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## *Loiseleuria procumbens* (Ericaceae) in the Ukrainian Carpathians

**Abstract:** Distribution of *Loiseleuria procumbens* (L.) Desv. in the Eastern Carpathians of Ukraine is presented on the basis of herbaria, literature and the authors' field studies. Site conditions of species occurrence and its phytocoenotic properties are described. The needs of protection of *L. procumbens* and its plant communities are discussed.

**Additional key words:** plant geography, chorology, ecology, phytocoenology, plant protection

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### Introduction

The alpine azalea (*Loiseleuria procumbens* (L.) Desv.) very rarely occurs in Ukraine, and only in the Carpathians. The authors had an opportunity to find this species in several locations in the Charnokhora Mts in 1997–1999. The field observations and studies allow us to compare the site conditions of *L. procumbens* with those of other plants typical for the subalpine/alpine belt of the Eastern Carpathians of Ukraine (Didukh and Boratyński 2000). The aim of the present study is to show actual distribution of *L. procumbens* in Ukraine, describe the local site conditions of the species here and determine its phytocoenotic character.

### General distribution

*Loiseleuria procumbens* belongs to species with amphiatlantic type of range, but it can be also regarded as circumpolar with a large gap in North-West

Asia (Hultén, Fries 1986). It occurs mainly in the arctic and subarctic zones of Europe, Asia and North America, also in the high mountain massifs of temperate regions of these continents (Hultén 1968; Meusel et al. 1978, Hultén, Fries 1986). In northern Europe the species grows southwards to 58° N latitude on the Scandinavian Peninsula (Hultén 1971) and to 56° in Scotland (Perring, Walters 1962). In addition to the range of distribution on the North, the alpine azalea occurs in the high mountains of central Europe (Fig. 1). It is even locally common in the alpine/subalpine layers of the Alps and Pyrenees and grows sparsely in the Carpathians (Fig. 2). The species presents an arctic-alpine type of range in Europe.

The most elevated European localities of *L. procumbens* have been reported from altitudes of 3100 m in the Alps of France and 2900 m in Switzerland (Braun-Blanquet and Rübél 1934; Meusel et al. 1978). The species attains 2600 (2850) m in the Pyrenees (Villar 1993), and about 2100 m in the Carpathians (*in sched.*).

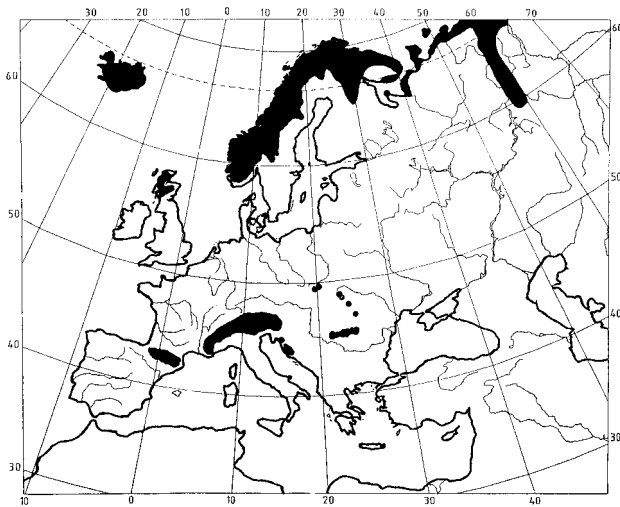


Fig. 1. Range of *Loiseleuria procumbens* in Europe (after Perring and Walters 1962; Hultén 1971; Meusel et al. 1978, Welten and Sutter 1982; Sokolov et al. 1986; Haeupler and Schönfelder 1989; Dupont 1992; supplemented)

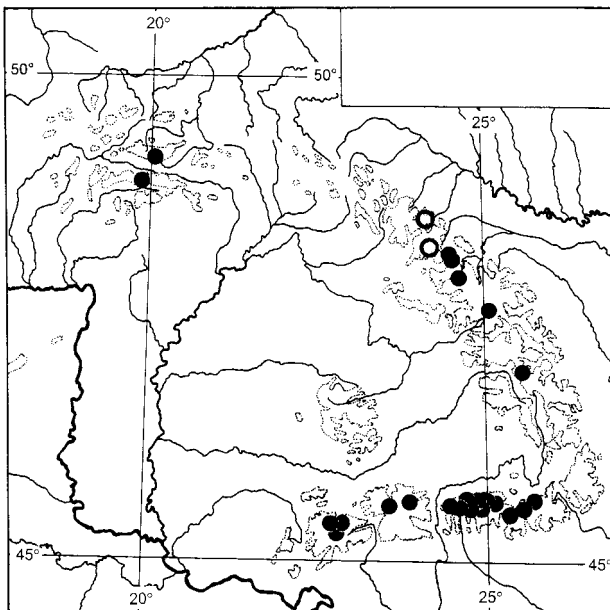


Fig. 2. Distribution of *Loiseleuria procumbens* in the Carpathians (on the basis of data of Ćopa 1960; Jasičová 1982, supplemented)

## Occurrence in the Ukrainian Carpathians

*Loiseleuria procumbens* is a well defined species without taxonomic problems, however, individual specimens of the species have been found erroneously determined among the materials of *Empetrum nigrum* L. and *E. hermaphroditum* Hagerup in several herbaria

studied. Available herbarium materials, literature data and our own field observations allow us to draw a distribution map of *L. procumbens* and to give some ecological comments concerning conditions of occurrence of the species in the Ukrainian Carpathians.

Data on the occurrence of *Loiseleuria procumbens* in the Ukrainian Carpathians were reported several times (Jávorka 1924; Wilczyński 1931; Pawłowski 1937; Barbarich 1957; Kotov and Chopik 1976; Chopik 1976; Malinovsky 1980; Barbarich 1987). Most of species locations were reported from the Charnokhora main range, with single, isolated locality on Mt. Petros, as it was shown on a map published recently by Malinovsky (1998), and another single locality on the Kostrich Mt (Swederski and Szafran 1931). The other data reporting the occurrence of *L. procumbens* in the Ukrainian Carpathians (Fig. 3) concern the Svidovec and the Gorgany ridges. From the former only one mention could be found: ridge of Svidovec (Domin, after Barbarich 1957), with no subsequent confirmation. Reviewing herbaria we have also encountered specimens of *L. procumbens* collected from Syvula, Ihrovishche and Matakho in the Gorgany Mts (szczyty Matachów, Ihrowiszcze, Siwula na granicy Węgierskiej Stryjskiego powiatu, lg. Zipser, 1865, KRAM<sup>1</sup>, 170827). Occurrence of the species in this mountain range has also never been confirmed.

The Alpine azalea is a characteristic species of alpine-subalpine belt in the Charnokhora Mts and most of its localities were reported from altitudes between 1550 m on the north-eastern slopes of Khoverla and 2000 m on the tops of Rebra, Pohzyhzevska and Pop Ivan Mts (Fig. 4). No occurrence has been found below the upper forest line (compare: Środoń 1948). The alpine-subalpine character of the species in the

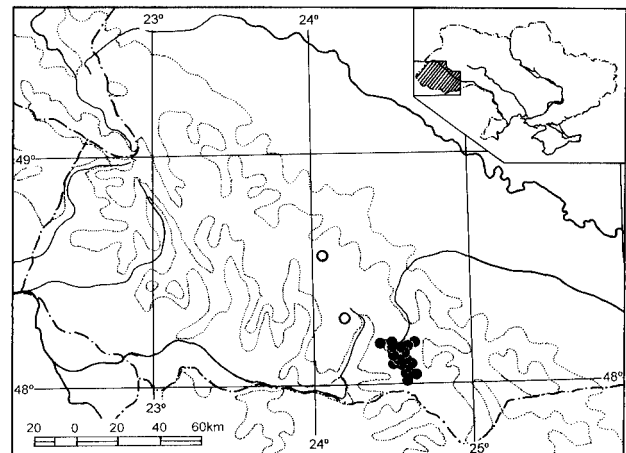


Fig. 3. Distribution of *Loiseleuria procumbens* in the Ukrainian Carpathians

<sup>1</sup> Abbreviations after Index herbariorum (K. Holmgren et al. 1990), except of KWU – University of Kiev, and LWU – University of Lvov

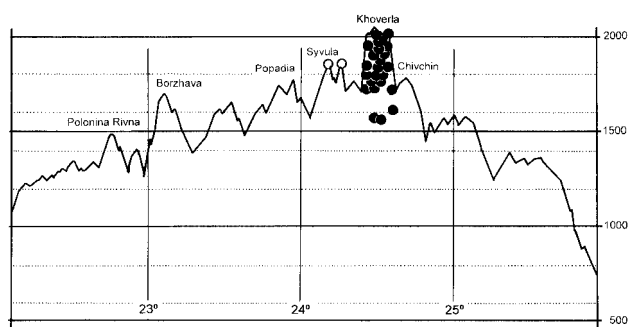


Fig. 4. Vertical distribution of *Loiseleuria procumbens* localities in the Ukrainian Carpathians

Charnokhora is also demonstrated in exposition of its localities. The authors' field observations, data gathered from the herbaria labels and from phytosociological inventories allow us to state, that most locations of *L. procumbens* are N- or NE-facing (Fig. 5).

### Ecological and phytocoenotical character of the species

*Loiseleuria procumbens* grows in the Charnokhora Mts on the open places, mostly on the rocks or on the slopes with rather shallow stratum of soil, exclusively derived from siliceous rocks. The humus stratum, however, can be deeper below procumbent branches of the species, than in other plant communities in the alpine belt of the mountains. The humus is protected against the wind erosion and can accumulate, similar as inside the cushion-like specimens of other species, which occur in the Arctic and Alpine zones.

*Loiseleuria procumbens* frequently forms its own associations in the Charnokhora Mts. These communities are most often developed at the altitudes between 1750 and 2000 m, on weakly inclined slopes or on fairly convex, small, North-facing, lateral ridges of the main range of Khoverla – Pop Ivan. The largest areas

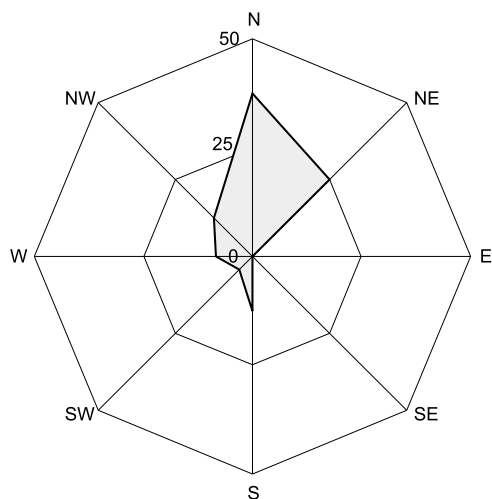


Fig. 5. Exposition of *Loiseleuria procumbens* localities in the Charnokhora range

of the species communities are found between mountains Gutin-Tomnatek and Brebenieska (Malinovsky 1980, 1998), on the places characterized with strong snow drifting processes causing reduced snow cover in the winter. On the open, upper parts of the slopes, especially where the terrain is somewhat convex, the snow is blown away and plants are exposed to the frost and wind action. These site conditions have the most continental character among all parts of alpine zone of Eastern Carpathians. It is probably connected with low height of the species, which allow it to take advantage of retain heat reflected off surface even at low temperatures (Grace et al. 1989). In comparison *L. procumbens* forms its communities in the snow-bed site conditions in the arctic (Razzhivin 1994).

Geobotanical characteristics of *Loiseleuria procumbens* communities in the Charnokhora Mts have been described several times on the basis of dominant species composition (Malinovsky, Bereznoy 1956, Golubec, Malinovsky 1969, Kemendar 1969, Malinovsky 1980, Stoyko 1987, Tasenkevich 1998). The specific associations formed by the species were considered as formation *Loiseleurietalia procumbentis*, in which, depending on species coexisting with *L. procumbens*, 3 associations were described – *Loiseleurietum (procumbentis) purum* (= *Loiseleurietum petraeum*), *Loiseleuria procumbens*+*Cetraria islandica* and *Loiseleuria procumbens*+*Carex curvula* (Malinovsky 1980, Stoyko 1987).

Syntaxonomic position of *L. procumbens* communities from Charnokhora was recently studied using the Braun-Blanquet methodology (Kricsfalushy et al. 1991; Malinovsky, Kricsfalushy 2000). The species occurs exclusively in the plant communities from Class *Loiseleurio-Vaccinietalia* Egger ex Schubert 1960 and Ordo *Rhododendro-Vaccinietalia* Br.-Bl. in Br.-Bl. et Jenny 1926, and most abundantly in associations from alliance *Loiseleurio-Vaccinion* Br.-Bl. in Br.-Bl. et Jenny 1926 (Malinovsky, Kricsfalushy 2000). In this alliance it forms the association *Loiseleurio-Cetrarietum* Br.-Bl. et al. 1939, where it is a dominant species. It also enters other associations from this alliance, as *Empetro-Vaccinietum gaultherioides* Br.-Bl. in Br.-Bl. et Jenny 1926 corr. Grabherr 1993 and *Cetrario-Vaccinietum gaultherioides* Hadaè 1956. *L. procumbens* can be also found sporadically in the association *Rhododendretum myrtifolii* Puscaru et al. 1956 from *Rhododendro-Vaccinion* Br.-Bl. 1926 alliance (Malinovsky, Kricsfalushy 2000).

The association of *Loiseleurio-Cetrarietum* and most of other plant communities with participation of *Loiseleuria procumbens* can be easily distinguished in the field by its specific physiognomy. They are dominated by small, more or less prostrate shrubs. The diagnostic plants of *Loiseleurio-Cetrarietum* in the Charnokhora (participation above II degree) are *L. procumbens*, *Vaccinium gaultherioides* Bigelow<sup>2</sup>, *Carex curvula* All.,

*Juncus trifidus* L., *Doronicum clusii* (All.) Tausch, *Homogyne alpina* (L.) Cass., *Soldanella hungarica* Simonk., *Pulsatilla scherfelii* (Ullep.) Skálický, *Primula minima* L., *Campanula alpina* Jacq. and *Hieracium alpinum* L. From the surrounding communities frequently enter such species as *Empetrum hermaphroditum* Hagerup, *Rhododendron myrtifolium* Schott et Kotschy, *Vaccinium vitis-idaea* L., *V. myrtillus* L. and other. Most of the vascular plant species coexisting with *Loiseleuria procumbens* in its specific communities belong to the arctic-alpine or alpine elements.

The community of *Loiseleurio-Cetrarietum* is abundant in moss and lichen species. To the former belongs the common species, which occur in many plant communities, as *Racomitrium lanuginosum* (Hedw.) Brid., *Polytrichum piliferum* Hedw. and *Dicranum scoparium* Hedw. The most important lichen species are *Cetraria islandica* (L.) Ach., *Cladonia rangiferina* (L.) Nyl., *Alectoria ochroleuca* (Hoffm.) Massal., *Thamnolia vernicularis* (Schwartz) Scher. and *Cladonia macroceras* (Delise) Haw. (Malinovsky, Kricsfalusy 2000).

The floristic composition of associations with *Loiseleuria procumbens* in the Charnokhora Mts does not differ strongly from those described in other mountain ranges of the Carpathians (Țopa 1960; Coldea 1991).

## Protection

The species *Loiseleuria procumbens*, as well as communities which it forms, particularly *Loiseleurio-Cetrarietum*, are very rare in the Ukrainian Carpathians. For this reason the species and associations with its participation deserve to be protected. The need to protect *Loiseleuria procumbens* and associations in which it occurs have been mentioned several times (Wilczyński 1931; Klačtersky 1935; Pawłowski 1937; Malinovsky, Berezhny 1956; Komendar 1969; Kotov, Chopik 1976; Stoyko et al. 1982; Shelyag-Sosonko et al. 1987; Kricsfalushiy et al. 1991; Kricsfalushiy, Malinovsky 1993; Tasenkevich 1998). The best way to conserve plant associations containing *L. procumbens* in the Charnokhora Mts will be exclusion from intensive pasturing areas, where they are formed. Pasture lands in the Charnokhora Mts were traditionally burned by pastors (Vincenz 1936). This kind of treatment is very damaging to *L. procumbens* specimens and was recognized as the main threat (Komendar 1969). However, moderate browsing and reduction of thicket of *Pinus mugo* and *Juniperus communis* subsp. *alpina* should be recommended to prevent specimens of *L. procumbens* from being shaded. This latter recommendation applies to the lowest locations of the species, where it forms small clumps on rocky places among *Pinus mugo* thick-

ets, as on the Smotrich slopes above Dzhembonia, and even in the *Pinus cembra* forest, as for example on the Gadzhyna Mt. in the place named Mreye (Wilczyński 1931).

## List of localities – herbarium materials and literature records

### Charnokhora:

- On Charna Hora (na Czarnej Horze) *lg. Rehmann*, 1869, KRAM, LWDZ; Charna Hora (Czarna Hora), *lg. Raciborski*, 1911, KRA; *ibidem*, *lg. Kulczyński*, 1925, LU;
- Petros (Pietros, Carpati orientalis), *lg. Paczoski*, 1895, LU; *ibidem*, *lg. Malinovsky*, ?, LWDZ; *ibidem* (Barbarich 1957, Komendar 1969);
- Mt. Khoverla, NW slopes of Mala Khoverla near saddle, *lg. Zagulsky*, 1987, LU; *ibidem* (Komendar 1969); *ibidem*, 1800 m, NE slopes, obs. Boratyński 1997; *ibidem*, 1550 m, NE slopes (Malinovsky, Kricsfalushi 2000);
- Between Brebenieska and Shpyci (Brebenieska – Szpyci), *lg. Rehmann*, 1865, KRAM; LWDZ;
- Mt. Brebenieska, rocky ridges, *lg. Ślędziński*, 1875, KRA; *ibidem*, *lg. Kryś*, 1970, KWH; *ibidem*, 1980 m, NW and W slopes (Malinovsky, Kricsfalushi 2000);
- Pozhizhevska (Pożyżewska), near biological laboratory, subalpine meadows, *lg. Kharkevich*, 1961, KWH; *ibidem*, 2000 m, SW slopes (Malinovsky, Kricsfalushi 2000);
- Mt. Gadzhyna, at the upper glacial kettle with peat-bog (Gadžyna, koło górnego kotła z torfowiskiem), *lg. Środoń*, 1934, KRAM; *ibidem*, *lg. Melnyk*, 1960, LWDZ; *ibidem*, 1750 m, NW slopes (Malinovsky, Kricsfalushi 2000);
- Mt. Kozły, *lg. Szafer*, 1908, KRA; *ibidem*, 1900 m, NW slopes of rocky ridge, *lg. Boratyński, Didukh*, 1998, ID;
- Mt. Maryshevska Velka, *lg. Rehmann*, ?, LU; *ibidem*, mountain meadow at the top, 1564, (Maryszewska Wielka, przy szczycie na poloninie) *lg. Środoń*, 1936, KRAM; *ibidem*, *lg. Kolishchuk*, 1960, LWDZ; *ibidem*, *lg. Kravec*, 1971, LDZ; *ibidem*, *lg. Volgin, Kardash, Hinda*, 1986, LU;
- Mt. Muncul (Muńczel), *lg. Środoń*, 1933, KRAM; *ibidem*, 1750 m, NE slopes (Malinovsky, Kricsfalushi 2000); *ibidem*, between Muncel and Brebenieska (Muńczel – Brebenieska), *lg. Walas*, 1935, KRA;
- Mt. Smotrych (Smotrycz), NE ridge, *lg. Mądalski*, 1935, LDZ; *ibidem*, 1600, *lg. Kolishchuk*, 1956, LDZ; *ibidem*, above Dzhembonya, 1700, on the rocks among *Pinus mugo* thicket, NE slopes, *lg. Boratyński*, 1997, ID;
- Gutin-Tomnatek – Berbenieskul, stony N slope above the lake near Berbenieskul spring, *lg. ?*, 1947, KW; *ibidem*, 1800, ridge between Gutin-Tomnatek and Berbenieskul, *lg. Kolishchuk*, 1954, LWDZ;
- Mt. Gutin-Tomnatek (Gutin-Tomnatek), 1950, in declivibus saxosis, una cum *Rhododendron*, *lg. Krist*, 1933, KRA; *ibidem*, on W slopes, 1950 m, *lg. Tasenkevich*, 1978, LWDZ; *ibidem*, *lg. Kozij*, ?, LWDZ; *ibidem*, 1950 m, N slopes (Komendar 1969); *ibidem*, 1910 m, NE slopes (Malinovsky, Kricsfalushi 2000); Mt. Tomnatik (Tomnatek), on the rocks at the border of Kossowo district and Hungary (na granicy pow. Kossowskiego i Węgier), *lg. Ślędziński*, 1875, KRA, KRAM; *ibidem*, *lg. Zapalowicz*, 1881, 1906, KRAM;
- Mt. Turkul, ridge of the mount, *lg. Malinovsky*, 1958, LWDZ; *ibidem*, *lg. Lazezna*, 1967, LWDZ; *ibidem*, *lg. Dobrochaeva*, 1976, KW;
- Niesamovite Lake, on the rocks above the lake, *lg. Stophan*, 1970, KWH; *ibidem*, 1850 m, rocky ridge above Niesamovite Lake, rare on the plane rocks on N slopes, *lg. Boratyński, Didukh*, 1998, ID;
- Shpyci (Szpyci), in clusters on the ridge and below the top, *lg. Ślędziński*, 1875, KRAM; *ibidem*, *lg. Woloszczak*, 1888, KRAM; *ibidem*, Galiciae orientalis, in alpa Szpyci Carpatorum Czarnohorae, *lg. Blocki*, 1908, LU; *ibidem*, *lg. Kozikowski*, 1909, LU; *ibi-*

- dem, lg. Szafer, 1909, LU; *ibidem*, (Szypci w grupie Czarnej Hory) lg. Lilienfeldówna, 1910, KRAM; KRA; ID; LDZ; LU; *ibidem*, 1750, sandstones, lg. Pawłowski, 1925, KRA; *ibidem*, at the top, lg. Środoń, 1931, KRAM; *ibidem*, lg. Piech, 1933, KRAM; *ibidem*, 1800, it forms plant community, lg. Ziembianka and Pawłowska, 1933, KRAM; *ibidem*, from the South, 1900, lg. Ziembianka and Pawłowska, 1933, KRA; *ibidem*, lg. Mądalski, 1934, LDZ; *ibidem*, 1864, lg. Środoń, 1936, KRAM; *ibidem*, 1900, in the grasses on S-facing slopes, lg. Pawłowski, 1936, KRA; *ibidem*, 1800, lg. Środoń, 1938, KRAM; *ibidem*, lg. Vaynagiy, 1958, LWDZ; *ibidem*, lg. Lazebna, 1971, LWDZ; *ibidem*, lg. Tasekovich, 1978, LWDZ; *ibidem*, top of the mount, lg. Zagulsky, 1983, LU; *ibidem*, 1780 m, N slopes (Swederski, Szafran 1931);
- Between Shypci and Munchel (Muńczel), rocky ridge, in *Curvuleto-Trifolietum*, lg. Pawłowski, 1929, KRA;
- Kizi Ulokhy (Kizi Ulohy), lg. Zapalowicz, ?, KRA; *ibidem*, stony N slopes, lg. Zagulsky, 1987, LU;
- Pokhorivka (In pratis montanis poloniny dictis Czarnogóra Pohoriwka (Carpati), lg. Mądalski, 1927, LU; *ibidem*, 1980 m, N slopes (Wilczyński 1931); Mt Kedrovatiy, lg. Tasekovich, 1983, LWDZ;
- Rebra, 2000, NE slopes (Malinovsky, Kricsfalushi 2000); *ibidem*, 2007 m, N slopes (Malinovsky, Kricsfalushi 2000);
- Pop Ivan, lg. Zapalowicz, 1907, KRAM; *ibidem*, lg. Zelenchuk, 1969, LU;
- Rogneska, 1900 m, S slopes (Malinovsky, Kricsfalushi 2000);
- Kostrych (Kostrycz) (Swederski, Szafran 1931)
- Svidovec:**
- Ridge of Svidovec (Domin, after Barbarich 1957)
- Gorgany Mts:**
- Mts. Matakhev, Ikhrovishche and Syvula on the Hungarian border of Stryj district (szczyty: Matachów, Ihrowiszcze, Syvula na granicy węgierskiej Stryjskiego powiatu), lg. Zipser, 1865, no 170827, KRAM
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- na) v Ukrainiskikh Karpatakh ["Alpine Azalea (*Loiseleuria procumbens* (L.) Desv.) and fescue (*Festuca versicolor* (Tausch) Krajina) in the Ukrainian Carpathians". In: Voprosy okhrany prirody Karpat, pp. 43–47. Karpaty, Uzhgorod (in Russian).
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