

## What do we know about the *Callistosporium* collections from Slovakia?

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Abstract: In Slovakia, two species of the genus *Callistosporium* are known, *C. luteo-olivaceum* and *C. pinicola*, both only with low number of collections and a brief description of macroscopic and microscopic characters. In this paper, information about all *Callistosporium* collections from Slovakia is gathered and data on species ecology, distribution and threat within Europe summarized. *Callistosporium luteo-olivaceum* is also provided with a detailed description based on the own collection.

Keywords: fungi, Agaricomycotina, rare species, morphology, ecology, distribution range.

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### Introduction

*Callistosporium* is a genus of agaricomycetous fungi, family Tricholomataceae. Basidiomata are of collybioid or mycenoid habit with a mixture of yellow, brown and olivaceous colours. Spores are ellipsoid, subglobose, oblong, ovoid or amygdaliform, smooth, without a germ pore, non-amyloid, not-dextrinoid and white in deposit. Cheilocystidia and pleurocystidia are absent. A cutis of pileipellis and stiptipellis consists of smooth or incrustated, thin- to thick-walled hyphae. Content of some spores, basidia and cutis hyphae is pigmented violaceous brown in KOH ("necropigments" visible in exsiccates). Clamp connections absent (ARNOLDS 2006, HALAMA & RUTKOWSKI 2014, VESTERHOLT & HOLEC 2012).

The genus was described by SINGER (1944) with the type species *Callistosporium palmarum* (MURRILL) SINGER (basionym *Gymnopus palmarum* MURRILL). Since then, several new *Callistosporium* taxa have been recognised, as well new combinations made. On the internet database Index Fungorum (KIRK 2015), there are listed 34 *Callistosporium* names. In Europe, only three of them are used as correct names: *C. luteo-olivaceum* (BERK. & M. A. CURTIS) SINGER, *C. olivascens* (BOUD.) BON and *C. pinicola* ARNOLDS (NOORDELOOS 1995, HOLEC et al. 2012, VESTERHOLT & HOLEC 2012, KIRK & COOPER 2015, Tab. 1).

**Tab. 1. The comparison of morphological characters and ecological data of the *Callistosporium* species presented in the selected identification works and our own observations**

Explanation: - character not mentioned. Note: we accept *Callistosporium elaeodes* and *C. xanthophyllum* as synonyms of *C. luteo-olivaceum*.

	<i>C. luteo-olivaceum</i>	<i>C. olivascens</i>	<i>C. pinicola</i>
<b>MOSER (1983)</b>	<b><i>C. elaeodes</i></b>	<b><i>C. olivascens</i></b>	
spores ( $\mu\text{m}$ )	6.5–8 × 3.5–4.5	(8)9–11(13) × 5–7	
clamps / cystidia	- / -	- / -	
taste / smell	- / -	- / -	
ecology	on remains of deciduous wood	under <i>Cedrus</i>	
<b>MOSER (1983)</b>	<b><i>C. xanthophyllum</i></b>		
spores ( $\mu\text{m}$ )	5–6(7) × 3.5–4.5		
clamps / cystidia	- / -		
taste / smell	- / rather musty		
ecology	on coniferous tree trunks		
<b>BON (1984)</b>	<b><i>C. elaeodes</i></b>	<b><i>C. olivascens</i></b>	
spores ( $\mu\text{m}$ )	6.5–7.5(8.5) × 3.5–4.4(5)	(8)9–11(13) × 5–7	
clamps / cystidia	absent / -	absent / -	
taste / smell	indistinct / indistinct	- / -	
ecology	on hardwood fragments	under <i>Cedrus</i>	
<b>BON (1984)</b>	<b><i>C. xanthophyllum</i></b>		
spores ( $\mu\text{m}$ )	(5)5.5–6(7) × (3)4–4.5		
clamps / cystidia	absent / present		
taste / smell	indistinct or somewhat astringent or bitter / weak		
ecology	on branches, stumps, sawdust mainly of conifers		
<b>GULDEN (1992)</b>	<b><i>C. luteo-olivaceum</i></b>		
synonym	<i>C. xanthophyllum</i>		
spores	4–7 × 3–4.5		
clamps / cystidia	absent / absent		
taste / smell	farinaceous-bitter / dusty		
ecology	on bark of fallen logs of <i>Pinus</i>		

Tab. 1. – cont.

<b>NOORDELOOS (1995)</b>	<b><i>C. luteo-olivaceum</i></b>	<b><i>C. olivascens</i></b>
synonyms	<i>C. elaeodes</i> , <i>C. xanthophyllum</i>	
spores ( $\mu\text{m}$ )	(6)6.5–8.5(10) $\times$ (3)3.5–4.5	9–11 $\times$ 5–7
clamps / cystidia	absent / -	- / -
taste / smell	indistinct / indistinct	- / -
ecology	in humus of deciduous woods under <i>Cedrus</i>	
<b>HOLEC et al. (2012)</b>	<b><i>C. luteo-olivaceum</i></b>	<b><i>C. pinicola</i></b>
synonym	<i>C. xanthophyllum</i>	
spores ( $\mu\text{m}$ )	4–7 $\times$ 3–4.5	3–4 $\times$ 2–3 $\mu\text{m}$
clamps / cystidia	- / -	- / -
taste / smell	not bitter / -	bitter / indistinct to farinaceous
ecology	on rotting wood	on rotting trunks of coniferous, rarely broad-leaved trees
<b>VESTERHOLT &amp; HOLEC (2012)</b>	<b><i>C. luteo-olivaceum</i></b>	<b><i>C. pinicola</i></b>
synonym	<i>C. xanthophyllum</i>	
spores ( $\mu\text{m}$ )	4–7 $\times$ 3–4.5	(2.5)3–4(4.5) $\times$ 2–3(3.5)
clamps / cystidia	absent / absent	absent / absent
taste / smell	mild or somewhat bitter / faint	bitterish / indistinct to farinaceous
ecology	on <i>Pinus</i> , possibly also on other kinds of woody debris	on strongly decayed trunks of conifers ( <i>Abies</i> , <i>Picea</i> , <i>Pinus</i> ), rather broadleaved trees ( <i>Fagus</i> )
<b>Authors (SLO 480)</b>	<b><i>C. luteo-olivaceum</i></b>	
spores ( $\mu\text{m}$ )	(4.2)4.7–5.6(6) $\times$ (3)3.3–4(4.2)	
clamps / cystidia	absent / present	
taste / smell	mild / like a beeswax, soon indistinct	
ecology	on decaying fallen trunk of <i>Pinus sylvestris</i>	
<b>Authors (BRA CR 15016)</b>	<b><i>C. luteo-olivaceum</i></b>	
spores ( $\mu\text{m}$ )	(4.2)4.6–5.7(6.2) $\times$ (3)3.3–4	
clamps / cystidia	absent / present	
taste / smell	- / farinaceous	
ecology	close to stump of <i>Quercus</i>	
<b>Authors (BRA CR 22323)</b>	<b><i>C. luteo-olivaceum</i></b>	
spores ( $\mu\text{m}$ )	(4.5)4.8–5.6(6.2) $\times$ (3)3.1–3.8(4)	
clamps / cystidia	absent / present	
taste / smell	- / -	
ecology	on rotting sawdust	

In Slovakia, the only one collection of the genus *Callistosporium* was published before our study. It was the collection of *C. luteo-olivaceum* by Hagara (2002) provided with a brief description of macro- and microscopic characters. The objectives of this study are therefore: 1) to describe *C. luteo-olivaceum* in detail based on our own collection, 2) to gather information about all *Callistosporium* collections known from Slovakia, and 3) to verify the occurrence of other species of the genus in Slovakia.

## Material and methods

The collections of the genus *Callistosporium* from Slovakia were search for in the herbaria BRA, BRNM, CB, PRM, SAV and SLO. The herbarium acronyms follow THIERS (2015). Data on the specimens are presented in the original form.

The description of *C. luteo-olivaceum* is based on the specimen SLO 480 (altogether 11 basidiomata in all development stages were observed). The macroscopic features were observed on fresh basidiomata. Microscopic features were described from dried material mounted in a 3% KOH aqueous solution, Melzer's reagent and Congo red, using an Olympus BX41 light microscope with oil immersion lens and a magnification of 1000×. Illustrations of all microscopic structures were drawn using the drawing tube at a projection scale of 2000×. Statistics for micromorphological characters are based on 30 measurements and are given as minimum, maximum (in parentheses), average +/- standard deviation and average values.

Abbreviations: L = number of lamellae reaching the stipe, I = number of lamellulae between each pair of lamellae, Q = ratio of length and width of spores. Descriptive terminology is according to VELLINGA (1988). Taxonomy and nomenclature of *Callistosporium* species occurring in Slovakia follow VESTERHOLT & HOLEC (2012); the nomenclatural database Index Fungorum (KIRK 2015) was used for other *Callistosporium* taxa.

## Results and discussion

***Callistosporium luteo-olivaceum*** (BERK. & M. A. CURTIS) SINGER, *Lloydia* 89: 117 (1946)

**Description, Figs. 1, 2.** **Basidiomata** clustered. **Pileus** 10–35 mm broad; hemispherical, convex to plano-convex; centre slightly depressed to umbilicate (especially in larger basidiomata); margin inflexed to straight, flat to wavy, entire, translucently striate; surface smooth, velutinous to apparently glabrous, coloured in shades of brown and (depending on wet and age) with mixture of yellow and green; hygrophanous; when drying (from the half of the pileus towards the centre and margin), soaking wet and thus lighter pileus becomes darker and has a distinct dark line at the margin. **Lamellae** crowded, L = 38–52, I = (1)3(5), up to 3 mm wide, ventricose, emarginate, brightly yellow when young, then rusty yellow or olive yellow (always distinctly contrasting with colour of pileus), edge entire,

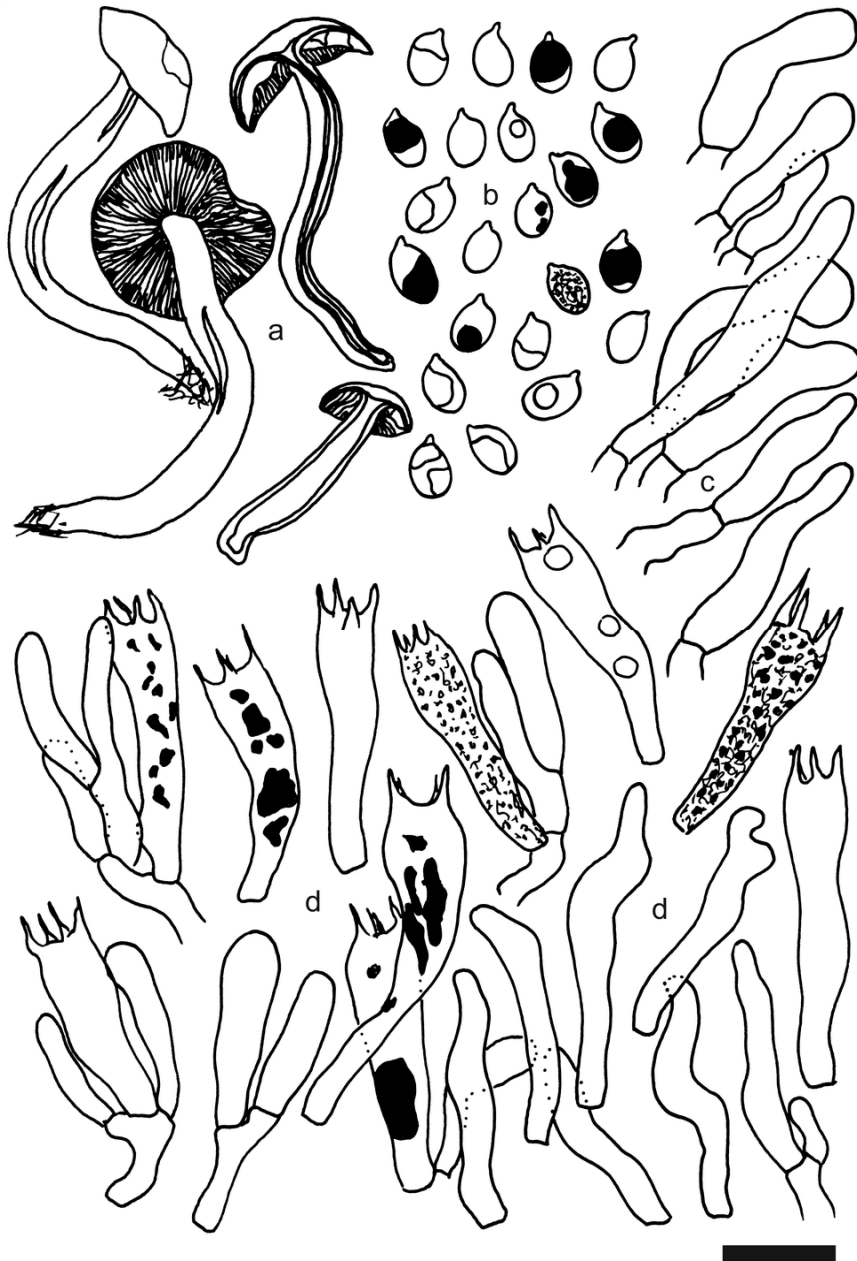


Fig. 1. *Callistosporium luteo-olivaceum*: a – basidiomata (75% reduction of original size), b – spores, c – terminal cells in the stipitipellis, d – basidia and other hyemial cells (Slovakia, Borská nížina Lowland, Sološnica village, 21 September 2007, SLO 480). Scale bar = 10  $\mu$ m. Del. S. Jančovičová.

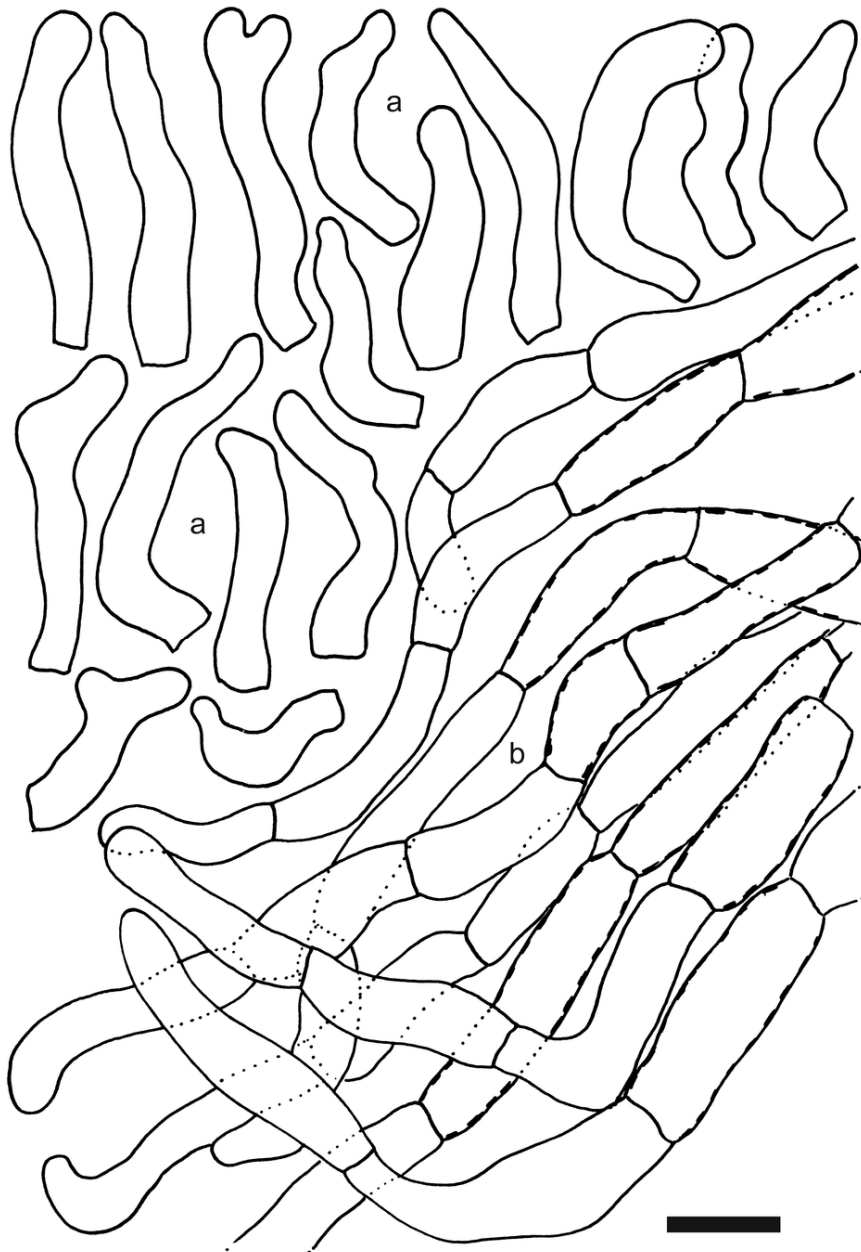


Fig. 2. *Callistosporium luteo-olivaceum*: a – terminal cells in the pileipellis, b – hyphae and terminal cells in the pileipellis (Slovakia, Borská nížina Lowland, Sološnica village, 21 September 2007, SLO 480). Scale bar = 10  $\mu$ m. Del. S. Jančovičová.

concolorous or somewhat lighter. **Stipe** 25–80 × 3–8 mm, central to slightly eccentric, tapering upwards and downwards (the broadest in its half), and fused into a cluster, mostly curved, longitudinally compressed, fistulose, brown, yellowish brown and olive brown, when young minutely floccose all over the length or only at the apex (5–15 mm from the attachment to the pileus), later finely longitudinally fibrillose, this covering more or less concolorous but lighter than background colour, at the base with distinct white tomentum. **Context** in pileus up to 2 mm thick, olive brown, but yellowish in place when stipe attached, taste mild, smell like a beeswax (immediately after cutting), soon indistinct; in stipe 1.5–2 mm thick (the thickest at the base) and concolorous with its surface.

**Spores** (4.2)4.7–5.6(6) × (3)3.3–4(4.2) μm, av. 5.2 × 3.6 μm, Q = (1.2)1.3–1.6(1.9), av. Q = 1.43, broadly ellipsoid, ellipsoid to oblong, with small but distinct hilar appendage, smooth, thin-walled, non-dextrinoid, non-amyloid, with various content: they are hyaline and homogenous (seem to be empty) or contain hyaline or violaceous brown: i) well-delimited globose droplet, ii) irregularly shaped but compact substance located in some part, or iii) heteromorphous (mostly granular) substance diffused in all parts. **Basidia** (18)20.1–26.4(31) × (4)4.9–6.5(7.5) μm, av. 23.3 × 5.7 μm, 4-spored, very rarely 2-spored, clavate and narrowly clavate, thin-walled, with various content: they are hyaline and homogenous or (mostly) contain hyaline or violaceous brown: i) globose droplets, ii) irregularly shaped substance in some part, or iii) heteromorphous (mostly granular) substance in all parts. **Hymenial cells** of two types: i) clavate, narrowly clavate, narrowly utriform and cylindrical with obtuse apex, (12)13.6–20.9(25) × (2.5)3.5–5.3(6) μm, av. 17.3 × 4.4 μm (typical basidioles), and ii) cylindrical and narrowly cylindrical with tapered apex, (11)14.7–25.1(31) × (2)3–4.3(5) μm, av. 19.9 × 3.7 μm (this type present especially on lamella edge); both types thin-walled, filled with hyaline and homogenous or heteromorphous (mostly granular) substance. **Cheilocystidia** and **pleurocystidia** absent. **Pileipellis** a cutis, about 30–70 μm deep, made up of cylindrical, violaceous brown to light brown, smooth or incrustated (of parietal incrusting pigments), thin- to thick-walled, 3–8 μm wide hyphae; **pileocystidia** (the terminal cells) (17)19.5–31.7(38) × (4)4.3–6.6(9.5) μm, av. 25.6 × 5.5 μm, cylindrical, narrowly cylindrical, clavate, narrowly clavate or narrowly lageniform, some flexuose, above with lateral projection or forked, at the apex obtuse or tapered, ± concolorous, smooth, thin- to thick-walled, adpressed to erect. **Stipitipellis** a cutis of cylindrical, lightly violaceous brown to almost hyaline, smooth or slightly incrustated, thin- to slightly thick-walled, up to 9 μm wide hyphae; the hyphae (rarely) with lateral outgrowths up to 10 μm long or (mostly) with ascending to erected terminal cells, i.e. **caulocystidia** (12.5)15.7–29.8(38) × (3.5)3.9–5.7(6.5) μm, av. 22.7 × 4.8 μm, clavate, narrowly clavate, cylindrical or narrowly utriform, often irregular, at the apex obtuse or tapered, ± concolorous, smooth, thin- to thick-walled. **Trama** of pileus composed of cylindrical to slightly inflated, parallel to irregularly and more loosely (comparing with pileipellis) arranged, hyaline to light brown, smooth, thin-walled, up to 20 μm wide hyphae; trama of stipe formed of cylindrical, parallel, hyaline, brown

yellowish to light brown, smooth, thin-walled, up to 14 µm wide hyphae. **Clamp-connections** absent in all tissues; rarely observed lateral outgrowth on hyphae in subhymenium, pileipellis and stiptipellis (such clamps-like structures do not connect two adjacent cells).

#### **Slovak collections of *Callistosporium luteo-olivaceum***

We have found out five collections of *C. luteo-olivaceum* from Slovakia. Three of these collections, CR 15016, SLO 480, and BRA CR 22323, have been observed personally (Tab. 1).

**BRA CR 15016** “Trnavská pahorkatina, Budmerice, okr. Pezinok, kaštieľsky park, 60 m JZ od kaštieľa, na báze pňa *Quercus* sp., Q 7670a, 205 m n. m., 6. X. 2001, leg. & det. L. Hagara, rev. S. Jančovičová.” This is the first and still the only one published collection of the genus *Callistosporium* from Slovakia. The basidiomata were found growing in cluster close to the *Quercus* stump with *Q. cerris* and *Q. petraea* nearby, in the castle park in the village of Budmerice, Trnavská pahorkatina Mts. (HAGARA 2002).

**SLO 480** “Borská nížina Lowland, 3.8 NNW of the church in the village of Sološnica, the *Pinus sylvestris* monoculture of 50 to 70 years old trees, with admixed exemplars of *Betula pendula* and *Tilia* sp., in cluster on wood of decaying fallen trunk of *Pinus sylvestris*, 184 m a. s. l., coord. 48° 30' 02.7" N, 17° 13' 17.1" E, 21. IX. 2007, leg. V. Kučera, det. S. Jančovičová.” (Our own collection.)

**BRNM 766991** “Laborecká vrchovina, Snina, Dlhé nad Cirochou. Lokalita: Rieka “Cirocha”, Typ lokality: na starom skladisku pilín (agát, vrbá, jelša). Substrát: na prehnutých pilinách. 9. XI. 2013, leg. J. Pavlík, det. J. Pavlík, rev. V. Antonín and H. Ševčíková.” **BRNM 766992** “Laborecká vrchovina, Snina, Dlhé nad Cirochou. Lokalita: Rieka “Cirocha”, Typ lokality: listnatý les (vrba, agát, jelša). Substrát: na prehnutých pilinách. 10. XI. 2013, leg. J. Pavlík, det. H. Ševčíková.” **BRA CR 22323** “Laborecká vrchovina, Dlhé nad Cirochou, na pilinách, alt. s. m. 170, 8. X. 2014, leg. & det. J. Pavlík, rev. S. Jančovičová.” These all three collections are from the same locality, i.e. from the former sawdust storage site about 100 square metres large, near the village of Dlhé nad Cirochou, locality “Cirocha River”, Laborecká vrchovina Mts. The basidiomata were found on rotting sawdust of unknown origin with *Salix*, *Alnus* and *Robinia pseudoacacia* trees nearby (PAVLÍK, pers. com.). Photographs of these collections can be seen on the web page nahuby.sk (BARANOVÍČ 2015).

**Identification.** The basidiomata of *C. luteo-olivaceum* show a wide variation in form and colours. Such morphological variability together with its world-wide distribution caused that the species had been described many times as a new taxon (REDHEAD 1982). Among all 34 *Callistosporium* names in the database Index Fungorum (KIRK 2015), the most (14) are concerning *C. luteo-olivaceum*. Names – *C. elaeodes* (ROMAGN.) BON and *C. xanthophyllum* (MALENÇON & BERTAULT) BON – used in some European identification works (Tab. 1.) recently stand for synonyms of *C. luteo-olivaceum*.



The size of spores is used as the key character for distinguishing European species of the genus *Callistosporium* (e.g. MOSER 1983, VESTERHOLT & HOLEC 2012). Comparing our measurements of spores of *C. luteo-olivaceum* with the values in the identification works, spores of Slovak collections are somewhat shorter (Tab. 1). On the other hand, our measurements are very similar to those measured on the type of *C. luteo-olivaceum* by ROBERTS (2008):  $4\text{--}6.5 \times 3\text{--}4 \mu\text{m}$ .

Smell and taste of basidiomata are also used as distinguishing character, e.g. HOLEC et al. (2012) described *C. luteo-olivaceum* as not bitter (smell is not mentioned), contrary to bitter *C. pinicola* (smell is described as indistinct to farinaceous). However, other authors (Tab. 1) presented taste of *C. luteo-olivaceum* differently – as indistinct, mild, somewhat bitter, farinaceous bitter or astringent; smell as dusty, indistinct, faint or musty. We have described taste of our collection as mild and smell like a beeswax (immediately after cutting), soon indistinct. BERAN & PAPOUŠEK (1995) compared smell of the species to a smell of *Cortinarius callisteus* that smells like smoke of steam locomotive or burning candle. BON (1984) mentioned also smell like parsley, polyethylene, “piere à fusil”, burning candle and *Aceras anthropophora* (for *C. xanthophyllum* in his paper). Because of such differences in smell and taste interpretation, we consider these characters unsuitable for the species differentiation.

Cystidia are either not mentioned at *C. luteo-olivaceum* (e.g. MOSER 1983, HOLEC et al. 2012) or they are presented as absent (e.g. GULDEN 1992) or not observed (e.g. BERAN & PAPOUŠEK 1995). Some authors, e.g. BON (1984) used the term cheilocystidia (for *C. xanthophyllum* in his paper), NOORDELOOS (1995) distinguished cystidioid terminal elements in the pileipellis, and according to VESTERHOLT & HOLEC (2012) true cystidia absent.

Caulocystidia were described for the species by ANTONÍN & VÁGNER (1994):  $20.3\text{--}31.1 \times 5.7\text{--}14.6 \mu\text{m}$ , clavate, cylindrical, often irregular, thin-walled, brownish in  $\text{NH}_4\text{OH}$ . According to our observations of Slovak collections of *C. luteo-olivaceum*, terminal cells in stipeipellis are distinct and interpreted also as caulocystidia. In the specimen SLO 480, they were clavate, narrowly clavate, cylindrical or narrowly utriform, often irregular, at the apex obtuse or tapered, lightly violaceous brown to almost hyaline, thin- to thick-walled,  $(12.5)15.7\text{--}29.8(38) \times (3.5)3.9\text{--}5.7(6.5) \mu\text{m}$  large (Fig. 1c). In the specimen BRA CR 15016, caulocystidia were of more or less the same characters as in SLO 480 and measured  $(16)20.1\text{--}32.6(35) \times (4.5)4.7\text{--}7(7.5) \mu\text{m}$ . In the specimen BRA CR 22323, we observed not only caulocystidia similar to those as in SLO 480 with their measurements  $(15)22.8\text{--}34.5(38) \times (4)4.5\text{--}6.3(7) \mu\text{m}$ , but also caulocystidia with a capitate to subcapitate terminal part (once also with a septum under the capitulum) and lower part either cylindrical or broadened near the basal septum,  $(20)25.7\text{--}40.7(46) \times (6.5)7.6\text{--}13.9(16.5) \mu\text{m}$  (Fig. 3). Similar cells on caulocutis depicted BON (1984) for *C. xanthophyllum*. In our material, we have also observed distinct terminal cells in pileipellis (pileocystidia); there were only minor differences in characters among the collections.

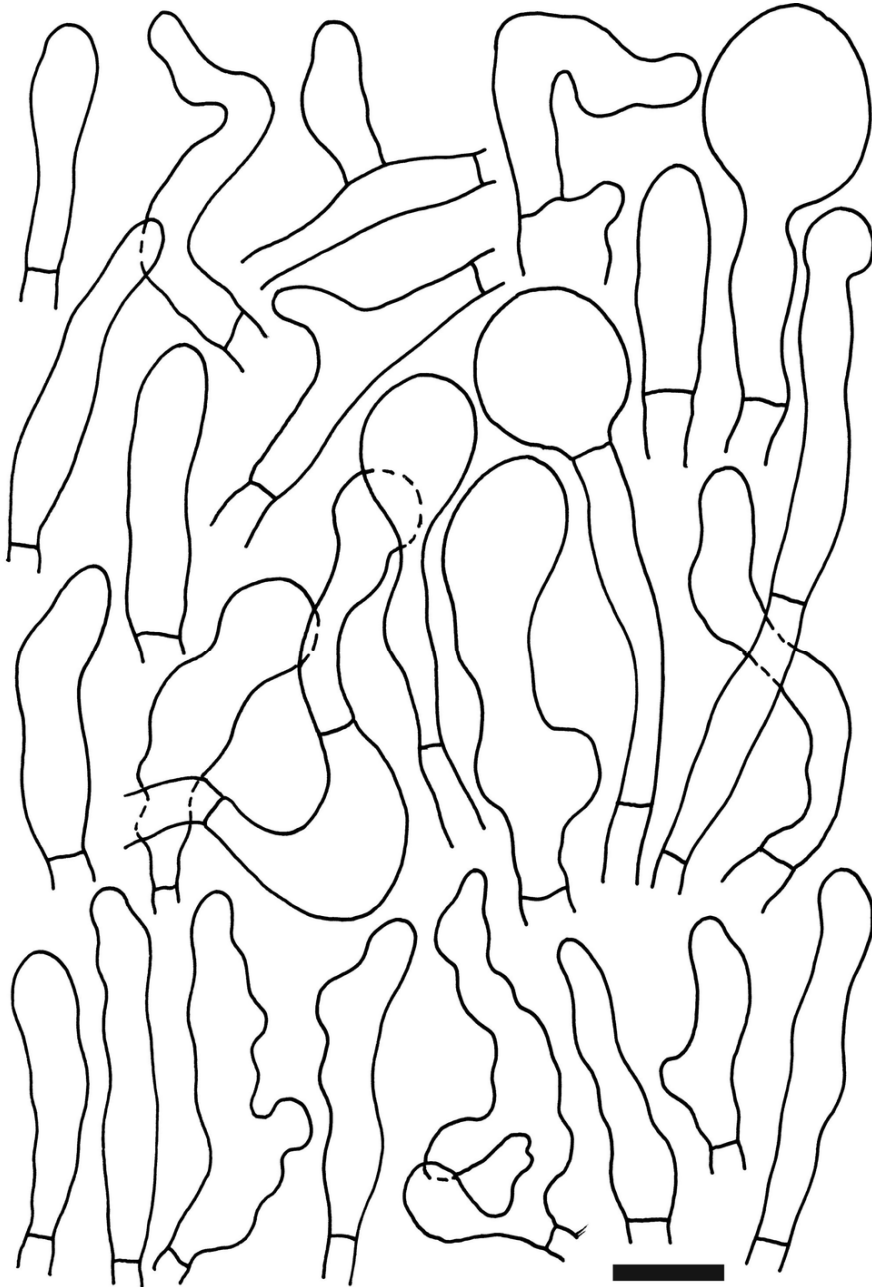


Fig. 3. *Callistosporium luteo-olivaceum*: terminal cells in the stipitipellis (Slovakia, Laborecká vrchovina Mts., Dlhé nad Cirochou village, 8 October 2014, BRA CR 22323). Scale bar = 10  $\mu$ m. Del. S. Jančovičová.

**Distribution and ecology.** Although rare, *C. luteo-olivaceum* is a wide-spread species, reported from Europe, North America, South America, the Caribbean and Asia (GÁNDARA & GUZMÁN 2006, REDHEAD 1982, SABA & KHALID 2014).

Considering the ecological data by authors of the traditionally used fungal identification works in Europe (Tab. 1.), *C. luteo-olivaceum* is known as a saprotroph growing on *Pinus* (logs), possibly on other kinds of woody debris, also in humus of deciduous woods. Oak tree as a host of this species is mentioned by GÁNDARA & GUZMÁN (2006).

In Slovakia, the basidiomata of *C. luteo-olivaceum* were found near the oak stump, on the rooting sawdust (of unknown tree origin) and on the fallen decaying trunk of *Pinus sylvestris*, from September to November.

In comparison with four published collections from the neighbouring Czech Republic, there is also a find from sawdust (basidiomata grew seemingly on the ground in association with *Mnium* sp., probably on the thick layer of sawdust, by which a former quarry was filled up, later covered by thin layer of soil and afforested by spruce seedlings) (BERAN & PAPOUŠEK 1995). Other collections are from: decaying stump of *Pinus sylvestris* (ANTONÍN & VÁGNER 1994), stump of *Pinus* (ANTONÍN et al. 2000), and stump covered by mosses of *Picea* (KOTLABA 2006); these collections are from August to October.

**Threat.** *Callistosporium luteo-olivaceum* is a red-listed species in Croatia (TKALČEC et al. 2005, as *C. elaeodes* and *C. luteo-olivaceum*), the Czech Republic (ANTONÍN 2006), Germany (BENKERT et al. 1996, as *C. elaeodes*), and the Netherlands (ARNOLDS & VEERKAMP 2008). In Slovakia, no *Callistosporium* species is included in the Red list of fungi (LIZOŇ 2001). This might be because the first published *Callistosporium* collection is that on *C. luteo-olivaceum* from 2002 (HAGARA 2002). As *C. luteo-olivaceum* is a remarkable fungus with bright colours, we think it is rather rare than overlooked and propose including it into a new edition of the Slovak red list of fungi.

***Callistosporium pinicola*** ARNOLDS, Acta Mycol. 41: 32 (2006)

#### **Slovak collections of *Callistosporium pinicola***

We have found out two collections of *C. pinicola* from Slovakia.

**CB 16624** “Zázrivá, ca 4,5 km ZSZ: Kozinská dolina, kulturní jedlobučina s vtroušeným *Picea abies*, zařízlé údolíčko potoka, prameniště nad potokem; ležící silně zetlelý fragment kmenu jehličnanu, Q 6781a, 730 m n. m., 18. VII. 2009, leg. & det. M. Beran.” It seems to be the first collection of *C. pinicola* for Slovakia. The basidiomata were found on strongly decayed fallen trunk of a conifer in the managed fir-beech forest with admixed *Picea abies*, at spring over the brook in the Kozinská dolina valley near the village of Zázrivá, Kysucká vrchovina Mts.

**BRNM 766990** “Snina. Lokalita: kopec “Štefkovo”. Typ lokality: zmiešaný les. Substrát: na prehnitom dreve smreka, 350 m n. m., 21. VII. 2013, leg. J. Pavlík, det. V. Antonín.” This collection is presented on the web page nahuby.sk

(BRANOVIČ 2015) and mentioned by HALAMA & RUTKOWSKI (2014). The basidiomata grew on wood of decaying fallen trunk of *Picea abies* in the mixed forest, in the locality "Štefkovo hill" near the village of Snina, Beskydské predhorie Mts.

**Identification.** Within the European members of the genus *Callistosporium*, *C. pinicola* is distinguished by having the smallest basidiospores  $(2.5)3\text{--}4(4.5) \times 2\text{--}3(3.5) \mu\text{m}$  (Tab. 1). Recently, a detailed description together with notes on taxonomy and nomenclature of this taxon give ANTONÍN et al. (2009).

**Distribution and ecology.** *Callistosporium pinicola* was hitherto reported only from Europe: Austria, Belgium, the Czech Republic, France, Germany, Italy, the Netherlands, Switzerland, Ukraine (ANTONÍN et al. 2009), England (KIRK & COOPER 2015), Poland (HALAMA & RUTKOWSKI 2014), and Sweden (VESTERHOLT & HOLEC 2012).

Habitat requirements of *C. pinicola* and its possible role of an indicator of old-growth forests on a European scale are discussed in detail by ANTONÍN et al. (2009) and HALAMA & RUTKOWSKI (2014). Extracting data (from these works) on substrate and period of basidiomata production, *C. pinicola* grows preferably on wood (fallen trunks and stumps) of conifers (*Abies alba*, *Picea abies*, *Pinus sylvestris*, *P. pinea*), rarely of broadleaved trees (*Fagus sylvatica*), from June to November.

In Slovakia, the basidiomata of *C. pinicola* were found on a strongly decayed trunk of an (unknown) conifer and of *Picea abies*, in July.

**Threat.** Within Europe, *C. pinicola* is a red-listed species in the Netherlands (ARNOLDS & VEERKAMP 2008). As a rare species confined to endangered natural habitats, it is going to be included into a new edition of the Red list of fungi of the Czech Republic (ANTONÍN et al. 2009) and of Poland (HALAMA & RUTKOWSKI 2014). Two known Slovak collections of *C. pinicola* are from the managed habitats, but we think that because of its rarity and preferences for old-growth forests in the neighbouring Czech Republic, Ukraine (ANTONÍN et al. 2009) and Poland (HALAMA & RUTKOWSKI 2014), *C. pinicola* should be red-listed also in Slovakia.

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