* and *Centaurea cyanus*). We estimate vascular plant diversity of the NAO to be no fewer than 800 species (excluding apomictic microspecies).

Keywords: Nenets Autonomous Okrug, Arctic flora, vascular plants, biodiversity, new records, GBIF, European Russia

РЕЗЮМЕ

Серегин А.П. Флора Ненецкого автономного округа (Европейская Россия): материалы к чеклисту сосудистых растений. Ненецкий автономный округ (НАО) – арктический регион в европейской части России, для которого на данный момент отсутствует полный чеклист сосудистых растений; его флора является самой бедной по видовому составу среди всех субъектов Российской Федерации. В качестве основы для данного исследования нами был составлен список из 685 таксонов сосудистых растений, зафиксированных на территории НАО по значковым картам "Флоры Северо-Востока европейской части СССР" (1974–1977); впоследствии этот предварительный чеклист был опубликован в виде набора данных (датасета) в GBIF. Настоящая работа обобщает достоверные сведения о дополнительных 113 видах, выявленных на основе анализа источников литературы, оцифрованных гербарных коллекций и подтвержденных наблюдений на платформе iNaturalist. Шесть из этих таксонов ранее не упоминались для НАО в публикациях: четыре аборигенных вида и гибрида (*Potamogeton* × *nitens*, *Draba oxycarpa*, *Drosera* × *obovata* и *Alchemilla transpolaris*) и два заносных вида (*Galeopsis bifida* и *Centaurea cyanus*). По нашим оценкам, видовое разнообразие сосудистых растений, известных в настоящее время на территории НАО, составляет не менее 800 видов (без учета апомиктических микровидов).

Ключевые слова: Ненецкий автономный округ, арктическая флора, сосудистые растения, биоразнообразие, новые находки, GBIF, Европейская Россия

Current global climatic shifts are particularly pronounced in the Arctic. Transformations within ecosystems are increasingly evident, notably through the emergence of southern vascular plant species – both within the native flora and among alien plants of transformed habitats. Consequently, there is an urgent need for the continuous monitoring and recording of Arctic biodiversity, both through real-time electronic information systems and periodic publications that synthesise biodiversity data for specific Arctic regions.

While compiling a comparative assessment of regional floras across Russia, we noticed that the vascular flora of the Nenets Autonomous Okrug (NAO) is the most species-poor among all first-level administrative units of the Russian Federation (Seregin et al. 2020). The figure available at that time – 720 species (Matveeva 2006) – was notably lower than the species richness of Kalmykia (995 species) (Baktasheva 2012, Seregin 2024b) and the Chukotka Autonomous Okrug (1 036 species, or 1 159 taxa including subspecies and varieties) (Yurtsev et al. 2010, Seregin 2024a). A more recent estimate for the NAO flora, based on a bibliographic database, puts the diversity of vascular plants at 760 species, 26 of which include infraspecific taxa (Rozhnov et al. 2019). Although this database was intended to form the basis of an online information system, the project remains unrealised.

The floristic poverty of the region is attributable to the fact that almost the entire vast territory of the NAO (176 800 km^2) lies within the Arctic Circle. The region encompasses both mainland areas and several islands, most notably

Kolguyev and Vaygach. Approximately 90 % of the district consists of lowlands with elevations below 100 m above sea level. In the east, the Pay-Khoy Ridge reaches an altitude of 467 m; however, it exhibits minimal altitudinal zonation (Safronova et al. 1999). Vegetation cover displays distinct latitudinal zonation: across a relatively short meridional span of 300–400 km, there is a sequential transition through five vegetation subzones, ranging from the Arctic tundra of Vaygach Island to the northern taiga in the southwest of the okrug (Safronova et al. 1999, Rozhnov et al. 2019). The coastline, bordering the White, Barents, and Kara Seas, exceeds 3 000 km.

At present, we have prepared preliminary checklists of the vascular flora for each federal subject (first-level administrative units) of Russia, based on standard floras or other published sources (Seregin 2026a). Identifying and digitising a baseline source for the NAO checklist of vascular plants proved exceptionally challenging, as no comprehensive regional treatments exist for this territory. Ultimately, the checklist was compiled through a systematic review of dot-distribution maps published in the four-volume "Flora of the North-East of the European part of the USSR" (Tolmachev 1974, 1976a,b, 1977). This proved to be the oldest primary source used for any regional checklist across Russia. The resulting list contains 685 mapped taxa with at least one recorded occurrence within the NAO, i.e. 658 species, 17 additional subspecies, 5 additional varieties, and 5 mapped intermediate forms (hybrids). This checklist, maintaining the original nomenclature, has been published as an open-access GBIF-mediated dataset (Seregin 2026b; see also Appendix I in electronic supplement).

As of now, the NAO is not only the most floristically poor region in Russia but also possesses the most outdated baseline source among all regional checklists.

Through various projects, the author has undertaken the inventory and analysis of sources pertaining to the NAO flora. This work includes the digitisation of herbarium collections, the creation of a database of Russian local floras, the collection of photographic observations, and the development of a grid-based atlas of the Russian flora. For each of these four research areas, extensive datasets were generated and subsequently deposited in GBIF.

The objective of the present article is to meticulously consolidate existing knowledge of the NAO flora from open sources (literature, digitised herbaria, and iNaturalist data) and to compile a list of species that augment the preliminary checklist (Seregin 2026b).

MATERIAL AND METHODS

GBIF-mediated data

As of 1 February 2026, the total volume of floristic data for the NAO in GBIF reached 27 398 occurrence records (GBIF.org 2026). The most significant contributions were provided by Tolmachev et al. (2025), Bochkov & Seregin (2026), Rebristaya et al. (2025), Seregin (2026d), iNaturalist contributors & iNaturalist (2026), Seregin & Stepanova (2026) (Fig. 1). The synthesis of this substantial volume of digitised data has enabled the identification of species that supplement the baseline checklist for the NAO.

Digitised herbarium collections from the Moscow Digital Herbarium portal (Seregin 2026c) are published in GBIF as twelve datasets from each participating member of the consortium. Within the NAO territory, 2 311 vascular plant specimens were identified in the Moscow University Herbarium (MW) (Seregin 2025, 2026d), while the Herbarium of the Main Botanical Garden RAS, Moscow (MHA) holds 550 specimens (Seregin & Stepanova 2020, 2026). The primary collectors of the NAO flora represented in these two Moscow herbaria include S.G. Grigoryev (MW, 717 specimens), I.A. Perfilyev (MW, 335 specimens), M.S. Ignatov and N.Y. Stepanova (MHA, 380 specimens), D.M. Milko (MW, 169 specimens), A. Detlaf (MW, 165 specimens), V.N. Vekhov (MW, 143 specimens), F.S. Leontyev (MW, 121 specimens), A.S. Zholobov (MW, 114 specimens), V.V. Morozov (MW, 90 specimens), A.K. Skvortsov (MHA, 86 specimens), and others. Notably, ca. 50 specimens collected by F.I. Ruprecht in 1841 were transferred to MW from the Komarov Insitute Herbarium, Russian Academy of Sciences, St. Petersburg (LE). These collections provide documentation for several seminal works on the flora and vegetation of the NAO (Ruprecht 1845, 1854, Grigoryev 1929, Perfilyev 1934, 1936, Morozov & Kuliev 1989, 1990, 1994, Kuliev & Morozov 1991).

As of 5 February 2026, the database of Russian local floras (Seregin et al. 2024, Bochkov & Seregin 2026) covers more than 3 500 locations based on data from 647 published references, including 51 sites within the NAO (Tolmachev & Tokarevskikh 1968, Rebristaya 1977, Vekhov & Kuliev 1986, Sergienko 1987, 2013, Vekhov 1994, Novakovskaya 1997, Kustysheva 1999, Kuliev 2007, Lavrinenko et al. 2009, 2016, 2019). These records primarily consist of comprehensive floristic inventories of local floras, as well as surveys of specific freshwater bodies. In total, this source consolidates 9 245 individual occurrences.

The collection of floristic data via photographic observations in Russia (Seregin et al. 2020) has proven largely unsuccessful for the NAO. On the iNaturalist platform, the region consistently ranks penultimate among Russian federal subjects in terms of observation number. This deficit is attributable to both the low number of local residents and a lack of engagement from professional researchers. Nevertheless, as of 5 February 2026, there are 1 013 verified observations covering 243 species of the NAO flora, including contributions from several professional researchers.

Furthermore, dot-distribution maps from two important sources on the flora of northern European Russia were digitised and published as GBIF datasets in 2025 (Rebristaya et al. 2025, Tolmachev et al. 2025). These include a dataset based on maps from the abovementioned "Flora of the North-East of the European part of the USSR" (Tolmachev 1974, 1976a,b, 1977), comprising 61 073 occurrences in total, 10 532 of which pertain to the NAO (Tolmachev et al. 2025), and a dataset based on "Flora of the east of Bolshezemelskaya Tundra" (Rebristaya 1977), totaling 5 164 points, with 2 611 located within the NAO (Rebristaya et al. 2025).

All such activities – herbarium digitisation, literature databasing, and the collection of photographic observations – are conducted with the ultimate objective of creating a grid-based atlas of the Russian flora using 100×100 km squares

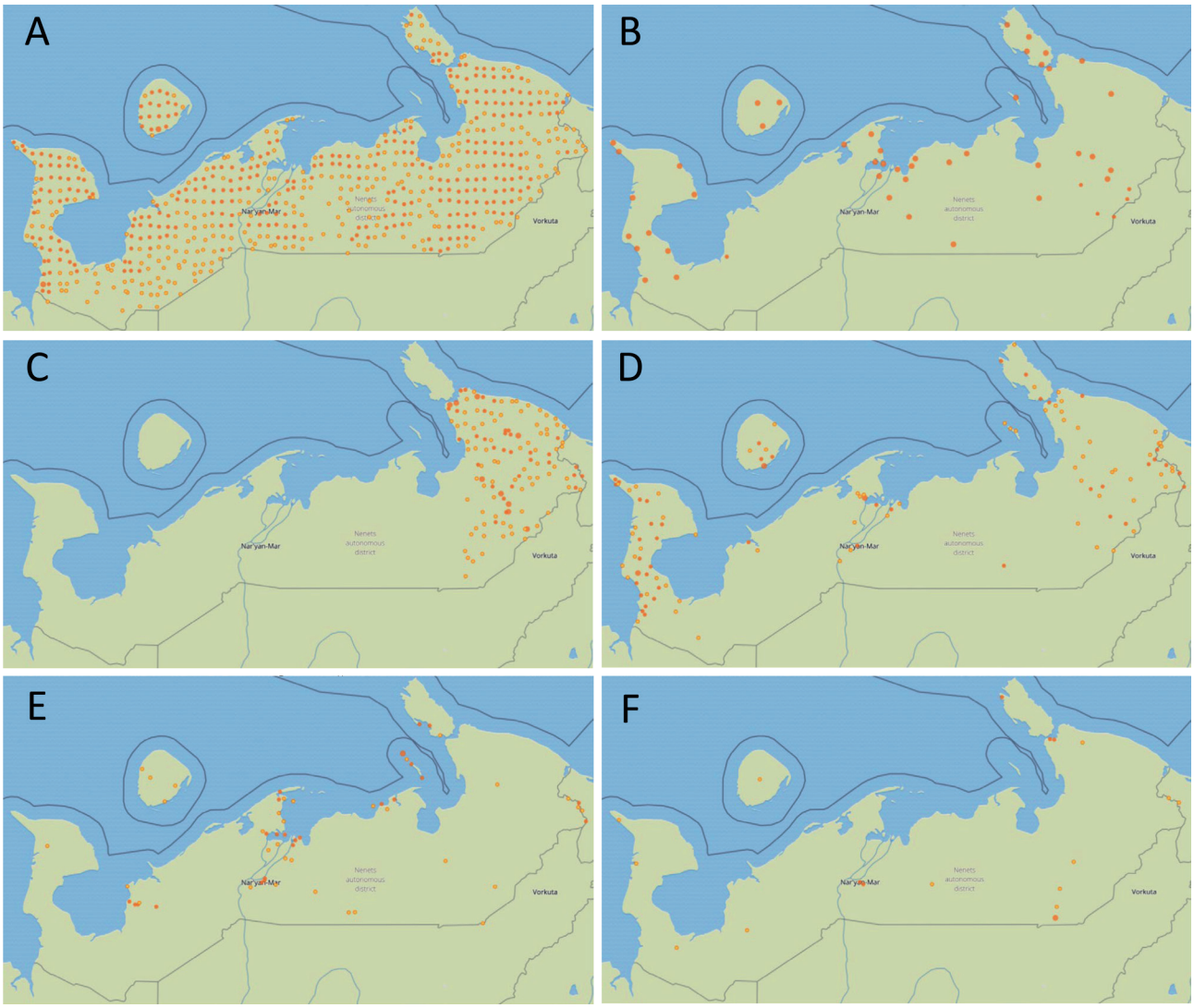

Figure 1 GBIF-mediated data from top datasets for the Nenets Autonomous Okrug by the number of occurrences of vascular plants. A – Dot-distribution maps from "Flora regionis boreali-orientalis…" (Tolmatchev et al. 2025): 10 532 occurrences; B – Species lists of the local floras of Russia (Bochkov & Seregin 2026): 9 245 occurrences in 51 locations; C – Dot-distribution maps from "Flora of the east of Bolshezemelskaya Tundra" (Rebristaya et al. 2025): 2 611 occurrences; D – Specimens from the Moscow University Herbarium (MW) (Seregin 2026): 2 311 occurrences E – Research-grade observations from the "Flora of Russia…" project (iNaturalist contributors & iNaturalist 2026): 1 013 occurrences; F – Specimens from the Main Botanical Garden, RAS, Moscow (MHA) (Seregin & Stepanova 2026): 550 occurrences

by our team. Preliminary maps for 9 885 species are currently available in open access mode (Dudov & Seregin 2026).

Data assessment and data cleaning

A dataset comprising 27 398 records of vascular plants within the NAO was retrieved from GBIF (GBIF.org 2026). From this dataset, we exclude: (1) all records not identified to species level; and (2) all incidental records originating from non-specialised datasets. The remaining records were subsequently grouped by species.

Species already accounted for in the preliminary checklist of the NAO (Seregin 2026b) were automatically green-flagged. All remaining records were then systematically verified against primary sources: bibliographic references were verified, and images of herbarium specimens and in situ photographs were examined. Ambiguous reports and unreliable identifications were discarded. Furthermore, georeferenced data from border regions were scrutinised; in particular, records from the right and left banks of the Kara River – the lower reaches of which form the district boundary – were clarified where possible.

Integration of additional records from references

In the subsequent phase, data from the second edition of the regional Red Data Book (Matveeva 2020) were integrated, adding a further four species. Following this, using the tables provided by N.A. Sekretareva (2004), all records for the five subdivisions of the Russian Arctic located within the NAO were identified: Kanin Peninsula; Kolguyev Island; the Timano-Malozemelskaya Tundra; the western part of the Bolshezemelskaya Tundra; and the Yugorsky Peninsula (including the Pay-Khoy Range and Vaygach Island). This yielded an additional 29 species, including four tentative records and 11 records of alien species. For each of these, the primary source was sought, typically being the relevant volume of "Arctic flora of the URSS" (1960–1987) or subsequent papers detailing new floristic records.

The regionalization was significantly revised and many new data were added in the second edition (Sekretareva 2024). According to this source, the following subdivisions extend into the territory of the Nenets Autonomous Okrug (NAO): Kanin Peninsula [#6] (completely); Kolguyev Island [#7] (completely); the Malozemelskaya Tundra [#8] (completely); the western part of the Bolshezemelskaya Tundra [#9] (completely); the eastern part of the Bolshezemelskaya Tundra [#10] (incl. the Yugorsky Peninsula and the Kara Tundra) (major part); Barents Sea Islands (Vaygach, Dolgiy, etc.) [#11] (completely); Kanin-Timan forest-tundra [#28] (major part); Pechora-Kolva forest-tundra [#29] (minor part). In the second edition, some noteworthy records of seven alien species from Kanin Peninsula reported earlier (Sekretareva 2004) (i.e. *Triticum aestivum* L., *Secale cereale* L., *Hordeum vulgare* L., *Allium sativum* L., *A. cepa* L., *Lepidium ruderale* L., *Pisum sativum* L.) were fully omitted as misinterpretations as well as an alien record of *Elymus trachycaulus* (Link) Gould & Schinners s. l. from Yugorsky Peninsula.

Finally, references on the flora and vegetation of the region published after 1974 and not yet digitised for GBIF were reviewed. These included articles detailing new floristic discoveries (Morozov & Kuliev 1989, 1990, 1994, Kuliev & Morozov 1991) and district inventories for Kolguyev Island and the Kara River (Safronova 1990, Savinov 2018). Additionally, precise data on individual occurrences were extracted from papers containing phytosociological relevés (Lavrinenko & Lavrinenko 2018a, 2018b, 2021, Moseev & Sergienko 2020, Lavrinenko & D'yachkova 2021, Lavrinenko et al. 2024).

Final nomenclature was checked against newly published sources on some critical groups (Wieglib 2017, Efimov 2022, Fehrer 2022, Kirschner et al. 2025, etc.) and general nomenclature (Chepinoga et al. 2024, Sekretareva 2024), but not follow them completely.

RESULTS

We identified no fewer than 113 additional species currently recorded in the NAO that, for various reasons, were omitted from the maps in "Flora of the North-East of the European part of the USSR" (Tolmachev 1974, 1976a,b, 1977) and the subsequent checklist dataset derived from it (Seregin 2026b).

It is important to note that species mentioned in the baseline source as varieties, subspecies, or synonyms – but whose modern taxonomic interpretation has changed – are excluded from this list; thus, only novelties or previously overlooked records are presented below. For instance, the treatment of *Deschampsia cespitosa* subspecies by N.N. Tzvelev (in Tolmachev 1974) differs significantly in taxonomic rank and circumscription from his latest treatment of Russian grasses (Tzvelev & Probatova 2019). Similar discrepancies occur within the genera *Elymus*, *Calamagrostis*, *Betula*, *Eremogone*, *Silene*, *Cardamine*, *Ribes*, *Armeria*, and *Galium*. In these cases, "Arctic flora of the URSS" (1960–1988) and subsequent works often adopted a narrower species concept than "Flora of the North-East of the European part of the USSR" (Tolmachev 1974, 1976a,b, 1977), while recent revisions have conversely reduced some of these microspecies to synonymy.

Consequently, our materials include only new records that augment, rather than revise, the existing checklist.

Dryopteridaceae

***Dryopteris fragrans* (L.) Schott** – One locality (Rebristaya 1977 – map); the Kheyakha River headwaters, 17.7.1991 (Morozov & Kuliev 1994); canyon near the Pestanshor River mouth, 26.7.1991 (Morozov & Kuliev 1994); the Saayakha River valley, 17.8.1991 (Morozov & Kuliev 1994); Pay-Khoy, rare (Tolmachev 1960); Yugorsky Peninsula (with Pay-Khoy Range and Vaygach Island) (Sekretareva 2004) = subdivision #10, rare (Sekretareva 2024).

Thelypteridaceae

***Phegopteris connectilis* (Michx.) Watt** (*Thelypteris phegopteris* (L.) Sloss.) – See Red Data Book (Matveeva 2020); subdivision #28, rare (Sekretareva 2024).

Ophioglossaceae

***Sceptridium multifidum* (S.G. Gmel.) M. Nishida ex Tagawa** – Nenetsky Zapovednik, Kostyanoy Nos, 12.6.2022, T. D'yachkova (iNat 122442252); subdivision #29, alien (Sekretareva 2024). – Locality details and species biology do not support that this outlying record is of human origin.

Isoëtaceae

***Isoëtes lacustris* L.** – Diyaty Lake (Vekhov 1994).

Typhaceae

***Sparganium angustifolium* Michx.** – Pesha River – Volonga River (Vekhov & Kuliev 1986); Nenetsky Reserve, Pechora River Estuary (Lavrinenko & D'yachkova 2021); Kashin Island in Korovinskaya Bay (Lavrinenko et al. 2024); Vicinity of Naryan-Mar, the area behind the Naryanmarneftegaz office, a lake along the road to the new airport, 31.7.2022 (Lavrinenko et al. 2024); Lovetsky Island in Pechora Bay, southern part, shallow water at the lake edge, 10.8.2020 (Lavrinenko et al. 2024); Pechora River Delta (Kumzhinskoye gas condensate field), area of wells No. 1 and 2, a lake connected to an unnamed channel, a tidal islet in the center of the lake, 8.8.2020 (Lavrinenko et al. 2024); Naryan-Mar (Tolmachev 1960).

Potamogetonaceae

***Potamogeton compressus* L.** (*P. zosterifolius* Schumach.) – Pechora River Delta (Kumzhinskoye gas condensate field), a large elongated lake connected by an anabranch to Korovinskaya Bay, 4.8.2023 (Lavrinenko et al. 2024). This record clearly needs a voucher or a photo for verification.

***Potamogeton natans* L.** – Chizha (Sergienko 2013); Golubnitsa (Sergienko 2013); Vizhas (Sergienko 2013); Nes (Sergienko 2013); subdivision #6, rare (Sekretareva 2024).

***Potamogeton* × *nitens* Weber** (= *P. gramineus* L. × *P. perfoliatus* L.) – Middle course of Adzva River, left bank, outcrop No. 41, in water, 30.7.2009, coll. M.S. Ignatov, N.Yu. Stepanova, O.V. Ivanov & D.G. Donskov, det. A. Bobrov (MHA0002970); ibidem, near the camp, in water, 1.8.2009, coll. N.Yu. Stepanova & O.V. Ivanov, det. A. Bobrov (MHA0002971).

***Potamogeton obtusifolius* Mert. & W.D.J. Koch** – Yugorsky Peninsula (with Pay-Khoy Range and Vaygach Island) (Sekretareva 2004 – disputable record marked with "?").

***Potamogeton pusillus* L.** s.str. – Nenetsky Reserve, Pechora River Estuary, recorded "much further north than previous locations" with a reference to identifications of aquatic plants by A.A. Bobrov in acknowledgements (Lavrinenko & D'yachkova 2021); Pechora River Delta (Kumzhinskoye gas condensate field), Kozlyukov Shar anabranch, 8.8.2020 (Lavrinenko et al. 2024).

***Potamogeton sibiricus* A. Benn.** – Srednyaya Peschanka (Lavrinenko et al. 2016); Nizhnyaya Peschanka (Lavrinenko et al. 2016); Nenetsky Nature Reserve, Pechora

River mouth, Svizev Shar anabranch, on clayey bottom sediments, 6.9.2014, coll. N.G. Panarina, det. A.A. Bobrov & M.N. Kozhin (MW0200090); Nenetsky Reserve, Pechora River Estuary (Lavrinenko & D'yachkova 2021); Lovetsky Island in Pechora Bay, northern part, 13.8.2020 (Lavrinenko et al. 2024); Kashin Island in Korovinskaya Bay, a small oxbow lake in the southwest of the island, 7.8.2020 (Lavrinenko et al. 2024); Western part of the Bolshezemelskaya Tundra, Bolvansky Nos Cape, a small lake behind a pebble ridge along the right bank of the Pechora River, 28.7.2020 (Lavrinenko et al. 2024).

***Stuckenia filiformis* (Pers.) Börner** (*Potamogeton filiformis* Pers.) – Srednyaya Peschanka (Lavrinenko et al. 2016); Nizhnyaya Peschanka (Lavrinenko et al. 2016); Bolvanskaya Bay (Lavrinenko et al. 2016, Lavrinenko & Lavrinenko 2018b); Pakhancheskaya Bay (Lavrinenko et al. 2016, Lavrinenko & Lavrinenko 2018b); Khaypudyrskaya Bay (Lavrinenko et al. 2016, Lavrinenko & Lavrinenko 2018b); Gusinets (Lavrinenko et al. 2019); Shapkina (Lavrinenko et al. 2019); Khylchuyu (Lavrinenko & Lavrinenko 2018b, Lavrinenko et al. 2019); Dvoynichnaya (Lavrinenko & Lavrinenko 2018b, Lavrinenko et al. 2019); More-Yu Forest Island (Kustysheva 1999); Pesha River – Volonga River (Vekhov & Kuliev 1986); Nenetsky Nature Reserve, Pechora River mouth, Kostyanoy Nos Peninsula, near the eastern shore, on sandy bottom sediments, 6.9.2014, coll. N.G. Panarina, det. A.A. Bobrov & M.N. Kozhin (MW0200074); ibidem, Svizev Shar Strait, silty-clayey bottom sediments, 6.9.2014, coll. N.G. Panarina, det. A.A. Bobrov & M.N. Kozhin (MW0200075); Nenetsky Reserve, Pechora River Estuary (Lavrinenko & D'yachkova 2021); 15 relevés at multiple sites across NAO (Lavrinenko et al. 2024); Middle course of Adzva River, left bank, near the camp, in water, 1.8.2009, coll. N.Yu. Stepanova & O.V. Ivanov, det. A. Bobrov (MHA0002786, MHA0002789); ibidem, right bank, outcrop No. 29, in water, 24.7.2009, coll. M.S. Ignatov & N.Yu. Stepanova, det. A. Bobrov (MHA0002787, MHA0002788); ibidem, right bank, outcrop No. 32, in water, 28.7.2009, coll. M.S. Ignatov & N.Yu. Stepanova, det. A. Bobrov (MHA0002790); Western part of Bolshezemelskaya Tundra (Sekretareva 2004); subdivisions #7, #9 (Sekretareva 2024).

***Stuckenia vaginata* (Turcz.) Holub** (*Potamogeton subretusus* Hagstr.) – Vashutkiny Lakes (Vekhov 1994); Padimeiskie Lakes (Vekhov 1994); Syadeity Lake (Vekhov 1994); Diyaty Lake (Vekhov 1994); Bolshie Vyyaty Lake (Vekhov 1994); Nenetsky Nature Reserve, Pechora River mouth, Kostyanoy Nos Peninsula, near the eastern shore, on sandy bottom sediments, 6.9.2014, coll. N.G. Panarina, det. A.A. Bobrov & M.N. Kozhin (MW0200091, MW0200092); Middle course of Adzva River, left bank, outcrop No. 41, in water, 30.7.2009, coll. M.S. Ignatov, N.Yu. Stepanova, O.V. Ivanov & D.G. Donskov, det. A. Bobrov (MHA0003298); Western part of Bolshezemelskaya Tundra (Sekretareva 2004); subdivision #10, rare (Sekretareva 2024). – Three widespread species of *Stuckenia* are currently known in the NAO (i.e. *S. pectinata* (L.) Börner, *S. filiformis* and *S. vaginata*). Fehrer et al. (2022) and Bobrov (in Chepinoga et al. 2024) reported interspecific hybrids, which are consistently sterile, which are detected among all widespread species, but not reported from the NAO.

***Zannichellia palustris* L.** (incl. *Z. repens* Boenn.) – Nenetsky Nature Reserve, Pechora River mouth, Kostyanoy Nos Peninsula, plant fragments found near the eastern shore, 4.9.2014, coll. N.G. Panarina (MW0200093; Kirina et al. 2026). – The specimen was involved in recent molecular studies of Z. palustris complex (Kirina et al. 2026), which synonymized Z. repens based upon genetic and morphological evidence.

Zosteraceae

***Zostera marina* L.** – Shoina (Sergienko 2013); subdivision #6, rare (Sekretareva 2024).

Scheuchzeriaceae

***Scheuchzeria palustris* L.** – Chizha (Sergienko 2013); Nes (Sergienko 2013); subdivisions #6, #28, rare (Sekretareva 2024); Kanino-Timanskiy District, Oma River, 1.5 km N of Tarasovo, sedge-sphagnum bog, in hollows with water, 16.8.1957, coll. L. Korkonosova (MW0218122).

Alismataceae

***Alisma plantago-aquatica* L.** – Nes (Sergienko 2013).

***Sagittaria natans* Pall.** – Nenetsky Zapovednik, Malyy Gusinets, 8.8.2020, T. D'yachkova (iNat 69362032); Nenetsky Nature Reserve, Pechora River mouth, Svizev Shar anabranch, on clayey bottom, 6.9.2014, coll. N.G. Panarina, det. A.A. Bobrov & M.N. Kozhin (MW0200108, MW0200109); Nenetsky Reserve, Pechora River Estuary (Lavrinenko & D'yachkova 2021); Pechora River Delta (Kumzhinskoye gas condensate field): area of wells 1 and 2, a shallow lake connected to the Svizhev Shar anabranch, 8.8.2020 (Lavrinenko et al. 2024).

Poaceae

ALIEN ***Avena sativa* L.** – Kanin Peninsula, alien (Sekretareva 2004). Later, Sekretareva (2024) indicated this species for subdivision #28 as an old casual record with no recent confirmations.

ALIEN ***Lolium pratense* (Huds.) Darbysh.** (*Festuca pratensis* Huds.) – Kharyaginsk (Novakovskaya 1997); subdivision #29, alien (Sekretareva 2024).

ALIEN ***Poa angustifolia* L.** – Western part of Bolshezemelskaya Tundra, alien (Sekretareva 2004).

***Dupontia pelligera* (Rupr.) Rupr. ex Nyman** (*D. fischeri* subsp. *pelligera* (Rupr.) Tzvelev) – Kanin Nos (Sergienko 2013); Tarkhanovo (Sergienko 2013); Kambalnitsa (Sergienko 2013). – The species was described from the Kanin Peninsula. It possibly originates from the hybridization of *D. psilosantha* (Rupr.) Griseb. (*D. fischeri* subsp. *psilosantha* (Rupr.) Hultén) with *D. fisheri* R. Br. s.str., as it occupies an intermediate position between them (Tzvelev & Probatova 2019). Typical *D. fisheri* as circumscribed by Tzvelev & Probatova (2019) is a species of High Arctic absent from NAO. Numerous records of *D. fisheri* auct. from the area mostly refer to *D. psilosantha*.

***Phippsia* × *algidiformis* (H. Smith) Tzvelev** (*P. concinna* (Th. Fries) Lindeb. × *P. algida* (Soland.) R. Br.) – Yugorsky Peninsula (with Pay-Khoy Range and Vaygach Island) (Sekretareva 2004); subdivision #10 (Sekretareva 2024).

ALIEN ***Puccinellia distans* (Jacq.) Parl.** – Shapkina (Lavrinenko et al. 2019); Ortina (Lavrinenko et al. 2019); Kanin Peninsula, alien (Sekretareva 2004); subdivisions #6, #28, #29, alien (Sekretareva 2024). – Only as an alien on human habitats. The records from seashore areas clearly refer to other native species.

***Puccinellia maritima* (Huds.) Parl.** – Shoina (Sergienko 2013); Kanin Peninsula (Sekretareva 2004). – Tzvelev & Probatova (2019) indicated this species for nearby Dvina-Pechora region, but not for European Arctic proper. Probably due to this, there are no species records in Sekretareva (2024).

ALIEN ***Dactylis glomerata* L.** – Vizhas (Sergienko 2013); Nes (Sergienko 2013); Kanin Peninsula, alien (Sekretareva 2004); subdivision #28, alien (Sekretareva 2024).

***Melica nutans* L.** – Vizhas (Sergienko 2013); Nes (Sergienko 2013); subdivision #28, rare (Sekretareva 2024).

***Phragmites australis* (Cav.) Trin. ex Steud.** – Shoina (Sergienko 2013); Nes (Sergienko 2013); subdivisions #6, #28, rare (Sekretareva 2024); Kanin Peninsula, southern part, the Borovaya River laida (salt marsh), shore of a small lake-puddle, 21.7.1914, coll. S. Grigoryev (MW0236261); S part of Kanin Peninsula (Tolmachev 1964).

Cyperaceae

***Eriophorum callitrix* Cham. ex C.A. Mey.** – Kara Tundra, collected by Sukachev as reported by Krylov (Tolma-

chev 1966a); Yugorsky Peninsula (with Pay-Khoy Range and Vaygach Island) (Sekretareva 2004). Later, Sekretareva (2024) reported this record for subdivision #10 as doubtful.

***Schoenoplectus lacustris* (L.) Palla** (*Scirpus lacustris* L.) – Nes (Sergienko 2013) ; subdivision #28, rare (Sekretareva 2024).

***Eleocharis quinqueflora* (Hartmann) O. Schwarz** – Shapkina (Lavrinenko et al. 2019).

***Carex lasiocarpa* Ehrh.** – Kharyaginsk (Novakovskaya 1997); subdivision #29, rare (Sekretareva 2024).

***Carex serotina* Mérat** (*C. oederi* p.p.) – Shomokhovskie Sopki (Sergienko 2013); subdivisions #6, #28, rare (Sekretareva 2024).

***Carex salina* Wahlenb.** – Bolvanskaya Bay (Lavrinenko et al. 2016, Lavrinenko & Lavrinenko 2018b); Pakhancheskaya Bay (Lavrinenko et al. 2016, Lavrinenko & Lavrinenko 2018b); Khaypudyrskaya Bay (Lavrinenko et al. 2016, Lavrinenko & Lavrinenko 2018b); Khylchuyu (Lavrinenko & Lavrinenko 2018b, Lavrinenko et al. 2019); Dvoynichnaya (Lavrinenko & Lavrinenko 2018b, Lavrinenko et al. 2019); subdivisions #9, #28, rare (Sekretareva 2024).

Araceae

***Calla palustris* L.** – Vizhas (Sergienko 2013); subdivision #28, rare (Sekretareva 2024). See also Red Data Book (Matveeva 2020).

Juncaceae

***Juncus ranarius* Songeon & E.P. Perrier** (*J. ambiguus* auct., *J. bufonius* p.p.) – Chizha River Estuary (Moseev & Sergienko 2020); Nenetsky Zapovednik, Malyy Gusinets, 8.8.2020, T. D'yachkova (iNat 69361855) = Pechora River Estuary in Nenetsky Reserve (Lavrinenko & D'yachkova 2021) = Pechora River Delta (Kumzhinskoye gas condensate field), Gniloy Sharok anabranch, 8.8.2020 (Lavrinenko et al. 2024 sub nom. *J. bufonius* auct.). – Also, there are some additional records of *J. bufonius*, which should be treated under this name: Dvoynichnaya (Lavrinenko et al. 2019); Shoina (Sergienko 2013); Chizha (Sergienko 2013); Vizhas (Sergienko 2013); Nes (Sergienko 2013); Kanin Peninsula, alien (Sekretareva 2004); vicinity of Naryan-Mar, a dirt road behind the antenna field, a dried-up puddle, 2.8.2022 (Lavrinenko et al. 2024). Sekretareva (2024) indicated *J. bufonius* s.l. for subdivisions #6, #9, #10, #28 as an alien, but all records cited above are based upon native populations.

Liliaceae

***Gagea granulosa* Turcz.** – Nes (Sergienko 2013); subdivision #28, rare (Sekretareva 2024).

Melanthiaceae

***Paris quadrifolia* L.** – Nes (Sergienko 2013); subdivision #28, rare (Sekretareva 2024).

Orchidaceae

***Neottia cordata* (L.) Rich.** (*Listera cordata* (L.) R.Br.) – Bolvanskaya Bay (Lavrinenko et al. 2016); Ortina (Lavrinenko et al. 2019); Dvoynichnaya (Lavrinenko et al. 2019); Kharyaginsk (Novakovskaya 1997); Vizhas (Sergienko 2013); Timano-Malozemelskaya Tundra (Sekretareva 2004); subdivisions #8, #9, #28, #29, rare (Sekretareva 2024); "North of the Malozemelskaya Tundra (W of the Dvuglavaya Sopka, mossy willow thicket; Igoshina, 1930)" (Tolmachev 1963). See also Red Data Book (Matveeva 2020) and later confirmation by Efimov (2022).

***Goodyera repens* (L.) R.Br.** – Nes (Sergienko 2013); subdivision #28, rare (Sekretareva 2024). See also Red Data Book (Matveeva 2020) and later confirmation by Efimov (2022).

***Gymnadenia conopsea* (L.) R.Br.** – Nes (Sergienko 2013); Kanin Peninsula, southern part, the Malaya Nes River valley, boundary between tundra and meadow, 25.7.1914, coll. S. Grigoryev, det. L. Averyanov (MW0297161). See also Red Data Book (Matveeva 2020) and later confirmation by Efimov (2022).

***Dactylorhiza psychrophila* (Schltr.) Aver.** (*D. maculata* p.p.) – See Red Data Book (Matveeva 2020 sub nom. *D. maculata*). Later, Sekretareva (2024) indicated *D. maculata* s.l. for subdivisions #28, #29 as a rare plant. Later, Efimov (2022) recorded only *D. psychrophila* from this complex for NAO.

***Dactylorhiza lapponica* (Laest. ex Hartm.) Soó** – Kharyaginsky settlement (Efimov 2022 – disputable record marked with "?"); near the Pytkov Shar anabranch (Efimov 2022 – disputable record marked with "?"). – Efimov (2022) added in the discussion: "Based on the known range [of *D. lapponica*] in Scandinavia… the discovery of plants outwardly similar to *D. lapponica* in the NAO was rather unexpected, but judging by the photographs (provided by O. Lavrinenko), they are indeed similar to this species. At the same time, it cannot be ruled out that they represent a different allotetraploid or some hybrids."

Salicaceae

***Salix arbuscula* L.** – Srednyaya Peschanka (Lavrinenko et al. 2016); Peschanka River in the upper and in the middle reaches (Lavrinenko & Lavrinenko 2021); Bugryanka (Lavrinenko et al. 2016); Khabuyka (Lavrinenko et al. 2016); Shoina (Sergienko 2013); Shomokhovskie Sopki (Sergienko 2013); Kolguyev Island, many localities (Tolmachev 1966b); Kolguyev Island (Safronova 1990); Kanin Peninsula (Sekretareva 2004); Kolguyev Island (Sekretareva 2004 – disputable record marked with "?"); subdivision #7 (Sekretareva 2024). See also mapped localities by Belyaeva et al. (2006).

***Salix uralicola* I.V. Belyaeva** – Several mapped localities (Belyaeva et al. 2006).

Betulaceae

***Betula pendula* Roth** – Vizhas (Sergienko 2013); Nes (Sergienko 2013); subdivision #28, rare (Sekretareva 2024).

Amaranthaceae

***Salicornia pojarkovae* N. Semenova** (*S. herbacea* p.p.) – Shoina (Sergienko 2013); Golubnitsa (Sergienko 2013); Vizhas (Sergienko 2013); Chizha River Estuary (Moseev & Sergienko 2020); Chesha River Estuary (Moseev & Sergienko 2020); Kanin Peninsula (Sekretareva 2004); subdivisions #6 (rare), #28 (Sekretareva 2024).

Caryophyllaceae

ALIEN ***Silene flos-cuculi* (L.) Greuter & Burdet** (*Coronaria flos-cuculi* (L.) A. Br.; *Coccyganthe flos-cuculi* (L.) Fourr.) – Nes (Sergienko 2013); subdivision #28, alien (Sekretareva 2024).

Nymphaeaceae

***Nuphar lutea* (L.) Sibth. & Sm.** – Vizhas (Sergienko 2013); Nes (Sergienko 2013); subdivision #28, rare (Sekretareva 2024). See also Red Data Book (Matveeva 2020).

***Nuphar pumila* (Timm) DC.** – Pesha River – Volonga River (Vekhov & Kuliev 1986).

Ranunculaceae

***Delphinium middendorffii* Trautv.** (*D. cheilanthum* p.p.) – Amderma (Rebristaya 1977 – table); four localities (Rebristaya 1977 – map); Kara River, left bank, the Silovayakha River mouth, 29.7.2017, I. Savinov (iNat 41520767) (Savinov 2018); South of Pay-Khoy (Tolmachev 1971); Yugorsky Peninsula (with Pay-Khoy Range and Vaygach Island) (Sekretareva 2004); subdivision #10, rare (Sekretareva 2024). – Also on adjacent localities on the right bank of the Kara River (iNat 180651373, 180657226).

***Ranunculus mongolicus* (Krylov) Serg.** (?) – This uncertain record by Sekretareva (2004, 2024) is based upon

indications of *Batrachium peltatum* auct. for Timano-Malozemelskaya Tundra (=subdivision #8) and Western part of Bolshezemelskaya Tundra (=subdivision #9). The only heterophyllous species from *R.* aggr. *aquaticus* known to occur in adjacent regions is *Ranunculus mongolicus* (Krylov) Serg. (Wiegleb et al. 2017, Bobrov in Chepinoga et al. 2024), but this could not be stated with certainty without study of specimens. It's hybrid *R.* × *algidus* (Kapitonova) A.A. Bobrov (*R. kauffmannii* Clerc × *R. mongolicus*) was reported from the nearby Komi Republic as well (Wiegleb et al. 2017).

***Ranunculus ×spitzbergensis* (Nath.) Hadač** (*Ranunculus lapponicus* L. × *Ranunculus pallasii* Schltdl.) (*Coptidium spitsbergense* (Hadač) Luferov & Prob. = *Coptidium lapponicum* (L.) Gand. × *Coptidium pallasii* (Schltdl.) Á. Löve & D. Löve) – Lovetsky (Lavrinenko et al. 2016); subdivisions #7, #8 (Sekretareva 2024); Nenetsky Zapovednik, Lovetsky Island, 30.7.2021, T. D'yachkova (iNat 101756600, 101756864) & 31.7.2021, T. D'yachkova (iNat 101756646); Northwestern coast of Kolguyev (Ruprecht's collections in 1843) (Tolmachev 1971 sub nom. *R. pallasii* var. *minimus* Rupr.). See also Red Data Book (Matveeva 2020).

Brassicaceae

***Descurainia sophioides* (Fisch. ex Hook.) O.E. Schulz** – Two places on the right bank of the Silovayakha River along the rock canyons: in mixed-grass groups 2 km below the mouth of the Nyadeyyakha River, several plants, 24.7.1987 & on screes in the canyon of the Silovayakha River 1 km below the mouth of the Udacha River (right tributary of the Silovayakha River), also singly, 24.7.1988 (Morozov & Kuliev 1990); outcrops of bedrock of the Sibirchata-Yakha river 5 km below the mouth of the Shchelyashor River together with Erysimum pallasii, 15.7.1990 (Kuliev & Morozov 1991); the lower reaches of the Kara River, the Serova-Tonya tract in the upper part of the shale cliffs, 22.8.1991 (Morozov & Kuliev 1994); on scree in the canyon of the Saayakha River, 18.8.1991 (Morozov & Kuliev 1994); Yugorsky Peninsula (with Pay-Khoy Range and Vaygach Island) (Sekretareva 2004); subdivision #10, rare (Sekretareva 2024).

***Erysimum pallasii* (Pursh) Fernald** (*E. redowskii* auct.) – Silovoyakha River valley, canyon 6 km from the confluence with the Kara River, on a scree slope of the right bank, 23.7.1987, coll. A.N. Kuliyev (MW0375095-1; Morozov & Kuliev 1989); Silovoyakha River valley, right bank, Grand Canyon, on the tops of cliffs, along crevices, 26.7.1988, coll. A.N. Kuliyev (MW0375095-2; Morozov & Kuliev 1990); on the screes of the right bank of the Silovayakha River 2 km above and 2 km below the mouth of the Udacha River (right tributary of the Silovayakha River) (Morozov & Kuliev 1990); rocks of the left bank of the Sibirchata-Yakhi River, 5 km downstream from the mouth of its left tributary – the Shchellyashor Stream, 15.7.1990 (Kuliev & Morozov 1991); Saayakha River, in the canyon on a fine-scree slope and on the ledges of a separate high rock, together with *Descurainia sophioides* and *Androsace triflora*, 18.7.1991 (Morozov & Kuliev 1994); Yugorsky Peninsula (with Pay-Khoy Range and Vaygach Island) (Sekretareva 2004); subdivision #10, rare (Sekretareva 2024). See also Red Data Book (Matveeva 2020). – Also on adjacent localities by the Kara River and its right tributaries (Morozov & Kuliev 1989, Kuliev & Morozov 1991).

***Odontarrhena obovata* C.A. Mey.** (*Alyssum obovatum* (C.A. Mey.) Turcz.) – Pay-Khoy, right bank of the Silovoyakha River, on the canyon rocks along the upper edge 5 km from the mouth, 23.7.1987, coll. V.V. Morozov (MW0375872-1) & Pay-Khoy, on talus at the foot of southern exposure cliffs, 6 km from the mouth of the Silovoyakha River, 23.7.1987, coll. V.V. Morozov (MW0375872-2) (Morozov & Kuliev 1989); in large quantities (abundance – sp.) on rock ledges in the canyon of the Silovayakha River 0.5 km below the mouth of the Buredan-Yu River, 29.7.1988 (Morozov & Kuliev 1990); many localities in the lower reaches of the Kara River from the mouth of the Malaya Seryu River down to the mouth of the Tagareiyakha River, on scree slopes, 22–25.8.1991 (Morozov & Kuliev 1994); Yugorsky Peninsula (with Pay-Khoy Range and Vaygach Island) (Sekretareva 2004); subdivision #10, rare (Sekretareva 2024). See also Red Data Book (Matveeva 2020).

***Draba pauciflora* R. Br.** – Lyamchina (Lavrinenko et al. 2016, Lavrinenko & Lavrinenko 2018a); Dolgaya (Lavrinenko et al. 2016 based upon record of *D. oblongata* by Kuliev 2007); Sarmik (Lavrinenko et al. 2016 based upon record of *D. oblongata* by Kuliev 2007); Drovyanaya (Lavrinenko et al. 2016 based upon record of *D. oblongata* by Kuliev 2007); subdivision #10, rare (Sekretareva 2024).

***Draba oxycarpa* Sommerf.** – Vaygach Island, Varneka Bay, on golets (rubble), 16.8.1927, coll. Perfilyev, det. A.V. Razumovskaya (MW0371950); Vaygach Island, Bolvanskiy Nos Cape, herb tundra, 15.7.1984, coll. D. Milko, det. A.V. Razumovskaya (cf.) (MW0371926).

***Draba pohlei* Tolm.** – Dolgiy (Lavrinenko et al. 2009); Lyamchina (Lavrinenko et al. 2016); subdivision #11, rare (Sekretareva 2024). See also Red Data Book (Matveeva 2020).

Droseraceae

***Drosera* × *obovata* Mert. & W.D.J. Koch** (*D. anglica* Huds. × *D. rotundifolia* L.) – Kanin Peninsula, southern part, near Yazhemskoye Lake, Sphagnum peat bog, 3.7.1914, coll. S. Grigoryev (MW0377938 sub nom. *D. intermedia* auct.).

Crassulaceae

***Rhodiola quadrifida* (Pall.) Fisch. & C.A. Mey.** – Ust-Kara (Rebristaya 1977 – table); two localities (Rebristaya 1977 – map); Gravelly patches in spotted tundra on a bluff at the confluence of the Syadey-Yu River and its left tributary, near camp No 13, 11.7.1958, coll. V.N. Vekhov (MW1052505); in stony dryad mountain tundras in the upper reaches of the Kheiyakha River near the mouth of the Yeratosyo River, 18.7.1991 (Morozov & Kuliev 1994); on limestone outcrops in the interfluve of the Khengursyo and Madagayu Vtoraya Rivers, 23.7.1991 (Morozov & Kuliev 1994); Yugorsky Peninsula (with Pay-Khoy Range and Vaygach Island) (Sekretareva 2004); subdivision #10, rare (Sekretareva 2024). See also Red Data Book (Matveeva 2020). – Also on adjacent locality on the right bank of the Kara River (iNat 41366103) (Savinov 2018).

Saxifragaceae

***Saxifraga hyperborea* R. Br.** – Dolgaya (Kuliev 2007); Amderma (Rebristaya 1977 – table); Khuptpe Uplands (Rebristaya 1977 – table); Ust-Kara (Rebristaya 1977 – table); Vaygach Island, Bolvanskiy Nos Cape, stony tundra, 11.7.1984, coll. D. Milko, det. P. Zhmylev (MW0379861); Kolguyev (rare), Vaigach & Pay-Khoy (Flora arctica… 1984); Kolguyev Island (Safronova 1990); Kolguyev Island (Sekretareva 2004) = recorded for subdivision #7 as doubtful (Sekretareva 2024); Yugorsky Peninsula (with Pay-Khoy Range and Vaygach Island) (Sekretareva 2004) = subdivision #10 (Sekretareva 2024).

***Saxifraga nelsoniana* D. Don** – Lower reaches of the Kara River (Flora arctica… 1984); Yugorsky Peninsula (with Pay-Khoy Range and Vaygach Island) (Sekretareva 2004); subdivision #10, rare (Sekretareva 2024).

***Saxifraga radiata* Small** – Bolshezemelskaya Tundra (rare) (Yurtsev 1984); Western part of Bolshezemelskaya Tundra (Sekretareva 2004); subdivisions #9, #29, rare (Sekretareva 2024).

***Saxifraga spinulosa* Adams** – One locality (Rebristaya 1977 – map); subdivision #10, rare (Sekretareva 2024). Also in east of the Bolshezemelskaya Tundra (Yurtsev 1984).

Rosaceae

***Potentilla lyngei* Jurtzev & Soják** (*P. sommerfeltii* auct. p.p.) – Varnek (Kuliev 2007); Dolgaya (Kuliev 2007);

Drovyanaya (Kuliev 2007); "reported for Vaigach Island (Cape Greben)" (Yurtsev 1984); Yugorsky Peninsula (with Pay-Khoy Range and Vaygach Island) (Sekretareva 2004); subdivision #11, rare (Sekretareva 2024). See also Red Data Book (Matveeva 2020).

***Potentilla* × *tikhomirovii* Jurtz.** (*P. arenosa* (Turcz.) Juz. × *P. hyparctica* Malte) – "Pay-Khoy, Kara Tundra (atypical forms)" (Yurtsev 1984); Yugorsky Peninsula (with Pay-Khoy Range and Vaygach Island) (Sekretareva 2004); recorded for subdivision #10 as doubtful (Sekretareva 2024). See also Red Data Book (Matveeva 2020).

***Potentilla* × *drymeja* Soják** (*P.* × *tomentulosa* Jurtz.; *P. arenosa* (Turcz.) Juz. × *P. crebridens* (Juz. ex Koehne) Juz.) – Yugorsky Peninsula (Amderma) (Yurtsev 1984); Yugorsky Peninsula (with Pay-Khoy Range and Vaygach Island) (Sekretareva 2004); recotrded for subdivision #10 as doubtful (Sekretareva 2024).

ALIEN ***Alchemilla monticola* Opiz** – Nes (Sergienko 2013); Kanin Peninsula (south) (Yurtsev 1984); subdivision #28, alien (Sekretareva 2024).

***Alchemilla obtusiformis* Alechin** – Alluvial sands along the Pechora River near Telvisochka, near the sea pier. In willow thickets, 1.9.1927, coll. N. Kats, S. Kats, det. V. Alekhin ("autumn specimens – apparently, *Alchemilla obtusiformis* mihi") (MW0397998); Bolshezemelskaya Tundra (Yurtsev 1984 – text and map); Western part of Bolshezemelskaya Tundra (Sekretareva 2004). However, the species is absent in Sekretareva (2024).

***Alchemilla transpolaris* Juz.** (*A. glomerulans* auct. p.p.) – Shoyna, willow thicket in a depression between the hills 7 km SW of the village, 19.8.1971, coll. L.A. Arsenyeva & V.T. Sergiyenko, det. A. Czkalov (MW0561224).

Fabaceae

ALIEN ***Trifolium hybridum* L.** – Gusinets (Lavrinenko et al. 2019); subdivisions #10, #28, #29, alien (Sekretareva 2024); Varandey, 21.8.2022, N. Emelchenko (iNat 132918746).

***Lotus corniculatus* L.** (incl. *L. peczoricus* Miniaev & Ulle) – Gusinets (Lavrinenko et al. 2019); subdivision #29, rare (Sekretareva 2024); Among willow thickets on an island of the Pechora River near Telvisochka, 1.9.1927, coll. N.Ya. Kats & S.V. Kats, det. N. Miniaev (sub nom. *L. hyperboreus* m.) (MW0410530). – These records refer to a native alluvial race known as *L. peczoricus*, if splitted.

***Vicia sylvatica* L.** – Vizhas (Sergienko 2013); Nes (Sergienko 2013); subdivision #28, rare (Sekretareva 2024).

Geraniaceae

ALIEN ***Erodium cicutarium* (L.) L'Hér.** – On the left bank of the Kara River, in its lower reaches opposite Mount Tagarey-Seda, on outcrops of bedrock, slightly covered with silt, on the boundary of the rise of flood waters, 24.8.1991 (Morozov & Kuliev 1994); Yugorsky Peninsula (with Pay-Khoy Range and Vaygach Island), alien (Sekretareva 2004). Later, Sekretareva (2024) incorrectly indicated this species for subdivision #10 as an old casual record with no recent confirmations.

Polygalaceae

***Polygala amarella* Crantz** – Kanin Nos (Sergienko 2013); subdivisions #6 (?), #28 (rare) (Sekretareva 2024). See also Red Data Book (Matveeva 2020).

Hypericaceae

ALIEN ***Hypericum maculatum* Crantz** – Kharyaginsk (Novakovskaya 1997 sub nom. *H. tetrapterum* auct.).

Violaceae

***Viola nemoralis* Kütz.** (*V. montana* auct., *V. canina* p.p.) – Vizhas (Sergienko 2013); subdivision #28, rare (Sekretareva 2024).

***Viola epipsiloides* Á. Löve & D. Löve** (*V. epipsila* subsp. *repens* (Turcz. ex Trautv. & C.A. Mey.) W. Becker; *V. suecica* subsp. *repens* W. Becker; *V. epipsila* auct. p.p.) – Mikulkin (Sergienko 2013); Shomokhovskie Sopki (Sergienko 2013); Barents Sea coast, Korovinskaya Bay, 47 km N of Nelmin Nos settlement, Seduyakha River valley, herb meadow in the lower part of the SE exposure slope of a stream valley, 29.6.2011, coll. A.S. Zholobov, det. M.N. Kozhin (sub nom. *V.* × *hyperborea* (Rupr.) Nikit.) (MW0444246); Middle course of Adzva River, left bank, outcrop No. 32, alder forest along the coastal slope, 5.8.2009, coll. M.S. Ignatov, N.Yu. Stepanova, O.V. Ivanov & D.G. Donskov, det. N.Yu. Stepanova (MHA0188856, MHA0188857); ibidem, right bank, lake shore in the tundra, 28.7.2009, coll. M.S. Ignatov & N.Yu. Stepanova, det. N.Yu. Stepanova (MHA0188858); ibidem, left bank, fault in the tundra, 4.8.2009, coll. N.Yu. Stepanova & O.V. Ivanov, det. N.Yu. Stepanova (MHA0188859); Near Naryan-Mar, wet hummocky meadow, 12–13.8.1968, coll. A.K. Skvortsov, det. V. Nikitin (MHA0188860); Kolguyev Island (Safronova 1990); Kanin, Kolguyev, Malozemelskaya Tundra and Bolshezemelskaya Tundra (Tolmachev & Yurtsev 1980); all divisions (Sekretareva 2004, 2024). – Also on adjacent localities on the Kara River (Savinov 2018). – Both species are present in the area (Sekretareva 2004), i.e. *V. epipsila* Ledeb. (Kanin Peninsula, Kolguyev Island, Timano-Malozemelskaya Tundra) and *V. epipsiloides* (throughout). See also dot maps of these species (Tolmachev & Yurtsev 1980). An intermediate form, known as *V.* × *hyperborea* (Rupr.) Vl. Nikit., was recorded as well.

Apiaceae

***Angelica decurrens* (Ledeb.) B. Fedtsch.** – Ust-Kara (Rebristaya 1977 – table); Kara Tundra (Tolmachev & Yurtsev 1980); Yugorsky Peninsula (with Pay-Khoy Range and Vaygach Island) (Sekretareva 2004); subdivision #10 (Sekretareva 2024). – Also on adjacent localities on the right bank of the Kara River (iNat 180645474, 180656102). Savinov (2018) reported the species only from the headwaters of the Kara River upon specimen of Leontyev (8.8.1936; MW0118203). However, in these days Leontyev collected in the lower reaches of the Kara river between the Sibirchata River (see MW0101468 for 7.8.1936) and the Valuyta River (see MW0055163 for 9.8.1936).

Ericaceae

***Empetrum subholarcticum* V.N. Vassil.** (*E. nigrum* subsp. *subholarcticum* (V.N. Vassil.) Kuvaev) – Mapped localities (Tolmachev & Yurtsev 1980); Yugorsky Peninsula (with Pay-Khoy Range and Vaygach Island) (Sekretareva 2004); subdivisions #10, #11, rare (Sekretareva 2024). Records from Timano-Malozemelskaya Tundra and Western part of Bolshezemelskaya Tundra are disputable and marked with "?" (Sekretareva 2004, 2024).

Gentianaceae

***Gentiana nivalis* L.** – "Indicated by Leskov (1937) for Malozemelskaya Tundra (mouth of the Indiga River)" (Tolmachev & Yurtsev 1980); Timano-Malozemelskaya Tundra (Sekretareva 2004 – disputable record marked with "?") = subdivision #8 as doubtful (Sekretareva 2024).

***Gentianella aurea* (L.) Harry Sm.** (*Gentiana aurea* L.) – Srednyaya Peschanka (Lavrinenko et al. 2016); Bugryanka (Lavrinenko et al. 2016); Kanin Nos (Sergienko 2013); Tarkhanovo (Sergienko 2013); Kanin Nos, NE side, moraine terrace, near the Berezhnykh sign, small marsh, 3.7.1905, coll. S. Grigoryev (MW0473678); Kanin (Cape Tonky on the north of Kanin Peninsula, collections by Pohle) (Tolmachev & Yurtsev 1980); Kanin Peninsula (Sekretareva 2004); subdivisions #6, #7, rare (Sekretareva 2024). See also Red Data Book (Matveeva 2020). – The species was not mapped in the "Flora of the North-East of the European part of the USSR" (Tolmachev 1977), but mentioned in the text: "According to literary data, it grows in the north of Kanin (Cape Tonky) on loamy

meadow slopes."

Boraginaceae

***Myosotis decumbens* Host** (*M. sylvatica* subsp. *frigida* Vestergr.; *M. frigida* (Vestergr.) Á. Löve & D. Löve) – Chesha (Sergienko 2013); Golubnitsa (Sergienko 2013); Vizhas (Sergienko 2013); Nes (Sergienko 2013); Kanin Peninsula, middle part, Kurechevy Sopki (hills), 21.6.1914, coll. A. Detlaf, det. N.M. Reshetnikova (MW0482301); Kanin Peninsula, southern part, Nes', floodplain of the Nes River, dry sandy place, 26.6.1914, coll. S.G. Grigoryev, det. N.M. Reshetnikova (MW0482318); Bolshezemelskaya Tundra (Tolmachev & Yurtsev 1980); Kanin Peninsula (Sekretareva 2004); Western part of Bolshezemelskaya Tundra (Sekretareva 2004); subdivisions #6, #28, #29, rare (Sekretareva 2024).

Lamiaceae

ALIEN ***Galeopsis bifida* Boenn.** – Kanin Peninsula, 37 km NNW of Chizha, bank of the Volosova River near its mouth, former Volosovo settlement, at the site of a collapsed hut, 19.8.2012, coll. P. Volkova & D. Zakharchenko, det. M.N. Kozhin (MW0489123).

***Thymus* aggr. *reverdattoanus* Serg.** – In the subpolar part of the Kara River valley, 21.7.2017, I. Savinov (Savinov 2018). The author reported that the specimen is deposited in the MHA Herbarium, but it was not traced there.

Orobanchaceae

***Euphrasia parviflora* Schag.** (*E. curta* auct.) – Nes (Sergienko 2013).

***Pedicularis hyperborea* Vved.** – On a sedge-moss bog in the floodplain of the Sibirchata-Yakha river near the mouth of the Shchelyashor stream, 16.7.1990 (Kuliev & Morozov 1991); along the swampy shores of a large watershed lake near the Khalmer-Yu river – a left tributary of the Sibirchata-Yakha river, 19.7.1990 (Kuliev & Morozov 1991); on the shores of Lake Bolshoye Diyaty in the valley of the Sibirchata-Yakha river in a willow-sedge-moss tundra, 22.7.1990 (Kuliev & Morozov 1991); found in the middle reaches of the Kheyayakha River below the mouth of the Khengursyo River on a sedge bog, 22.7.1991 (Morozov & Kuliev 1994). See also Red Data Book (Matveeva 2020); Yugorsky Peninsula (with Pay-Khoy Range and Vaygach Island) (Sekretareva 2004); subdivision #10, rare (Sekretareva 2024). – Also on adjacent locality on the Kara River (Morozov & Kuliev 1989); on the watershed of the Silova-Yakha and Malaya Khalmer-Yu rivers, as well as in the floodplain of the Khalmer-Yu River near the waterfall under the northern end of Mount Pemboy (Kuliev & Morozov 1991).

***Pedicularis karoi* Freyn** (*P. palustris* subsp. *karoi* (Freyn) Tsoong) – Yugorsky Peninsula (with Pay-Khoy Range and Vaygach Island) (Sekretareva 2004).

***Pedicularis novaiae-zemliae* (Hult.) Ju. Kozhevn.** (*P. sudetica* subsp. *novaiae-zemliae* Hult.) – Vaygach & Yugorsky Peninsula (Tolmachev & Yurtsev 1980); Yugorsky Peninsula (with Pay-Khoy Range and Vaygach Island) (Sekretareva 2004); subdivisions #10, #11, rare (Sekretareva 2024).

Lentibulariaceae

***Utricularia intermedia* Hayne** – Nes (Sergienko 2013).

***Utricularia vulgaris* L.** – Pesha River – Volonga River (Vekhov & Kuliev 1986); Chizha (Sergienko 2013); Nes (Sergienko 2013); Naryan-Mar, 15.7.2025, N. Zuyeva (iNat 328323806); Nenetsky Nature Reserve, Pechora River mouth, Malyy Gusinets Strait, on clayey bottom sediments, 29.8.2014, coll. N.G. Panarina, det. A.A. Bobrov & M.N. Kozhin (MW0202651); Vicinity of Naryan-Mar, the area behind the Naryanmarneftegaz office, a lake along the road to the new airport, 31.7.2022 (Lavrinenko et al. 2024); Pechora River Delta (Kumzhinskoye gas condensate field), area of wells No. 1 and 2, 3.8.2023 & a circular lake with a sandy bottom at the fork between the Maly Gusinets and Kozlyukov Shar anabranches, 1.8.2023 (Lavrinenko et al. 2024); Western part of Bolshezemelskaya Tundra (Sekretareva 2004).

Plantaginaceae

ALIEN ***Plantago major* L.** – Vizhas (Sergienko 2013); Nes (Sergienko 2013); subdivisions #10, #28, #29, alien (Sekretareva 2024).

Rubiaceae

ALIEN ***Galium aparine* L.** – Kharyaginsk (Novakovskaya 1997); subdivision #29, alien (Sekretareva 2024).

***Galium ruthenicum* Willd.** (*G. verum* p.p.) – Kara Tundra (Yurtsev 1987); Yugorsky Peninsula (with Pay-Khoy Range and Vaygach Island) (Sekretareva 2004). However, no records for relevant subdivisions in Sekretareva (2024).

Campanulaceae

ALIEN ***Campanula glomerata* L.** – Subdivision #6 (i.e. Kanin Peninsula), alien (Sekretareva 2024).

Asteraceae

***Erigeron eriocephalus* J. Vahl** – Varnek (Kuliev 2007); Lyamchina (Lavrinenko et al. 2016); Dolgaya (Kuliev 2007); Sarmik (Kuliev 2007); Drovyanaya (Kuliev 2007); Amderma (Rebristaya 1977 – table); Khuptpe Uplands (Rebristaya 1977 – table); Ust-Kara (Rebristaya 1977 – table); eight localities (Rebristaya 1977 – map); Pay-Khoy (often), Kara Tundra (Yurtsev 1987); Kolguyev Island (Safronova 1990); Kolguyev Island (Sekretareva 2004); Yugorsky Peninsula (with Pay-Khoy Range and Vaygach Island) (Sekretareva 2004); subdivision #7 (?), #10, #11 (Sekretareva 2024). – Also on adjacent locality on the right bank of the Kara River (iNat 180649651). – Both species, i.e. *E. eriocephalus* and *E. eriocalyx* (Ledeb.) Vierh., are present in the area (Sekretareva 2004). Typical *E. eriocalyx* s.str. is recorded from Yugorsky Peninsula (with Pay-Khoy Range and Vaygach Island) (Sekretareva 2004).

***Antennaria alpina* (L.) Gaertn.** – Kanin Nos (Sergienko 2013); Kanin Peninsula (Sekretareva 2004). – The species was not mapped in Tolmachev (1977), but mentioned in the text: "In LE Herbarium, there is a specimen collected by Pohle in 1899 on Kanin, resembling *A. alpina* Gaertn. – a species characteristic of tundra regions and the mountains of Fennoscandia." However, not reported from Kanin in Yurtsev (1987) and absent as a taxon in Sekretareva (2024).

***Achillea nigrescens* (E. Mey.) Rydb.** – Malozemelskaya Tundra (but much less often than *A. apiculata* Orlova), lower reaches of the Pechora, Bolshezemelskaya Tundra (mostly eastern part of it), Kara Tundra (along the Kara River) (Yurtsev 1987); Timano-Malozemelskaya Tundra (Sekretareva 2004); Western part of Bolshezemelskaya Tundra (Sekretareva 2004); Yugorsky Peninsula (with Pay-Khoy Range and Vaygach Island) (Sekretareva 2004); subdivisions #8 (?), #9 (?), #10 (?), #29 (?) (Sekretareva 2024). – Records of *A. millefolium* L. s.l. mostly refer to *A. apiculata*, which is recorded for all five divisions (Sekretareva 2004). See also mapped localities of *A. nigrescens* and *A. apiculata* (Yurtsev 1987).

ALIEN ***Matricaria discoidea* DC.** (*M. matricarioides* (Less.) Porter ex Britt., *Lepidotheca suaveolens* (Pursh) Nutt.) – Nes (Sergienko 2013); Kanin Peninsula, alien (Sekretareva 2004); subdivision #10, #28, alien (Sekretareva 2024).

***Saussurea tilesii* (Ledeb.) Ledeb.** – Two localities (Rebristaya 1977 – map); "mainly East Siberian species with an isolated location at the northern tip of the Yugorsky Peninsula" (Yurtsev 1987); Yugorsky Peninsula (with Pay-Khoy Range and Vaygach Island) (Sekretareva 2004); subdivision #10, rare (Sekretareva 2024). See also Red Data Book (Matveeva 2020). – The species was not mapped in Tolmachev (1977), but mentioned in the text: "In the

vicinity of the settlement of Yugorsky Shar, on the southern sandy slope of the hill."

***Cirsium helenioides* (L.) Hill** – More-Yu Forest Island (Kustysheva 1999); subdivision #10, rare (Sekretareva 2024). – Also on adjacent locality on the left bank of the Kara River (Morozov & Kuliev 1989).

ALIEN ***Centaurea cyanus* L.** – Vicinity of Naryan-Mar, near the experimental zonal station, 13.10.1940, coll. U. Yeliseyev (MW0430861).

Taraxacum lateritium [auct. non] **Dahlst.** – Ust-Kara (Rebristaya 1977 – table); Kara Tundra (Kara settlement, forb tundra along the edge of the bedrock bank, 28.7.1965, O. Rebristaya, № 520) (Yurtsev 1987); Yugorsky Peninsula (with Pay-Khoy Range and Vaygach Island) (Sekretareva 2004); subdivision #10, rare (Sekretareva 2024). – The species is resent in Russia in Chukotka (locus classicus), Kamchatka and Magadan Oblast. The reported distribution in other regions may combine several taxa under this name and needs to be revised (Chepinoga et al. 2024, Kirschner et al. 2025).

***Taraxacum glabrum* DC.** – Varnek (Kuliev 2007); Dolgaya (Kuliev 2007); Sarmik (Kuliev 2007); Drovyanaya (Kuliev 2007); Pay-Khoy, Vaygach (Yurtsev 1987); Yugorsky Peninsula (with Pay-Khoy Range and Vaygach Island) (Sekretareva 2004). Later, Sekretareva (2024) reported the species for subdivisions #10 and #11 as doubtful. See also Red Data Book (Matveeva 2020).

***Taraxacum arcticum* (Trautv.) Dahlst.** – Khabarovo (Rebristaya 1977 – table); Khuptpe Uplands (Rebristaya 1977 – table); Ust-Kara (Rebristaya 1977 – table); two localities (Rebristaya 1977 – map); Yugorsky Peninsula (Kara Coast) (Yurtsev 1987); Yugorsky Peninsula (with Pay-Khoy Range and Vaygach Island) (Sekretareva 2004); subdivision #10, #11, rare (Sekretareva 2024). See also Red Data Book (Matveeva 2020).

***Taraxacum korjakorum* Kharkev. & Tzvelev** – Kara Tundra (Kara River below the mouth of the Nerusovey-Yaga river, damp dolomite rocks, 16.7.1909, V. Sukachev) (Yurtsev 1987); Yugorsky Peninsula (with Pay-Khoy Range and Vaygach Island) (Sekretareva 2004). Later, Sekretareva (2024) reported the species for subdivision #10 as doubtful.

***Taraxacum macilentum* Dahlst.** – Northern Kanin (Pae-Khoi Ridge, Ladzet-yaga River, phyllite outcrops, 2.8.1928, V. Andreev – doubtful specimen without inflorescences) (Yurtsev 1987); Bolshezemelskaya Tundra (eastern part – collections of A. Schrenk in 1837, no precise location indicated) (Yurtsev 1987); Kara Tundra (Yurtsev 1987); Yugorsky Peninsula (with Pay-Khoy Range and Vaygach Island) (Sekretareva 2004). Recorded for Kolguyev Island (Safronova 1990), but records from Kanin Peninsula, Kolguyev Island and Western part of Bolshezemelskaya Tundra are disputable and marked with "?" in Sekretareva (2004). Later, Sekretareva (2024) reported the species only for subdivision #10 as rare.

***Taraxacum simulum* Brenn.** (=? *T. longicorne* Dahlst.) – "Indicated for Vaygach Island" (Yurtsev 1987); Yugorsky Peninsula (with Pay-Khoy Range and Vaygach Island) (Sekretareva 2004 – disputable record marked with "?"). Later, Sekretareva (2024) reported the species for subdivision #11 as doubtful.

***Hieracium subarctophilum* Schljakov** (*H. umbellatum* p.p.) – "West and southeast of the Bolshezemelskaya Tundra; it is highly likely that record of *H. umbellatum* (Leskov 1937) for Malozemelskaya Tundra belongs to this species" (Yurtsev 1987 – text and map); Timano-Malozemelskaya Tundra (Sekretareva 2004); Western part of Bolshezemelskaya Tundra (Sekretareva 2004); subdivisions #28, #29 (Sekretareva 2024). – True *H. umbellatum* L. s.str. is recorded for Western part of Bolshezemelskaya Tundra as an alien plant (Sekretareva 2004).

***Hieracium nigrescens* Willd.** (*H. alpinum* p.p.) – Bolvansky Nos (Lavrinenko et al. 2016); Shapkina (Lavrinenko et al. 2019); Ortina (Lavrinenko et al. 2019); Shoina (Sergienko 2013); Kanin Peninsula (Sekretareva 2004); Kolguyev Island (Sekretareva 2004); Timano-Malozemelskaya Tundra (Sekretareva 2004); Western part of Bolshezemelskaya Tundra (Sekretareva 2004); subdivisions #6, #7, #9, #10, #29, rare (Sekretareva 2024). – Schljakov (in Yurtsev 1987) reported 37 microspecies of *H.* aggr. *nigrescens* from Russian Arctic, including eight microspecies from NAO: (1) *H. excubitum* Elfstr.: East of Bolshezemelskaya Tundra; (2) *H. shaparenkoi* Schljakov: Malozemelskaya Tundra (Srednyaya River, upper reaches of the Neruta River and Seduyakha River); West of Bolshezemelskaya Tundra (Vangurey Ridge, Khylchou River); (3) *H. tolmatchevii* Schljakov: Bolshezemelskaya Tundra (untraceable localities); (4) *H. czeschaense* Schljakov: Kanin Peninsula (Cape Mikulkin), Timanskaya Tundra (lower reaches of the Indiga River); (5) *H. kaninense* Schljakov: Kanin Peninsula (northern part); (6) *H. kolgujevense* Schljakov: Kolguyev Island; later reported from Nizhnyaya Peschanka (Lavrinenko et al. 2016) and Bugryanka (Lavrinenko et al. 2016); (7) *H. coloratum* Elfstr.: Kanin Peninsula; (8) *H. polymorphophyllum* Elfstr.: Kolguyev Island. – True *H. alpinum* L. s.str. is recorded for all five divisions (Sekretareva 2004) or, more precisely, for Kanin Peninsula, Kolguyev Island, Timanskaya Tundra, Malozemelskaya Tundra and Bolshezemelskaya Tundra (Yurtsev 1987).

***Hieracium dolabratum* (Norrl.) Norrl.** (*H. laevigatum* p.p.) – Bolshezemelskaya Tundra (Yurtsev 1987 – text and map); Western part of Bolshezemelskaya Tundra (Sekretareva 2004). However, there are no records from relevant subdivisions in Sekretareva (2004).

***Hieracium timanense* Schljakov** (*H. laevigatum* p.p.) – Kanin Peninsula, Timanskaya Tundra and Bolshezemelskaya Tundra (Yurtsev 1987 – text and map); Timano-Malozemelskaya Tundra (Sekretareva 2004); Western part of Bolshezemelskaya Tundra (Sekretareva 2004); subdivisions #28, #29, rare (Sekretareva 2024).

DISCUSSION

The comprehensive digitisation and subsequent georeferencing of all specimens in a major collection have yielded significant scientific results. Six taxa deposited in the MW Herbarium had never been reported for the NAO in published references; these include four native species and hybrids (*Potamogeton* × *nitens*, *Draba oxycarpa*, *Drosera* × *obovata*, *Alchemilla transpolaris*) and two alien species (*Galeopsis bifida*, *Centaurea cyanus*). An additional record which is apparently absent from references, *Sceptridium multifidum*, was retrieved from iNaturalist but subsequently indicated by Sekretareva (2024).

The most substantial additions to the preliminary checklist resulted from inventories of local floras in the southwest of the region, particularly those situated within the forest landscapes of the northern taiga. For instance, the local flora of Nes (Sergienko 2013) included 23 species that were absent from the baseline source: *Potamogeton natans*, *Scheuchzeria palustris*, *Alisma plantago-aquatica*, *Dactylis glomerata*, *Melica nutans*, *Phragmites australis*, *Schoenoplectus lacustris*, *Juncus ambiguus* (*J. bufonius* auct.), *Gagea granulosa*, *Paris quadrifolia*, *Goodyera repens*, *Gymnadenia conopsea*, *Betula pendula*, *Silene flos-cuculi*, *Nuphar lutea*, *Alchemilla monticola*, *Vicia sylvatica*, *Myosotis decumbens*, *Euphrasia parviflora*, *Utricularia intermedia*, *Utricularia vulgaris*, *Plantago major*, and *Matricaria discoidea*. These are predominantly more southerly species, many of which do not

extend into the Arctic proper. In the nearby local flora of Vizhas (Sergienko 2013), located at the southern limit of the forest-tundra, 13 such species were recorded.

In total, 22 species identified as new records since the publication of "Flora of the North-East of the European part of the USSR" (Tolmachev 1974, 1976a, 1976b, 1977) are aliens in the NAO, while the remaining 97 belong to the native flora. On one hand, this suggests that the indigenous flora is now relatively well-documented; future discoveries are likely to arise from taxonomic revisions or the gradual northward shift of range margins, particularly among forest species.

On the other hand, the alien flora of the NAO remains significantly under-researched. There are no specialized publications dedicated to floristic records of alien species – a common practice in most Russian regions, including Arctic ones. New records are to be expected from systematic surveys of:

- the Naryan-Mar – Usinsk road, particularly following its reconstruction, as construction machinery was transported from more southerly regions;
- the diverse habitats within and around settlements connected to the "mainland" (e.g., Naryan-Mar, Krasnoye, Kharyaginsky);
- industrial sites and infrastructure, specifically those associated with oil and gas extraction.

CONCLUSIONS

According to our data, beside the microspecies of *Hieracium* the total number of taxa currently known in the NAO comprises at least 800 species and subspecies. The latter could be treated as species following Soviet/Russian tradition like in Tzvelev & Probatova (2019), Sekretareva (2024) or Chepinoga et al. (2024). It is evident that a critical revision of the regional flora is required, incorporating the most recent phylogenetic data on Arctic plants published in recent years.

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