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Taraxacum norvegicum (*Asteraceae*) in Russia: historical records, rediscovery and issues of conservation (*Taraxacum* Notulae Rossiae Boreali Europeae V)

Taraxacum norvegicum (*Asteraceae*) в России: исторические данные, повторное обнаружение и вопросы охраны (*Taraxacum* Notulae Rossiae Boreali Europeae V)

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Abstract. *Taraxacum norvegicum* (Dahlst.) Dahlst. is a dandelion species from section *Borealia* Hand.-Mazz. without any closely related or similar species in European Russia; it is unanimously accepted in all taxonomic revisions. It was earlier reported for Russia based on old collections from two distant localities in the Murmansk Region: Rybachiy Peninsula, the northernmost tip of the region (collected in 1909), and Pyhäkuru Valley, south Murmansk Region (collected in 1917 and 1939). In 2021–2025, we rediscovered *T. norvegicum* in the both localities. The total number of individuals recorded in the both places in 2025 did not exceed 30. The species is likely one of the rarest vascular plant species of the Murmansk Region and Russia in general, and certainly merits special conservation: our assessment according to IUCN Red List criteria is "Critically Endangered". Other reports of *T. norvegicum* from Russia published in literature or in web-based datasets (north part of the Republic of Karelia, and the vicinity of Fedoseyevka in the Murmansk Region) are erroneous.

Keywords: *Taraxacum norvegicum*, *Taraxacum* section *Borealia*, Murmansk Region, arctomontane taxa, historical localities, flora of Russia.

Аннотация. *Taraxacum norvegicum* (Dahlst.) Dahlst. — вид одуванчика из секции *Borealia* Hand.-Mazz., не имеющий близкородственных видов в России, всеми авторами принимаемый в качестве самостоятельного вида. Ранее для нашей страны он приводился из двух отдаленных друг от друга местонахождений в Мурманской области: с п-ова Рыбачий (крайний север), где он был найден в 1909 г., и из урочища Пюхякуру (юг области у границы с Карелией), где его собирали в 1917 и 1939 гг. В 2021–2025 гг. мы повторно обнаружили *T. norvegicum* в обоих пунктах. Общее число выявленных растений в обеих точках не превышает 30 экземпляров, что делает этот вид одним из самых малочисленных сосудистых растений Мурманской области и России в целом, заслуживающим включения по крайней мере в Красную книгу Мурманской области с категорией CR по критериям МСОП. Иные места произрастания данного вида в России, указываемые в литературе и электронных базах данных (указание для севера Республики Карелия и сведения из окрестностей пос. Федосеевка Мурманской области) являются ошибочными.

Ключевые слова: *Taraxacum norvegicum*, *Taraxacum* section *Borealia*, Мурманская область, арктомонтанные виды, исторические местонахождения, флора России.

Introduction

The genus *Taraxacum* F. G. Wigg. is notable for its very complex taxonomy, and its diversity in many parts of the world is very poorly known (Kirschner et al., 2020). Russia is a country where *Taraxacum* taxonomy is still substantially under-investigated (Sennikov, 2007; Efimov, Trávníček, 2022; Kirschner et al., 2025).

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The present article deals with one species of the genus known from the Murmansk Region (North European Russia). For this area *Taraxacum* was revised mainly within major floristic accounts, of which the most important are "Flora URSS" (Schischkin, Tzvelev, 1964), "Flora of the Murmansk Region" (Orlova, 1966), "Flora Arctica URSS" (Tzvelev, Jurtzev, 1987) and "Flora partis europaeae URSS" (Tzvelev, 1989). The lists of *Taraxacum* species occurring in the Murmansk Region and nearby areas presented in the above-mentioned revisions largely relied on earlier studies by Scandinavian authors (see Sennikov, 2007), who dealt mainly with the parts of the country near the border with Finland, and only occasionally (see e. g. Uotila, 2013; Väre, 2017) explored more distant regions of Russia.

Due to the above reasons, many *Taraxacum* species are reported for Russia only according to very old information sources (see Sennikov, 2007), with herbarium running back to 1900s–1930s. Moreover, voucher specimens for old reports may be largely unknown to the botanical audience, being kept in the botanical collections outside Russia, which are often not enough involved into Russian biodiversity inventories. This concerns both poorly known agamospermous taxa and some well-distinguishable taxonomically isolated taxa, of which *T. norvegicum* (Dahlst.) Dahlst. is a prominent example.

In the Murmansk Region, there are 4 taxonomically isolated *Taraxacum* species: *T. nivale* Lange ex Kihlm. (section *Glabra* Dahlst.), *T. leucoglossum* Brenner (sectional affiliation unclear, most likely section *Glabra* or section *Crocea* M. P. Christ.), *T. hjeltii* Dahlst. (core section *Borealia* Hand.-Mazz.), and *T. norvegicum* (section *Borealia*, an "arcticoid" species group). Those species do not provide any ambiguity in determination in the Murmansk Region. Three of them (except for *T. hjeltii*) are very rare, recorded from 1–2 localities only, and have regional or state-level conservation importance. *Taraxacum norvegicum* was the only one lacking recent records; because of that, it was excluded from the current (third) edition of the regional Red Data Book (Borovichev et al., 2025), although was present in its first edition (Konstantinova et al., 2003). Absence of new records excited our interest, and this species became one of main focuses of our fieldwork in the Murmansk Region. The search was successful, and the present contribution aims to fill the gap in our knowledge on the *T. norvegicum* state in Russia.

Material and methods

The study is primarily based on field explorations in the Murmansk Region in 2021, 2023 and 2025, mainly aimed to *Taraxacum* collecting. In the focused field search of *T. norvegicum*, we mainly followed old tracks, where it was discovered in the past: the Rybachiy Peninsula (northernmost tip of the Murmansk Region) in 2021, 2023 and 2025, and the valley of Pyhäkuru (in contrast, the southernmost part of the Murmansk Region) in 2025.

The study of herbarium material of the species in question was undertaken in Herbaria H (Helsinki, Finland) and LE (Saint Petersburg, Russia); additionally, digital images of the specimens were downloaded via the websites of Herbaria O — Oslo, Norway (Herbarium O, 2025), and MW — Moscow, Russia (Seregin, 2025).

The new material obtained in the course of our field studies is deposited in the Herbarium LE and can be accessed by barcode numbers via the website "Vascular Plants Herbarium of the Komarov Botanical Institute RAS" (Herbarium LE, 2025).

Results

Taxonomy

Taraxacum norvegicum (Dahlst.) Dahlst. 1906, Ark. Bot. 5, 9: 22. ≡ *T. ceratophorum* subsp. *norvegicum* Dahlst. 1905, Bot. Not. (Lund), 1905: 163. — Lectotype (Lundevall, Øllgaard, 1999: 69): Norway, Finnmark, Habatvuoppebakte near Masi, 4 VIII 1903, O. Dahl (S10-40360!); isolectotypes: O-V-2014956!, O-V-2014957!, O-V-2014958!, O-V-2014959!, O-V-2014960!

Morphology of the plants from Russia

Plants medium-sized to small, rather delicate, not heterophyllous. **Tunic** absent. **Petioles** short, up to 2 cm long, usually rather narrowly winged, distinctly purple. **Leaves** narrowly lanceolate to linear in outline, 2–20 × 0.5–3 cm. **Leaf surface** unspotted, in living plants with visible silvery tinge, subglabrous or pubescent along the midrib. **Leaf blade** with complex lobation, pinnatisect, occasionally pinnatipartite. **Midrib** in the plants growing in full sun purplish almost up to the leaf apex, whereas in the plants growing in shade purplish only at the base. **Lateral leaf lobes** (3)4–5, varying in shape and direction, from triangular to narrowly triangular, often hamate, directed upwards or downwards, usually acute but sometimes obtuse. **Interlobes** short, in well-developed leaves with 1–3 additional teeth, which may be displaced to the lateral leaf lobes. **Apical leaf lobe** usually large and prominent, from $\frac{1}{6}$ to $\frac{1}{3}$ of leaf length, very distinctly hastate, often ligulate (broadening toward apex) and obtuse, occasionally with 1(2) additional small teeth marginally (only in the largest leaves in bigger plants). **Stems** rather sparsely pubescent, but ± woolly under inflorescence. **Capitula** medium-sized, ca. 3–4 cm diam., medium yellow. **Outer phyllaries** erect to erect-arcuate, 4–8 mm long, ovate to narrowly ovate, dark green and somewhat pruinose dorsally, bluish green ventrally, with

distinct membranous border ca. 0.2 mm wide, distinctly corniculate with horns 0.5–1.5 mm long (occasionally may be tuberculate in the earliest capitulum). **Inner phyllaries** distinctly corniculate. **Ligules** without specific coloration at the apex (may be only a bit darker yellow), outer ones striped blackish outside. **Pollen** present, uneven in size. **Styles** with dark hairs. **Fruits** (examined only in one specimen) cinnamon-coloured, body ca. 4 mm long, spinulose in upper ¼ and shortly tuberculate elsewhere, with gradual body/cone transition, cone conical, ca. 0.75 mm long, discoloured apically, beak ca. 5 mm long, pappus white.

The species is considered agamospermous, and uneven size of pollen grains confirms this.

In Fennoscandia, *Taraxacum norvegicum* is easily distinguished from the other Fennoscandian dandelions primarily by its very specific, narrow leaves with large terminal lobe, and very dark green and distinctly corniculate outer and inner phyllaries. Somewhat silvery leaves and specific habitat allow to distinguish the living plants easily in the wild.

Affinities

Taraxacum norvegicum is unanimously attributed to section *Borealia*, which was better known in the past under the later name *Ceratophora* Dahlst. According to the recently published revision of this section in Siberia and the continental Far East (Kirschner et al., 2025), *T. norvegicum* was classified in a "distinct group close to *T. lacerum* Greene", which includes predominantly North American taxa, except for two localities of *T. sublacerum* Hagl. in Kamchatka, and *T. norvegicum*. However, we suppose that *T. norvegicum* can be equally well classified into another informal subgroup from the same section also proposed by Kirschner and co-authors, namely "*T. macilentum / lateritium* group", which has some features shared with section *Arctica* Dahlst. It is predominantly North Asian group, but also with some North American taxa; this group marginally touches North European Russia in the Polyarnyi Ural Mountains. If both groups would be merged, they will together represent a natural association of "arcticoid" members of section *Borealia* with Holarctic distribution with a small gap between the Murmansk Region and the Ural Mts.

Distribution

Taraxacum norvegicum is a strictly Fennoscandian taxon. Main part of its distribution area is located in the northernmost Scandinavia (North Norway and North Finland), but there is also an isolated set of localities in the Central Finland, Province of Kuusamo (Dahlstedt, 1928; Sonck, 1991; *Taraxacum*..., 2023). Two historic collections from Russia mark the easternmost localities of *T. norvegicum*: the first one (Rybachiy Peninsula) belongs to the main portion of its distribution in the North, and the second (Pyhäkuru Valley) continues a group of isolated localities in Kuusamo.

1. Rybachiy Peninsula, Pechenga District, northern Murmansk Region (Fig.: A–D). Initially the species was collected near the seashore at the village Vaida-Guba: "Lt, Vaidoguba, klapperstenfält nära hafsstrand [pebble field near the seashore], 5 VIII 1909, F. W. Klingstedt" (H 159591). This important finding was reported by H. Lindberg (Societas..., 1924) and cited afterwards in many sources (Hjelt, 1926; Dahlstedt, 1928; Tzvelev, Jurtzev, 1987; etc.). According to available data, this species was never collected in that place for the next 112 years, despite rather intensive collections of other plants in the Rybachiy Peninsula.

Our new records from the same area were made in two nearby localities: "*Murmansk Region, Pechenga District,* N part of the Rybachiy Peninsula, near Kekurskiy Cape, sparse vegetation at the top of the rock, in the crevice; very sparse community dominated with *Empetrum*, 69.93342° N, 32.09634° E, 1 VII 2021, P. G. Efimov, G. Yu. Konechnaya, M. B. Sheludyakova, № 2021/678" (LE 01149857), "*ibidem*, Rybachiy Peninsula, Kekurskiy Cape, slope of the hill in its upper part, dry place, crevice, 69.94060° N, 32.06164° E, 29 VI 2023, M. V. Legchenko, P. G. Efimov, V. V. Kuropatkin, V. V. Domashkina, V. A. Dudka, № 2023/1166" (LE 01256118). The plants in the former locality were repeatedly observed in 2023 and 2025.

Two new findings were made at a distance of ca. 1.5 km one from another, both in similar habitats, in small crevices of the same rocky slope facing to the sea, near the entrance to the Vaidaguba Bay. The Klingstedt's specimen was obviously collected somewhere very near to this place, but in different habitat (pebble field at seashore). The name "Vaidoguba" on its label most probably refers to the village, which was situated ca. 3 km west of our records. Currently, the environment in the vicinity of the village is strongly disturbed, decreasing the possibility of survival of rare plants.

Thorough search for other possible localities in the Rybachiy Peninsula gave no results, confirming rarity of *T. norvegicum* in that area. In the former locality, there were 10 plants found in 2021, reduced to only one in 2025. In the latter one, only two plants were seen.

2. Pyhäkuru Valley, Kandalaksha District, southern Murmansk Region (Fig.: E–F). This locality is situated not far from the present border between the Murmansk Region and the Republic of Karelia, and also not far from Finland. Two earlier records were made at least twice in this place: "Lkem, Kuolajarvi, Pyhäkuru, in rupe, 8 VIII 1917, V. Pesola" (H 159604, H 159605),


A
B
E
C
D
F

and "prov. Kuusamo, par. Salla, ad flumen Kutsajoki in parte media convallis montanae 'Pyhäkuru' dictae, in fissuris in pariete granitica ad septentrionem versus exposita convallis montanae una cum *Melandrio affini*, *Saxifraga aizoides* etc., 29 VII 1939, M. Laurila" (H 273019). The records from this place were repeatedly cited in literature (e. g. see Lindberg, 1924; Hjelt, 1926; Hultén, 1950). In this locality, the plants were never collected for the next 86 years; fieldwork in that area, however, was undertaken rather occasionally. The most important botanical inventory of Pyhäkuru valley was made by a Finnish team by Rauno Ruuhijärvi and Tauno Ulvinen on 4–9 VIII 1994 (Ulvinen, 1996). During that fieldwork, many rare taxa were rediscovered, but *T. norvegicum* was not recorded.

The locality name "Pyhätunturi" in Hjelt (1926) is an obvious misprint for Pyhäkuru.

The plants in the same locality were rediscovered in 2025: "*Murmansk Region, Kandalaksha District, 25 km SW from Alakurtti (a straight line), Kutsa Protected Area, 5 km W from Vuorijärvi Lake, Pyhäkuru Valley (a deep valley on a unnamed stream flowing from the W to Vuorijärvi Lake), right bank, on the stony wall in its highest and most impressive place, shady locality, 66.78046° N, 29.96219° E,* 27 VI 2025, *P. G. Efimov, M. V. Legchenko, M. B. Sheludyakova,* № 2025/866" (LE 01328008), "*ibidem,* 5 VII 2025, *iidem,* № 2025/1020" (LE 01328200). The plants inhabited a rather short fragment of the rocky wall 100 m long, from the point 66.78011° N 29.96185° E to 66.78052° N 29.96379° E, in a place where the wall reached its maximal height (ca. 30 m), and was the most impressive. In total, 26 plants were seen, but their exact number may be somewhat bigger because the plants inhabited crevices of the wall, which in part was inaccessible without special equipment. Nine plants developed flowers, eight of them having one capitulum each, and one plant with four capitula.

Taraxacum norvegicum has an arctomontane distribution. In this respect, a special importance should be paid to a group of its isolated localities in Pyhäkuru Valley and the Kuusamo Province of Finland. The whole area is situated below 700 m a. s. l., leaving no chance for montane or other type of tundra or tundra-like localities: the entire territory up to the tops of the hills is covered by boreal taiga vegetation, composed mostly of *Pinus sylvestris* L. forests. However, this area is notable for isolated localities of several arctomontane species with the distribution similar to that of *T. norvegicum*: *Arenaria pseudofrigida* (Ostenf. et O. C. Dahl) Schischk. et Knorring, *Arnica angustifolia* Vahl, *Astragalus frigidus* (L.) A. Gray, *Potentilla chamissonis* Hultén, *Saxifraga aizoides* L., etc. (Ulvinen, 1996). Survival of such species in this area is attributed to two important factors: a mountainous relief of the area with many steep rocky slopes and deep valleys (Vaarama, 1935; Ahti et al., 1968), and the presence of carbonate-rich substrates (Pesola, 1929; Tuomikoski, 1939). Suitable conditions for arctomontane species in this area are often provided not in elevated places, but, on the contrary, in deep valleys, where snow cover persists for a longer time and less access is provided for warm air in mid-summer days. *Taraxacum norvegicum* occurs in this area in a north-facing slope of the valley, very shady due to the forest cover, providing no access to the full sun in the summer. Carbonate substrates favour growth of alpine and arctic rock plants first of all at their distributional limits, whereas in the central part of their ranges, under more favourable conditions, these plants are less dependent upon the carbonate substrates (Pesola, 1929). Indeed, the mineralogical composition of rocks in the two localities of *T. norvegicum* in the Murmansk Region is different: whereas the outcrops of Pyhäkuru Valley are composed of granitic and gneiss substrates enriched with carbonatites originating from intrusive bodies, the rocks of NW part of Rybachiy Peninsula mainly represent metamorphosed sedimentary material such as siltstone, with local dolerite intrusions (Medvedev et al., 2016), but without any presence of carbonate minerals.

Erroneous reports

1. Two herbarium specimens from the Kandalaksha District of the Murmansk Region, determined as *Taraxacum norvegicum*: "near Beloye More [railway] station, roadside of the road to the cottage settlement Fedoseyevo [Fedoseyevka], 21 VIII 1998, D. D. Sokolov" (MW0551747, MW0551748) — in fact represent a totally unrelated species from section *Erythrosperma* (H. Lindb.) Dahlst. or *Dissecta* Soest (Efimov, 2023) very widespread in the North (we also repeatedly collected it from Fedoseyevka). In 2023, the first author described this species as *T. erythroboreale* Efimov, but it turned out that it was described earlier by B. S. Kharitontsev (see Sennikov, 2024 about this personality) from West Siberia. Kharitontsev described the species several times under several names, of which we employ *T. cruciatum* Charit. (Efimov, 2026). The plants

Fig. *Taraxacum norvegicum* and its habitats in Russia.
A–D — Rybachiy Peninsula (A, B — plant LE 01256118; C — plant LE 01149857; D — habitat); E, F — Pyhäkuru Valley (E — plant LE 01328200; F — habitat). Photos by V. A. Dudka (A), P. G. Efimov (B–D), M. V. Legchenko (E, F).

from Fedoseyevka were attributed to *T. norvegicum* because of horned outer phyllaries, which can characterize all sections (*Borealia*, *Dissecta* and *Erythrosperma*), and after some similarity in leaf shape. In fact, the leaves of both species are substantially different, and the observed similarity may be due to very late collection time of the plants from Fedoseyevka, during the secondary flowering, when *Taraxacum* plants become unsuitable for identification.

2. Hultén (1950) provided a distribution map of *T. norvegicum* in Fennoscandia, with correctly positioned locality in Pyhäkuru Valley. As far as this locality is situated closely to the border between the Murmansk Region and the Republic of Karelia, it was difficult to establish its correct administrative affiliation after Hultén's map, and N. N. Tzvelev and B. A. Jurtzev (1987) reported *T. norvegicum* for both regions, by this providing an incorrect report of *T. norvegicum* for the northern part of the Republic of Karelia. Fortunately, Sennikov in his detailed revision of genus *Taraxacum* for a "Compendium of Karelian Flora" (Kravchenko, 2007) did not repeat this mistake. However, further finds in the Republic of Karelia are possible, because the known localities (both in Russia and in Finland) are situated not far from it.

Conservation

Taraxacum norvegicum was included in the first list of threatened animals and plants of the Murmansk Region (Zhdanov, 1979) as "possibly extinct" species. The next document (Zhdanov, 1990) treated it as "critically endangered or possibly extinct". Further on, *T. norvegicum* was included in the appendix to the first edition of the Red Data Book of the Murmansk Region as "data deficient" (Konstantinova et al., 2003), but then excluded from its further editions, including the current one (Konstantinova et al., 2014; Borovichev et al., 2025), obviously due to the absence of new data. Thus, nowadays *T. norvegicum* is not legally protected in Russia.

However, the habitats of *T. norvegicum* in the both localities are under some protection because they are situated within protected areas: those in Rybachiy Peninsula in the nature park "Rybachiy and Sredniy Peninsulas", and Pyhäkuru Valley in the "Kutsa" regional sanctuary (*zakaznik*). This is especially important in case of the "Kutsa" sanctuary, where any disturbance like alpinism or deforestation may quickly lead to elimination of the plants.

At the same time, *T. norvegicum* definitely needs to be included in the next edition of the Red Data Book of the Murmansk Region as taxonomically isolated species with few localities and very small number of individuals. Our estimation in 2025 suggested that the number of plants recorded in Russia to date did not exceed 30, only about 10 of them having flowerheads. According to the IUCN Red List categories and criteria (IUCN..., 2012; IUCN Standards..., 2024), the species falls into CR category due to very small extent of occurrence, small area of occupancy, small and declining population size and very small number of mature individuals: B1ab(v)+2ab(v); C2a(i, ii); D. The studied populations have no significant immigration of propagules from outside or such immigration is unknown.

Along with *T. norvegicum*, which was rediscovered in the region after 82 years, several other species were recently rediscovered in the Murmansk Region after very long intervals: *Calamagrostis chalybaea* (Laest.) Fr., 161 years (Kozhin, 2024); *Astragalus norvegicus* Grauer, 116 years (Kozhin et al., 2018); *Taraxacum kolaense* H. Lindb. ex Dahlst., 112 years (Efimov, Golovina, 2025); *Erythrichium villosum* Bunge, 105 years (Borovichev et al., 2020). These findings underpin the importance of re-inventory of vascular plant flora of the Murmansk Region.

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