

Remarks on taxonomy and ecology of *Dentipratulum bialoviesense* based on records from Boubínský prales virgin forest in the Czech Republic

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Two recent records of the rare fungus *Dentipratulum bialoviesense* from Boubínský prales virgin forest in the Czech Republic were documented morphologically and molecularly. One collection from the type locality, Białowieża virgin forest in Poland, was used for morphological comparison. The Boubínský prales collections agree with the Białowieża collection in macro- and micromorphological characters and ecology, namely their growth on decaying wood of *Picea abies* in natural forest. Simultaneously, Boubínský prales collections clearly differ in their ITS rDNA region from the only published *Dentipratulum* sequence based on a collection from France, originally identified as *D. bialoviesense* but currently representing a paratype of the recently described species *D. crystallinum*. Consequently, the Boubínský prales sequences most likely represent the first sequence data of *D. bialoviesense*. Notes on the taxonomy and ecology of *D. bialoviesense* and *D. crystallinum* are added, suggesting that the identity of all collections should be verified molecularly in future, especially those from wood of broadleaved trees in France. Photographs of dried basidiomata and key micromorphological characters of *D. bialoviesense* from Boubínský prales and Białowieża are provided.

Key words: Fungi, Basidiomycota, Russulales, Auriscalpiaceae, ITS rDNA, natural forests.

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Dva sběry vzácného druhu *Dentipratulum bialoviesense* z Boubínského pralesa jsou dokumentovány na základě morfologických a molekulárních dat. Pro srovnání je použit i jeden sběr z typové lokality, Bělověžského pralesa v Polsku. Boubínské sběry svými makroskopickými a mikroskopickými znaky a ekologií, konkrétně růstem na tlejícím dřevě smrku, odpovídají materiálu z typové lokality. Zároveň se ovšem výrazně liší v sekvenci ITS rDNA od jediné prozatím publikované sekvence rodu *Dentipratulum*, původně označené jménem *D. bialoviesense*, avšak získané ze sběru z Francie, který v současnosti představuje paratyp nedávno popsáného druhu *D. crystallinum*. Z toho vyplývá, že

naše sekvence s velkou pravděpodobností představují první publikované sekvence druhu *D. bialoviesense*. Jsou připojeny poznámky k taxonomii a ekologii druhů *D. bialoviesense* a *D. crystallinum*, které naznačují, že identita všech sběrů by měla být ověřena molekulárně, zejména v případě sběrů ze dřeva listnáčů z Francie. Jsou připojeny fotografie plodnic a klíčových mikroznaků *D. bialoviesense* z Boubínského a Bělověžského pralesa.

INTRODUCTION

Natural forests with a high amount of dead wood are key sites for lignicolous fungi (Heilmann-Clausen et al. 2017, Halme et al. 2017). In such habitats, this ecological group has a much higher diversity than in man-made forests. In Europe, one of the best examples is the hemiboreal Białowieża virgin forest in Poland and Belarus, hosting half of the total number of polypore species known from Europe (Karasiński et Wołkowycki 2015), a high number of corticioid species and other groups of wood-inhabiting fungi (Karasiński et al. 2009, 2010). In Central Europe, a well-documented mycological hotspot is e.g. Boubínský prales virgin forest in Czechia (Holec et al. 2015, Holec 2019, Holec et al. 2020, Holec et Kučera 2020), situated in the montane belt. In the lowlands, floodplain forests between the Morava and Dyje rivers in southern Moravia (Antonín et al. 2000) and along the Danube river in Slovakia (Tejklóvá et Zíbarová 2018, 2020) are comparable in the value of mycobiota. Such sites are usually refuges for extremely rare species.

One of them is undoubtedly *Dentipratulum bialoviesense* Domański, a resupinate fungus with a hydroid hymenophore and ornamented amyloid spores, described from the Białowieża forest (Domański 1965). This species, belonging to the *Auriscalpiaceae* subclade of the *Russulales* clade (Larsson et Larsson 2003, Larsson 2007, Zhou et Dai 2013), is currently only known from a few localities in Poland, France and Switzerland (Domański 1965, Boidin et Gilles 1990, Karasiński et Piątek 2016). In 2020, the first author found *D. bialoviesense* in Boubínský prales virgin forest. The species belongs to the rarest fungi of the locality. Its taxonomic delimitation has recently been narrowed due to the description of two similar species, *D. crystallinum* Karasiński and *D. khuranae* Karasiński & Piątek (Karasiński et Piątek 2016). For all these reasons, we publish the records here with comments on their morphological characters, DNA sequences, taxonomy, and ecology.

MATERIAL AND METHODS

Field and morphological study. *Dentipratulum bialoviesense* was found in 2020 during a repeated detailed study of huge Norway spruce (*Picea abies*) trunks in the Boubínský prales virgin forest first monitored in 2015 and

coded BPK on herbarium labels or BB in Holec et al. (2020). ID means trunk identification number in the tree database administered by the Silva Tarouca Research Institute for Landscape and Ornamental Gardening, Brno, Czech Republic. For habitat conditions and fungi of Boubínský prales virgin forest, see Holec et al. (2015) and Holec (2019). Wood decay stages 1–5 were estimated in accordance with Heilmann-Clausen (2001) and Holec et al. (2015, 2020). A collection from Białowieża virgin forest deposited in the PRM herbarium was additionally revised. As all studied basidiomata were originally considered a *Mucronella* species, no descriptions or photographs were unfortunately taken in the field. Therefore, the description of macromorphological characters is based on dried basidiomata observed under a stereomicroscope (magnifications 10–50×). Micro-morphological characters were studied in a 5% KOH solution with Congo Red and in Melzer's reagent. All structures were measured directly under a microscope (Olympus BX43) using an eyepiece micrometer. Spore size is presented as the main range (10–90 percentiles), flanked by limit values in parentheses, of all spores measured (20 measurements per collection). Q means quotient of length/width for each spore measured, Q_{av} average value per collection. Voucher specimens are kept in the National Museum, Prague, Czech Republic (herbarium PRM). Herbarium codes are according to Index Herbariorum (<http://sweetgum.nybg.org/science/ih/>).

Molecular methods. DNA from dried herbarium specimens was isolated using a Zymo Research Fungal/Bacterial Kit (Zymo Research, Orange, CA, USA). About 10 well preserved spines without obvious superficial alien fragments were separated for DNA extraction from both Boubínský prales specimens. The amplification and sequencing of the nuclear rDNA region ITS were performed as described in Holec et Zehnálek (2020). The Geneious 7.1.9 software (Biomatters, Auckland, New Zealand) was used to edit the generated sequences. The obtained sequences were combined with the sequence of *Dentipratulum crystallinum* (AF506389, deposited as *D. bialoviesense* in GenBank) and aligned using MAFFT algorithms contained in Geneious 7.1.9.

RESULTS AND DISCUSSION

Dentipratulum bialoviesense Domański, Acta Mycologica 1(6): 7, 1965

Figs. 1–3, 5

Holotype. Poland, Podlasie Province: Białowieża National Park, on rotten wood of fallen trunk of *Picea abies* in mixed forest, 6 Aug 1962 leg. S. Domański (KRAM F-SD 4001). Not studied by us.

Note: the current location of the holotype specimen (see Karasiński et Piątek 2016) differs from that given in the protologue (Domański 1965).

Description

Macromorphological characters. Not recorded for fresh basidiomata. In herbarium collections studied, basidiomata are represented by densely arranged subtle spines forming pale yellowish ochre aggregations which cover areas of wood up to 15 cm long and several cm wide. Individual spines 0.5–1.5(2) mm long and 0.06–0.15 mm wide, growing individually or in clusters of 2–10 ('glued' together as a consequence of drying?), unbranched, straight or slightly flexuose, principally cylindrical but with slightly attenuated basal part and more or less conically acute apex. Basal part \pm glabrous, ochre, glassy translucent. Fertile part representing about 90% of the overall length, opaque, creamy, white furfuraceous (magnification 50 \times). Subiculum almost invisible in dry state, but visible as finely granulose yellowish ochre covering on wood surface in best preserved parts (magnification 50 \times). For complete description of fresh basidiomata and subiculum, see Domański (1965).

Micromorphological characters. Hyphal system monomitic. No cells amyloid or dextrinoid except for amyloid basidiospores. Generative tramal hyphae 2–5 μ m wide, densely arranged, parallel, clamped. Gloeoplerous hyphae mostly frequent, rarely infrequent (Białowieża collection), 4–8(10) μ m broad, irregularly swollen and constricted. Gloeocystidia emerging from gloeoplerous hyphae in trama, ending in hymenium or slightly projecting, at places swollen and constricted, gradually broadened upwards, there 6–10 μ m wide, with obtuse, clavate or fusiform apex, often with protruding outgrowth 2–3 μ m broad which is cylindrical or constricted, usually flexuose. Leptocystidia absent. Hyaline hyphae protruding from the hymenium ('hyphidia') present in some collections, frequent, 1.5–3 μ m broad, cylindrical, flexuose, often constricted (but possibly representing the outgrowths of gloeocystidia described above). Basidia 18–24 \times 4.5–5.5 μ m, cylindrical with attenuated base, sometimes with slight median constriction, 4-spored, clamped, sterigmata up to 5 μ m long. Basidiospores of the same size in KOH and Melzer's reagent, 4–5.5(6.0) \times (3.5)3.7–5.0 μ m, subglobose to broadly ellipsoid, rarely almost globose, with small but distinct hilar appendix, slightly thick-walled (\pm 0.3 μ m), $Q = 1.05$ – 1.40 , $Q_{av} = 1.15$ – 1.19 ; variable in degree of development in each collection (Fig. 5a–c), in KOH most of them either a) hyaline and smooth, b) yellowish brownish and smooth, or c) yellowish brownish and finely verrucose with ornamentation protruding up to 0.3 μ m but up to 0.5 μ m in the Białowieża collection; in Melzer's reagent strongly amyloid, with blackish blue wall, a great portion of them deformed or collapsed, the non-deformed ones with a rounded or slightly multi-angled outline, probably an artefact caused by Melzer's reagent, ornamentation less distinct than in KOH and visible in very small portion of spores per collection; fully mature spores with one large oil droplet.



Fig. 1. *Dentipratulum bialoviesense*, extensive aggregation of spines, dried material, Białowieża virgin forest, wood of *Picea abies* (PRM 847259). For details, see Collections studied. Scale bar = 1 mm. Photo J. Holec.



Fig. 2. *Dentipratulum bialoviesense*, aggregation of spines, dried material, Boubínský prales virgin forest, wood of *Picea abies* (PRM 955252). For details, see Collections studied. Scale bar = 1 mm. Photo J. Holec.



Fig. 3. *Dentipratulum bialoviesense*, detail of spines, dried material, Boubínský prales virgin forest, wood of *Picea abies* (PRM 955252). For details, see Collections studied. Scale bar = 1 mm. Photo J. Holec.



Fig. 4. Boubínský prales virgin forest, decaying fallen trunk of *Picea abies* (BPK15 = BB15 = ID 104062) inhabited by *D. bialoviesense* (PRM 955252). Photo J. Holec.

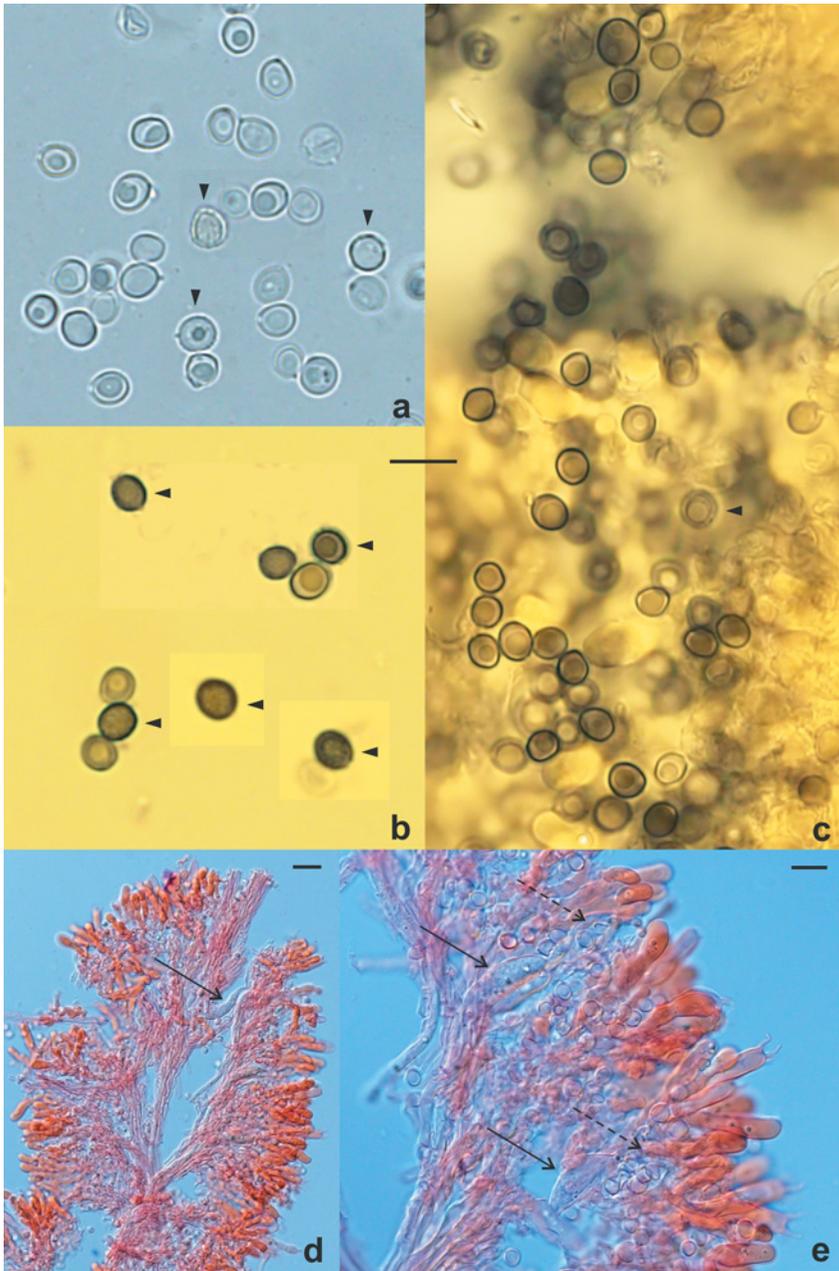


Fig. 5. *Dentipratulum bialoviesense*, Boubínský prales virgin forest, wood of *Picea abies* (PRM 955252), microcharacters. **a–c** – basidiospores in KOH (a) and Melzer's reagent (b, c), black triangles indicate spores with visible ornamentation; **d** – spine apex with trama, gloeocystidium (arrow) and hymenium; **e** – detail of subhymenium and hymenium with gloeocystidia (arrows) having a flexuose cylindrical outgrowth (dashed arrows). Scale bars = 10 μm (a–c, e), 20 μm (d). Photos J. Holec.

Tab. 1. Basidiospore characters in collections studied (in KOH).

Abbreviations: L – length, W – width, L10 – 10th percentile for length, L90 – 90th percentile for length (analogically for W). For other abbreviations, see Material and methods.

Collection	Lmin (µm)	L10 (µm)	L90 (µm)	Lmax (µm)	Wmin (µm)	W10 (µm)	W90 (µm)	Wmax (µm)	Qmin	Qav	Qmax	Hyaline, smooth (%)	Brownish, smooth (%)	Brownish, ornamented (%)
PRM 955234	4.0	4.0	5.0	5.2	3.5	3.7	4.5	4.7	1.05	1.15	1.30	70	10	20
PRM 955252	4.5	4.5	5.5	6.0	3.7	4.0	5.0	5.0	1.06	1.19	1.40	40	20	40
PRM 847259	4.5	4.5	5.5	6.0	3.8	3.8	4.5	5.0	1.10	1.19	1.33	50	10	40

DNA sequences

Two sequences of the ITS region of our specimens from Boubínský prales were generated and aligned with sequence AF506389 deposited in GenBank as *D. bialoviesense* and based on a collection from France. Recently, this collection became a paratype of *D. crystallinum* (Karasiński et Piątek 2016). Unfortunately, the paratype sequence generated by Larsson et Larsson (2003) does not contain the ITS1 region. Therefore, the part of ITS available for comparison with our sequences contained 5.8S and ITS2 regions and resulted in a 356 base pairs long sequence. The sequence of *D. crystallinum* had nearly 9% different positions (Tab. 2). Such a great difference confirms that our ITS sequences represent another species, most probably *D. bialoviesense* sensu Karasiński et Piątek (2016). Unfortunately, a molecular comparison of the Boubínský prales samples with material from Białowieża virgin forest, the type locality of *D. bialoviesense*, was not possible. Although the Białowieża specimen available to us (PRM 847259) was not collected very long ago (in 1973), the combination of slight and fragile basidioma with supposed desiccation by too high temperatures has made it impossible to obtain sequence data (although attempted two times, for the second time with a slightly optimised protocol). Similarly, M. Piątek, co-author of the recent *Dentipratulum* study (Karasiński et Piątek 2016), informed us (pers. comm., March 2021) that it had been impossible to obtain sequence data from the holotype of *D. bialoviesense* in the molecular laboratory of the W. Szafer Institute of Botany, Kraków.

Tab. 2. Comparison of an incomplete ITS region of available *Dentipratulum* sequences.

Voucher	GenBank access. no.	Source	Differences in sequence of <i>D. crystallinum</i> when compared to <i>D. bialoviesense</i>	
PRM 955234 (JH 217/2020), <i>D. bialoviesense</i>	MW900164	This study	Substitution 25/356 positions ~ 7%	Insertion/deletion 6/356 positions ~ 1.7%
PRM 955252 (JH 269/2020), <i>D. bialoviesense</i>	MW900165	This study		
GB 0069354 (GG 1645), <i>D. crystallinum</i> , paratype	AF506389	Larsson et Larsson (2003)		

Collections studied

Czech Republic. Bohemian Forest, near the village of Zátoň close to Volary, **Boubínský prales** National Nature Reserve, fenced core area: segment BP1e (Holec et al. 2015: 163, 165), 1010 m a.s.l., montane virgin forest (*Picea abies*, *Fagus sylvatica*, *Abies alba*), *Picea abies*: fallen trunk (BPK13 = BB13 = ID 104298, see Holec et al. 2020), diameter at breast height 110 cm, medium decay stage, trunk exterior distinctly decayed, soft, bark cover 0%, moss cover 50%, *D. bialoviesense* found in its upper (thinner) part, on lateral side, on wood of decay stage 3, 8 Oct 2020 leg. et det. J. Holec, JH 217/2020 (PRM 955234). – Ibid., 1020 m a.s.l., *Picea abies*: fallen trunk (BPK15 = BB15 = ID 104062), diameter at breast height 100 cm, advanced decay stage, trunk strongly decayed, starting to lose its original shape, bark cover 0%, moss cover 70%, *D. bialoviesense* found in its lower (thicker) part, on lateral side, on wood of decay stage 4, 8 Oct 2020 leg. et det. J. Holec, JH 269/2020 (PRM 955252).

Poland. Podlasie Province, **Białowieża** virgin forest, strict zone of the National Park, forest section 369 (forest section identical to that of specimen KRAM F-53646 cited in Karasiński et Piątek 2016: 111 but collected by Z. Pouzar, i.e. another collector than in the case of PRM 847259), on fallen trunk of *Picea abies*, 27 Aug 1973 leg. V. Holubová, det. Z. Pouzar as *Mucronella* sp., rev. J. Holec as *D. bialoviesense* (PRM 847259, collection from type locality of *D. bialoviesense*).

Other species found in 2020 on trunks inhabited by *D. bialoviesense*

BB13: 55 species in total; rare corticioid fungi: *Athelopsis subinconspicua*, *Globulicium hiemale*, *Hyphoderma cremeoalbum*, *Hyphoderma involutum*, *Hyphodontia curvispora*, *Laurilia sulcata*; other rare fungi: *Amylocystis lapponica*, *Arrhenia epichysium*, *Galerina pruinatipes*, *Gymnopilus bellulus*, *Musumecia vermicularis*, *Mycena laevigata*, *Phellinus nigrolimitatus*, *Pseudorhizina sphaerospora*.

BB15: 21 species in total; rare corticioid fungi: *Hyphoderma cremeoalbum*, *Hypochnicium albostramineum*; other rare fungi: *Mycena clavata*, *Mycena laevigata*, *Phellinus nigrolimitatus*.

Notes on taxonomy

The appearance of the basidiospores was found to be very variable in each of the collections studied. This is probably due to the different degree of development of individual spores. In 5% KOH, about half of them (but also more, see Tab. 1) were smooth and hyaline with a slightly thickened wall (Fig. 5c). Other spores had a thicker wall, which was pale yellowish brownish, but looked smooth under the light microscope. Such spores usually reached the largest size. Only part of the spores (usually those ‘swimming’ in the microscopic mount, i.e. separated from the hymenophore) was fully developed, with a thick, yellowish brownish wall and finely verrucose ornamentation (Fig. 5a, b). The ornamentation was hardly visible from above, at most like small ‘dots’. It was better seen when focused exactly on the spore outline which looked finely dentate from protruding verrucae up to 0.3(0.5) μm high. Interestingly, the ornamentation was less visible in Melzer’s reagent. As the spore wall was distinctly amyloid, this suggests that the ornamentation covering it (and better visible in KOH or in SEM, see Karasiński et Piątek 2016) is formed by a substance reacting less intensely with Melzer than the wall itself. In the best developed spores, a pale bluish ‘halo’ around the spore surface embedding the more bluish verrucae was rarely seen (Fig. 5b).

The studied collections from Boubínský prales and Białowieża are very similar in appearance and micromorphological characters. They originate from the same substrate, namely decaying wood of *Picea abies*. Although the two localities clearly differ in vegetation (see Ecology section below), they are comparable in terms of high naturalness and presence of numerous fungi with a boreal-montane type of distribution, e.g. *Amylocystis lapponica*, *Perenniporia subacida*, *Phellinus ferrugineofuscus*, *Skeletocutis odora* (see e.g. Holec et al. 2015, Karasiński et Wołkowycki 2015). For reason of high similarity in morphology, substrate and some habitat conditions, we consider the collections from these two localities conspecific, representing *D. bialoviesense*.

Some records previously referred to as *D. bialoviesense* (e.g. by Boidin et Gilles 1990) currently represent *D. crystallinum* Karasiński (Karasiński et Piątek 2016). This concerns two collections mentioned in the protologue of *D. crystallinum*, namely those from the Kuril Islands in the Russian Far East (on a fallen trunk of *Betula ermanii*, leg. E. Parmasto, TAAM 12993; holotype of *D. crystallinum*) and the Landes department in France (Carcen-Ponson, alt. 30 m, on wood of *Salix atrocinnerea*, 21 Sep 1979 leg. G. Gilles, GG 1645; paratype). *Dentipratulum crystallinum* differs from *D. bialoviesense* “by having slightly narrower basidiospores ornamented with larger and more scattered warts visible in SEM, and presence of cylindrical, hyphoid, often projecting leptocystidia, obtuse at the apex, basally clamped, more or less covered with crystalline matter” and in being an “inhabitant of decayed wood of deciduous trees” (Karasiński et Piątek 2016).

The sequence from the *D. crystallinum* paratype (GG 1645, currently kept in Göteborg under GB 0069354) clearly differs from our sequences obtained from two Boubínský prales collections (see DNA section). This fact confirms that *D. crystallinum* is a separate species. As shown above, the collections from Boubínský prales and Białowieża kept in PRM correspond to the recent narrow concept of *D. bialoviesense* (Karasiński et Piątek 2016). Consequently, the Boubínský prales sequences (Tab. 2) most likely represent the first sequence data of *D. bialoviesense*. Unfortunately, sequencing of both the Białowieża collection in PRM and the holotype in KRAM was unsuccessful (see DNA section).

***Dentipratulum bialoviesense* and *D. crystallinum* in the light of DNA analysis and ecology**

The genus *Dentipratulum* was described as monotypic (Domański 1965). Currently, three species are recognised according to morphological characters (Karasiński et Piątek 2016). Only three *Dentipratulum* collections have been sequenced (Larsson et Larsson 2003; this paper) documenting the existence of two distinct entities, corresponding to *D. crystallinum* (French collection from wood of *Salix atrocinnerea*) and, most probably, *D. bialoviesense* (Boubínský prales

collections from wood of *Picea abies*). Both species seem to be very distant molecularly (see DNA study). However, more sequence data are needed for robust phylogeny.

In SW France, there is an aggregation of several *Dentipratulum* records (Boidin et Gilles 1990, Karasiński et Piątek 2016, Martini 2021), all of them from wood of deciduous trees. The region comprises the departments of Pyrénées-Atlantiques and Landes, north of the Pyrenees and not far from the Atlantic Ocean (Bay of Biscay). For comments on these records, see below.

1. The record close to the village of Bonnut at about 100 m a.s.l. is from wood of *Quercus robur* (LY 15557), that from Oloron-Saint-Pée at about 250 m a.s.l. from wood of an unidentified deciduous tree, possibly *Salix* (LY 12010). Both of them were revised by Karasiński et Piątek (2016) as *D. bialoviesense*.
2. The record from Landes (Carcen-Ponson, 30 m a.s.l., on wood of *Salix atrocinnerea*, 21 Sep 1979 leg. G. Gilles 1645) has become a paratype of *Dentipratulum crystallinum* (Karasiński et Piątek 2016). It clearly differs molecularly from *D. bialoviesense* (Tab. 2).
3. The record from Buglose at about 50 m a.s.l. reported by Boidin et Gilles (1990: GG 514) is from decayed wood of *Alnus glutinosa*. Martini (2021) studied another specimen by G. Gilles from Landes, namely close to Pontoux-sur-l'Adour at about 50 m a.s.l., collected on lying decayed wood also of *Alnus glutinosa* (GG 188). These two collections were not revised by Karasiński et Piątek (2016) and could represent either *D. bialoviesense* or *D. crystallinum*. However, E. Martini informed us (pers. comm., 2 March 2021) that “after re-examination, the collection GG 188 is not well in agreement with *D. bialoviesense* and neither with *D. crystallinum*, and it may be a cryptic species”.

It is striking that in a rather small and ecologically homogeneous region of SW France (oceanic area with broadleaved forests and mild climate) there are two species of the rare *Dentipratulum* genus, one of them verified morphologically and molecularly (*D. crystallinum*), the other one morphologically (*D. bialoviesense*). This occurs in the situation where typical *D. bialoviesense* (see this paper) is known from coniferous wood (*Picea abies*) in a hemiboreal forest (Białowieża) and a montane forest (Boubínský prales) in regions with a more continental climate (Poland, Czechia). The difference in ecology is considerable and offers the hypothesis that French records from deciduous wood represent separate species than the Białowieża and Boubínský prales materials collected on coniferous wood. Another possible explanation is that *Dentipratulum* species are simply moisture-demanding species, which is a condition met in Central European virgin forests as well as in the oceanic conditions of western France or mountain valley in Switzerland. Finding two species in SW France can also be caused by the intensive work of G. Gilles. In our opinion, all existing *Dentipratulum* collections

should be sequenced, including new attempts to obtain DNA from the old Białowieża collections (or future records from this locality). Subsequent comparison could help to understand species limits and ecological preferences in *Dentipratulum* better.

Ecology of *Dentipratulum bialoviesense*

Owing to the taxonomic ambiguities summarised above, this section is limited to the Central European records from coniferous wood studied by us and includes a short note on a montane Swiss record.

Czech Republic. The Czech records come from one of the best preserved montane virgin forests of Central Europe, the Boubínský prales National Nature Reserve in the Bohemian Forest, protected since 1858. Its core area (47 ha), where *D. bialoviesense* grows, has never been affected by forestry interventions (Vrška et al. 2012). It is predominantly composed of *Fagus sylvatica*, *Picea abies*, *Abies alba* and hosts rich mycobiota of more than 800 species including many rarities, especially those preferring natural forests (Holec et al. 2015, Holec 2019). Some of these species were also found on the two fallen trunks of *Picea abies* inhabited by *D. bialoviesense*, especially on BB13 (see above). The trunks were in medium and advanced stages of decay (3, 4), had diameters of 110 and 100 cm (thus, large ones) and a moss cover of 50 and 70%, respectively. Basidiomata were found on their lateral sides, once in the upper (crown) part, the second time in the lower (basal) half (Fig. 4). The species was not found on these trunks during detailed monitoring in 2015 (Holec et al. 2020). The years 2020 and 2015 clearly differed in precipitation. The total annual precipitation in 2015 was 678 mm but 941 mm in 2020. The average value for the period 2011–2020 was 881 mm (data from the nearest climatic station Kubova Huť, only 3 km WNW; kindly provided by Michal Žák, Czech Hydrometeorological Institute). It shows that the 2015 precipitation was deep below average while 2020 above average with high precipitation from June to August, which may have caused the fructification of *D. bialoviesense* in October 2020. It is obvious that the species is extremely rare in Boubínský prales, as it has never been found there during previous research lasting more than hundred years (see Holec et al. 2015). Simultaneously, it was not found on dozens of *Picea abies* trunks monitored by J. Běťák in 2020 (Běťák, pers. comm., spring 2021) although he collected and revised numerous specimens identified preliminarily as *Mucronella*.

Poland. The records from the type locality, Białowieża National Park (Domański 1965), are comparable with those from Boubínský prales in terms of habitat naturalness (virgin forest) but differ considerably in habitat. Białowieża is a hemiboreal lowland forest predominantly composed of *Carpinus betulus*, *Quercus robur*, *Tilia cordata*, *Fraxinus excelsior* and *Picea abies* (Faliński

1986). *Dentipratulum* grows there on fallen decaying trunks of *Picea abies* (Domański 1965, Karasiński et Piątek 2016). Except for the first collector, the famous Polish mycologist Stanisław Domański, the fungus was collected there also by Czech mycologists Zdeněk Pouzar and Věra Holubová-Jechová in 1973. Pouzar identified the records as *Mucronella* sp. The true identity was recognised much later by Karasiński et Piątek (2016), who studied Pouzar's collection in the Kraków herbarium (Karasiński et Piątek 2016: KRAM F-53646). Another record from the same locality and the same day (PRM 847259) was revised by us. It is interesting that the species in Białowieża forest was only found on wood of *Picea abies*, although numerous broadleaved tree species are present here, among them *Quercus robur*, *Alnus glutinosa* and *Salix* spp., i.e. trees on which *Dentipratulum* species were recorded in France (Boidin et Gilles 1990, Karasiński et Piątek 2016, Martini 2021). *Dentipratulum bialoviesense* is certainly also very rare in Białowieża (similarly to Boubínský prales) as it has not been collected recently in spite of intensive research (see Introduction). Another possibility is that it is present in mycelial form but fructifies rarely. If basidiomata are found, they should be sequenced immediately to have a reference sequence from the type locality.

Switzerland. The locality in the Bernese Alps (close to the village of Les Diablerets, path to Lac Retaud lake, 1300 m a.s.l., 26 Aug 1993 leg. M. Meyer, LY 15613) has clearly a montane character. Unfortunately, the vegetation and exact substrate is not indicated. The collection was revised by Karasiński et Piątek (2016) as *D. bialoviesense* s. str. As mentioned above, a molecular revision is needed.

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