

## CONTRIBUTION TO THE BIOGEOGRAPHY OF ARCTIC-ALPINE FUNGI: FIRST RECORDS IN THE SOUTHERN CARPATHIANS (ROMANIA)

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A list of 24 species collected in the alpine zone of the Southern Carpathians is given. Fourteen species are new to Romania and the Southern Carpathians; five have not been previously reported from the Carpathian Mts. A synopsis of the geographical distribution of eleven species representing the arctic-alpine element is included. The seven most interesting species, *Inocybe alboperonata*, *I. microfastigiata*, *I. nespiakii*, *I. oreina*, *Lactarius brunneoviolaceus*, *L. nanus*, and *Russula heterochroa*, are described and illustrations of their microcharacters are given.

Keywords: Alpine agarics, Basidiomycetes, Romania, Southern Carpathians.

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### INTRODUCTION

Arctic-alpine agarics are known to occur in the arctic areas of Europe, Asia and North America. In Europe, a substantial amount of data has been gathered for the Alps while much less is known about the distribution of this group of fungi in other alpine areas. Very few records are available from the Carpathians, and no mycological investigations have been carried out in the alpine areas of the southern and eastern parts of this mountain range to date. The main objective of this work is to present the first records of fungi collected in the alpine zone of the Southern Carpathians (Romania). Special attention is paid to the arctic-alpine element.

### STUDY AREA

The Carpathians constitute a major mountain system in Europe. Situated in the south-eastern part of the continent, they extend through Slovakia, Poland, Ukraine and Romania (Fig. 1). Approximately 55% of the range belongs to Romania, covering almost 30% of its territory (Ronikier 1996a). The Carpathian Mts are divided into three parts: the Western Carpathians (Slovakia and Poland), the Eastern

Carpathians (Poland, Slovakia, Ukraine and Romania), and the Southern Carpathians (Romania). The latter constitute a mountain chain about 320 km long running from the east to the west. They reach the Predeal pass (1033 m) in the vicinity of Braşov in the West and the gorge of the Donau river, called Porțile de Fier in the East (Ronikier 1996b). A characteristic feature of the Southern Carpathians is a high average altitude; 10 % of the area reaches more than 2000 m a.s.l. Because of intensive pastoral culture developed in the Romanian Carpathians, alpine and subalpine meadows cover extensive areas in the mountain landscape, extending down to relatively low altitudes (Ronikier 1996b), at the expense of subalpine dwarf pine forests and patches of *Rhododendron myrtifolium* Schott et Kotschy and *Juniperus communis* L. ssp. *alpina* (Sm.) Čelak.

The Southern Carpathians are composed of several well differentiated massifs: Munții Făgăraşului, Munții Iezer–Păpuşa, Munții Leaota, Munții Bucegi, Piatra Craiului, Munții Parîng, Munții Căpăținii, Munții Lotru, Munții Cindrel, Munții Latoriței, Munții Sebeşului, Munții Retezat, Munții Țarcu, Munții Godeanu, and some smaller ones. One national park is established in the Southern Carpathians, Parcul Național Retezat, and three other parks are planned; in Munții Bucegi, in Piatra Craiului and in the small massif Cozia situated between Munții Făgăraşului and Munții Lotru (Sorani et al. 2000). Several areas are protected as nature reserves.

Six main massifs were studied: Munții Făgăraşului, Munții Iezer–Păpuşa, Munții Bucegi, Munții Lotru, Munții Cindrel and Munții Latoriței (Fig. 1). The vegetation of these massifs is conditioned on the bedrock. Munții Bucegi and Munții Latoriței are built up of limestone-rich rocks. Typical calcareous ectomycorrhizal plant species, such as *Salix reticulata* L. and *Dryas octopetala* L., are abundant in the former massif while they are completely absent throughout the latter. The other four massifs are mostly granitic. The Iezer–Păpuşa, Lotru and Cindrel Mts. are dominated by poor, crystalline-bedrock grasslands. *Salix herbacea* L. and *Polygonum viviparum* L. occur there as the only mycorrhizal hosts. In Munții Făgăraşului, there are many places richer in nutrients, especially along the edges of the main ridge cliffs and in schistous slopes; *Salix reticulata* and *Dryas octopetala* are often encountered.

## MATERIAL AND METHODS

Extensive field work was carried out in the alpine belt of the Southern Carpathians in July and August 2004.

Most collections of fungi were made by Anna Ronikier and Michał Ronikier (AR, MR); some collections were made by Elżbieta Cieślak (EC) or Jakub Cieślak (JC). The entire material is deposited at the Herbarium of the Institute of Botany, Polish Academy of Sciences, Cracow (KRAM).

References to colours follow Kornerup & Wanscher (1965).

## RESULTS

About 200 collections were made during the field work of which 77 have been examined for this paper. A total of 24 species have been identified, of which 11 are arctic-alpine and 13 species are typical grassland species (*Hygrocybe* spp.) or ubiquitous species that occur in various habitats and also frequently in the alpine zone. Fourteen species have not previously been reported from Romania

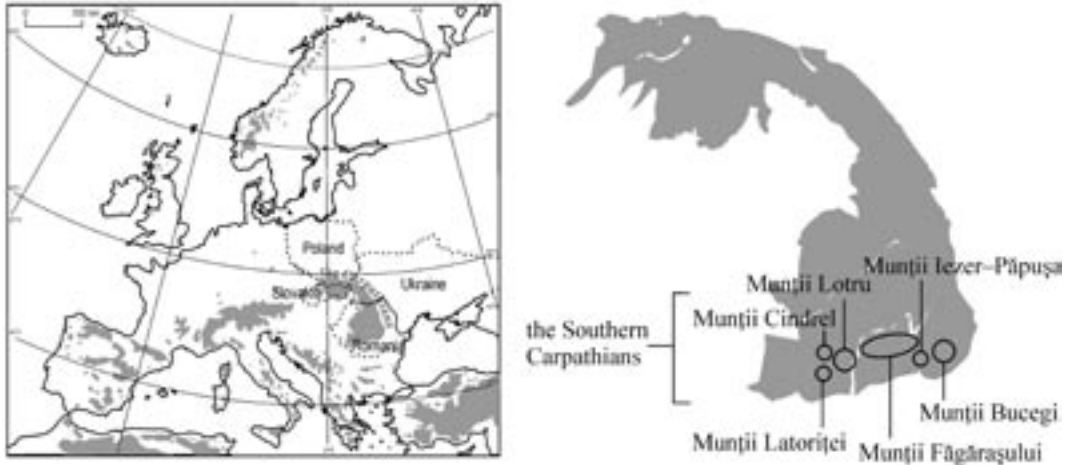


Fig. 1. Location of the Carpathians in Europe (left) and the massifs examined (right).

and from the Southern Carpathians: *Amanita nivalis*, *Hygrocybe turunda*, *Inocybe alboperonata*, *I. dulcamara*, *I. microfastigiata*, *I. nespaki*, *I. oreina*, *Lactarius brunneoviolaceus*, *L. nanus*, *Lichenomphalia alpina*, *Mycena citrinomarginata*, *Russula heterochroa*, *R. nana*, *R. saliceticola*. Five species: *Inocybe alboperonata*, *I. microfastigiata*, *I. oreina*, *Lactarius brunneoviolaceus*, and *Russula heterochroa* are new to the Carpathians.

## DISCUSSION

Over 2000 species of Basidiomycetes are known to occur in Romania (Bontea 1985). Results of mycological investigations in the Romanian Carpathians have been reported in numerous publications; those, however, focus mostly on microfungi or forest macrofungi. The body of data on macrofungi recorded in Munții Bucegi is fairly substantial (Kotlaba 1959, Eliade 1961, 1963, 1964, Eliade & Toma 1977), and some records from Munții Leaota (Toma & Diaconescu 1971) and Retezat (Pop 1989) are also available. Only three species of macrofungi are, however, encountered in the altitude between 1800 and 2500 m in Munții Bucegi; listed under the names “*Deconica coprophylla* (Fr. ex Bull.) Karst, *Amanitopsis vaginata* (Bull.) Roze and *Lactarius rufus* (Scop.) Fr.” (Eliade 1963). To the best of my knowledge, no previous published information exist on alpine fungi of the Southern Carpathians. Thus, the present paper provides the first well documented observations of fungi from the alpine zone of the Southern Carpathians. It clearly demonstrates that these mountains host a fungal flora that is fairly rich in species of this ecological group of fungi.

*Russula nana* was the most common species in alpine areas in the Southern Carpathians. Although found only in two massifs, it was very common, occurring not only with dwarf shrubs (*Dryas octopetala* and/or *Salix* spp.) but also in those areas where *Polygonum viviparum* was the only present potential mycorrhizal partner. The species is also known from the Western Carpathians, where it is one of the most frequent arctic-alpine fungi.

Three species of *Lichenomphalia* were also encountered in the Southern Carpathians with

high frequency. *Lichenomphalia hudsoniana*, which is also very frequent in the Western Carpathians (Lisicka 1999, Olech 2004), was the most common of these species. *L. alpina* is known only from few localities in the Western Carpathians.

Some rare species of fungi are reported for the first time from the Southern Carpathians. *Russula heterochroa* is a very rare species, reported only from the French Alps and Swedish Lapland, while *Inocybe nespiakii* is known from the Alps and the Western Carpathians. *Inocybe alboperonata* had previously been reported from alpine zones of the Alps and the Pyrenees. These three species were found in the Munții Bucegi or Munții Latoriței massifs. These two calcareous regions of the Southern Carpathians as well as the others not yet investigated within the present project seem to be the most promising among Carpathian areas with respect to fungal species richness, due to presence of many rare, calciphilous species.

The data collected are insufficient to acquire a general picture of the distribution of fungi in both the Southern Carpathians and the entire Carpathian system, but some indications emerge. As the alpine (and also subalpine) meadows cover extensive areas in the Southern Carpathians, high richness of fungi associated with grassland vegetation can be expected in the area. Furthermore, high diversity of bedrock types, giving rise to variation in edaphic conditions, results in the occurrence both of species requiring nutrient-rich soils and species that prefer oligotrophic sites. This environmental and vegetational variability suggests that this region has a potential for high fungal species richness.

#### COMMENTED LIST OF SPECIES

##### *Amanita nivalis* Grev.

**Observations.** Four carpophores were found growing in one place, on a large stone covered with a soil layer and *Salix retusa*. One carpophore (KRAM F-54854) had a greyish cap without veil remnants and a pure white volva while three others (KRAM F-54853) had a paler beige cap covered with numerous small volval warts with an ochraceous tinge and a pale brownish spotted volva. All specimens had white pruinose-floccose stipes without any girdles. Macroscopic and microscopic features of the collected specimens are consistent with the detailed description provided by Knudsen & Borgen (1987).

**Notes on distribution.** *Amanita nivalis* is known from arctic and subarctic areas of Finland, Greenland, Norway, Sweden, Russia (Polar Urals), from the Faroe Islands, Iceland and Scotland, alpine zones of the Norwegian mountains as well as the Swiss, French, Italian, Austrian and German Alps, the Pyrenees and the Western Carpathians (Favre 1955, Lange 1955, Gulden & Lange 1971, Kühner 1972, Bas 1977, Watling 1977, Bresinsky & Schmid-Heckel 1983, Trimbach 1983, Watling 1983, Bon 1985a, Gulden et al. 1985, Schmid-Heckel 1985, Gerhold 1986, Kühner & Lamoure 1986, Bon 1987a, 1987b, Bon & Cheype 1987, Knudsen & Borgen 1987, Watling 1987, Tondl 1989a, Bon 1990, Elborne & Knudsen 1990, Bon 1991, Hansen & Knudsen 1992, Knudsen & Mukhin 1998, Vesterholt 1998, Vila et al. 1998, Škubla 1999, Campo & Bizio 2000, Knudsen & Ronikier 2003, Niezdoiminogo 2003, G. Gulden pers. comm.). The species is new to Romania.

*Amanita nivalis* had not previously been reported from Romania; however, "*Amanitopsis vaginata* (Bull.) Roze" is listed among fungi found at the altitude 1800–2500 m in Munții Bucegi (Eliade 1963). This record may belong to *A. nivalis*.

**Specimen examined.** Munții Făgărașului, upper part of the Valea Podragului valley (towards the Șaua Podragului pass), on a large stone covered with *Salix retusa*, N 45°36'17", E 24°41'18", alt. 2270 m, 05-08-2004, leg. AR, MR, KRAM F-54853, 54854.

*Entoloma conferendum* (Britzelm.) Noordel.

**Notes on distribution.** *Entoloma conferendum* occurs in various habitats, and although it is not an arctic-alpine fungus, it occurs commonly in the alpine zone of European mountains (e.g. Gulden & Lange 1971, Kühner & Lamoure 1985, Horak 1993, Vila et al. 1998). It is also very common in the Western Carpathians (Knudsen & Ronikier 2003).

**Specimens examined.** **Munții Făgărașului**, upper part of the Valea Caprei valley, subalpine meadow (pasture), among mosses, N 45°35'23", E 24°38'49", alt. 1700 m, 03-07-2004, *leg.* AR, MR, KRAM F-54900; E ridge of the Țarăta peak, alpine meadow, among *Polygonum viviparum* and *Dryas octopetala*, N 45°36'20", E 24°41'42", alt. 2400 m, 05-08-2004, *leg.* AR, MR, KRAM F-54897; S-E slope of the Vf. Corabia peak, alpine meadow, N 45°36'13", E 24°43'01", alt. 2300 m, 05-08-2004, *leg.* AR, MR, KRAM F-54899; E slopes of the Viștea Mare peak, alpine meadow, among grass, N 45°36'11", E 24°44'10", alt. 2480 m, 07-08-2004, *leg.* AR, MR, KRAM F-54898; upper E part of the Valea Rea valley, alpine meadow, snow-bed, N 45°36'27", E 24°45'52", alt. 2160 m, 07-08-2004, *leg.* AR, MR, KRAM F-54896.

*Gymnopus dryophilus* (Bull.: Fr.) Murrill

**Notes on distribution.** *Gymnopus dryophilus* is one of the most common and widely distributed *Gymnopus* species. It is also quite common in arctic-alpine habitats (e.g. Gulden & Lange 1971, Kühner & Lamoure 1985, Schmid-Heckel 1985).

**Specimens examined.** **Munții Iezer–Păpușa**, vicinity of lake Lacul Iezeru, alpine meadow, N 45°27'38", E 24°57'40", alt. 2140 m, 30-07-2004, *leg.* AR, MR, KRAM F-54913; N 45°27'35", E 24°57'41", alt. 2400 m, 01-08-2004, *leg.* AR, MR, KRAM F-54915; the Curmătură Oticului pass, subalpine/alpine meadow, among *Rhododendron myrtifolium*, N 45°29'42", E 24°56'17", alt. 1850 m, 31-07-2004, *leg.* AR, MR, KRAM F-54914;

*Hygrocybe chlorophana* (Fr.: Fr.) Wünsche

**Notes on distribution.** The fungus is not associated with the alpine zone, but it is known from alpine habitats (e.g. Kühner 1977, Jamoni 1998-99). The species is typical of grassland vegetation (Boertmann 2000).

**Specimen examined.** **Munții Latoriței**, N-W slopes of the Vf. Fratoșteanu Mare peak, alpine pasture on calcareous bedrock, among grass, N 45°24'26", E 23°47'37", alt. 1960 m, 16-08-2004, *leg.* AR, MR, KRAM F-54909.

*Hygrocybe conica* (Schaeff.: Fr.) P.Kumm.

**Notes on distribution.** *Hygrocybe conica* is a widely distributed species occurring in many different habitats. Many reports are available from arctic-subarctic and alpine-subalpine regions of the northern and southern hemispheres (Boertmann 2000). The species is also common in alpine and subalpine meadows of the Western Carpathians (A. Ronikier, unpublished data).

**Specimens examined.** **Munții Bucegi**, main plateau, slopes between the Cabana Babele hostel and Muntele Caraiman, alpine meadow, N 45°24'39", E 25°28'25", alt. 2200 m, 27-07-2004, *leg.* EC, KRAM F-54901; **Munții Făgărașului**, the Șaua Caprei pass, alpine meadow, among *Thymus* sp., N 45°36'10", E 24°37'34", alt. 2315 m, 08-08-2004, *leg.* AR, MR, KRAM F-54902; the Valea Sâmbăta valley, Pietra Caprei, subalpine meadow, among stones (calcareous), N 45°37'48", E 24°48'16", alt. 1750 m, 10-08-2004, *leg.* AR, MR, KRAM F-54903; **Munții Latoriței**, the ridge of the Vf. Fratoșteanu Mare peak, alpine meadow, among grass, N 45°24'38", E 23°47'57", alt. 1980 m, 16-08-2004, *leg.* AR, MR, KRAM F-54904; the slope between the Curmătură Vidruței pass and the Vf. Fratoșteanu Mare peak, subalpine/alpine meadow, among grass, N 45°24'45", E 23°47'45", alt. 1870 m, 16-08-2004, *leg.* AR, MR, KRAM F-54905.

*Hygrocybe pratensis* (Pers.: Fr.) Murrill

**Notes on distribution.** *Hygrocybe pratensis* is a common species, occurring on almost all continents (Boertmann 2000). It is also frequent in the arctic-alpine regions (e.g. Favre 1955, Kühner & Lamoure 1986, Jamoni 1998-99, Vila et al. 2001, Borgen & Arnolds 2004).

**Specimens examined.** **Munții Făgărașului**, upper part of the Valea Caprei valley, alpine/subalpine meadow (pasture), N 45°35'23", E 24°38'49", alt. 1700 m, 12-08-2004, *leg.* AR, MR, KRAM F- 54865; **Munții Lotru**, N slope of the Vf. Șteflești peak, alpine/subalpine meadow, on a path, N 45°32'12", E 23°47'57", alt. 2005 m, 13-08-2004, *leg.* AR, MR,

KRAM F-54864, **Munții Latoriței**, the ridge of the Vf. Fratoșteanu Mare peak, alpine meadow, N 45°24'38", E 23°47'57", alt. 1980 m, 16-08-2004, *leg.* AR, MR, KRAM F-54866.

***Hygrocybe psittacina*** (Schaeff.: Fr.) P.Kumm.

**Notes on distribution.** Like the three species mentioned above (*Hygrocybe chlorophana*, *H. conica* and *H. pratensis*), *Hygrocybe psittacina* is a widespread species which also occurs in subarctic and subalpine-alpine meadows (Boertmann 2000).

**Specimen examined.** **Munții Latoriței**, N-W slopes of the Vf. Fratoșteanu Mare peak, alpine pasture on calcareous bedrock, among grass, N 45°24'26", E 23°47'37", alt. 1960 m, 16-08-2004, *leg.* AR, MR, KRAM F-54911.

***Hygrocybe turunda*** (Fr.: Fr.) P.Karst.

**Observations.** The collection from the Southern Carpathians is characterized by orange to orange-reddish (6A8, 7A8, 8A8) paling to yellow-buff (4A5) pilei covered with dark violet-brown, almost black (11F3–4, 12F3) squamules and by pale yellow (2A5), decurrent lamellae.

**Taxonomic notes.** The macro- and microcharacteristics of the specimens are consistent with the descriptions given by Boertmann (2000) and Borgen & Arnolds (2004).

**Notes on distribution.** The fungus has a boreal-montane, low alpine to (sub-) arctic distribution (Borgen & Arnolds 2004). The species is new to Romania.

**Specimen examined.** **Munții Latoriței**, N slopes of the Vf. Fratoșteanu Mare peak, alpine meadow, among mosses, N 45°24'38", E 23°47'57", alt. 1980 m, 16-08-2004, *leg.* AR, MR, KRAM F-54910.

***Inocybe alboperonata*** Kühner

Fig. 2.

**Description.** Cap 1–2 cm in diameter, campanulate with prominent umbo and decurved margin, greyish brown, clay-buff, dark greyish buff (5C3–4, 5D3–4), surface covered with white veil giving fibrillose-squamulose appearance, darker brown under veil. Lamellae greyish yellow, beige (4B3, 4C3), moderately distant, adnate, up to 3 mm broad, edge whitish ciliate. Stipe 2–5 × 0.4 × 0.6 cm, cylindrical, white when young because of a thick layer of white veil, isabella (5D6) under veil, not pruinose or only at extreme apex. Flesh whitish, smell spermatic, taste mild.

Spores amygdaliform with conical apex, 9.5–12 × 5.5–6 μm. Basidia 31–35 × 8–11 μm, with 4 sterigmata. Cheilocystidia cylindrical to fusiform, 60–104 × 11–18 μm, walls 1–1.5(2.5) μm. Pleurocystidia similar, 50–110 × 11–25 μm, scattered. Caulocystidia not well developed, rare, present only in extreme apex of the stipe, cylindrical, fusiform or lageniform, 70–140 × 11–26 μm.

**Taxonomic notes.** A discussion of closely related taxa is provided by Esteve-Raventós & Vila (1998).

**Ecological notes.** *Inocybe alboperonata* is considered to be a calciphilous species associated with *Salix* and *Dryas* (Esteve-Raventós & Vila 1998). The Carpathian record accord with the anticipated ecological preferences of the species: it was also found on limestone, with *Polygonum viviparum* as the only potential mycorrhizal host.

**Notes on distribution.** *Inocybe alboperonata* has been reported from the Alps (Kühner 1988) and the Pyrenees (Esteve-Raventós & Vila 1998). The species is new to the Carpathians and Romania.

**Specimen examined.** **Munții Latoriței**, the Vf. Mogoșu peak, alpine meadow with *Polygonum viviparum*, N 45°24'26", E 23°47'37", alt. 1960 m, 16-08-2004, *leg.* AR, MR, KRAM F-55178.

***Inocybe dulcamara*** (Alb. & Schwein. ex Pers.) P.Kumm.

**Notes on distribution.** *Inocybe dulcamara* is a widespread and greatly variable species, very often

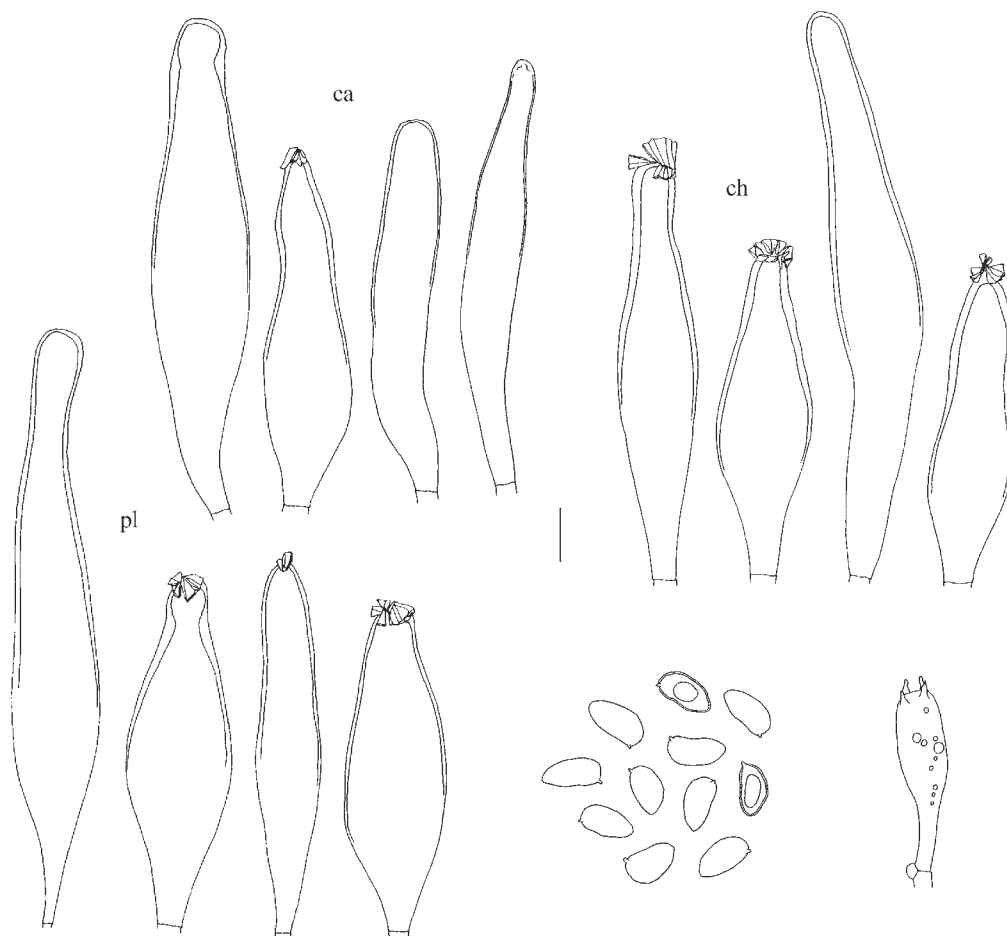


Fig. 2. *Inocybe alboperonata* Kühner, coll. KRAM F-55178: ch – cheilocystidia, pl – pleurocystidia, ca – caulocystidia; scale bar = 10  $\mu$ m.

reported from arctic-alpine habitats (e.g. Favre 1955, Vila et al. 2001, Niezdoiminogo 2003). The species is new to Romania.

**Specimen examined.** **Munții Bucegi**, Muntele Caraiman, calcareous (?) rocks near the marked trail to the Vf. Caraiman peak, alpine meadow, with *Dryas octopetala* and *Salix reticulata*, N 45°24'51", E 25°29'34", alt. 2300 m, 26-07-2004, leg. AR, MR, KRAM F-55174.

***Inocybe lacera* (Fr.) P.Kumm.**

**Notes on distribution.** *Inocybe lacera* is a greatly variable species occurring in lowlands and quite common in alpine habitats (e.g. Favre 1955, Gulden & Lange 1971).

**Specimens examined.** **Munții Lotru**, the Vf. Cristești peak, alpine meadow with *Salix herbacea*, N 45°31'37", E 23°47'24", alt. 2182 m, 13-08-2004, leg. AR, MR, KRAM F-55176; the Vf. Șteflești peak, edge of the postglacial kettle, alpine meadow with *Salix herbacea*, N 45°31'55", E 23°48'27", alt. 2220 m, 13-08-2004, leg. AR, MR, KRAM F-55177.

*Inocybe microfastigiata* Kühner

Fig. 3.

**Description.** Cap 1.5–2 cm in diameter, conical, straw yellowish brown, honey-coloured (4B4–6) with darker, yellowish brown centre (5D7), surface rimose, margin decurved in young specimens and white ciliate because of veil remnants. Lamellae pale greyish-yellow (3B4), moderately crowded, adnate, broad. Stipe 2–2.5 × 0.3 × 0.4 cm, cylindrical or subbulbose, white, longitudinally fibrillose, apex pruinose. Flesh white, pale ochraceous at base, smell herb-like, taste none.

Spores ellipsoid, subphaseoliform 11–12 × 6–7 µm. Basidia 35–37 × 10–11 µm, with 4 sterigmata. Pleurocystidia absent. Cheilocystidia cylindrical, narrowly clavate, thin-walled, some septate, 35–55 × 9–12 µm. Caulocystidia present only at stipe apex, cylindrical, thin walled, very long, up to >100 µm, 7–12 µm in diameter, septate.

**Notes on distribution.** *Inocybe microfastigiata* is known from the Swiss, French and Italian Alps (Kühner & Lamoure 1986, Bon 1992, Jamoni & Bon 1995). However, as the taxonomy of the *Inocybe fastigiata* group is in need of revision, the actual geographical distribution of *I. microfastigiata* is not known. The species is new to the Carpathians and Romania.

**Specimen examined.** Muntii Bucegi, Muntele Caraiman, calcareous (?) rocks near the marked trail to the Vf. Caraiman peak, alpine meadow with *Dryas octopetala* and *Salix reticulata*, N 45°24'51", E 25°29'34", alt. 2400 m, 26-07-2004, leg. AR, MR, KRAM F-55179.

*Inocybe nespiakii* Bon

Fig. 4.

**Description.** Cap 1–2 cm in diameter, convex with a decurved margin, then plane with slightly depressed centre, yellowish brown, brownish olive (5D6–7, 5E6–7), surface tomentose, fibrillose or slightly squamulose. Lamellae yellowish buff (4C6, 4C7), then brownish (4F8, 5F8), moderately crowded, adnate, broad. Stipe 1–1.5 × 0.3 × 0.5 cm, cylindrical, honey-coloured (4B4, 4B5), without distinct remnants of veil, longitudinally fibrillose, hollow. Flesh whitish chrome (3A2), without smell and taste. Veil inconspicuous.

Spores ellipsoid-cylindrical, 10–14(15) × 5–6 µm. Basidia 35–42 × 10–11 µm, with 4 sterigmata. Cheilocystidia cylindrical to broadly clavate or almost spherical, 25–38 × 10–20(36) µm.

**Taxonomic notes.** The name *I. nespiakii* was created by Bon (1996) as a replacement for the invalid name *I. favrei* described by Nespiak (1990). *I. nespiakii* is considered to be an alpine species (Bon 1997). Although Nespiak described the species on the basis of Favre's alpine collection of *I. dulcamara* f. aff. *malenconii* (Favre 1955), he selected a type collection from the subalpine spruce forest of the Tatra Mts. (Western Carpathians). *I. nespiakii* is very similar to *I. malenconii* Heim var. *megalospora* Stangl & Bresinsky. According to the original description (Nespiak 1990), the former species is characterized by lack of a distinct cortina (stipe surface is covered by fibrils which do not form any trace of a ring), while the latter taxon has a very well developed veil (Stangl 1989). In the description of *I. nespiakii* provided by Bon (1997), the stipe of the species is "fibriloso-laineux" or has a thick cortina. The typical *I. malenconii* has a distinct but fugacious cortina (Heim 1931). As the presence or absence of cortina seems to be a variable feature, it cannot be excluded that *I. nespiakii* is conspecific with *I. malenconii* var. *megalospora* and *I. malenconii*. Bizio (1997) reports *I. maleconii* from the alpine zone. He also points out the differences between *I. malenconii* and *I. nespiakii*, and notices that their similarity makes the distinction between the two species very difficult.

**Notes on distribution.** *Inocybe nespiakii* is known from alpine habitats of the Swiss and French Alps (Favre 1955, Kühner & Lamoure 1986, Bon 1991). *I. malenconii* reported from the alpine zone of the Italian Alps (Bizio 1997) may be conspecific with the Carpathian specimens examined. The species is new to Romania.

**Specimen examined.** Muntii Bucegi, Muntele Caraiman, calcareous (?) rocks near the marked trail to the Vf.



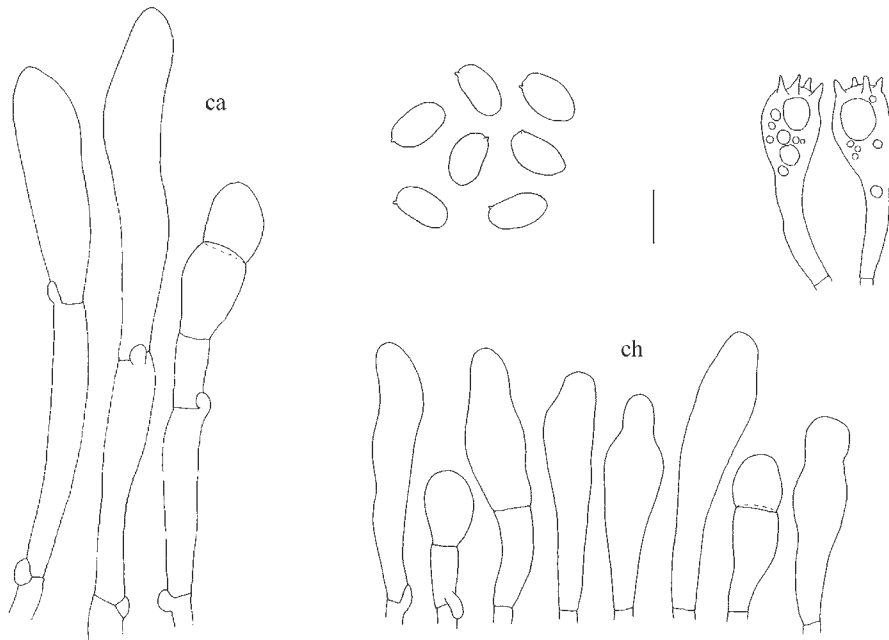


Fig. 3. *Inocybe microfastigiata* Kühner, coll. KRAM F-55179: ch – cheilocystidia, ca – caulocystidia; scale bar = 10  $\mu$ m.

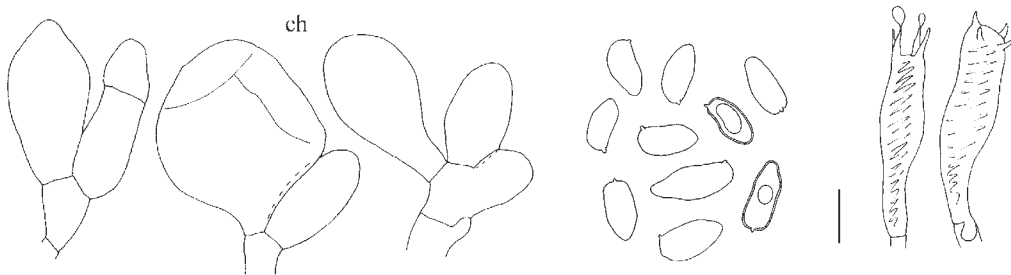


Fig. 4. *Inocybe nespiakii* Bon, coll. KRAM F-55175: ch – cheilocystidia; scale bar = 10  $\mu$ m.

Caraiman peak, alpine meadow, with *Dryas octopetala*, N 45°24'51", E 25°29'34", alt. 2400 m, 26-07-2004, leg. AR, MR, KRAM F-55175.

***Inocybe oreina*** J.Favre

Fig. 5.

**Description.** Cap 1.5–2 cm in diameter, conico-campanulate, yellowish brown (5D7, 5E7–8), surface fibrillose arachnoid. Lamellae yellowish beige (4C5, 4D5), moderately crowded, adnate, broad, edge slightly ciliate, paler or brownish. Stipe 2.5–3  $\times$  0.4  $\times$  0.5 cm, beige, honey-coloured (4B4), white pruinose over entire length, base bulbous, bulb marginate. Flesh yellowish grey in cap

(3B4), pale cream in stipe (3A3), without smell and taste. Veil not observed.

Spores bluntly 6–8-angled, 11–14(15) × 8–10 µm. Basidia 41–50 × 12–13 µm, with 4 sterigmata. Cheilocystidia cylindrical to narrowly lageniform-fusiform 70–100 × 12–22 µm, thick walled, walls 1.5–3(4) µm. Pleurocystidia similar 65–105 × 14–20 µm. Caulocystidia cylindrical 38–140 × 10–15 µm, mostly thin-walled (wall 0.5–1.5 µm), very abundant in upper part of the stipe, less frequent in its lower part.

**Taxonomic notes.** The shape of spores, intermediate between elliptic (smooth) and nodulose, is the most characteristic feature of the species. Another alpine species, *I. concinnula*, described by Favre (1955), also has such characteristically angled spores.

**Notes on distribution.** *Inocybe oreina* is a rare alpine species, known from the French, Swiss, Italian and German Alps and the alpine zone of the Norwegian mountains (Favre 1955, Bresinsky & Schmid-Heckel 1982, Bon 1985a, Schmid-Heckel 1985, Kühner & Lamoure 1986, Horak 1987, Kühner 1988, Bon 1991, 1992, Bizio 1995, G. Gulden, pers. comm.). The locality in Munții Făgărașului is the first one in the Carpathians. The species is new to Romania.

**Specimen examined.** Munții Făgărașului, N slopes of the Șaua Podragului pass, alpine meadow with *Salix retusa*, *S. reticulata*, *Polygonum viviparum* and *Dryas octopetala*, among *S. reticulata*, N 45°36'15", E 24°41'23", alt. 2330 m, 05-08-2004, leg. AR, MR, KRAM F-55180.

***Lactarius brunneoviolaceus* M.P.Christ. (= *L. robertianus* Bon)**

Fig. 6.

**Description.** Cap 1–3 cm in diameter, convex with a decurved margin, brown vinaceous, vinaceous grey (8E5, 8F5, 8D3, 8E3), more or less uniformly coloured with whitish margin (especially when young), azonate, surface viscid. Lamellae first whitish cream (3A3) then cream (4A3), moderately crowded, adnate or slightly decurrent, narrow, staining violet when bruised. Stipe 1–1.5 × 0.5 × 0.7 cm, cylindrical, white to cream, staining violet when bruised. Flesh white, turning violet when cut, smell characteristic, reminiscent of *Lactarius quietus* or cedar-oil, taste the same as smell, mild. Milk scarce, white turning violet.

Spores broadly ellipsoid, 10–11 × 7.5–8.5 µm, ornamentation low, in the form of ridges and lines forming incomplete reticulum. Basidia 45–53 × 11–12 µm, with 4 sterigmata. Pleurocystidia 75–84 × 7–10 µm, narrowly fusiform often with mucronate apex, scattered. Cheilocystidia similar, fusiform to narrowly fusiform, 50–80 × 7–8 µm. Pileipellis an ixotrichoderm.

**Notes on distribution.** *Lactarius brunneoviolaceus* is a typical arctic-alpine species. It is known from Swedish Lapland and Russian arctic, the Polar Urals, the Faroe Islands, the Norwegian mountains, the Swiss, French, Italian and German Alps, and the Pyrenees (Kühner 1975a, Bon 1985a, 1985b, 1990, 1991, Senn-Irlet 1993, Knudsen & Mukhin 1998, Vesterholt 1998, Vila et al. 1998, Basso 1999, Bresinsky et al. 2000, G. Gulden, pers. comm.). This species is new to the Carpathians and Romania.

**Specimens examined.** Munții Făgărașului, the Țarăta peak, alpine meadow with *Salix retusa*, *S. reticulata*, *Polygonum viviparum* and *Dryas octopetala*, N 45°36'20", E 24°41'42", alt. 2440 m, 05-08-2004, leg. AR, MR, KRAM F-55108; the Ucea Mare peak, alpine meadow with *Dryas octopetala*, N 45°36'24", E 24°43'16", alt. 2400 m, 07-08-2004, leg. AR, MR, KRAM F-55109; the Arpașu Mare peak, alpine meadow with *Dryas octopetala*, N 45°35'48", E 24°40'49", alt. 2460 m, 12-08-2004, leg. AR, MR, KRAM F-55110.

***Lactarius nanus* J.Favre**

Fig. 7.

**Description.** Cap 1–2 cm in diameter, convex with a decurved margin and very small umbo, dark fawn, clay-buff, fuscous, (5C4, 6 E3–4, 6F3–4, 7E3–4, 7F3–4), more or less uniformly coloured, azonate, surface slightly viscid. Lamellae first whitish cream, pinkish buff (5A4–5, 5B4–5), moderately crowded, adnate, forked at the stem, narrow. Flesh cream to pinkish, taste mild, smell

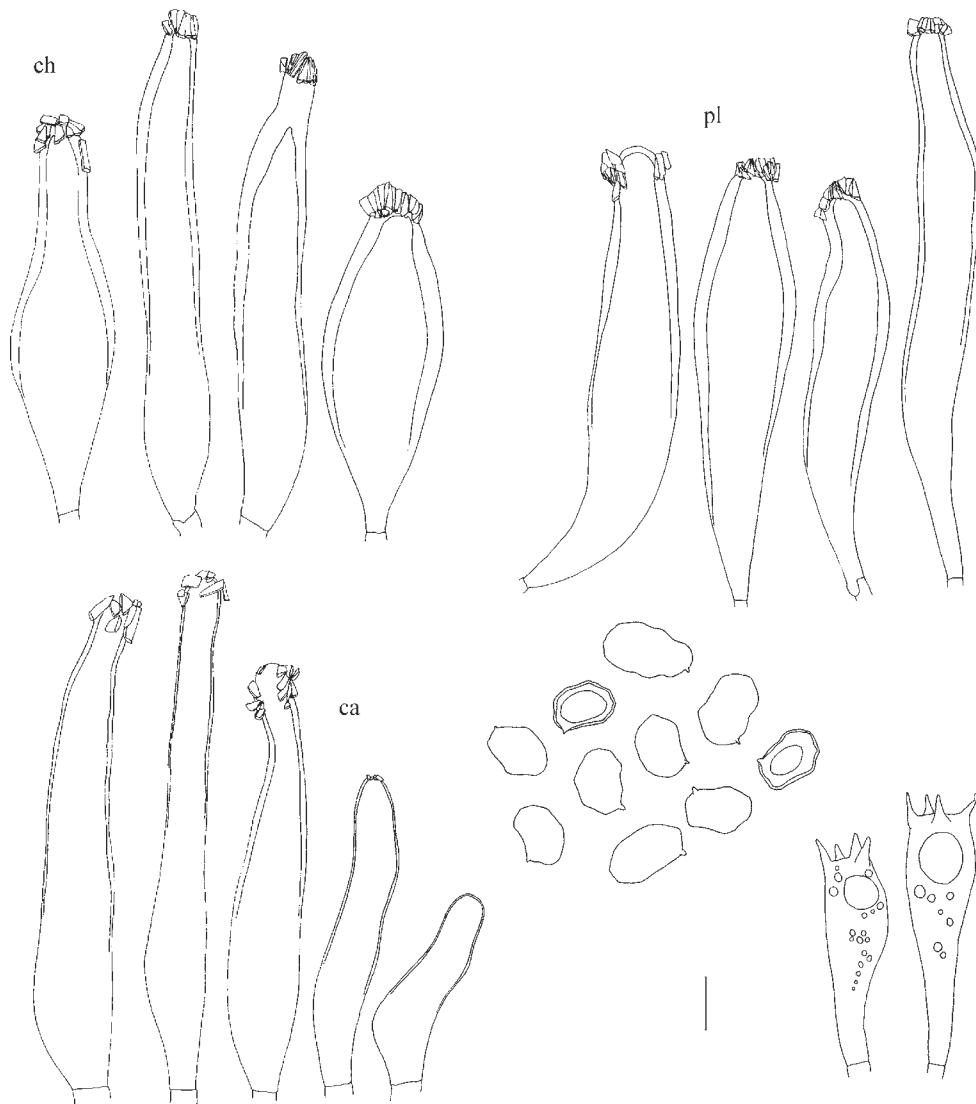


Fig. 5. *Inocybe oreina* J. Favre, coll. KRAM F-55180: ch – cheilocystidia, pl – pleurocystidia, ca – caulocystidia; scale bar = 10  $\mu$ m.

none. Milk very scarce, watery white.

Spores broadly ellipsoid,  $7.5\text{--}8 \times 6\text{--}6.5 \mu\text{m}$ , ornamentation low, in the form of ridges and lines forming incomplete reticulum. Basidia  $35\text{--}42 \times 11\text{--}12 \mu\text{m}$ , with 4 sterigmata. Pleurocystidia  $43\text{--}65 \times 7\text{--}8 \mu\text{m}$ , cylindrical with obtuse apex, rarely mucronate, scattered. Cheilocystidia similar, mostly with obtuse apex,  $40\text{--}50 \times 7\text{--}9 \mu\text{m}$ . Pileipellis an ixocutis  $30\text{--}40 \mu\text{m}$  thick.

**Notes on distribution.** *Lactarius nanus* is one of the most common arctic-alpine species of the genus, more frequently encountered in the alpine zone than in the Arctic. It is known from northern Canada, Norway, Sweden, Finland, Russia, Svalbard, Greenland, Iceland, the Faroe Islands, Ireland,

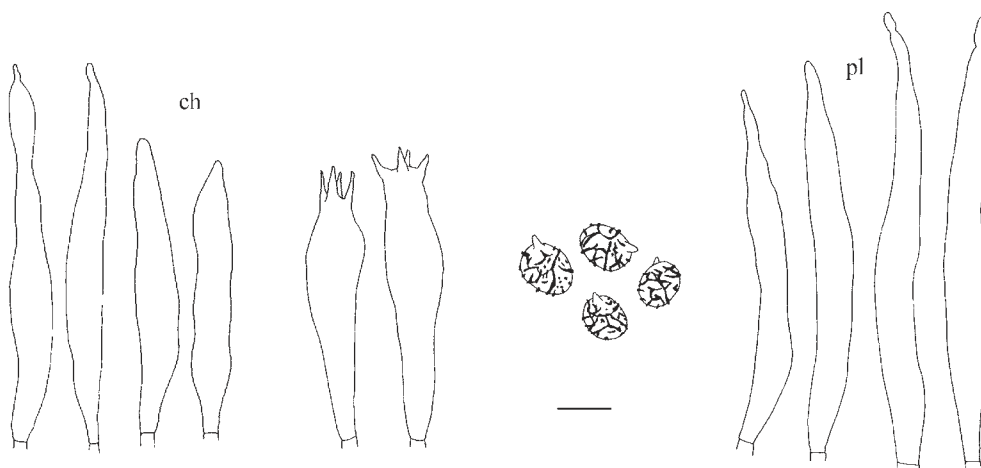


Fig. 6. *Lactarius brunneoviolaceus* M. P. Christ., coll. KRAM F-55108: ch – cheilocystidia, pl – pleurocystidia; scale bar = 10  $\mu$ m.

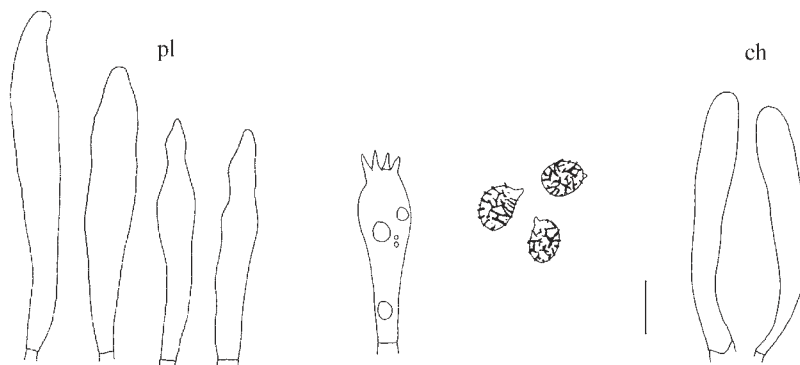


Fig. 7. *Lactarius nanus* J. Favre, coll. KRAM F-55142: ch – cheilocystidia, pl – pleurocystidia; scale bar = 10  $\mu$ m.

from the alpine zone of the Norwegian and Swedish mountains, the Austrian, Swiss, French, Italian and German Alps, the Pyrenees and North American mountains (Favre 1955, Horak 1960, Gulden & Lange 1971, Kühner 1975a, Knudsen & Borgen 1982, Lamoure 1982, Lamoure et al. 1982, Bon 1985a, Gulden et al. 1985, Schmid-Heckel 1985, Kühner & Lamoure 1986, Bon & Cheype 1987, Moser & McNight 1987, Senn-Irlet 1987, Bon 1990, 1991, Hansen & Knudsen 1992, Ohenoja & Ohenoja 1993, Senn-Irlet 1993, Bon & Ballarà 1996, Peintner 1998, Vesterholt 1998, Basso 1999, Bresinsky et al. 2000, Vila et al. 2001, Niezdoiminogo 2003, G. Gulden pers. comm.). The species has also been found several times in the alpine zone of the Western Carpathians and has been reported from Ukraine (Fellner & Landa 1991, 1993, Skirgieńo 1998, Škubla 1999, Antonín & Škubla 2000). The species is new to Romania.

**Specimen examined.** Munții Latorîței, the ridge of the Vf. Fratoșteanu Mare peak, alpine meadow with *Polygonum viviparum*, N 45°24'38", E 23°47'57", alt. 1980 m, 16-08-2004, leg. AR, MR, KRAM F-55142.

***Lichenomphalia alpina*** (Britzelm.) Redhead, Lutzoni, Moncalvo & Vilgalys

**Notes on distribution.** *Lichenomphalia alpina* is a typical arctic-alpine species widely distributed but not as common as *L. hudsoniana*. It is known from arctic-subarctic areas of Sweden, Norway, Finland, Russia, Canada, Alaska, from Svalbard, Greenland, Iceland, the Faroe Islands, Scotland, alpine zones of the Norwegian mountains and the French and Swiss Alps (Favre 1955, Lange 1955, Miller 1968, Bigelow 1970, Gulden & Lange 1971, Watling 1977, Lamoure et al. 1982, Watling 1983, 1987, Hansen & Knudsen 1992, Lamoure 1993, Vesterholt 1998, Niezdoiminogo 2003, G. Gulden, pers. comm.). *Lichenomphalia alpina* has also been reported from the Western Carpathians (Bujakiewicz 1993, Flakus & Bielczyk 2006) but it seems to be very rare there. The species is also known from the Andes in South America and from lowland sites (Gulden et al. 1985). The species is new to Romania.

**Specimens examined.** **Munții Făgărașului**, the Țarăta peak, alpine meadow, among rocks, N 45°36'20", E 24°41'42", alt. 2440 m, 05-08-2004, leg. AR, MR, KRAM F-54880; the Moldoveanu peak, alpine meadow, N 45°36'11", E 24°44'10", alt. 2540 m, 07-08-2004, leg. AR, MR, KRAM F-54885; the Arpașu Mic peak, alpine meadow, N 45°35'46", E 24°39'34", alt. 2455 m, 12-08-2004, leg. AR, MR, KRAM F-54879; **Munții Iezer–Păpușa**, slopes of the Iezeru Mare peak towards lake Lacul Iezeru, alpine meadow, among rocks, N 45°27'24", E 24°57'43", alt. 2170 m, 30-07-2004, leg. AR, MR, KRAM F-54881; **Munții Lotru**, the Vf. Șteflești peak, edge of the postglacial kettle, alpine meadow, N 45°31'55", E 23°48'27", alt. 2220 m, 13-08-2004, leg. AR, MR, KRAM F-54882; **Munții Cindrel**, the Vf. Cindrelu Mare peak, Căldarea Iezeru Mic, alpine meadow, N 45°34'43", E 23°48'07", alt. 2200 m, 14-08-2004, leg. AR, MR, KRAM F-54883.

***Lichenomphalia hudsoniana*** (H.S.Jenn.) Redhead, Lutzoni, Moncalvo & Vilgalys

**Notes on distribution.** *Lichenomphalia hudsoniana* is one of the most common arctic-alpine species occurring mainly in the alpine zone and arctic areas, but descending to subalpine and subarctic belts. It has also been reported from lowland sites in Denmark (Gulden et al. 1985). The species is known from arctic and subarctic areas of northern Norway, Sweden and Finland, from Svalbard, Greenland, the Faroe Islands, Scotland, Alaska, northern Canada, Russia, North American mountains, Norwegian mountains, the Swiss Alps and from the alpine zone of South American mountains (Favre 1955, Lange & Skifte 1967, Bigelow 1970, Gulden & Lange 1971, Watling 1977, Lamoure et al. 1982, Miller 1982, Watling 1983, Gulden et al. 1985, Schmid-Heckel 1985, Redhead & Kyuper 1987, Watling 1987, Hansen & Knudsen 1992, Lamoure 1993, Knudsen & Mukhin 1998, Vesterholt 1998, Niezdoiminogo 2003, G. Gulden, pers. comm.). *L. hudsoniana* is also very common in the Western Carpathians (Adamčík 1998b, Tondl 1989b, Lisicka 1999, Olech 2004).

The species has been reported by lichenologists from the Southern Carpathians as *Coriscium viride* Wain. (Moruzi et al. 1967).

**Specimens examined.** **Munții Făgărașului**, the Țarăta peak, alpine meadow with *Salix retusa*, *S. reticulata*, *Polygonum viviparum* and *Dryas octopetala*, N 45°36'20", E 24°41'42", alt. 2440 m, 05-08-2004, leg. AR, MR, KRAM F-54867; the Moldoveanu peak, alpine meadow, N 45°36'11", E 24°44'10", alt. 2540 m, 07-08-2004, leg. AR, MR, KRAM F-54868; the Arpașu Mare peak, alpine meadow, N 45°35'48", E 24°40'49", alt. 2460 m, 12-08-2004, leg. AR, MR, KRAM F-54869; **Iezer–Păpușa Massif**, E crest of the Iezeru Mare peak, alpine meadow, N 45°28'01", E 24°57'14", alt. 2400 m, 31-07-2004, leg. AR, MR, KRAM F-54870, alt. 2450 m, 31-07-2004, leg. AR, MR, KRAM F-54872; vicinity of lake Lacul Iezeru, alpine meadow, N 45°27'38", E 24°57'40", alt. 2140 m, 30-07-2004, leg. AR, MR, KRAM F-54871; **Munții Latoriței**, the Vf. Fratoșteanu Mare peak, alpine meadow, N 45°24'14", E 23°48'17", alt. 2503 m, 16-08-2004, leg. AR, MR, KRAM F-54876; **Munții Lotru**, the Vf. Cristești peak, alpine meadow, N 45°31'37", E 23°47'24", alt. 2180 m, leg. AR, MR, KRAM F-54873; the Vf. Șteflești peak, edge of the postglacial kettle, alpine meadow, N 45°31'55", E 23°48'27", alt. 2220 m, 13-08-2004, leg. AR, MR, KRAM F-54875; **Munții Cindrel**, the Vf. Cindrelu Mare peak, Căldarea Iezeru Mic, alpine meadow, N 45°34'43", E 23°48'07", alt. 2200 m, 14-08-2004, leg. AR, MR, KRAM F-54874.

***Lichenomphalia umbellifera*** (L.: Fr.) Redhead, Lutzoni, Moncalvo & Vilgalys

**Notes on distribution.** *Lichenomphalia umbellifera* is common in lowland as well as arctic and alpine habitats. It is also frequent in the Western Carpathians (e.g. Adamčík 1998b, Olech 2004).

**Specimens examined.** **Munții Făgărașului**, upper part of the Valea Podragului valley (towards the Șaua Podragului pass), on a large stone covered with *Salix retusa*, N 45°36'17", E 24°41'18", alt. 2270 m, 05-08-2004, *leg.* AR, MR, KRAM F-54889; the Ucea Mare peak, alpine meadow, N 45°36'24", E 24°43'16", alt. 2430 m, 07-08-2004, *leg.* AR, MR, KRAM F-54888; **Munții Iezer–Păpușa**, the Curmătură Oticului pass, alpine meadow, among mosses, N 45°29'42", E 24°56'17", alt. 2350 m, 31-07-2004, *leg.* AR, MR, KRAM F-54887; **Munții Lotru**, the Vf. Șteflești peak, edge of the postglacial kettle, alpine meadow, N 45°31'55", E 23°48'27", alt. 2220 m, 13-08-2004, *leg.* AR, MR, KRAM F-54893; the Vf. Cristești peak, alpine meadow, among mosses, N 45°31'37", E 23°47'24", alt. 2180 m, 13-08-2004, *leg.* AR, MR, KRAM F-54892; **Munții Cindrel**, the Vf. Cindrelu Mare peak, Căldarea Iezeru Mic, alpine meadow, among mosses (*Sphagnum*), N 45°34'43", E 23°48'07", alt. 2200 m, 14-08-2004, *leg.* AR, MR, KRAM F-54891; **Munții Latoriței**, the Vf. Fratoșteanu Mare peak, alpine meadow, among mosses, N 45°24'14", E 23°48'17", alt. 2053 m, *leg.* AR, MR, KRAM F-54890.

### *Mycena citrinomarginata* Gillet

**Observations.** The collected specimens are characterized by yellow brownish, greyish yellow colours (4B6, 4C4–5) of the cap which was darker in the centre and almost white at the margin, by yellow lamella edges and numerous lageniform to fusiform cheilocystidia which are simple or with a few short or long, apical or lateral, simple or branched excrescences.

**Notes on distribution.** *Mycena citrinomarginata* probably represents the montane-boreal element as it occurs more often in boreal regions and mountainous habitats than in lowlands. It is also frequently recorded in arctic areas and alpine zones. In the Western Carpathians, it has been found in the subalpine zone a number of times. The species is new to Romania.

**Specimen examined.** **Munții Făgărașului**, upper part of the Valea Podragului valley (towards the Șaua Podragului pass), on a large stone covered with *Salix retusa*, on shoots of *Salix retusa*, N 45°36'17", E 24°41'18", alt. 2270 m, 05-08-2004, *leg.* AR, MR, KRAM F-54916.

### *Mycena leptcephala* (Pers.: Fr.) Gillet

**Notes on distribution.** *Mycena leptcephala* is a widespread species occurring mainly in lowland sites. In the Western Carpathians, it is more common in subalpine forests.

**Specimen examined.** **Munții Făgărașului**, upper part of the Valea Podragului valley (towards the Șaua Podragului pass), on a large stone covered with *Salix retusa*, on soil, among shoots of *Salix retusa*, N 45°36'17", E 24°41'18", alt. 2270 m, 05-08-2004, *leg.* AR, MR, KRAM F-54917.

### *Russula heterochroa* Kühner

Fig. 8.

**Description.** Cap 2–4 cm in diameter, convex with slightly decurved margin, dark vine red, blackish violet, violet purple to lilac violet (10D8, 10E6-8, 10F6-8, 9B5, 9E7-8, 9F3-5, 9F7-8, 8E7, 8F7, 11B4, 11F5-6, 11E8), uniformly coloured, or with pale lilac, cream or yellowish brown (5D7, 5E7) centre, surface smooth, greasy, margin smooth or slightly sulcate. Lamellae first white then cream to yellow (3A3, 4A2-6). Stipe 2–3 × 0.7–1.5 cm, clavate to slightly bulbous, white. Flesh white, under the pileipellis lilac-rose (9A3), about 3 mm thick in the cap centre, smell none, taste mild. Spore-print cream yellow (III c, "ochre foncé" according to Romagnesi 1967).

Spores broadly ellipsoid to ovoid, 10–12 × 8–9 μm, covered with isolated spines up to 1.5 μm high. Basidia 45–50 × 11–13 μm, with 2 sterigmata. Pleurocystidia 60–100 × 7–13 μm, fusiform, narrowly fusiform to cylindrical. Dermocystidia present, narrow, 5–6 μm in diameter, 2–4-septate, marginal cells of pileipellis 2.5–4.5 μm in diameter, cylindrical, single or branched, septate.

**Notes on distribution.** *Russula heterochroa* is a very rare alpine species reported by Kühner (1975b) from the French Alps and Swedish Lapland. The records from the Munții Bucegi massif are the first for this species in the Carpathians. The species is new to Romania.

**Specimens examined.** **Munții Bucegi**, at the Șaua Șugărilor pass, alpine meadow with *Polygonum viviparum* and *Dryas octopetala*, N 45°25'54", E 25°27'34", alt. 2400 m., 27-07-2004, *leg.* AR, MR, KRAM F-55101, 55098, 55099; Mun-

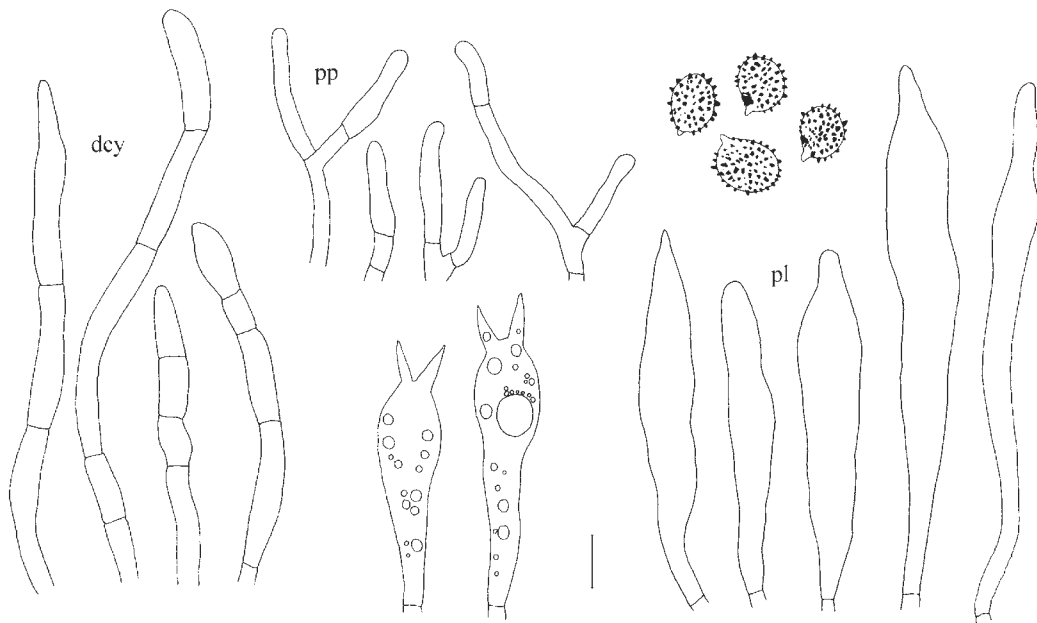


Fig. 8. *Russula heterochroa* Kühner, coll. KRAM F-55098: dcy – dermatocystidia, pp – elements of pileipellis, pl – pleurocystidia; scale bar = 10  $\mu$ m.

tele Caraiman, calcareous (?) rocks near the marked trail to the Vf. Caraiman peak, alpine meadow with *Dryas octopetala*, N 45°24'51", E 25°29'34", alt. 2400 m, 26-07-2004, leg. AR, MR, KRAM F-55100.

### *Russula nana* Killerm.

**Observations.** *Russula nana* was the most frequently encountered species in the alpine zone of the Southern Carpathians. The fungus has no special preferences regarding either the edaphic condition or the mycorrhizal host. It occurred on calcareous and siliceous bedrock, and grew together with *Salix* spp., *Dryas octopetala* or *Polygonum viviparum*. Although recorded only in two massifs so far, it should also be found in other regions.

**Notes on distribution.** *Russula nana* is one of the most common arctic-alpine species occurring in arctic areas of Norway, Sweden, Finland, Russia, Canada, Greenland, the Faroe Islands, Scotland, Alaska, Svalbard, Iceland, in the alpine zone of the Norwegian mountains, the Polar Urals, the Swiss, French, Austrian, Italian and German Alps and the Pyrenees (Favre 1955, Horak 1960, Lange & Skifte 1967, Gulden & Lange 1971, Kühner 1975b, Watling 1977, Knudsen & Borgen 1982, Lamoure 1982, Lamoure et al. 1982, Linkins & Antibus 1982, Miller 1982, Watling 1983, Bon 1985a, Gulden et al. 1985, Irlet 1985, Schmid-Heckel 1985, Kühner & Lamoure 1986, Bon 1987b, Bon & Cheype 1987, Senn-Irlet 1987, Watling 1987, Senn-Irlet 1988, Bon 1991, Hansen & Knudsen 1992, Ohenoja & Ohenoja 1993, Senn-Irlet 1993, Bon & Ballarà 1996, Knudsen & Mukhin 1998, Peintner 1998, Sarnari 1998, Vesterholt 1998, Bresinsky et al. 2000, Niezdoiminogo 2003, G. Gulden, pers. comm.). The fungus is also very common in the alpine zone of the Western Carpathians (Nespiak 1960, Tondl 1988, Fellner & Landa 1991, 1993, Adamčík 1998a). The species is new to Romania.

**Specimens examined.** Munții Bucegi, at the Cabana Babele hostel, alpine meadow with *Polygonum viviparum*, N 45°24'22", E 25°28'21", alt. 2200 m, 25-07-2004, leg. AR, MR, KRAM F-54926; the same locality, 27-07-2004, leg. EC, JC,

KRAM F-54927; at the Şaua Şugărilor pass, alpine meadow with *Polygonum viviparum* and *Dryas octopetala*, N 45°25'54", E 25°27'34", alt. 2400 m, 27-07-2004, *leg.* AR, MR, KRAM F-54928; between Vf. Caraiman and Vf. Coştila peaks, alpine meadow with *Polygonum viviparum*, N 45°25'01", E 25°29'06", alt. 2385 m, 26-07-2004, *leg.* JC, KRAM F-54929; main plateau, slopes between the Cabana Babele hostel and Muntele Caraiman, alpine meadow with *Polygonum viviparum*, N 45°24'39", E 25°28'25", alt. 2200 m, 26-07-2004, *leg.* AR, MR, KRAM F-54930; S from the Vf. Omul peak, alpine meadow with *Polygonum viviparum*, N 45°25'54", E 25°27'34", alt. 2500 m, 27-07-2004, *leg.* AR, MR, KRAM F-54931; **Munții Făgăraşului**, S-W slopes of the Arpaşu Mic peak, alpine meadow with *Dryas octopetala* and *Salix retusa*, N 45°35'41", E 24°39'19", alt. 2250 m, 03-08-2004, *leg.* AR, MR, KRAM F-54932; the Țarăta peak, alpine meadow with *Dryas octopetala*, *Polygonum viviparum*, *Salix reticulata*, and *Salix retusa*, N 45°36'20", E 24°41'42", alt. 2440 m, 05-08-2004, *leg.* AR, MR, KRAM F-54933; E ridge of the Ucişoara peak, alpine meadow with *Polygonum viviparum*, *Salix reticulata*, and *Salix retusa*, N 45°36'27", E 24°43'49", alt. 2400 m, 05-08-2004, *leg.* AR, MR, KRAM F-54934; N slopes of the Şaua Podragului pass, alpine meadow with *Polygonum viviparum* and *Salix reticulata*, N 45°36'15", E 24°41'23", alt. 2330 m, 07-08-2004, *leg.* AR, MR, KRAM F-54935; the Arpaşu Mare peak, alpine meadow with *Dryas octopetala*, N 45°35'48", E 24°40'49", alt. 2460 m, 08-08-2004, *leg.* AR, MR, KRAM F-54936.

***Russula saliceticola*** (Singer) Kühner ex Knudsen & T.Borgen

**Notes on distribution.** *Russula saliceticola* is known from alpine and arctic-subarctic habitats in Norway, Sweden, Finland, Greenland, Iceland, the Faroe Islands, Swedish and Norwegian mountains, the Swiss, French and German Alps (Favre 1955, Kühner 1975b, Knudsen & Borgen 1982, Lamoure et al. 1982, Schmid-Heckel 1985, Bon 1991, Hansen & Knudsen 1992, Vesterholt 1998, G. Gulden, pers. comm.). *Russula saliceticola* is also present in the Western Carpathians (Fellner & Landa 1993, Knudsen & Ronikier 2003). The species is new to Romania.

**Specimens examined.** **Munții Făgăraşului**, N slopes of the Şaua Podragului pass, alpine meadow with *Polygonum viviparum* and *Salix reticulata*, N 45°36'15", E 24°41'23", alt. 2330 m, 07-08-2004, *leg.* AR, MR, KRAM F-54937; the Țarăta peak, alpine meadow with *Dryas octopetala*, *Polygonum viviparum*, *Salix reticulata*, and *Salix retusa*, N 45°36'20", E 24°41'42", alt. 2440 m, 05-08-2004, *leg.* AR, MR, KRAM F-54939; the Portița Arpaşului pass, alpine meadow with *Polygonum viviparum*, N 45°36'00", E 24°39'23", alt. 2170 m, 08-08-2004, *leg.* AR, MR, KRAM F-54940; the Arpaşu Mare peak, alpine meadow, N 45°35'48", E 24°40'49", alt. 2460 m, 12-08-2004, *leg.* AR, MR, KRAM F-54941; **Munții Latorîței**, N slopes of the Vf. Fratoşteanu Mare peak, alpine meadow, among mosses, N 45°24'38", E 23°47'57", alt. 1980 m, 16-08-2004, *leg.* AR, MR, KRAM F-54938.

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