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Distribution of *Gentiana acaulis* L. in Ukraine

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Abstract: The distribution of the rare high-altitude species, *Gentiana acaulis* L., listed in the Red Data Book of Ukraine, has been summarized based on the results of our field research, herbarium collections, data from the Global Biodiversity Information Facility, iNaturalist, UkrBIN, and various literature sources. Based on the data from this analysis, a general list of known locations and a map of the distribution of the studied species in Ukraine were compiled. According to the results of the analysis of the current distribution of *G. acaulis* in Ukraine, the species occurs in Svydovets, Chornohora, Marmarosh, Gorgany Mountains ranges, and is also known in the Eastern Beskydy and Low Polonyny, Pokutsko-Bukovynsky Mountains ranges, and the Chyvchino-Hrynyavski Mountain range. Currently, 83 locations of *G. acaulis* have been registered in the studied region. The largest number of locations (29 geographic sites) is in Svydovets. Slightly fewer locations are concentrated in the Chornohora Mountain range (27 geographic sites) and in the Gorgany (14 geographic sites). There are five locations in the Eastern Beskydy and Low Polonyny, four locations in the Marmarosh, three in the Pokutsko-Bukovynsky Mountain range, and one location each in the Chyvchino-Hrynyavski Mountain range. The data obtained significantly support the existing information on the general range and distribution of *G. acaulis* in Ukraine. They can be used to organize the monitoring of known *G. acaulis* locations, study the state of its populations, and develop recommendations for its conservation.

Keywords: Carpathians, conservation, endangered species, Gentianaceae, high-mountain flora, Ukraine.

Introduction

Gentiana acaulis L. is a hemicryptophyte, a perennial herb. The stem is short, growing from a basal rosette of leaves. The leaves are concentrated mainly in the basal rosette. The rosette leaves are over 20 mm long, elliptical-oval, pointed, and rough at the edges. The stem leaves are opposite, usually in one or two pairs, ovate-lanceolate. The flowering stem terminates in a single, large flower, 5–6 cm long. The corolla is 4.5–7 cm long, funnel-bell-shaped, bluish-blue with olive-green spots. The calyx is ovate-bell-shaped, and its teeth are ovate or elliptical. The fruit is a capsule. It blooms in June–July (Chopyk & Fedoronchuk 2015).

Gentiana acaulis is a rare, perennial species of alpine and subalpine zones (1500–2000 m above sea level). It is a relic species with a disjunctive range. The species is part of the associations *Cystopteridetum fragilis*, *Rumicetum scutati-Rhodioretum roseae* (Ziman & Shyian 2009), and *Rhodoretum campanulosum alpinae* (Moskaliuk 2010).

The general range of *Gentiana acaulis* includes the Pyrenees, the Alps, the Balkans, and the Carpathians (Fig. 1). *G. acaulis* grows naturally in Albania, Austria, Bulgaria, the Czech Republic, France, Germany, Italy, Romania, Slovakia, Spain, Switzerland, Ukraine, and other countries of the Balkan Peninsula (POWO 2025).

In the study of the *Gentiana* genus in the flora of the Ukrainian Carpathians, we distinguish three periods: the first from 1772 to 1939, the second from 1939 to 1991, and the modern (since 1991) (Moskaliuk 2010). The first period is characterized by numerous floristic and geobotanical studies of the Ukrainian Carpathians. A great deal of information on the distribution, biology, and ecology of the *Gentiana* genus is presented in various editions of “Identification Guides” and special publications over a long period of time. The presence of *G. acaulis* in the Ukrainian Carpathians was first reported in a fundamental book by Zapalowicz (Zapalowicz 1889) and later confirmed by Buchek (Buček 1932).

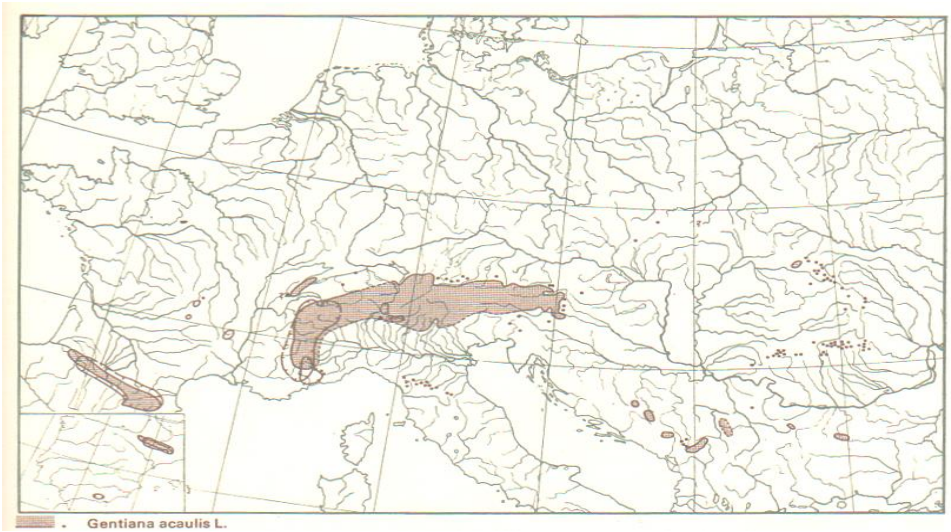

Fig. 1 Map of the distribution range of *Gentiana acaulis* L. (Meusel et al. 1978).

Between 1939 and 1991, studies focused primarily on the plant cover of individual Carpathian regions, alongside the compilation of "Identification Guides" and floristic and geobotanical research (Fodor 1974; Chopyk 1976; Malinovskyi 1980, etc.).

The modern period of studying the *Gentiana* genus is characterized by a predominance of biochemical, embryological, and population-based studies. Experiments are being conducted to develop biotechnological methods for introducing its species into *in vitro* culture (Mayorova et al. 2013; Mayorova 2014; Hrytsak & Drobyk 2020, etc.). Presently, N. Drapaylo (1995) has critically reviewed the taxonomic composition of the genus *Gentiana* within the flora of Ukraine. Studies on the population characteristics of *Gentiana* species in the Ukrainian Carpathian flora were conducted (Moskaliuk & Komendar 2008; Moskaliuk 2010; Moskaliuk & Melesh 2025). A number of published studies from the Ukrainian Carpathians presented a large amount of chorological data, but in many of them, the locations of *G. acaulis* were noted very generally, without specific locations, often only at the level of floristic regions identified by Chopyk (1976).

The species *G. lutea* L., *G. punctata* L., and *G. acaulis* have developed high adaptive abilities to survive and reproduce in the extreme conditions of the highlands over a long evolutionary process. However, the anatomical and morphological features of their shoot and root systems, the specificity of reproductive biology, and the low regenerative ability of the root system determine their vulnerability to disruption of abiotic or biotic growth conditions. Therefore, excessive pastoral and recreational pressure on highland ecosystems, combined with increased global warming, may lead to a gradual decline of these species from the flora of the Ukrainian Carpathians (Hrytsak & Drobyk 2020).

The species is included in the Red Data Book of Ukraine (Didukh et al. 2009) and the European Red List (Bilz et al. 2013). Livestock grazing, trampling, and mass harvesting of the plant represent the main threats and pressures on the species´ populations.

Given the threats the species faces, the survey on the distribution of *Gentiana acaulis* in Ukraine will not only contribute to its conservation efforts but also serve as a factual basis for the development of a comprehensive program for its monitoring in the context of increased anthropogenic impact (recreation, human economic activity) and global climate change. In this paper, we aim to summarize data on the distribution of *G. acaulis* in Ukraine and establish monitoring to improve the conservation of known locations.

Material and Methods

In order to bring up-to-date distribution survey of occurrence of *Gentiana acaulis* in Ukraine, we used our own field observations (conducted between 2008 and 2025), available literature sources (Moskaliuk & Komendar 2008; Ziman & Tiukh 2008; Moskaliuk 2010; Kulbanska & Buniak 2010; Tiukh et al. 2011; Mayorova et al. 2013; Mayorova 2014), known distribution maps in the Red Data Books of Ukraine (Sheliag-Sosonko et al. 1996; Didukh et al. 2009), and relevant Ukrainian herbarium

collections (M.G. Kholodny Institute of Botany of the National Academy of Sciences of Ukraine – KW; M.M. Hryshko National Botanical Garden of the National Academy of Sciences of Ukraine – KWHA; Ivan Franko National University of Lviv – LW; State Natural History Museum of the National Academy of Sciences of Ukraine – LWS; Uzhhorod National University – UU; Carpathian Biosphere Reserve – CBR; Carpathian National Nature Park – CNNP). Additionally, the databases of the Global Biodiversity Information Facility (263 occurrences), iNaturalist (474 observations), and UkrBIN (19 findings) were also used. Based on the data from these sources, a list of locations and a distribution map of the studied species in Ukraine were compiled.

Throughout the following text, we use the term "location", by which we mean a place on the earth's surface, a geographic site, or a geographic point where the species of interest occurs or occurred in the past. A population may include one or more locations. During the data compilation, particular attention was paid to locations confirmed by herbarium material, photographs, and field diary entries. Google Maps, Google Earth, and an interactive map from the Trekking Carpathians Maps website (https://vpohid.com.ua/map/) were used to identify locations.

Results and Discussion

Gentiana acaulis L. has a Central European range (Fodor 1974). In Ukraine, the studied species is confined to the mountain ranges of the Eastern Carpathians, which are part of the Carpathian Mountain range. Based on the composition of the flora and vegetation, the Ukrainian Carpathians are divided into the following units: Prikarpattya, Chornohora, Svydovets, Marmarosh, Gorgany, Chyvchino-Hryniavski, Eastern Beskydy, Low Polonyny, Volcanic Carpathians, Transcarpathian Foothills, and Transcarpathian Plain (Chopyk & Fedoronchuk 2015).

The Red Data Book of Ukraine (Ziman & Shyian 2009) lists eight locations of *G. acaulis*, primarily in the alpine and less frequently in the subalpine zones, where the species is found at altitudes of 1500–2000 m above sea level.

According to literary sources, *G. acaulis* is common in the Gorgany (Ziman & Tiukh 2008; Tiukh et al. 2011), Svydovets, Chornohora, Chyvchino-Hryniavski Mountains, Maramorosh (Chopyk 1976; Malynovsky & Kricsfalusy 2002), and in the Skolivski Beskydy Mountains (Kaule & Tasenkevych 2007). Here, the species is confined to the subalpine and alpine zones at altitudes of 1500–1950 m, descending to the forest zone at an altitude of 730 m (the vicinity of the village of Yasinya and below Polonyna Lyutyanka Holytsia).

Based on previous observations (Moskaliuk 2010) and new data, a comprehensive overview of the distribution of *G. acaulis* in Ukraine is provided below.

This species was observed at 83 locations (geographic sites) (Fig. 2). In the Chornohora Mountain range, the species was observed at 27 locations, including the following: Mts. Brebeneskul, Breskul, Bukovynka, Dancher, Dzembronia, Hoverla, Hutyn Tomnatyk, Klyfa, Komyn, Menchul, Rebra, Petros Chornohirskyi, Pip Ivan Chornohirskyi, Pohorilets, Shchavnyk, Sheshul, Shpytsi, Skorushny, Smotrych, Turkul, Velyki Kizly, Vascul-Vertopy, Verkh-Debry, and Polonyna Lemska, Polonyna

Pozhyzhevska, Polonyna Rohnieska, Polonyna Shumnieska. We confirmed the species´ occurrence near Mt. Turkul (at an altitude of 1800 m), on Mt. Petros (at an altitude of 1900 m), and on Mt. Shchavnyk (at an altitude of 1400 m).

Svydovets Mountain range – the species was observed at 29 locations: Mts. Apetska, Apetska Mala, Blyznytsia Mala, Blyznytsia Velyka, Dohiaska, Dumen, Krasnyi Hrun, Kurtiaska Mala, Pereval Dohiaska, Pleshka, Stih, Svydovets Tsentralnyi, Svydovo-Pryslop (Pryslip), Tataruka, Tempa, Troiaska, Velykyi Kotel, Zhandarm (Drahobrat), Zhandarm druhyi, Kobyla, and Polonyny Braivka, Heryshaska, Krachuneska, Stohy, Strymcheska, Svydovets, Urda, Vorozheska, and Yarosheska. An isolated occurrence was recorded on Mt. Dragobrat (Zhandarm) (at an altitude of 1700 m), so we consider this habitat to be one where the species is on the verge of extinction. This is probably due to excessive anthropogenic impact on the population. The population was much larger in the past, but now the population size has decreased.

In the Marmarosh Mountain range, the species was observed at four locations: Pip Ivan Marmaroskyi, Petros Marmaroskyi, Nenieska (Mika-Mare), and Berlebashka (Latundur). We recorded a location of *G. acaulis* on Mt. Berlebashka (at an altitude of 1700 m).

In the Gorgany Mountain range, the species was observed at 14 locations: Mts. Horb, Hreblia, Mykulynka, Nehrovets, Pereluka Vysoka, Shtouba, and Voronenko. Additionally, it was recorded on the outskirts of the villages of Nymetska Mokra, Yablunytsia, Yamna, Zelena, Yasinia, Vorokhta, and Yablunetskyi Pereval. In addition, four locations in the Eastern Gorgany Mts. have been reported by Kulbanska & Bunyak (2010): near the village of Vorokhta, the proximity of the villages of Yablunytsia, Yamna, and Zelena in the Nadvirna district of Ivano-Frankivsk region.

In Eastern Beskydy and Low Polonyny, five locations are known: the vicinity of the village of Lumshory and on the Polonyna Liutianska Holytsia, the Mts. Ruzha, Ruzha-Hropa, and Chorna Ripa.

The species occurs in the Pokutsko-Bukovynskyi Mountain range at Mt. Tomnatyk, Mlakovata, and Yarovytsia. Additionally, there is one known location of *G. acaulis* in the Chyvchyno-Hryniavski Mountain range, the exact location of which is not marked (Chopyk 1976).

In this paper, we present data on the occurrence of *G. acualis* in Ukraine, which we have observed at 83 locations. The species´ occurrence is centred in the Svydovets Mountain range (29 geographic sites), the Chornohora Mountain range (27 geographic sites), and the Gorhany Mountain range (14 geographic sites). In other phytogeographical districts, the species is less common, occurring in Marmarosh (four locations), Pokutsko-Bukovynskyi (Prikarpattya) (three locations), or in isolated populations in the Eastern Beskydy and Low Polonyny, Chivchino-Hrynyavski Mountains.

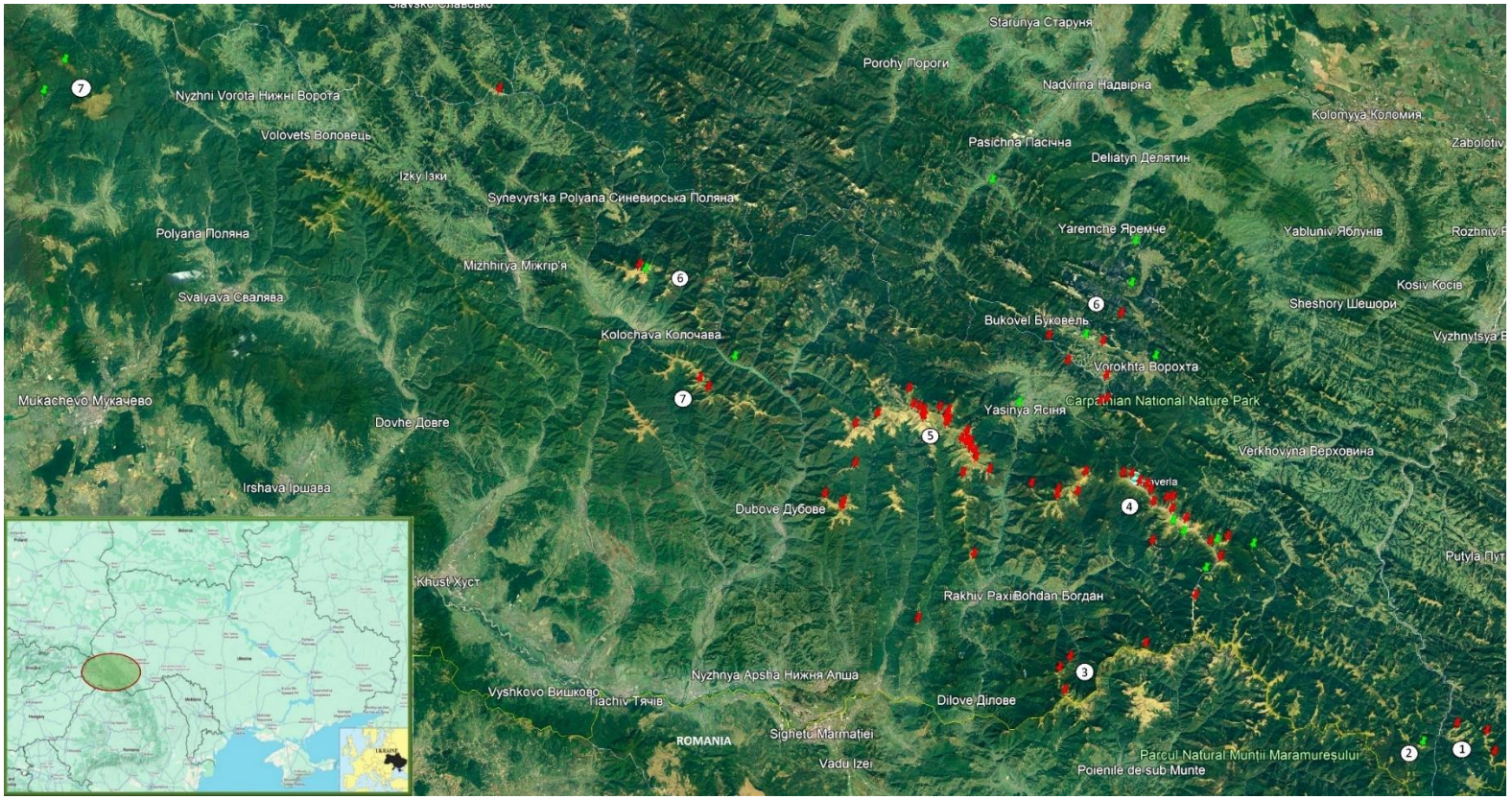

Fig. 2 Distribution of *Gentiana acaulis* L. in Ukraine (Notes cartographic basis Google Maps and Google Earth): red point - locations based on herbarium collections and photographs from Internet resources, green point - locations based on literary data. 1 - Pokutsko-Bukovynskyi Mountain range, 2 - Chyvchyno-Hryniavski Mountain range, 3 - Marmarosh, 4 - Chornohora, 5 - Svydovets, 6 - Gorgany, 7 - Eastern Beskydy and Low Polonyny.

Summary

Here, we reported 83 locations of *Gentiana acaulis* in Ukraine, 67 of which are confirmed by herbarium collections, field data observations, or photographs from Internet resources (iNaturalist and UkrBIN), and the rest by literary data. This data significantly expands the information on the distribution of Gentiana acaulis in Ukraine and can be used by conservationists to develop conservation plans for the species.

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Appendix

List of locations of *G. acaulis* in the Ukrainian Carpathians

1. Chornohora Mountain range:

Chornohora – E. Turczyński 27.07.1864 LWS 073708 GBIF 4440457289; Leioll 28.06.1927 LW; Madalski 08.1927 LW; Kozij 25.07.1935 LW; s. coll. 29.08.1935 LW; **Mt. Hoverla** (2061 m) – Zapalowicz's 1889; B. Janowski 24-25.06.1901 LWS; B. Janowski 15.07.1905 LWS 073729 GBIF 4440456938; s. coll. 23.07.1929 KW; s. coll. 02.08.1946 KW; Buček 1932; Dobrochaeva 28.06.1947 KW; Kozij 28.06.1947 KW; Grin 01.07.1948 KW; Bradis, Zapyatova 07.07.1948 KW; Berko 12.06.1961 LWS; Shevchuk 05.06.1963 LWS; Mosyakin 11.07.1985 KW; Genik 20.07.1987 herbarium CNNP; Isaikina 15.07.1988 KWHA; A. Mialik 12.05.2013 iNat ID 47619352, GBIF 2814215537; Mayorova 2014; M. Peregrym 02.06.2016 iNat ID 65832491, GBIF 2992750814; M. Bogomaz s. dato 2018 UNCG-2020-12-782 GBIF 3018869612; D. Komanov 07.01.2023 iNat ID 146033555, GBIF 4080458481; **Mt. Komyn** (1850 m) – aliaksandarmialik 12.06.2013 iNat ID 47619352; **Mts. Shpytsi-Gadzina** – Zapalowicz's 1889; **Mt. Shpytsi** (1863 m) – Bradis, Andrienko 17.07.1959 KW; Mayorova et al. 2013; Mayorova 2014; T. Wiśniewski 09.08.1921 WA0000111479, GBIF 4858692746; **Mt. Velyki Kizly** (1750 m) – S. Kulish 08.07.2023 UkrBIN 298133; A. Kupriy 19.06.2023 UkrBIN 297298; demak 22.06.2024 iNat ID 224956128; O. Popelnytska 22.06.2025 iNat ID 291720209; **Mt. Rebra** (2001 m) – Mayorova 2014; A. Zamoroka 02.07.2020 iNat ID 168316548; **Mt. Sheshul** (1728 m) – Buček 1932; Vainahii 31.05.1957 LWS; Zhdanova 05.07.1959 LW; Tymoshchuk 08.06.1966 KW; Kardash 27.05.1985 LW; Shiyan 26.06.1988 KW; Pavlik – Mayorova et al. 2013; **Polonyna Rohnieska** (over 1450 m) – V. Vitvitskaya 20.07.2017 KHER 10404 1434445 GBIF 2609744847; **Polonyna Shumneska** (1590 m) – natalia_shiyan 10.02.2013 iNat ID 190247826, GBIF 5062594238; **Mt. Petros Chornohirskyi** (2020 m) – Zapalowicz's 1889; Buček 1932; Grin 15.07.1947 KW; Malinovsky 05.06.1948 LWS; Firchuk 12.07.1956 LWS; Firchuk 12.07.1956 LWS 074054 GBIF 4440457032; Malikova 26.05.1960 LW; Komendar 1965; Ziman 06.07.1981 KW; Vainahii 08.07.1994 herbarium CBR; Pashigarova 11.07.1995 LW; Antosyak 20.07.1995 herbarium CBR; Bednarska 27.08.2005 KW; K. Danyliuk 26.06.2022 LWS 116893 GBIF 4440456814; **Mt. Pip Ivan Chornohirskyi** (2028 m) – Kozij 18.07.1927 LWS; Kozij 1930 LWS; Turchinsky 27.07.1864 LWS; Reman s. dato 1965 LWS; Kozij 03.08.1979 LWS; N. Zarya 13.08.2017 UkrBIN 43082; **Mt. Skorushny** (1552,3 m) – Zapalowicz's 1889; **Mt. Hutyn Tomnatyk** (2016 m) – Mayorova 2014; **Polonyna Pozhyzhevska** (1822 m) – Zapalowicz's 1889; G. Kozij 25.07.1935 UW 11170: Flora Polonica I Herbarium Generale WA0000111481 GBIF 4858692679; G. Kozij 25.07.1935 GH barcode-01245263 GBIF 5029071629; Blotsky 03.07.1899 LWS; s. coll. 31.07.1912 LWS; Tasenkevich 06.07.1978 LWS; Lovelaz 29.08.1979 KW; Danyliuk 07.06.1985 LW; **Mt. Dancher (Dantsyzh)** (1855 m) – Zapalowicz's 1889; Mayorova et al. 2013; P. Kondrat 01.07.2019 UkrBIN 117362; **Mt. Turkul** (1933 m) – Zapalowicz's 1889; G. Kozij 18.07.1927 LWS 073707 GBIF 4440456579; G. Kozij 18.07.1927 LWS 120084 GBIF 4440457504; V. Komendar 1965; Lazebna 07.07.1967 LWS; lake Nesamovyte – Ornst, Miakushok 01.07.1968 KW; Vainahii 08.06.1971 herbarium CBR; Lazebna 15.07.1971 LWS; Shyian 19.07.1992 KW, LW; Mayorova 2014; Yu. Guglya 03.09.2022 UkrBIN 263426, UkrBIN 263425; **Mt. Breskul** (1911 m) – Zapalowicz's 1889; s. coll. 21.06.1908 LWS; T. Wiśniewski 10.08.1921 WA0000111480 11039 GBIF 4858692677; Tulihlovych 23.06.1929 LWS; Korzhynskyi 18.06.1975 LWS 074623 GBIF 4440456390; Vainahii, Tasienkevych, Sukhariuk 07.06.1979 herbarium CBR; Sukhariuk 18.07.1980 herbarium CBR; Breskulets – Shevchuk 17.08.1960 LWS; **Mt. Breskul-Pozhyzhevska** – M. Tuligłowicz 23.06.1929 LWS 073733 GBIF 4440457420; M. Tuligłowicz LW 23.06.1929

S073735 GBIF 4440456628; **Mt. Menchul** (1300 m) – Buček 1932; Susip 05.06.1960 LW; Borysyk 05.06.1960 LW; **Mt. Dzembronia** (1877 m) – Zapalowicz's 1889; O. Moroshan 04.06.2009 GBIF 3018870340; Maksym Mysak 23.06.202 UkrBIN 161104; **Mt. Pohorilets** (1760 m) – Zapalowicz's 1889; **Mt. Smotrych** (1898 m) – N. Nazaruk 21.06.2022 iNat ID 123506852; **Mt. Bukovynka** (1216 m) – H. Kuzyo 14.05.2022 iNat ID 117275539; **lake Brebeneskul** – Zapalowicz's 1889; **Mt. Brebeneskul** (2038 m) – G. Golovko 25.02.2018 UkrBIN 67070; **Mts. Vascul-Vertopy** – Zapalowicz's 1889; **Polonyna Lemska** – Zapalowicz's 1889; **Mt. Klyfa** (1458 m) – bilousviktoria 30.05.2023 iNat ID 165034749; **Mt. Verkh-Debry** (1237 m) – Tokarjuk, Derzhypilsky et al. 2011 UkrGrassDB-134526 GBIF 3022841026; **Mt. Shchavnyk** (1436 m) – herbarium collection Moskaliuk, 2014.

2. Marmarosh Mountain range:

Mt. Pip Ivan Marmaroskyi (1940 m) – Buček 1932; Khrzhanovskyi 29.07.1946 KW; Barbarych 01.07.1947 KW; Hryn 07.07.1948 KW; Bradis, Zapiatova 21.07.1948 KW; Vagner 06.07.1854 LW; Komendar 1965; E. Turczyński 19.07.1883 LWS 073703 GBIF 4440456835; Sukhariuk 18.06.1984 herbarium CBR; Vainahii 13.07.1992 herbarium CBR; Shyian 13.07.1992 KW, LW; Kobiv et al. 2017; forest 16.07.2017 UkrBIN 40832; **Mt. Petros Marmaroskyi** (1368 m) – Slobodian 11.06.1947 LWS; Bradis, Zapiatova 07.07.1948 KW; s. coll. 22.07.1996 LW; Bednarska 27.08.2005 KW; Mayorova 2014; Kobiv et al. 2017; **Mt. Nenieska** (Mika-Mare) (1815 m) – K. Malynovskiy 26.07.1961 LWS 110261 GBIF 4440456688; Chopyk, Verenko, Ornst 11.08.1971 KW; Kobiv et al. 2017; **Mt. Latundur (Berlebashka)** (1734 m) – Buček 1932; herbarium collection Moskaliuk, 2013.

3. Svydovets Mountain range:

Mt. Mala Blyznytsia (1878 m) – s. coll. 26.05.1910 LW; Vilchynskyi 16.08.1946 LWS; Bradis 23.06.1947 KW; Barbarych 24.06.1947 KW; Hryn 11-17.07.1947 KW; Bradis, Zapiatova 14.07.1948 KW; E. Bradis, A. Zapiatova 14.07.1948 herbarium CBG GBIF 5139259728; Liubovych 02.09.1949 LWS; Shylova 14.06.1955 LW; Chopyk, Verenko, Ornst 05.08.1971 KW; Malynovsky 05.06.1983 LWS; Shyian 11.07.1992 KW; J. Suda, J. Suda 29.06.1997 PRC 427658 GBIG 3413680412; Dzhus 25.07.1998 KW; Parnikosa et al. 2002; D. Davydov 13.07.2024 iNat ID 254337126, GBIF 4994011037; **Mt. Velyka Blyznytsia** (1881 m) – Viktoria 01.07.2011 iNat ID 36884801; A. Kuzemko 04.08.2021 NFDGrassland.plants.UA.2941 GBIF 3802243845; kateryna-kvitka-gorytsvit 31.05.2025 iNat ID 286586783, GBIF 5177204072; **Polonyna Krachunieska** (1686 m) – Zapalowicz's 1889; Chopyk, Verenko, Ornst 08.07.1970 KW; M. Zakharova 18.06.2024 iNat ID 224484882, GBIF 4903830464; romankish 18.06.2024 iNat ID 223817451; katerynapolianska 19.06.2024 iNat ID 223718561; L. Chabanova 19.06.2024 iNat ID 223726003, GBIF 4903961183; N. Skobel 19.06.2024 iNat ID 223767049, GBIF 4910807522; V. Pokaliuk 19.06.2024 iNat ID 223925630; R. Luzakova 19.06.2024 iNat ID 223729907; ivanmoysiyenko 10.06.2025 iNat ID 289226126; beatriskish 10.06.2025 iNat ID 288439215, GBIF 5198529678; **Mt. Velykyi Kotel** (1770 m) – M. Zakharova 19.06.2024 iNat ID 224557271, GBIF 4904262750; katerynapolianska 21.06.2024 iNat ID 224175056; ivanmoysiyenko 21.06.2024 iNat ID 224253205; N. Skobel 21.06.2024 iNat ID 224159673, GBIF 4904096364; V. Pokaliuk 21.06.2024 iNat ID 224856667; karinakovalchuk 21.06.2024 iNat ID 224362247; sopinthepan 12.06.2025 iNat ID 288966476; anna_yalova 12.06.2025 iNat ID 290888044; Yu. Hrad 12.06.2025 iNat ID 289139321; **Polonyna Yarosheska** (1460 m) – katerynapolianska 18.06.2024 iNat ID 223515720; ivanmoysiyenko 18.06.2024 iNat ID 223569563; L. Chabanova 18.06.2024 iNat ID 223540397, GBIF 4904348782; Nadiia Skobel 18.06.2024 iNat ID 223523689, GBIF 4911083853; **Polonyna Svydovets** (1560 m) – M. Zakharova 18.06.2024 iNat ID 224492548, GBIF 4903915081; N. Skobel 18.06.2024 iNat ID 223543636, GBIF 4976217124; L. Chabanova 19.06.2024 iNat ID 223985782, GBIF

4904027531; surmiievichvaleriia 20.06.2024 iNat ID 224128554, GBIF 4904216349; V. Pokaliuk 20.06.2024 iNat ID 225056196; anna_hrytsyk 10.06.2025 iNat ID 289299298, GBIF 5199132123; sequoiaoia 10.06.2025 iNat ID 288433021, GBIF 5198557641; K. Lytvyniuk 12.06.2025 iNat ID 289075616; **Mt. Zhandarm (Drahobrat)** (1763 m) – Zapalowicz's 1889; Kolishchuk 18.06.1954 LWS; Vainahii 12.07.1958 LWS; Vainahii 01.07.1976 herbarium CBR; 26-28.08.1963 Malynovsky & Kricsfalusy 2002; karinakovalchuk 20.06.2024 iNat ID 224359634; A. Radzanowski 09.06.2025 iNat ID 288462911; O. Shynder, V. Loya, I. Olshansky, O. Rak, 17.07.2008 iNat ID 102782011, GBIF 3923626446; M. Mysak 08.02.2020 UkrBIN 142157; katerynapolianska 20.06.2024 iNat ID 224203340; O. Korniienko 10.06.2025 iNat ID 288420502; **Mt. Zhandarm druhyi (Drahobrat**) (1785 m) – ivanmoysiyenko 20.06.2024 iNat ID 224123150; valeriasheno 09.06.2025 iNat ID 288560762; **Mt. Troiaska** (1702 m) – L. Borsukevych, M. Helesh 19.07.2005 LWS 116681 GBIF 4440456753; Mayorova et al. 2013; v._glazyrina 20.06.2024 iNat ID 224003744; **Mt. Svydovo-Pryslop** (Pryslip) (1452 m) – Bradis, Zapiatova 22.06.1948 KW; Malynovsky & Kricsfalusy 2000; **Mt. Svydovets Tsentralnyi** (1635 m) – surmiievichvaleriia 21.06.2024 iNat ID 224207338, GBIF 4904272781; **Polonyna Stohy** (approximately 1700 m) – Vaynagiy I. 13.06.1955 LWS 073710 GBIF 4440457390; Vainahii 13.06.1965 LWS; **Mt. Stih** (1704 m) – katia_suhodoieva 18.06.2024 iNat ID 223601483; romankish 18.06.2024 iNat ID 223817053; L. Chabanova 18.06.2024 iNat ID 223571470, GBIF 4904096311; N. Skobel 18.06.2024 iNat ID 223543636; ivanmoysiyenko 18.06.2024 iNat ID 223552652; katerynapolianska 19.06.2024 iNat ID 223708765; surmiievichvaleriia 19.06.2024 iNat ID 223785777, GBIF 4904124469; S. Bilyk 10.06.2025 iNat ID 288521249, GBIF 5198374670; beatriskish 10.06.2025 iNat ID 288413732; V. Yantso 10.06.2025 iNat ID 288497804; anna_hrytsyk 10.06.2025 iNat ID 289299159; muzyka_illia 10.06.2025 iNat ID 288435596; s._bohdanivna 10.06.2025 iNat ID 288521249; sopinthepan 10.06.2025 iNat ID 288436298; valeriasheno 10.06.2025 iNat ID 288559619; **Mt. Vorozheska** (1731 m) – Kardash 15.07.1989 LW; anna_hrytsyk 12.06.2025 iNat ID 289496057, GBIF 5199048249; kira_logvinenko 12.06.2025 iNat ID 289094881; **Polonyna Heryshaska** (1762 m) – Lukáš Kroča 01.08.2023 iNat ID 235336286; surmiievichvaleriia 19.06.2024 iNat ID 223720161, GBIF 4904221404; ivanmoysiyenko 19.06.2024 iNat ID 224021161; M. Zakharova 19.06.2024 iNat ID 224557311, GBIF 4903767100; L. Chabanova 19.06.2024 iNat ID 223726215, GBIF 4904053287; N. Skobel 19.06.2024 iNat ID 223770118, GBIF 5062740665; V. Pokaliuk 19.06.2024 iNat ID 223923470; R. Luzakova 19.06.2024 iNat ID 223795412; O. Hryshechkyna 10.06.2025 iNat ID 288451368, GBIF 5188427718, iNat ID 288448495; O. Korniienko 10.06.2025 iNat ID 288509875; anna_yalova 10.06.2025 iNat ID 288809348, GBIF 5199080780; E. Kish 10.06.2025 iNat ID 288451479, GBIF 5188422233; illyav 10.06.2025 iNat ID 288440276; Illyadidkovskiy 10.06.2025 iNat ID 288452384, GBIF 5188459299; cherema 10.06.2025 iNat ID 293505935; K. Lytvyniuk 10.06.2025 iNat ID 288438112; ernestbalint 10.06.2025 iNat ID 289295900, GBIF 5198299104; V. Yantso 10.06.2025 iNat ID 288505990, GBIF 5199110670; sequoiaoia 10.06.2025 iNat ID 288503154, GBIF 5187746155; anna_hrytsyk 10.06.2025 iNat ID 289186545, GBIF 5199019041; muzyka_illia 10.06.2025 iNat ID 288475473; solomiia_bohdanivna 10.06.2025 iNat ID 288532082; valeriasheno 10.06.2025 iNat ID 288440647; Yu. Hrad 12.06.2025 iNat ID 289070973; A. Radzanowski 12.06.2025 iNat ID 288964197, GBIF 5198981858; sopinthepan 12.06.2025 iNat ID 288966366, GBIF 5199052903; katerynapolianska 12.06.2025 iNat ID 288961113; ; **Polonyna Urda** (1237 m) – Moskaliuk 2010; **Mt. Mala Kurtiaska** (1591 m) – olena_shamray 24.06.2025 iNat ID 292702178; **Mt. Tataruka** (1707 m) – N. Nazaruk 07.07.2021 iNat ID 86306002; **Mt. Tempa** (1634 m) – Lukáš Kroča 01.08.2023 iNat ID 235333272; v._bogdan 28.06.2025 iNat ID 294524152; **Pereval Dohiaska** (1725 m) – anna_yalova 12.06.2025 iNat ID 290887990;

sopinthepan 12.06.2025 iNat ID 289048888, GBIF 5198481974; **Mt. Dohiaska** (1761 m) – O. Alfavitskyi 15.06.2025 iNat ID 289776947, GBIF 5199177392; **Mt. Apetska** (1512 m) – A. Zlatník 05.1972 US 1599422 GBIF 2236003496; A. Kovalyova 03.05.2025 iNat ID 280540571, GBIF 5153721009; O. Utkina 09.05.2025 iNat ID 279934537; O. Utkina 10.05.2025 iNat ID 279943152, GBIF 5153741641; **Mt. Apetska Mala** (1511 m) – M. Mysak 17.07.2023 UkrBIN 299596; Apetska-Krasnyi Hrun – M. Mysak 17.07.2023 UkrBIN 299594; **Mt. Krasnyi Hrun** (1386 m) – kateryna-kvitka-gorytsvit 28.04.2025 iNat ID 278933027; A. Kovalyova 03.05.2025 iNat ID 280581223, GBIF 5154502718; Mariya 10.05.2025 iNat ID 282142370, GBIF 5168052199; **Mt. Kobyla** (1177 m) – R. Gleb 15.05.2008 iNat ID 253428928, GBIF 4994514508; **Mt. Dumen** (1250 m) – V. Loya 24.05.2024 iNat ID 57012180, GBIF 3079548968; **Polonyna Strymcheska** (1650 m) – kasyanenko_elena 19.06.2021 iNat ID 84323961; **Mt. Pleshka** (1214 m) – D. Smirnov 09.05.2009 iNat ID 62107538, GBIF 2898424607; **Polonyna Braivka** (1333 m) – A. Kozurak 16.05.2024 iNat ID 216078723, GBIF 5104353380; kateryna-kvitka-gorytsvit 01.06.2025 iNat ID 287483868, GBIF 5187523634.

4. Gorhany Mountain range:

Outskirts of villages Nymetska Mokra Tyachivskyi district – Zapalowicz's 1889; **Yablunetskyi pereval** (931 m) – Sukhariuk 26.06.1983 herbarium CBR; Shyian 12.05.1992, KW, LW; Ziman, Bulakh 21.05.2005 KW; **Outskirts of villages Yablunytsia** (960 m), **Yamna** (590 m), **Zelena** (620 m), **Vorokhta** (810 m) **Nadvirnianskyi district** – Kulbanska, Buniak 2010; **Outskirts of villages Yasinia** (771 m) – Chopyk 1976; **Mt. Mykulynka** (997 m) – Daryna 07.04.2024 iNat ID 205851510, GBIF 4976219116; **Mt. Nehrovets** (1709 m) – Kolishchuk s. dato 1957, LWS; Berko 02.07.1962 LWS 073702 GBIF 4440456421; Malynovsky & Kricsfalusy 2000; 02.08.1962 Malynovsky & Kricsfalusy 2002; N. Nazaruk 24.05.2024 iNat ID 218356139; **Mt. Voronenko** (960 m) – A._Levon 29.05.2018 iNat ID 128975895, GBIF 3881761807; **Mt. Pereluka Vysoka** (1129 m) – katia_suhodoieva 18.06.2024 iNat ID 223605167; **Mt. Horb** (1687 m), **urochyshche Hedyshova** – Tiukh 2011; **Mt. Hreblia** (1252 m) – O. Tymchuk 05.07.2017 GBIF 4924710461; **Mt. Shtouba** (approximately 1700 m) – Tomych, Derzhypilskyi GBIF 3018870990;

5. Eastern Beskydy and Low Polonyny:

Mt. Chorna Ripa (1280 m) **outskirts of the village Yalynkuvate** – Kaule, Tasienkevych 07.05.2004 KW; Kaule, Tasienkevych 12.05.2004 LWS 108436 GBIF 4440456736; **outskirts of the village Lumshory** (480 m) **Zakarpatskyi region, nearby Polonyna Rivna** – Komendar, Red book of Ukrane 1996; **Polonyna Liutianska Holytsia** (1375 m) – Chopyk 1976; **Mt. Ruzha-Hropa** (1567-1495 m) – M. Mysak, UkrBIN 294105; Mt. Ruzha (1373 m) – Veronika 20.05.2025 iNat ID 282909075, GBIF 5166911616; olena_shamray 20.05.2025 iNat ID 283116662, GBIF 5167352596.

6. Chyvchyno-Hryniavski Mountain range:

exact location not marked – Chopyk 1976.

7. Pokutsko-Bukovynskyi Mountain range:

Mt. Tomnatyk (1565 m) – O. Tomniuk s. data 2012 GBIF 4924709505; V. Hrebenshchykov 19.06.2023 RBU.2023. FAUN-FLOR.6524 GBIF 4855846604; **Mt. Mlakovata** (1416 m), near the waterfall Kortuzianskyi – NFDGrassland.plants.UA.945, GBIF 3802241958; **Mt. Yarovytsia** (1586.9) – Chornei 16.08.1993 KW; Chernivetska oblast, Putylivskyi district – Kaule & Tasienkevych 2007.