

Two new species of the genus *Dendrothele* (*Corticaceae*) from the Czech Republic

ZDENĚK POUZAR¹ and FRANTIŠEK KOTLABA²

¹Nad Královskou oborou 23, 170 00 Praha 7, Czech Republic

²Na Petřinách 8, 162 00 Praha 6, Czech Republic

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Two new species of the genus *Dendrothele* – *D. salicicola* and *D. bisporigera* – are described. Both species occur on bark of especially old, living arborescent willows (*Salix alba* and *S. fragilis*) in Bohemia (Czech Republic). *Dendrothele salicicola* is characterised by tetrasterigmatic basidia with indextrinoid walls, slightly bent sterigmata and the presence of hyphidia; it is presently known from 29 localities and 7 microlocalities. *D. bisporigera* is chiefly characterised by bisporic basidia with dextrinoid walls, the special spores shape and content as well as by the absence of hyphidia and cystidia; it has been found at two localities to date.

Key words: Basidiomycota, *Corticaceae*, *Dendrothele*, description, taxonomy, ecology, Bohemia, Czech Republic.

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Jsou popsány dva nové druhy kornatců z rodu *Dendrothele* – *D. salicicola* a *D. bisporigera*. Oba druhy rostou na kůře zejména starých živých stromovitých vrb (vrby bílé a vrby křehké). Druh *D. salicicola* se vyznačuje čtyřvýtrusnými bazidii s nedextrinoidní stěnou, lehce prohnutými sterigmaty a přítomností hyfidií; v současnosti je známý z 29 lokalit a 7 mikrolokalit. *D. bisporigera* je význačná dvouvýtrusnými bazidii, rovnými sterigmaty, zvláštním tvarem a obsahem výtrusů, jakož i chyběním hyfidií a cystid; dosud je známa pouze ze dvou lokalit.

INTRODUCTION

During the past years we focused our attention on a study of Czech (and partly of Slovak) species of the genus *Dendrothele* Höhn. et Litsch. These are inconspicuous macromycetes forming resupinate, perennial, very thin, mostly white coloured carpophores, which grow saprotrophically on cracked bark of various old and/or middle-aged trees, predominantly on living ones; they occur most frequently in the shade, i.e. on north, north-east or north-west facing parts of trunks. In the course of these studies we encountered two species which we have not been able to identify with any known species – in spite of using appropriate literature (e.g. Bernicchia 1990; Boidin et al. 1996; Duhem and Michel 2007; Eriksson

and Ryvarden 1975; Gorjón and Bernicchia 2010; Nakasone 2005, 2008, 2009; Piątek 2001). For this reason we consider them to be new to mycology, and therefore we describe them here.

In the past decade, there has been renewed interest in *Dendrothele* species in Europe. Pouzar (2001) reported that there were nine species of *Dendrothele* in central Europe (including the new species *D. wojewodae*). In the same year, Piątek (2001) searched the literature and found 12 species occurring throughout Europe. Later, Duhem and Michel (2007) described two new species, *D. jacobi* Duhem et H. Michel from the United States and *D. minima* Duhem from France. Recently, Gorjón and Bernicchia (2010) described and illustrated 12 *Dendrothele* species from Europe, which is very similar to Piątek's (2001) list. This is twice as many species as reported by Eriksson and Ryvarden (1975) from North Europe and Bernicchia (1990) from Italy.

MATERIAL AND METHODS

For the study of *Dendrothele* species we used our own finds mostly from the surroundings of Praha (Prague), but also from South Bohemia, on the one hand, and specimens from the herbarium of the Mycological Department, National Museum, Prague (PRM), where a rich collection of these fungi is deposited, on the other hand. For this article we have taken in consideration only collections from the territory of Bohemia (Czech Republic). All collections were carefully analysed under a microscope (using Melzer's reagent). The results are presented below.

RESULTS

***Dendrothele salicicola* Pouzar et Kotl., spec. nov.**

Diagnosis latina. Carposomata 0,1–1,6(–2,2) × 0,1–1 cm, resupinata, per-tenua, laeves, rotundata, elongata vel irregularia, alba usque cretacea; systema hypharum monomiticum, hyphae basales 1–3 µm latae, fibulatae, cum pariete tenui, haud dextrinoideae; basidia 17–37 × 6–9 µm, cylindrica, in parte media leviter constricta, cum pariete haud dextrinoidea, tetrasterigmatica, sterigmata leviter curvata, 8–11 µm longa; sporae 9–11,5 × 5,5–7,5(–8) µm, ellipsoideae, satis crassitunicatae, laeves, inamyloideae et indextrinoideae; dendrohyphidia 35–41 × 0,8–2,2 µm, cystidia absentia.

Habitat. Ad corticem arborum vivarum vetustorum *Salicis albae* (incl. cv. 'Tristis') et *S. fragilis*.

Holotypus. Praha 5-Jinonice, Bohemia centralis: in valle “Prokopské údolí” dicto, pars superior ap. Nová Ves; *Salix fragilis* – ad corticem trunci vivi 28. XI. 2009 F. Kotlaba legit; depositus in herbario Musei nationalis Pragae (PRM 859601); dupl. in CFMR, Madison, USA.

Description. Carpophores 0.1–1.6(–2.2) × 0.1–1 cm, resupinate, very thin, smooth, rounded, elongated or irregular (these especially in chinks of the bark), white to cretaceous, with sharp limited margin, finely pruinose when fertile. Hyphal system monomitic with clamped, rather thin-walled, 1–3 µm broad generative hyphae, sometimes with tiny hyaline crystals among hyphae. Dendrohyphidia 35–41 µm long and 0.8–2.2 µm broad, straight, thin-walled, not incrustated, from the half upwards shortly branched; cystidia absent. Basidia 17–37 × 6–9 µm, cylindrical to barrel-shaped, in the lower part narrowed, in the central part slightly constricted, thin-walled, with indextrinoid and acyanophilous walls, tetrasterigmatic with slightly bent sterigmata, 8–11 × 1.7–2.5 µm. Spores 9–11.5 × 5.5–7.5(–8) µm, mostly ellipsoid, some slightly narrowed to the prominent apiculus, smooth, rather thick-walled, only weakly or not cyanophilous (especially collapsed spores), inamyloid and indextrinoid.

Ecology. Growing solely on bark of standing old and/or middle-aged trunks (quite exceptionally on younger trees – then only at the base) of living arborescent willows – on *Salix alba* (including cv. “Tristis”) and *S. fragilis* – occurring along rivers and streams as well as on pond banks and in wetlands.

Distribution. In Bohemia *Dendrothele salicicola* occurs rather abundantly – it is presently known from at least 29 localities and 7 microlocalities, chiefly in central Bohemia. This species may be also found on other species of willow and at other localities not only in the Czech Republic, but also in other countries, especially in Europe.

It is interesting that this species occurs at some localities in Bohemia very sporadically with just a few carpophores but at other localities with abundant carpophores, in some cases – especially on leaning trunks – they are dispersed even over a length of 3–4 m (for instance locality Divoká Šárka, site short of “Soutěska” – see below).

As regards the altitude of the presently known localities of *Dendrothele salicicola*, the lowest locality is situated at 180 m above sea level (Máslovice N of Praha), the highest one at 600 m alt. (Hostišov S of Votice). We can conclude that this species occurs in Bohemia only in the planar and colline belts (further research may in future render new localities, which might change our knowledge of its altitudinal distribution).

Material studied

At the quoted localities *Dendrothele salicicola* was collected on old and/or middle-aged trunks of mostly living trees (with only two exceptions); for this reason it is not noted below. – All data on the la-

bels of the collections in the PRM herbarium cited are written in Latin; here we have translated them into English. – Our names are shortened as Z.P. and F.K. Note. We consider localities of macromycetes to be different, if they are situated at a distance of at least 0.5 km from each other; if the distance is less than 0.5 km, they are considered to be microlocalities (we then use the Latin abbreviation „ibid.“ in our text).

Šlapanice N of Zlonice near Slaný, bank of “Vranský stream” in the village, *Salix fragilis*, 17. VI. 2010 leg. F.K., det. F.K. et Z.P. (PRM). – Beroun SW of Praha, at the railway-station, *S. fragilis*, 5. VI. 2010 leg. F.K., det. F.K. et Z.P. (PRM 859702). – Srbsko near Beroun, by chapel (anno 1755) in the village, *S. alba* ‘Tristis’, 5. VI. 2010 leg. F.K., det. F.K. et Z.P. (PRM 859704). – Srbsko near Beroun, bank of the Berounka river near the railway-station, *S. alba*, 5. VI. 2010 leg. F.K., det. F.K. et Z.P. (PRM 859703). – Máslovice N of Praha, bank of “Máslovický stream”, c. 0.5 km from the Vltava river, *Salix alba* cv. ‘Tristis’ (PRM 859621) and *S. fragilis* (PRM 859624), both 31. III. 2010 leg. F.K., det. F.K. et Z.P. – Brandýs n. L.-Stará Boleslav NE of Praha, by road c. 200 m SE of Hluchov Nature Reserve, *S. alba* ‘Tristis’ (PRM 859673) and *S. fragilis* (PRM 859674), both 7. IV. 2010 leg. F.K., det. F.K. et Z.P. – Brandýs n. L.-Stará Boleslav NE of Praha bank of the Labe river c. 0.75 km S of the Hluchov Nature Reserve, *S. fragilis*, 7. IV. 2010 leg. F.K., det. F.K. et Z.P. (PRM 859675). – Roztoky N of Praha, Tiché údolí Nature Monument, bank of “Únětický stream”, *S. alba*, 14. XI. 2009 leg. F.K., det. F.K. et Z.P. (PRM 859617). – Břve W of Praha, eastern bank of “Břevský pond”, *S. fragilis*, 30. X. 2009 leg. F.K., det. F.K. et Z.P. (PRM 859607); *ibid.*, bank of nameless stream between the “Břevský and Litovický ponds”, *S. fragilis*, 30. X. 2009 leg. F.K., det. F.K. et Z.P. (PRM 859611). – Hostivice W of Praha, south-eastern bank of “Litovický pond”, *S. alba* ‘Tristis’, 30. X. 2009 leg. F.K., det. F.K. et Z.P. (PRM 859612); *ibid.*, western margin of a marsh called “Chobot”, *S. fragilis*, 21. X. 2001 leg. et det. Z.P. (PRM 847409); *S. fragilis*, 30. X. 2009, leg. F.K., det. F.K. et Z.P. (PRM 859606). – Praha 6-Jenerálka, bank of “Šárecký stream”, *S. alba*, 9. XI. 2009 leg. F.K., det. F.K. et Z.P. (PRM 859610). – Praha 6-Šárka, Divoká Šárka Nature Reserve, next to site called “Soutěska”, bank of “Šárecký stream”, *S. fragilis*, 4. XI. 2009 leg. F.K., det. F.K. et Z.P. (PRM 859613); *ibid.*, “Soutěska”, bank of “Šárecký stream”, *S. alba*, 4. XI. 2009 leg. F.K., det. F.K. et Z.P. (PRM 859607, 859615). – Praha 6-Hor. Liboc, small alder marsh at the foot of Obora Hvězda Nature Monument, *S. alba* ‘Tristis’, 7. XI. 2009 leg. F.K., det. F.K. et Z.P. (PRM 859602); *ibid.*, on a dead trunk of *S. alba* ‘Tristis’, 7. XI. 2009 leg. F.K., det. F.K. et Z.P. (PRM 859608). – Praha 5-Motol, near junction of Plzeňská and Kukulova Streets, *S. fragilis*, 30. XI. 2009 leg. F.K., det. F.K. et Z.P. (PRM 859603); *ibid.*, by “Motolský stream”, *S. fragilis*, 30. XI. 2009 leg. F.K., det. F.K. et Z.P. (PRM 859604); *ibid.*, dam of “Motolské koupaliště pond”, *S. fragilis*, 30. XI. 2009 leg. F.K., det. F.K. et Z.P. (PRM 859614). – Praha 5-Jinonice, bank of “Prokopský stream” above Nová Ves, *S. fragilis*, 28. XI. 2009 leg. F.K., det. F.K. et Z.P. (PRM 859601, 859605, 859622). – Praha 5-Řeporyje, bank of “Dalejský stream” near Ebrova Str., *S. fragilis*, 26. XI. 2009 leg. F.K., det. Z.P. ut *D. acerina*, rev. 25. 3. 2010 Z.P. (PRM 917366). – Praha 14-Hloubětín, south-eastern bank of “Kyjský pond”, *S. fragilis*, 9. XII. 2009 leg. F.K., det. F.K. et Z.P. (PRM 859617). – Praha 15-Hostivař, bank of nameless stream near the confluence with “Botič” stream close to playground of TJ Hostivař, *S. fragilis*, 12. III. 2010 leg. F.K., det. F.K. et Z.P. (PRM 859618). – Praha 15-Hostivař, bank of nameless stream above basin N of Plukovníka Mráze Str., *S. fragilis*, 12. III. 2010 leg. F.K., det. F.K. et Z.P. (PRM 859620). – Praha 11-Šeberov, near “Šeberovský (Mlýnský) pond”, *S. fragilis*, 9. III. 2010 leg. F.K., det. F.K. et Z.P. (PRM 859619). – Praha 11-Újezd, bank of pond called “Sukov”, *S. fragilis*, 14. IV. 2010 leg. F.K., det. F.K. et Z.P. (PRM 859670). – Praha 22-Uhřetěves, bank of “Říčanský stream” in Obora Nature Monument, *S. alba*, 17. III. 2010 leg. F.K., det. F.K. et Z.P. (PRM 859623). – Průhonice SE of Praha, bank of “Botič stream” at northern boundary of the village, dead trunk of *S. fragilis*, 11. XI. 2009 leg. F.K., det. F.K. et Z.P. (PRM 859600, together with *Dendrothele bisporigera*). – Dol. Břežany S of Praha, bank of “Mlynářský pond”, *S. fragilis*, 9. IX. 2010 leg. F.K., det. F.K. et Z.P. (PRM 859672); *ibid.*, bank of “Břežanský stream”, same host tree, date etc. (PRM 859671). – Bystrice S of Benešov, by main road c. 1.5 km N of the village near a small stream, *S. fragilis*, 29. V. 2010. leg. F.K., det. F.K. et Z.P. (PRM 859700). – Hostišov S of Votice, below road junction Hostišov-Neustupov, *S. fragilis*, 10. VI. 2010 leg. F.K., det. F.K. et Z.P. (PRM). – Kakovice NW of Čimelice near Písek, *S. fragilis*, 8. VIII. 1963 leg. et det. M. Svrček ut *Dendrothele griseocana* ?, rev. 16.2. 2004 and 26.9. 2007 Z.P. (PRM 612910). – Tábor, bank of “Jordán pond”, western bay E of “Zimní stadion”, *S. fragilis*, 9.



Fig. 1. *Dendrothele salicicola* carpophores on living trunk of *Salix fragilis*. Praha 6, Divoká Šárka Nature Reserve, site next to "Soutěska", 17. VI. 2010 (PRM). Photo by F. Kotlaba.

VI. 2010. leg. F.K., det. F.K. et Z.P. (PRM). – Hlavatce E of Bechyně, by a pond in the village, *S. fragilis*, 30. IV. 2010 leg. F.K., det. F.K. et Z.P. (PRM 859701). – Debrník W of Soběslav, northern boundary of the village, *S. fragilis*, 9. VI. 2010 leg. F.K., det. F.K. et Z.P. (PRM).

Notes. We can not exclude that *D. salicicola* was described already 166 years ago as *Thelephora calcea* b. *salicina* (Rabenhorst, Deutschlands Cryptogamen-Flora 1: 387, n. 2934, 1844), but we do not know if any type material exists. The PRM herbarium contains an exsiccate by de Thümen under the name *Corticium calceum* var. *salicinum* (Bohemia sept.: Bodenbach, in *Salicis albae* cortice, rarissime, hieme 1873 ipse legit; de Thümen, Fungi austriaci 923, PRM 650497). Unfortunately, the carpophores are completely sterile. Nevertheless, the specific name *salicinum* or *salicina* for the fungus under discussion has never been published on the level of species.

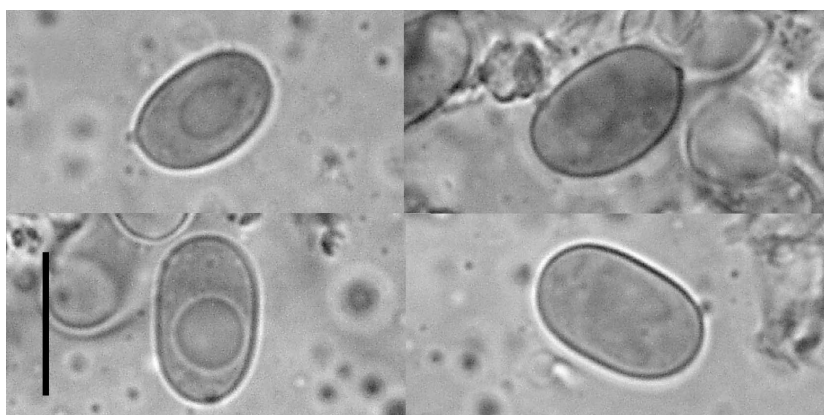


Fig. 2. *Dendrothele salicicola* – spores. Hostivice W of Praha, *Salix fragilis*, 30. X. 2009 (PRM 859606). Scale bar = 10 μ m. Microphoto by J. Holec.

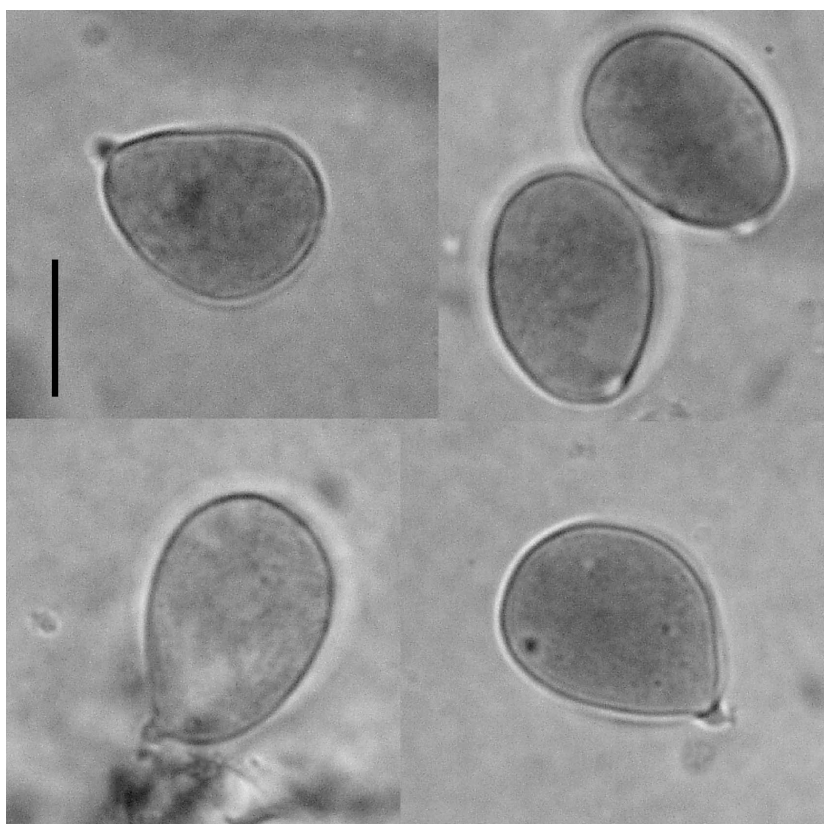


Fig. 3. *Dendrothele bisporigera* – spores. Průhonice SE of Praha, *Salix fragilis*, 11. XI. 2009 (PRM 856600). Scale bar = 10 μ m. Microphoto by J. Holec.

Dendrothele salicicola is evidently closely related to *D. commixta* (Höhn. et Litsch.) P.A. Lemke, which however differs in having mostly bisterigmatic (rarely tristerigmatic) basidia. These two species are characterised by indextrinoid basidia, the presence of dendrohyphidia and thick-walled, consistently inamyloid spores.

***Dendrothele bisporigera* Pouzar et Kotl., spec. nov.**

Diagnosis latina. Carposomata 1–8 × 1–6 mm, resupinata, pertenua, alba usque cremea, laevia, rotundata, elongata vel irregularia; systema hypharum monomiticum cum hyphis 2–2,5 µm latis, compactis, fibulatis, hyalinis, cum pariete tenui, haud dextrinoidea, haud amyloidea; basidia 36–55(–60) × 9–11 µm, bisterigmatica, cylindracea, haud constricta, pariete in senectute dextrinoidea; sterigmata recta, juvenes cylindrica, matura conica, 16–22 µm longa et 4–5 µm lata (in parte basali); spora 12,5–18,5 × 10–13 µm, ovoideae, versus apiculum attenuatae, cum pariete laeviter crassitunicato, hyalino, haud dextrinoideo et haud amyloideo, contento dilute granuloso; hyphidia et cystidia absentia.

Habitat. Ad corticem trunci emortui vetusti *Salicis fragilis* et trunci vivi *S. albae* cv. 'Tristis'.

Holotypus. Průhonice ap. Praha, Bohemia centralis, *Salix fragilis* – ad corticem trunci emortui vetusti in margine (sept.) vici in ripa rivuli "Botič", 11. XI. 2009 F. Kotlaba legit; depositus in herbario Musei nationalis Pragae (PRM 859600, coniuncte cum *Dendrothele salicicola*); dupl. in CFMR, Madison, USA.

Description. Carpophores 1–8 × 1–6 mm, resupinate, very thin, smooth, white to cream coloured, with indeterminate margin. Hyphal system monomitic, hyphae clamped, compact, with thin wall, indextrinoid, inamyloid, 2–2.5 µm wide. Basidia 36–55(–78) × 9–11 µm, bisporic, cylindrical, not constricted, dextrinoid and cyanophilous when old; sterigmata straight, when young cylindrical, when mature elongate and conical to pointed, 16–22 µm long and 4–6 µm broad (at base). Spores 12.5–18.5 × 10–13 µm, oval, tapering towards apiculus, with fine granulose content, indextrinoid, inamyloid and acyanophilous. Hyphidia and cystidia absent.

Ecology. On bark of dead and living old trunks of *Salix fragilis* and *S. alba* cv. 'Tristis'.

Distribution. Known from only two localities: one in central (see holotypus) and one in southern Bohemia (Mažice NW of Veselí n. Luž. – see below).

Material studied

Průhonice SE of Praha, Central Bohemia, bank of "Botič stream" at northern boundary of the village, *Salix fragilis*, 11. XI. 2009 leg. F.K., det. F.K. et Z.P. (PRM 859600, together with *Dendrothele salicicola*). – Mažice NW of Veselí n. Luž., South Bohemia, bank of nameless stream in the village,

S. alba cv. 'Tristis' 3. III. 2010 (PRM 859599), 16. IV. 2010 (PRM 859659) and 13. V. 2010 (PRM 859694), all leg. F.K., det. F.K. et Z.P.

Notes. In spite of the fact that *Dendrothele bisporigera* has been collected only on two localities, we do not hesitate to describe it as a new species for three unique characters: bisporic basidia with dextrinoid wall when old, special shape and contents of large spores as well as absence of hyphidia and cystidia. We are convinced that it will be also found at other localities.

It is noteworthy that we have fertile specimens of *Dendrothele bisporigera* from the locality of Mažice collected in March and May 2010, whereas many collections of *D. salicicola* from a number of other localities (including South Bohemia) collected in the same time were entirely sterile. It seems that both species differ most probably also in biology.

After repeated examination of the type collection of *Dendrothele bisporigera*, we were surprised to find that on three small pieces of willow bark not only carpophores of *D. bisporigera* were present, but also *D. salicicola*, whereas on the fourth and largest piece of willow bark only *D. bisporigera* could be found (consequently, we investigated the pieces additionally). All these pieces of bark had been cut off from the same trunk of willow at only 15–20 centimetres apart.

DISCUSSION

The genus *Dendrothele* in its present concept involves a large number of species exhibiting a considerable range of morphological characters. It is likely that some species belong to different genera, including the ones described here. We believe, however, that at present, *Dendrothele* is the best generic accommodation for *D. salicicola* and *D. bisporigera*. K. K. Nakasone (personal communication) inspired us to reflect also the possibility of a different classification. Genera such as *Clavulicium* Boidin, *Vuillemiania* Maire, and *Dendrocorticium* Parmasto have been considered for *Dendrothele bisporigera*. However, the placement of *D. bisporigera* in any of these small, well-defined genera seems to be inappropriate. Similarly, *Radulomyces* M.P. Christ. was considered to accommodate *Dendrothele salicicola* but has been rejected to avoid compromising the integrity of the genus.

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