Pseudobaeospora terrayi, a new species from Slovakia

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Pseudobaeospora terrayi is described and illustrated as a new member of the genus defined by (1) yellowish-greenish discoloration in 5 % KOH, (2) pileipellis with a well developed suprapellis of narrower aeriferous hyphae and wider hyphae in the subpellis, (3) relatively small, slender white basidiomata with distant gills, and (4) with cheilocystidia. Differences from similar species are discussed. Observations and comparison with the type specimen of *P. paulochroma*, the most similar species, are provided.

Keywords: Agaricomycotina, fungi, biodiversity, systematics.

Members of the genus *Pseudobaeospora* Singer are small agarics (Agaricomycotina) of uncertain taxonomical position (Velinga 2009). Because of very inconspicuous and subtle basidiomata, they had been overlooked for a long time and only two species were known from Europe before 1995 (Bas 2002). Descriptions of two new species by Bas (1995) initiated increased interest in the genus. Many new species described consequently are summarized in the monographic studies by Bas (2002, 2003) and Voto (2009). Altogether, 22 species (including two invalidly published taxa and one synonymized) and two infrageneric taxa of the genus *Pseudobaeospora* are known from Europe recently.

Infrageneric classification of the genus *Pseudobaeospora* is based mostly on morphological characters. The colour of basidiomata is used as the first-step character in the *Pseudobaeospora* key of Bas (2002). Our contribution deals with white colored *Pseudobaeospora* specimens recently collected in Slovakia. Concerning their colour, they are undoubtedly members of the "Albidula group". Bas (2003) classified three white species in this group: *P. albidula* Bas, *P. paulochroma* Bas, and "*P. bavariae*" (the last is an invalid name). *Pseudobaeospora calcarea* Clémençon & Ayer is the fourth species of this group that was described more recently (Clémençon & Ayer 2007). Our recent collections

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of white *Pseudobaeospora* from Slovakia are the most similar to *P. paulochroma*, but they differ in the presence of cheilocystidia, lower number of lamellae, and dimensions of basidiomata. The comparison of the Slovak collections with other white members of the genus *Pseudobaeospora* led to the description of the new species presented here.

Material and Methods

The study is based on the examination of three collections from two sites in Slovakia. It is supported by observations on the type of *P. paulochroma* (the type specimen is deposited in herbarium L). Slovak specimens are kept in herbarium SAV. The abbreviations of herbaria are cited in accordance with the Index Herbariorum (Holmgren *et al.* 1990).

The macroscopical characters were observed on fresh material. Microscopical structures were observed in a solution of Congo Red in ammonia (1 mL of 25 % ammonia added in a filtrated solution of 1.5 g of Congo Red in 50 mL of distilled water) and in a 5 % aqueous solution of KOH. Spores on the lamellae were observed in Melzer's reagent. Micromorphological characters were observed using an Olympus CX-41 microscope (oil-immersion, 1000 ×). All drawings of microscopical structures, with the exception of spores, were made with a 'camera lucida' using a Olympus U-DA drawing attachment (projection scale 2000 ×). Spores were scanned with an Olympus Artcam camera and measured using Quick Micro Photo (version 2.1) software. Enlarged scanned pictures of spores were used for measuring with an accuracy of 0.1 µm and for drawing. Description of the new species is based on the type specimen. Statistics for measurements of microscopical structures are based on 30 measurements per specimen. The range of values is estimated as mean value ± standard deviation; minimum and maximum values are in parentheses.

References to colours of macromorphological characters follow Kornerup & Wanscher (1974), the descriptive terminology follows Vellinga (1988) and Bas (2002, 2003).

Results and Discussion

Pseudobaeospora terrayi Adamčík & Jančovičová sp. nov. – Figs. 1 – 8.

MycoBank: MB 563754

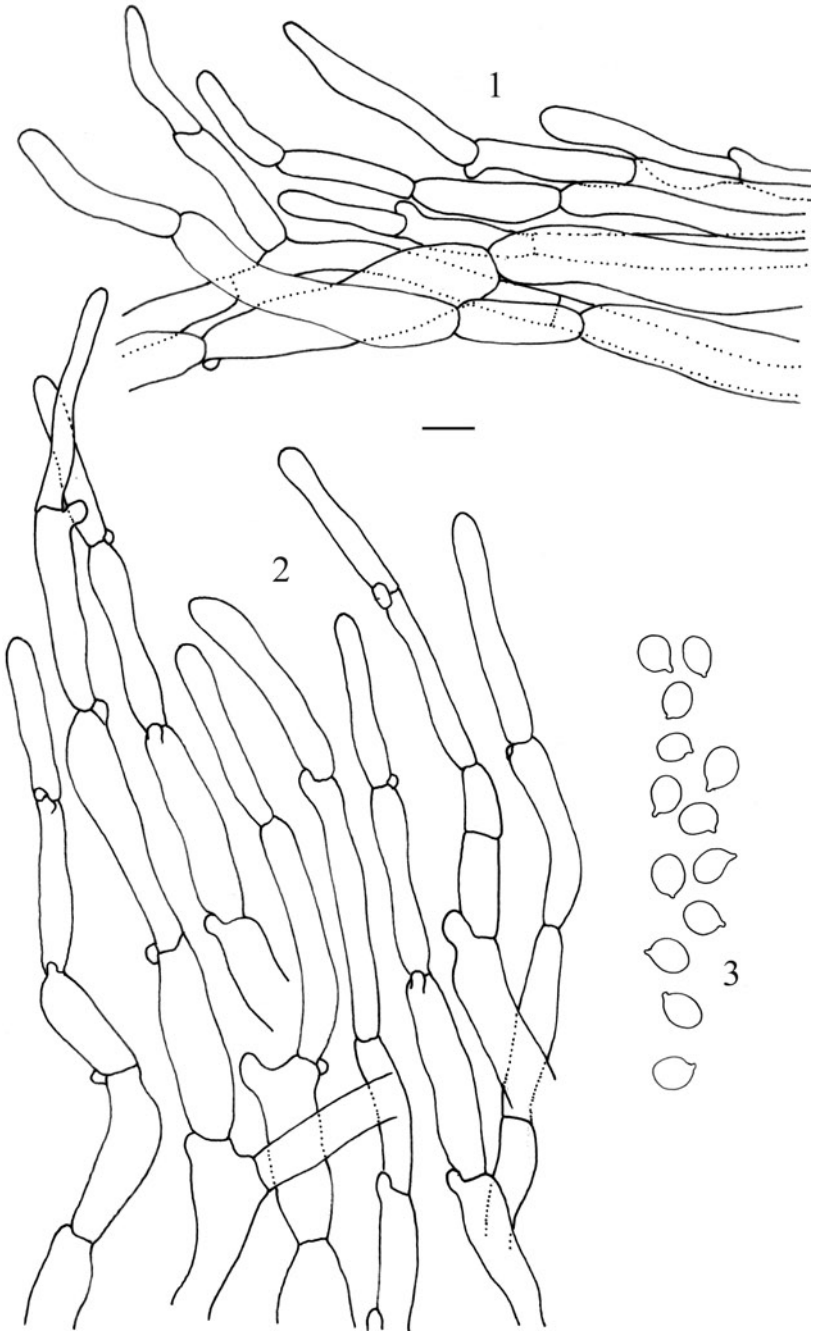
P i l e u s 3–7 mm latus, initio campanulatus, a convexo ad plano-convexum, in summo non hygrophanus, in margine striatus, superficies laevigata, sicca, sericea, fere alba, in media parte pallide lutescens. S t i p e s 15–30 × 0.5–0.75 mm, centralis, cylindraceo-filliformis, flexuosus, albo-lutescens, ad basem versus flavo-rubescens, in base cum albis rhizoidis subtilis. L a m e l l a e 1–1.5 mm latae, L = 11–18, l = (0–)1–3, adnexae, lutescenter-cinerascens. C a r o pilei alba, odor ingratus, piscinae aequa, crudo sine makroscopice conspicua colorata mutatione cum KOH 5%.

Sporae 3.7–4.2 × 2.8–3.1 µm, proportio Q = 1.23–1.38, ellipsoideae, levigatae, incoloratae, tenuiter tunicatae, deinde crasse tunicatae et dextrinoideae. Basidia 4-sporigera, 14–18 × 5–6 µm, incolorata, tenuiter tunicata, raro crasse tunicata et dextrinoidea. Cheilocystidia 12.5–21.5 × 5–9 µm, plerumque dilatato clavata, tenuiter tunicata, raro crasse tunicata, frequenter cum incrustatione hyalina. Pileipellis est transitus ex cute ad trichodermem, ex duo stratis est compositus: suprapellis valde aeripherosa ex angustis, repentibus, cylindricis hyphis; et subpellis est composita ex hyphis horisontalibus et densis, quae sunt diserte latiores quam in suprapelle et apud KOH 5% se colorant lutescenter-viridiscenter; cellulae terminales prope marginis pilei 28–47 × 5–7 µm, plerumque cylindricae cum apicibus obtusis; in centro confertiores, erectiores et distincte latiores quam quibus marginalibus. Caulocystidia numerosa modo in apice stipitis, 16–43 × 4.5–6 µm, cylindrica, clavata ad subcapitata, saepe moliniformia, incolorata, tenuiter tunicata. Fibulae praesentes.

Holotypus. – (hic designatus): SLOVAKIA, Laborecká vrchovina Mts., ca. 1 km NE of Svetlice village, the riverside meadow extensively used as pasture, on ground among ca. 15–30 cm tall herbal vegetation composed of *Achillea millefolium* L., *Agrimonia eupatoria* L., *Agrostis capillaris* L., *Dactylis glomerata* L., *Daucus carota* L., *Festuca pratensis* Huds., *Festuca rubra* L., *Jacea pratensis* Lam., *Leontodon hispidus* L., *Lotus corniculatus* L., *Pimpinella saxifraga* L., *Plantago lanceolata* L., *Poa pratensis* L., *Thymus pulegioides* L., *Tithymalus cyparissias* L., *Trifolium repens* L., *Veronica chamaedris* L. and *Viola hirta* L., alt. 458 m, coord. 49°11′12.9″ N, 22°02′55.8″ E, 23 Oct 2007, *leg.* J. Terray (SAV F-3317).

Pileus 3 mm to 7 mm wide, at first campanulate or hemispherical, later convex to plano-convex, without umbo or subumbonate, margin never striated, surface not hygrophanous, dry, smooth, silky, not shinning, colour ± uniform, almost white, yellowish white (4A2) to pale yellowish (4A3) at the centre, not changing during maturing. – Stipe 15–30 × 0.5–0.75 mm, central, cylindrical-filiform, flexuous, above pale yellowish white (4A2-4B3), towards the base darker reddish-blond (5C4) to dark-blond (5D4), surface finely pruinose above, on the base with fine white rhizoids. – Lamellae 1–1.5 mm wide, L = 11–18, l = (0) 1–3, adnexed, pale yellowish-grayish (more grayish than 4A2), edge entire and concolorous. – Context in pileus white; in stipe concolorous with surface, in pileus very fragile; sometimes with distinct unpleasant fishy smell, taste mild, when fresh with no macroscopic colour change in 5 % KOH.

Microcharacters: Spores (3.5) 3.7–4.2 (4.4) × (2.6) 2.8–3.1 (3.3) µm (n = 30), av. 3.9 × 3 µm, Q = (1.19) 1.23–1.38 (1.48), av. Q = 1.32, ellipsoid, hyaline, smooth, when mature dextrinoid and thick-walled. – Basidia 4-spored, 14–18 (21) × (4.5) 5–6 µm, av. 16.6 × 5.4 µm, hyaline, thin-walled, sclerified dextrinoid basidia present, but widely dispersed. – Cheilocystidia (10) 12.5–21.5 (24.5) × 5–9 µm, av. 16.3 × 6.7 µm, similar to basidioles on sides of lamellae, but more voluminous, mostly broadly clavate, thin-walled, a few also thick-walled, frequently with hyaline incrustation visible in Congo red. – Pileipellis a transition from cutis to trichoderm; vaguely divided to very aeriferous suprapellis composed of narrow, repent, cylindrical hyphae, ca. 20–40 µm deep, and ca. 40–50 µm deep subpellis composed of more



Figs. 1-3. – *Pseudobaeospora terrayi* (holotype): **1.** Radial section of pileipellis from the cap margin. **2.** Terminal cells of hyphae near the margin of pileus. **3.** Spores. Bar 5 µm for spores and 10 µm for other elements.

densely arranged horizontal hyphae that are distinctly wider than in the suprapellis, ca. 10–17 µm thick; in 5 % KOH yellowish-greenish; terminal cells of hyphae near the margin of pileus (21) 28–47 (67) × (4.5) 5–7 (8) µm, av. 37.3 × 6 µm, mostly cylindrical and obtuse on tips; near the centre more crowded and more erected, distinctly wider than those near the margin, (23) 30.5–50 (70) × (5) 7–12 (17) µm, av. 40.3 × 9.7 µm, mostly cylindrical and with obtuse tips. – Trama of lamellae subregular, composed of hyphae 5–16 µm wide, mostly wider than 10 µm; trama of pileus and stipe similar to that in lamellae, composed of more parallel hyphae. – Caulocystidia numerous at the apex of the stipe, absent towards the base, (14) 16–43 (71) × (4) 4.5–6 (7.5) µm, av. 29.7 × 5.4 µm, cylindrical, clavate to subcapitate, often moniliform, hyaline, thin-walled, often with glutinous incrustation and stuck spores on them. – Clamp connections present in all tissues.

Etymology. – In honour of Ján Terray, a botanist and environmentalist, who dedicated his life to the knowledge of biodiversity of Slovak Carpathians and collected the type specimen.

Other material examined. – ***Pseudobaeospora terrayi*** Adamčík & Jančovičová: SLOVAKIA, Laborecká vrchovina Mts., ca. 1 km NE of Svetlice village, the first collection from the type locality (more details are in reference to the type), 21 Sep 2006, leg. J. Terray (SAV F-3318); Biele Karpaty Mts., ca. 1.2 km NWW of Vršatecké Podhradie village, on meadow, on ground among ca. 15–30 cm tall herbal vegetation composed of *Brachypodium pinnatum* (L.) P. Beauv., *Dactylis glomerata* L., *Festuca rubra* L., *Galium album* Mill., *Hypericum perforatum* L., *Jacea pratensis* Lam., *Lathyrus pratensis* L., *Pimpinella saxifraga* L., *Potentilla argentea* L., *Sanguisorba officinalis* L., *Taraxacum officinale* agg., *Trifolium alpestre* L., alt. 721 m, coord. 49° 4'19.79" N; 18° 8'33.26" E, 17 Oct 2002, leg. S. Jančovičová (SAV F-3319).

Discussion

Following the *Pseudobaeospora* key of Bas (2002), the white basidiomata clearly place *P. terrayi* into the "Albidula group". The Slovak specimens described here are characterized by yellowish discoloration of the flesh in KOH, slender basidiomata (also in scale of the genus), relatively distant gills, pileipellis with well developed suprapellis of repent hyphae with slender tips, and the presence of cheilocystidia.

Bas (2002) used also the number of lamellae as character for the delimitation of his white species. The values for *P. terrayi* (L = 11–18) are more similar to those of *P. albidula* (L = 11–17) than to those of *P. paulochroma* (L = 19–24) (Tab. 1). The latter two are distinguished by the smaller size of basidiomata and the absence of a suprapellis in *P. albidula*, the Slovak specimens share a combination of these characters: the basidiomata are slender like in *P. albidula* and have a well-developed suprapellis like that of *P. paulochroma* (Tab. 1). The unpleasant smell observed in one collection of *P. terrayi* and microscopi-

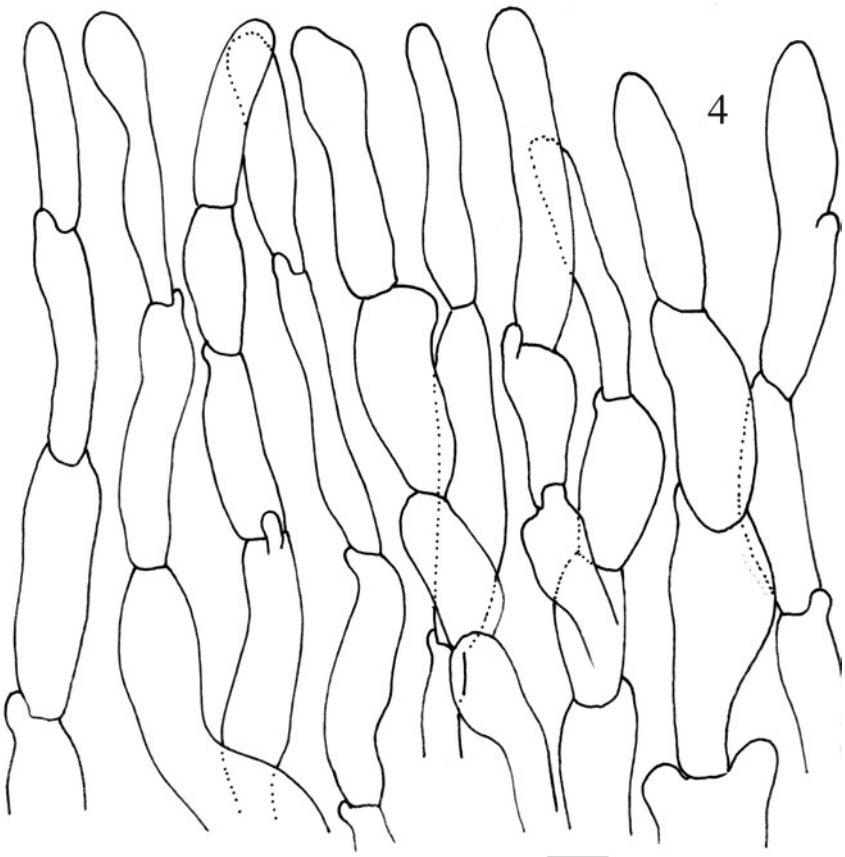
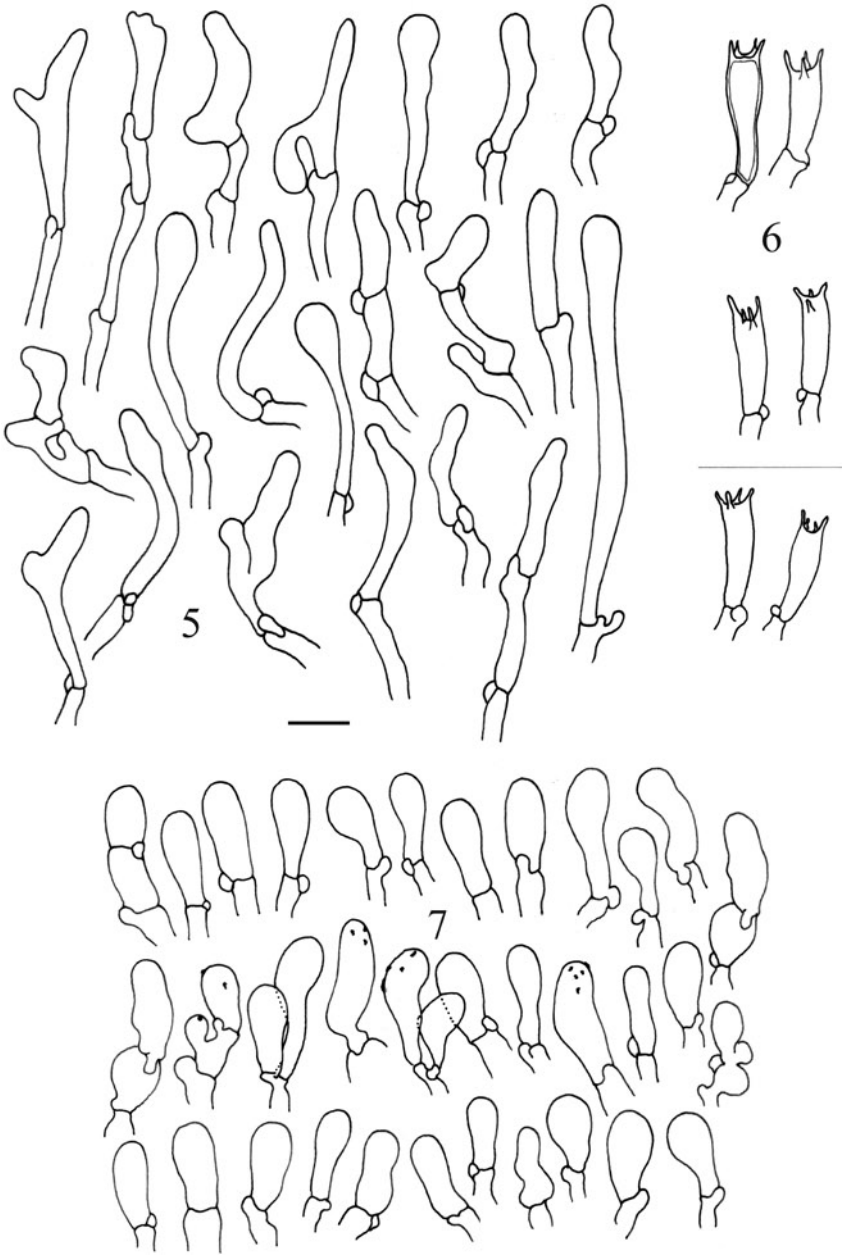


Fig. 4. – *Pseudobaeospora terrayi* (holotype): Terminal cells of hyphae in the centre of pileus. Bar 10 µm.

cal structures similar to that of *P. paulochroma* suggest a closer relationship of the latter two.

The more recently described *P. calcarea* (Clémençon & Ayer 2007) differs from all others of this group (including *P. terrayi*) by a negative reaction with KOH (no yellow discoloration) and the absence of clamp connections in most of the trama and pileipellis hyphae.

The unique character of *P. terrayi* are its cheilocystidia, which are somewhat basidioliform, but often broader and sometimes with distinctly thickened walls and/or incrusted surface. According to Bas (2003), and also in our type study of *P. paulochroma*, cheilocystidia were not observed in other white species of the genus. This character together with the differences mentioned above clearly delimits *P. terrayi* as a distinct species.



Figs. 5-7. – *Pseudobaeospora terrayi* (holotype): **5.** Caulocystidia. **6.** Basidia. **7.** Cheilocystidia. Bar 10 µm.

Tab. 1. – Selected micromorphological characters of *Pseudobaeospora* species of the group *Albidula*. All characters of *P. albida* and macrocharacters of *P. paulochroma* are adopted from the description by Bas (2003); microcharacters of the latter species are based on our type study. All characters of *P. calcarea* are according to the original description (Clémençon & Ayer 2007). Collections of *P. terrayi* are described based on our collections from two collecting sites: the type collecting site Svetlice and the second site, Vršatec.

Characters	***P. albidula***	***P. paulochroma***	***P. calcarea***	***P. terrayi* (Svetlice)**	***P. terrayi* (Vršatec)**
Pileus diam. (mm)	2–8	6–10	7–20	3–7	5–8
Colour of pileus	white to greyish white to buff	whitish with pale buff centre	chalky matt whitish and opaque	4A2, centre 4A3	5A2
Striation on pileus margin	not striated	not striated	not striated	not striated	not striated
Stipe size (mm)	14–30 × 0.1–0.6	11–15 × 0.7–1	15–35 × 1–4	15–30 × 0.5–0.8	12–18 × 0.5
Stipe colour	white to greyish-whitish, becoming pale ochraceous or somewhat pinkish-buff, with age brownish to reddish brown at base	pale brownish buff	pale grayish brown similar to the ground colour of the pileus, becoming darker brown towards the base when old	above 4A2 to 4B3 bellow 5C4 to 5D4	5B3–5C3
Lamellae number	11–17	19–24	ca. 16–28	11–18	ca. 16
Smell	± fungoid in one case	slightly unpleasant	indistinctive	slightly unpleasant in one collection	indistinct
Size (µm) of terminal pileipellis cells	26–45 × 11–19	23.5–47 × 5–8.5	20–45 × 4.5–7.5	26.5–45.5 × 4.5–7.5	26–48 × 4.5–10.5
Basal cell width (µm)	10–32	5–11	5–13	6–12	6–11
Colour reaction of pileipellis in 5% KOH	almost colourless to very pale brownish	yellow	pale greenish-yellow	pale yellowish-greenish	pale yellowish-greenish
Spore length (µm)	3.4–4.3	3.8–4.2	3.1–4.8	3.7–4.2	3.3–4.2
Spore width (µm)	2.9–3.5	3–3.2	2.5–3.4	2.8–3.1	2.5–3
Av. Q of spores	1.05–1.35	1.25–1.39	1.15–1.55	1.23–1.38	1.14–1.56
Cheilocystidia (µm)	absent	absent	absent	12.5–21.5 × 5–9	18–39 × 5.5–12.5
Caulocystidia (µm)	21–34 × 2–6.5	20–40.5 × 4–5.5	3–10 wide	18–36.5 × 4–7.5	21–37.5 × 4–5.5
Basidia (µm)	18–22 × 4–5.5	18–24 × 4.2–5.2	20–26 × 4–5	14–18 × 5–6	16.5–22 × 4.5–6.5

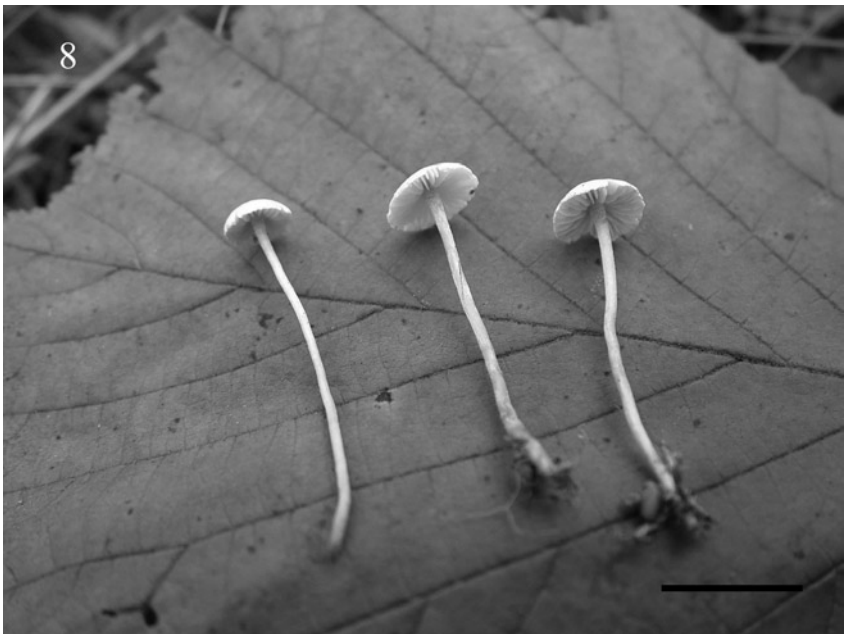


Fig. 8. – *Pseudobaeospora terrayi* (holotype): Basidiomata. Bar 1 cm.

Both known collection sites of *P. terrayi* have several similarities: their bedrock is flysch, they are extensively used as pastures with a demonstrably long history, they represent mesophilous grasslands, and the basidiomata grew at both sites in dense and high herbage with local abundance of *Fabaceae*. The plant community of the Vršatec site belongs to the alliance *Bromion erecti* Koch 1926 (Škodová *et al.* 2011), whereas the community at the type locality (Svetlice site) represents a species-rich grassland corresponding to the *Cynosurion cristati* Tüxen 1947 alliance (J. Terray, pers. comm.). These different herb compositions and the rather different altitude of the sampling sites suggest a relatively wide ecological amplitude of *P. terrayi*. Although *P. terrayi* is known only from two localities, the most similar *P. paulochroma* seems to differ also in ecology: it was collected on needle carpet under *Juniperus*.

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