

The genus *Fimetariella*

John C. Krug

Abstract: The taxonomy and phylogenetic relationships of the fungal genus *Fimetariella* (Ascomycotina, Lasiosphaeriaceae) are discussed. A revised generic description and key are presented. Descriptions and illustrations are provided for all taxa. *Fimetariella dunarum* n.comb. and *Fimetariella apotoma*, *Fimetariella brachycaulina*, *Fimetariella dolichopoda*, *Fimetariella macromischa*, *Fimetariella microsperma*, and *Fimetariella tetraspora* n.spp. are proposed. A phialidic anamorph resembling *Cladorrhinum* is reported for *F. microsperma*. The ascospores of the type species *Fimetariella rabenhorstii* are considered to possess two terminal germ pores, one large pore and one very small pore, along with several small, apparently nonfunctional pores. A key to the genera with these minor pores is included.

Key words: *Fimetariella*, *Cladorrhinum*, coprophilous, fungi, keys, taxonomy.

Résumé : L'auteur discute les relations taxonomiques et phylogénétiques du genre *Fimetariella* (Ascomycotina, Lasiosphaeriaceae). Il présente une description révisée du genre, ainsi qu'une clé. Des descriptions et illustrations sont fournies pour tous les taxons et on propose le *Fimetariella dunarum* n.comb. et les *Fimetariella apotoma*, *Fimetariella brachycaulina*, *Fimetariella dolichopoda*, *Fimetariella macromischa*, *Fimetariella microsperma* et le *Fimetariella tetrasporan* comme n.ssp. On rapporte un anamorphe avec phialide ressemblant au *Cladorrhinum* pour le *F. microsperma*. On considère que les ascospores de l'espèce type, le *F. rabenhorstii*, possèdent deux pores germinatifs terminaux, un grand pore et un très petit pore, ainsi que plusieurs petits pores apparemment non-fonctionnels. L'auteur présente une clé pour les genres comportant ces petits pores.

Mots clés : *Fimetariella*, *Cladorrhinum*, coprophiles, champignons, clés, taxonomie.
[Traduit par la rédaction]

Introduction

In a recent paper (Krug and Scott 1994), we pointed out that *Podospora* Ces. and *Sordaria* Ces. & de Not. are quite heterogeneous genera. As various taxa were studied in detail, it became possible to segregate some of the discordant species into other genera. One of these genera was *Bombardioidea* Moreau in Lundq., which we recently revised (Krug and Scott 1994). Related to *Bombardioidea* is *Fimetariella* Lundq., which was erected by Lundqvist (1964) based on *Sordaria rabenhorstii* Niessl in Rabenh.

In establishing *Fimetariella*, Lundqvist (1964) utilized such criteria as ascospore orientation in the ascus, number of germ pores, variation in the number of pores, and differences in pore size. The ascospores were described as having one large pore and several smaller ones, with the spores frequently reversed as to position of the larger pore. As discussed by Krug (1989), Lundqvist (1972) modified the generic description and mentioned that the minor pores apparently were not of generic significance, although certainly they are characteristic.

In spite of the modifications to the original description by Lundqvist (1972), *Fimetariella* is a distinct genus as reinter-

ated by Krug (1989). In the present paper I describe a number of additional taxa that are congeneric with *Fimetariella rabenhorstii* but differ in a number of morphological features.

Morphology

After examining several portions of the type collection of *S. rabenhorstii*, I feel that the spores generally contain two terminal germ pores, with the apical one being rather small, and a number of smaller, apparently nonfunctional pores as described by Lundqvist (1964). These smaller pores were also observed in most of the other species of *Fimetariella* treated herein. Lundqvist (1964) emphasized the terminal position of these minor pores, although he did mention that in exceptional cases they may be positioned laterally. From my observations I believe that these pores are scattered and generally not positioned as described by Lundqvist (1964); however, this is true in some spores. These pores are also found in *Bombardioidea* in which they are scattered on the spore. In addition to *Bombardioidea* and *Fimetariella*, these smaller pores are also known in *Periamphispora* Krug (Krug 1989). In all three genera there is no evidence that these pores function in germination, although admittedly cultural data are only available for a couple of species, and even here germination experiments were not undertaken. Lundqvist (1972) also mentioned that these pores have no germinative function in *Fimetariella*.

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In his original description and discussion, Lundqvist (1964) pointed out that the ascospores are frequently reversed as to the position of the large germ pore. He considered this phenomenon to be unique within the Ascomycetes. This spore reversal is now also known in both *Bombardioidea* and *Periampphispora*. In the additional species of *Fimetariella* being described, the larger pore is basal in most species, but spore reversal in the lower spores in the ascus was observed. As Lundqvist (1964) pointed out, the terms apical and basal are likely misapplications here as it is impossible to tell which is the normal and which is the reversed position. Still, this phenomenon of spore reversal is very characteristic of *Fimetariella* and related genera.

Taxonomy

Fimetariella Lundq., Bot. Not. 117: 239. 1964

Perithecia fimicolous, scattered or clustered, immersed or erumpent, usually bare, subglobose to pyriform; neck fairly

short, dark brown or black, bare, ostiolate; peridium pseudo-parenchymatous, subcoriaceous or occasionally membranaceous, fairly opaque or occasionally semitransparent, very pale yellowish brown to dark brown, consisting of three layers of different types of cells. Asci unitunicate, nonamyloid, 4- or 8-spored, cylindrical, stipitate; apical ring indistinct, or distinct and definitely thickened, or occasionally lacking. Paraphyses abundant, filiform, hyaline, mixed with the asci. Ascospores uniseriate, one-celled, surrounded by a hyaline gelatinous sheath, ellipsoidal, rounded or somewhat attenuated at the apices, dark brown, containing two terminal germ pores with the one, typically the basal pore, frequently appearing somewhat larger, and several smaller apparently nonfunctional pores; frequently with reverse spore orientation. Anamorph phialidic, with phialides reduced to collettes producing dry conidia.

TYPE SPECIES: *Sordaria rabenhorstii* Niessl in Rabenh.

Key to the species

1. Asci 4-spored; apical ring usually thickened (except *F. rabenhorstii*) 2
1. Asci 8-spored; apical ring rather indistinct or rarely lacking (except *F. brachycaulina*) 6
 2. Ascospores relatively small, less than 20 μm long 3
 2. Ascospores larger, usually over 30 μm long 4
3. Ascospores ellipsoidal, 14–17 \times 8–9 μm *F. rabenhorstii*
3. Ascospores ellipsoidal to subglobose, (11–)12–13(–14) \times 8–9(–11) μm *F. macromischa*
4. Peridium semitransparent, appearing almost colourless, composed of thin-walled cells; ascus stipe 25–45 μm ; ascospores (30–)32–36(–38) \times 17–19(–20) μm *F. tetraspora*
4. Peridium dark, composed of thick-walled cells; ascus stipe (40–)60–100 μm 5
5. Ascospores (30–)32–40(–42) \times (17–)18–21(–22) μm *F. dolichopoda*
5. Ascospores (40–)42–48(–50) \times (21–)23–26(–27) μm *F. dunarum*
6. Ascospores (23–)24–26(–27) \times (14–)15–16(–17) μm ; ascus stipe 5–10 μm *F. brachycaulina*
6. Ascospores 12–14 \times 7–8.5(–9.5) μm ; ascus stipe variable, 20–100 μm *F. microsperma*
6. Ascospores (29–)31–34(–36) \times (16–)17–19 μm ; ascus stipe 15–25 μm *F. apotoma*

Fimetariella apotoma Krug, sp. nov. Figs. 1–4, 34

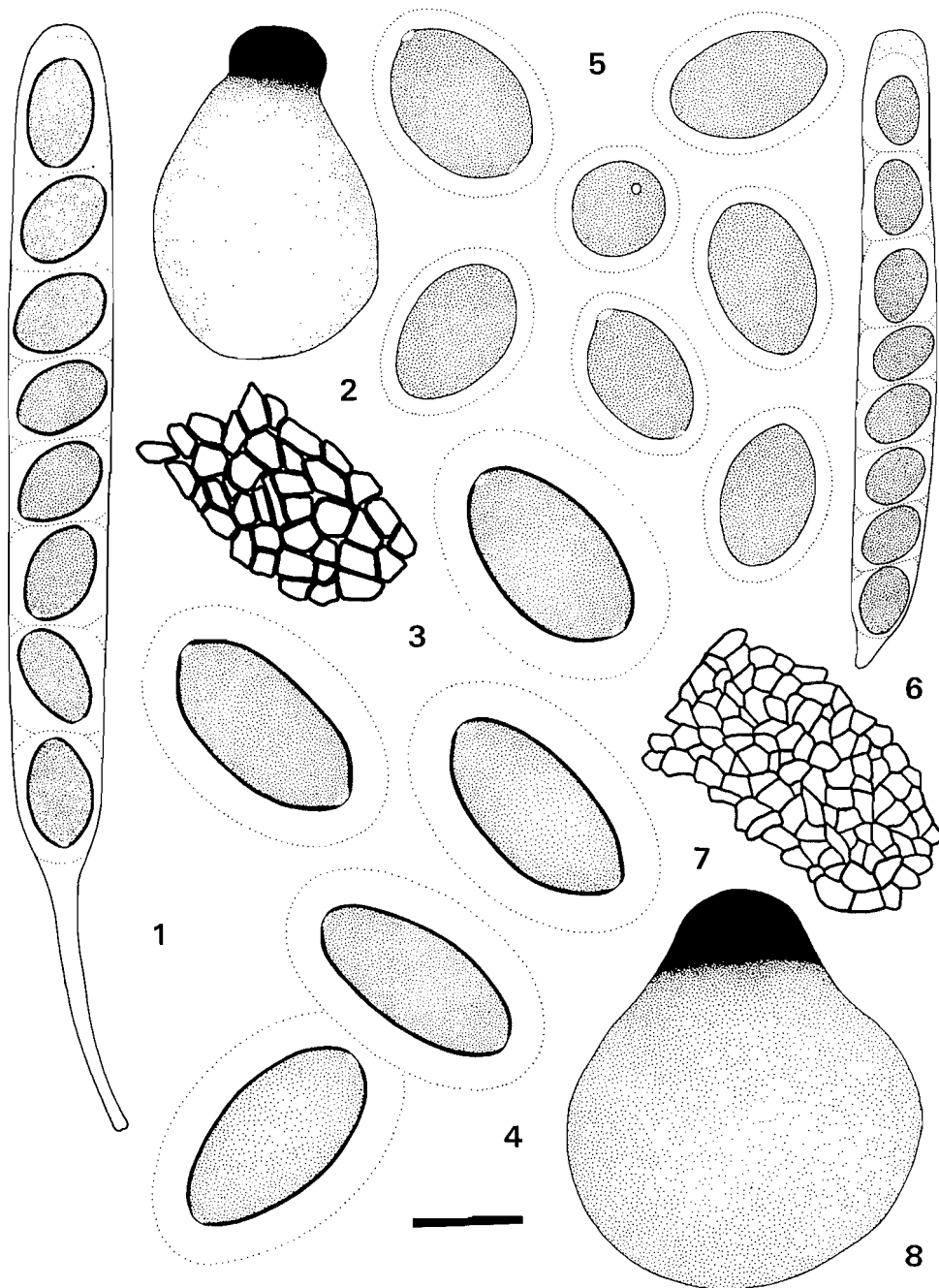
Perithecia dispersa, glabra, immersa, subpyriformia, 600–700 \times 450–550 μm magna; perithecia collum breve, robustum, truncatius, glabrum, nigrum, distinctum, circa 125–150 μm longum; peridium profunde aurantiacibrunneum, subcoriaceum, e cellulis atrifulvis, angulatis aut serpentine intricatis, cum parietibus crassis textum. Asci octospori, cylindracei, 225–250 \times 20–25 μm magni, in apice attenuati et truncati, basin versus in stipitem 15–25 μm longum attenuati; anulum apicale indistinctissimum. Paraphyses numerosae, filiformes, septatae, hyalinae. Ascospores oblique uniseriales, unicellulares, vagina hyalina gelatinosa 7 μm lata postremo circumdatae, ellipsoideae, in apice rotundatae aut minime attenuatae, (29–)31–34(–36) \times (16–)17–19 μm magnae, primum hyalinae vel fulvae, maturitate confirmata atribrunneae et opacae, foramen germinale basilare distinctum, circa 2–2.5 μm diametro crassum et foramen apicale minus, circa 1.5–2 μm diametro crassum exhibentes.

HOLOTYPE: In Cervi canadensis fimo lectus est, in loco 55

mi meridionali a Bozeman, apud flumen Gallatin, in Gallatinensi comitatu Montanensium finium, in imperio U.S.A., 2 Sept. 1957, Cain, TRTC 42408. In Museo Regi Ontarioensis Cryptogamarum herbario.

Perithecia scattered, bare, embedded, subpyriform, 600–700 \times 450–550 μm ; neck short, stout, subcylindrical, somewhat truncate, bare, black, distinct, about 125–150 μm long, with dark brown, thick-walled, elongated cells measuring about 8–12 \times 2.5–3 μm ; ostiole small, rather indistinct; peridium dark orange-brown by reflected light, subcoriaceous, appearing in surface view of angular to interlocking, thick-walled, dark yellow-brown cells measuring 5–8 \times 5–6 μm . Asci 8-spored, cylindrical, 225–250 \times 20–25 μm , narrowed and truncated at the apices, tapering into a fairly short stipe measuring 15–25 μm long; apical ring rather indistinct. Paraphyses very abundant, filiform, septate, hyaline, guttulate, longer than and mixed with the asci. Ascospores obliquely uniseriate, one-celled, surrounded by a hyaline gelatinous sheath reaching a width of about 7 μm , ellipsoidal, rounded to slightly narrowed

Figs. 1–4. *Fimetariella apotoma* (TRTC 42408). Fig. 1. Ascus and ascospores. Scale bar = 35 μm . Fig. 2. Perithecium. Scale bar = 215 μm . Fig. 3. Peridium in surface view. Scale bar = 16 μm . Fig. 4. Ascospores showing thickened wall and terminal germ pores. Scale bar = 16 μm .
Figs. 5–8. *Fimetariella brachycaulina* (TRTC 39641). Fig. 5. Ascospores, with one in end view, showing terminal germ pores. Scale bar = 18 μm . Fig. 6. Ascus and ascospores. Scale bar = 38 μm . Fig. 7. Peridium in surface view. Scale bar = 16 μm . Fig. 8. Perithecium. Scale bar = 190 μm .



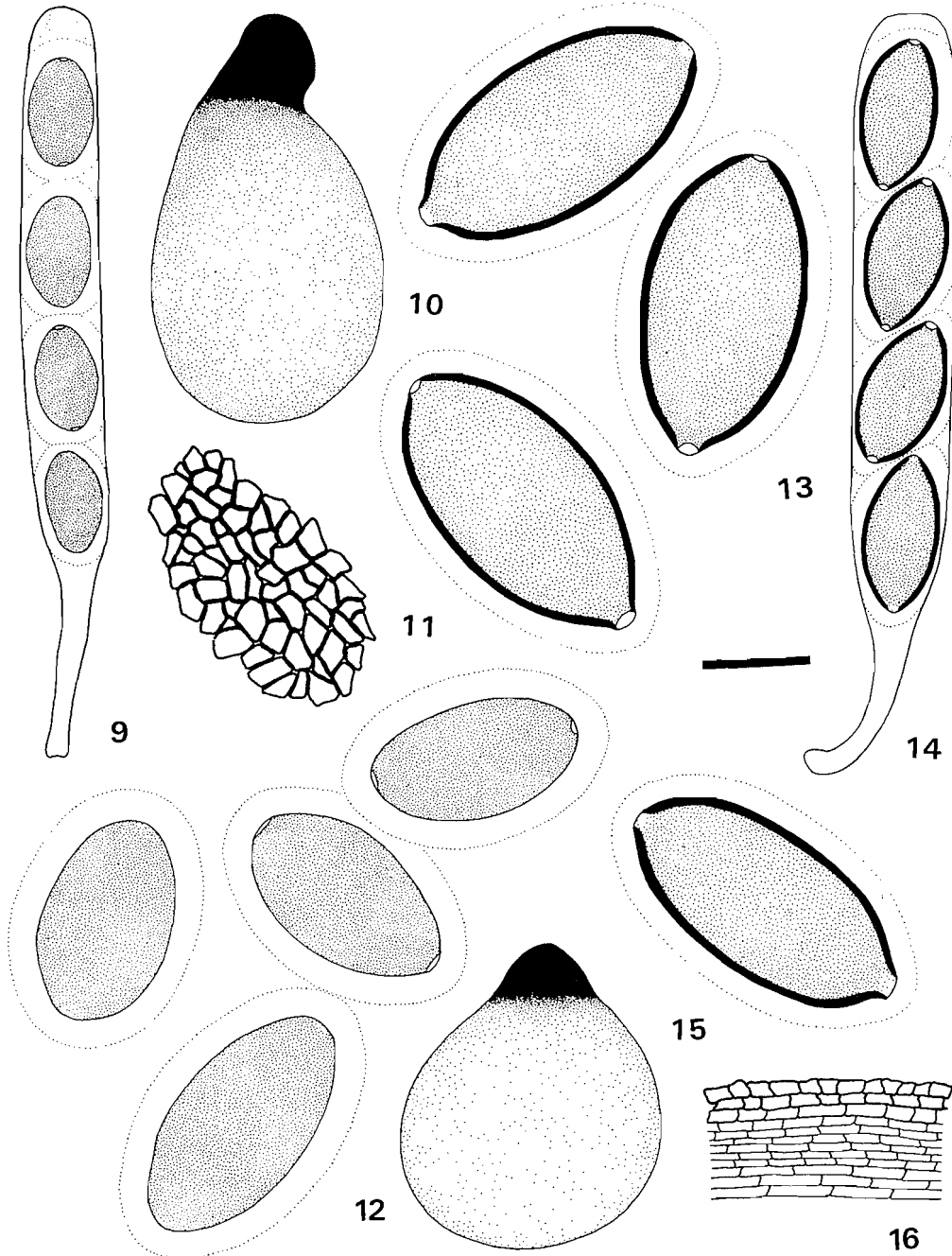
towards the ends, (29–)31–34(–36) \times (16–)17–19 μm , ranging from hyaline when young to yellow-brown, finally very dark brown and opaque at maturity, with each containing a distinct basal germ pore measuring about 2–2.5 μm in diameter and a slightly smaller apical pore measuring about 1.5–2 μm in diameter.

ETYMOLOGY: Greek *apotomos* (*αποτομος*) meaning cut off, referring to the truncated apex of the ascus.

SPECIMENS EXAMINED: U.S.A.: MONTANA: Gallatin Co.: Gallatin River, 55 mi S of Bozeman, wapiti dung, 2.IX.1957, *Cain*, TRTC 42408, moose dung, 2.IX.1957, *Cain*, TRTC 42403; 60 mi S of Bozeman, sheep dung, 2.IX.1957, *Cain*, TRTC 42241.

This species is characterized by the 8-spored asci, relatively short ascial stipe, and size of the ascospores. The other species with 8-spored asci, *F. brachycaulina* and *F. micro-*

Figs. 9–12. *Fimetariella dolichopoda* (TRTC 42238). Fig. 9. Ascus and ascospores. Scale bar = 38 μm . Fig. 10. Perithecium. Scale bar = 180 μm . Fig. 11. Peridium in surface view. Scale bar = 22 μm . Fig. 12. Ascospores showing terminal germ pores. Scale bar = 18 μm . **Figs. 13–16.** *Fimetariella dunarum* (Mouton 271). Fig. 13. Ascospores showing thickened wall and terminal germ pores. Scale bar = 15.5 μm . Fig. 14. Ascus and ascospores. Scale bar = 30 μm . Fig. 15. Perithecium. Scale bar = 170 μm . Fig. 16. Cross section of peridium. Scale bar = 21 μm .



sperma, differ in possessing smaller ascospores. *Fimetariella dolichopoda* and *F. tetraspora* have spores similar in size, but the asci are 4-spored.

***Fimetariella brachycaulina* Krug & J.H. Mirza, sp. nov.**

Figs. 5–8, 35

Perithecia dispersa aut raro laxe aggregata, glabra, immersa, subpyriformia, 650–750 \times 500–600 μm magna; perithecii collum breve, subcylindraceum, truncatius, glabrum, nigrum,

distinctum, circa 150–175 μm longum; peridium pallide aurantiacibrunneum, subcoriaceum, 25–35 μm crassum, e stratis tribus compositum. Asci octospori, cylindricei, 170–190 \times 20–25 μm magni, in apice distincte attenuati et truncati, basin versus in stipitem 5–10 μm longum abruptissime contracti; anulum apicale distinctissimum, incrassatum. Paraphyses numerosae, filiformes, septatae, hyalinae. Ascosporae primum oblique uniseriales, unicellulares, vagina hyalina gelatinosa 8 μm lata postremo circumdatae, ellipsoideae, apicibus

rotundatis, (23-)24-26(-27) × (14-)15-16(-17) μm magnae, primum hyalinae vel fulvae, maturitate confirmata atribrunneae et opacae, foramen germinale apicale prominens, circa 2.5-3 μm diametro crassum et foramen basilare minus, circa 2 μm diametro crassum exhibentes.

HOLOTYPUS: In vaccarum fimo lectus est, apud Warm Springs, in Nye comitatu Nevadensium finium, in imperio U.S.A., 22 Aug. 1957, *Cain*, TRTC 39641. In Museo Regi Ontarioensis Cryptogamarum herbario.

Perithecia scattered or occasionally loosely clustered, bare, embedded, subpyriform, 650-750 × 500-600 μm; neck short, subcylindrical, somewhat truncate, bare, black, distinct, about 150-175 μm long, with dark yellow-brown, thick-walled, elongated cells measuring 8-12 × 2-3 μm; ostiole small, quite indistinct; peridium light orange-brown by reflected light, subcoriaceous, 25-35 μm thick, appearing in surface view of irregular to angular cells, consisting of three layers, an outer layer about 3-4 cells thick, of quadrate to oblong, thick-walled, dark brown cells measuring 3-5 × 2-4 μm, a middle layer about 6-8 cells thick, of elongated, thin-walled, pale yellow-brown cells measuring 10-15 × 1.5-2 μm, and an inner layer about 4-6 cells thick, of elongated, thin-walled, hyaline cells measuring 10-15(-20) × (3.5-)4-5 μm. Asci 8-spored, cylindrical, 170-190 × 20-25 μm, distinctly narrowed and truncated at the apices, terminating very abruptly in a very short stipe measuring 5-10 μm long; apical ring very distinct, thickened. Paraphyses very abundant, filiform, septate, hyaline, guttulate, mixed with the asci. Ascospores initially obliquely uniseriate, one-celled, surrounded by a hyaline gelatinous sheath reaching a width of about 8 μm, ellipsoidal, rounded at the ends, (23-)24-26(-27) × (14-)15-16(-17) μm, ranging from hyaline when young to yellow-brown, finally dark brown and opaque at maturity, with each containing a prominent apical germ pore measuring about 2.5-3 μm in diameter and a smaller basal pore measuring about 2 μm in diameter, frequently orientated with the larger pore directed downwards in the lower spores.

ETYMOLOGY: Greek *brachys* (βραχυς) meaning short and *kaulinos* (καυλινος) meaning made of a stem, referring to the very short stipe of the ascus.

SPECIMENS EXAMINED: U.S.A.: NEVADA: Nye Co.: Warm Springs, cow dung, 22.VIII.1957, *Cain*, TRTC 39641. White Pine Co.: about 40 mi SW of Ely, cow dung, 21.VIII.1957, *Cain*, TRTC 39643; 60 mi S of Wendover, cow dung, 21.VIII.1957, *Cain*, TRTC 46905.

The characteristic features of this species are the extremely short stipe of the ascus (Fig. 6), thickened and distinct ascal apical ring (Fig. 35), and size of the ascospores. The only other species with 8-spored asci are *F. apotoma* that has larger ascospores and *F. microsperma* that differs in possessing much smaller ascospores, asci with a variable stipe, and a thinner ascal apical ring.

Fimetariella dolichopoda Krug, sp.nov. Figs. 9-12, 36

Perithecia dispersa, glabra, immersa, subpyriformia, 600-750 × 400-450 μm magna; perithecii collum breve, subcylindraceum, glabrum, atribrunneum, distinctum, circa 150-250 μm longum; peridium profunde olivaceibrunneum, subcoriaceous, e cellulis angulatis, atribrunneis, cum parietibus crassis textum. Asci quadrispori, cylindracei, (210-)225-300 × 22-25 μm magni, in apice attenuati

truncatique, basin versus in stipitem (40-)60-100 μm longum attenuati; annulum apicale prominentissimum, incrassatissimum. Paraphyses numerosae, filiformes, septatae, hyalinae. Ascosporae primum oblique uniseriales, unicellulares, vagina hyalina gelatinosa circa 7 μm lata postremo circumdatae, ellipsoideae, in apice leviter attenuatae, (30-)32-40(-42) × (17-)18-21(-22) μm magnae, primum hyalinae vel laete fulvae, maturitate confirmata atribrunneae et opacae, foramen germinale basilare distinctum, circa 2.5-3 μm diametro crassum et foramen apicale aliquanto minus, circa 2-2.5 μm diametro crassum exhibentes.

HOLOTYPUS: In ovium fimo lectus est, in loco circa 60 mi meridionali a Bozeman, apud flumen Gallatin, in Gallatini comitatu Montanensium finium, in imperio U.S.A., 2 Sept. 1957, *Cain*, TRTC 42238. In Museo Regi Ontarioensis Cryptogamarum herbario.

Perithecia scattered, bare, embedded, subpyriform, 600-750 × 400-450 μm; neck short, subcylindrical, bare, very dark brown, distinct, about 150-250 μm long, with dark brown, thick-walled, oblong cells measuring 6-10 × 3-4 μm; ostiole small, quite distinct; peridium dark olivaceous brown by reflected light, subcoriaceous, appearing in surface view of angular, thick-walled, dark brown cells measuring 5-8 × 3-4(-5) μm. Asci 4-spored, cylindrical, (210-)225-300 × 22-25 μm, narrowed and truncated at the apices, gradually tapering into a very long stipe measuring (40-)60-100 μm long; apical ring very prominent, considerably thickened. Paraphyses very abundant, filiform, septate, hyaline, guttulate, longer than and mixed with the asci. Ascospores initially obliquely uniseriate, one-celled, surrounded by a hyaline gelatinous sheath reaching a width of about 7 μm, ellipsoidal, slightly narrowed towards the ends, (30-)32-40(-42) × (17-)18-21(-22) μm ranging from hyaline when young to light yellow brown, finally very dark brown and opaque at maturity, with each containing a distinct basal germ pore about 2.5-3 μm in diameter and a slightly smaller apical pore about 2-2.5 μm in diameter.

ETYMOLOGY: Greek *dolichos* (δολιχος) meaning long and *podos* (ποδος) meaning foot, referring to the very long stipe of the ascus.

SPECIMENS EXAMINED: U.S.A.: MONTANA: Gallatin Co., Gallatin River, 60 mi S of Bozeman, sheep dung, 2.IX.1957, *Cain*, TRTC 42238, moose dung, 2.IX.1957, *Cain*, TRTC 42244. Stillwater Co.: Columbus, cow dung, 3.IX.1957, *Cain*, TRTC 42412. Treasure Co.: Bighorn, cow dung, 4.IX.1957, *Cain*, TRTC 42208. WYOMING: Crook Co.: Sundance, horse dung, 3.IX.1962, *Cain*, TRTC 39112.

This species is characterized by the 4-spored asci with prominent, thickened apical ring (Fig. 36), the extremely long ascal stipe, and the ascospore size. *Fimetariella tetraspora* also has 4-spored asci with similar spore size but differs in possessing an almost hyaline peridium and shorter ascal stipe. In *F. dunarum* the spores are larger and the apical ring thinner.

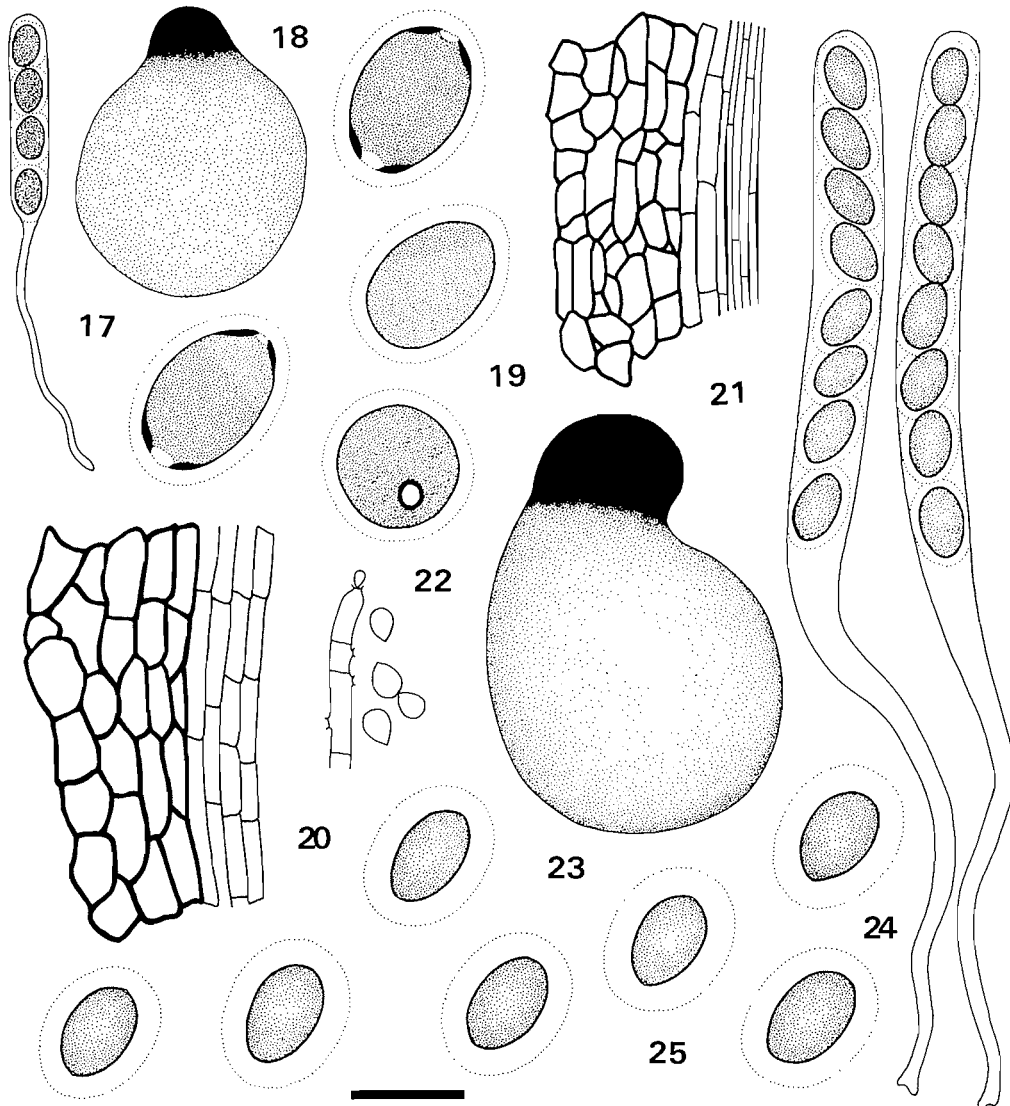
Fimetariella dunarum (Mouton) Krug, comb.nov.

Figs. 13-16, 37

≡ *Hypocropa dunarum* Mouton, Bull. Soc. R. Bot. Belg. 25: 145. 1886 (basonym)

≡ *Pleurage dunarum* (Mouton) Kunze, Rev. Genera Plant. 3(2): 505. 1898

Figs. 17–20. *Fimetariella macromischa* (TRTC 51750). Fig. 17. Ascus and ascospores. Scale bar = 33 μm . Fig. 18. Perithecium. Scale bar = 235 μm . Fig. 19. Ascospores showing thickened wall around germ pores with one spore in end view showing germ pore. Scale bar = 9 μm . Fig. 20. Cross section of peridium. Scale bar = 19 μm . **Figs. 21–25.** *Fimetariella microsperma* (TRTC 32615). Fig. 21. Cross section of peridium. Scale bar = 21 μm (outer layer) and 12 μm (inner layers). Fig. 22. Phialide and conidia. Scale bar = 11 μm . Fig. 23. Perithecium. Scale bar = 125 μm . Fig. 24. Asci and ascospores. Scale bar = 22 μm . Fig. 25. Ascospores. Scale bar = 14 μm .



Perithecia loosely clustered to somewhat scattered, bare, embedded to slightly erumpent, subpyriform to slightly ampulliform, 475–500 \times 400–450 μm ; neck short, dome-shaped, somewhat truncate, bare, very dark brown, distinct, about 100–125 μm long, with dark brown, thick-walled, elongated cells measuring 5–8 \times 1.5–2.5 μm ; ostiole small, very prominent; peridium dark yellowish brown by reflected light, very coriaceous, 20–30 μm thick, appearing in surface view of interlocking cells, consisting of three layers, an outer layer about 8–10 cells thick, of oblong, thick-walled, dark brown cells measuring 5–6 \times 2–3 μm , a middle layer about 6–8 cells thick, of oblong, thin-walled, hyaline cells measuring 6–8 \times 1–1.5 μm , and an inner layer about 2–3 cells thick, of elongated, thin-walled, hya-

line cells measuring 10–12(–15) \times 1.5–2 μm . Asci 4-spored or very rarely 5-spored, cylindrical, 200–220 \times 25–30(–35) μm , distinctly narrowed and truncated at the apices, tapering into a very long stipe measuring (50–)60–70 μm long; apical ring very distinct, considerably thickened. Paraphyses very abundant, filiform, septate, hyaline, guttulate, longer than and mixed with the asci. Ascospores initially obliquely uniseriate, one-celled, surrounded by a hyaline gelatinous sheath reaching a width of about 6 μm , ellipsoidal, narrowed towards the ends, (40–)42–48(–50) \times (21–)23–26(–27) μm , ranging from hyaline when young to yellow-brown, finally very dark brown and opaque at maturity, with each containing a prominent basal germ pore measuring about 2.5–3 μm in diameter and a slightly

smaller apical pore measuring about $2\ \mu\text{m}$ in diameter, usually orientated with the large pore directed upwards in the uppermost spore.

ETYMOLOGY: Latinized from *dune*, referring to the location of the type collection.

SPECIMENS EXAMINED: BELGIUM: FLANDERS: Blankenberghe, rabbit dung in dunes, VII.1884, *Mouton* 271, holotypus (BR, TRTC-slides). ICELAND: NORÐUR-ÞINGEYJARSÝSLA: Hólsfjöll: Klaufaskurður, 3 km SSE of Grimstafir, sheep dung, 29.VII.1971, *Lundqvist* 7098m (UPS). THE NETHERLANDS: OVERVEEN, rabbit dung, VI.1882, *Oudemans*, ex herb. Oudemans, under *Sordaria decipiens* (L.). U.S.A.: SOUTH DAKOTA: Meade Co.: S of Wall, cow dung, 3.IX.1962, *Luck-Allen*, TRTC 40150. WYOMING: Crook Co.: Sundance, horse dung, 3.IX.1962, *Cain*, TRTC 45432. Niobrara Co.: N of Lusk, cow dung, 2.IX.1964, *Cain*, TRTC 42459.

The 4-spored asci, dark peridium, and very large size of the ascospores are the diagnostic features. *Fimetariella dolichopoda* and *F. tetraspora* also have fairly large ascospores but smaller than in *F. dunarum*. The more pronounced ascus apical ring in *F. dolichopoda* and the semitransparent, almost colourless peridium in *F. tetraspora* are additional distinguishing characteristics for these taxa.

***Fimetariella macromischa* Krug, sp.nov.** Figs. 17–20

Perithecia dispersa aut raro laxa aggregata, glabra, ex immersi ad erumpentiorum positionem pertinentia, subpyriformia, $550\text{--}650 \times 400\text{--}450\ \mu\text{m}$ magna; perithecia collum breve, conicum, glabrum, nigrum, distinctum, circa $135\text{--}175\ \mu\text{m}$ longum; peridium atribrunneum, subcoriaceum, $35\text{--}45\ \mu\text{m}$ crassum, e stratis tribus compositum. Asci quadrispori, cylindracei, $(110\text{--})120\text{--}150\text{--}(155) \times 10\text{--}12\ \mu\text{m}$ magni, in apice anguste rotundati, basin versus in stipitem $(65\text{--})70\text{--}80\text{--}(100)\ \mu\text{m}$ longum abruptius contracti; annulum apicale parvum, leviter incrassatum. Paraphyses numerosae, filiformes, septatae, hyalinae. Ascospores primum oblique uniseriales, unicellulares, vagina hyalina gelatinosa circa $2\text{--}3\ \mu\text{m}$ lata circumdatae, ellipsoideae vel subgloboseae, in apice rotundatae, $(11\text{--})12\text{--}13\text{--}(15) \times 8\text{--}9\text{--}(11)\ \mu\text{m}$ magnae, primum pallidae vel laete fulvae, maturitate confirmata atribrunneae et opacae, foramen germinale basilare prominens, circa $2\ \mu\text{m}$ diametro crassum et foramen apicale multo minus, indistinctum exhibentes.

HOLOTYPE: In Cervi canadensis fimo lectus est, apud Chancellor Mountain Camp, in Yoho National Park, in British Columbia provincia Canadensis regni, 10 Aug. 1962, *Cain* C1906c, TRTC 51750. In Museo Regi Ontarioensis Cryptogamarum herbario.

Perithecia scattered or occasionally loosely clustered, bare, embedded to slightly erumpent, subpyriform, $550\text{--}650 \times 400\text{--}450\ \mu\text{m}$; neck short, conical, stout, bare, black, distinct, about $135\text{--}175\ \mu\text{m}$ long, with yellow-brown, slightly thick-walled, elongated cells measuring $8\text{--}12 \times 2\text{--}3\ \mu\text{m}$; ostiole small, rather indistinct; peridium dark brown by reflected light, subcoriaceous, $35\text{--}45\ \mu\text{m}$ thick, appearing in surface view of angular to somewhat interlocking cells, consisting of three layers, an outer layer about 2–4 cells thick, of quadrate to oblong, thick-walled, dark brown cells measuring $10\text{--}15 \times 5\text{--}7\ \mu\text{m}$, a middle layer about 2–3 cells thick, of elongated, thin-walled, hyaline

cells measuring $(15\text{--})20\text{--}30 \times 1.5\text{--}2\ \mu\text{m}$, and an inner layer about 4–6 cells thick, of oblong to somewhat elongated, thin-walled, hyaline cells measuring $10\text{--}15 \times 3\text{--}4\ \mu\text{m}$. Asci 4-spored, cylindrical, $(110\text{--})120\text{--}150 \times 10\text{--}12\ \mu\text{m}$, narrowly rounded at the apices, terminating rather abruptly in a very long stipe measuring $(65\text{--})70\text{--}80\text{--}(100)\ \mu\text{m}$ long; apical ring small, slightly thickened. Paraphyses very abundant, filiform, septate, hyaline, guttulate, longer than and mixed with the asci. Ascospores initially obliquely uniseriate, one-celled, surrounded by a hyaline gelatinous sheath about $2\text{--}3\ \mu\text{m}$ wide, ellipsoidal to subglobose, rounded at the ends, $(11\text{--})12\text{--}13\text{--}(15) \times 8\text{--}9\text{--}(11)\ \mu\text{m}$, ranging from pallid when young to light yellow-brown, finally dark brown and opaque at maturity, with each containing a prominent basal germ pore measuring about $2\ \mu\text{m}$ in diameter and a smaller, less distinct apical pore, usually orientated with the larger pore directed upwards in the lower spores.

ETYMOLOGY: Greek *makros* ($\mu\alpha\kappa\rho\varsigma$) meaning long and *mischos* ($\mu\iota\sigma\chi\omicron\varsigma$) meaning stalk, referring to the elongated stipe of the ascus.

SPECIMENS EXAMINED: CANADA: BRITISH COLUMBIA: Yoho National Park, Chancellor Mountain Camp, wapiti dung, 10.VIII.1962, *Cain* C1906c (TRTC 51750, UPS).

The essential distinguishing criteria of *F. macromischa* are the 4-spored asci and small ascospores (Fig. 19). The only other species with small spores are *F. microsperma* that has 8-spored asci and ascospores with a very inconspicuous apical germ pore and *F. rabenhorstii* that has more ellipsoidal ascospores and a very inconspicuous apical ring.

***Fimetariella microsperma* Krug & J.H. Mirza, sp.nov.**

Figs. 21–25

= *Fimetariella corsicana* Lundq., in herb. (UPS)

Perithecia dispersa, levia, denudata, e semisuperficiali ad erumpentem positionem pertinentia, ovoidea, $390\text{--}500 \times 310\text{--}375\ \mu\text{m}$ magna; perithecia collum breve, tholiforme, nigrum, distinctum, papillis praeditum; peridium brunneum, subcoriaceum, $30\text{--}35\ \mu\text{m}$ crassum, e stratis tribus compositum. Asci octospori, cylindracei, $115\text{--}185 \times 9.5\text{--}12.5\ \mu\text{m}$ magni, in apice rotundati, basin versus in stipitem $60\text{--}100\ \mu\text{m}$ longum attenuati; annulum apicale indistinctissimum. Paraphyses numerosae, filiformes, septatae, hyalinae. Ascospores oblique uniseriales, unicellulares, vagina hyalina gelatinosa $5\ \mu\text{m}$ lata postremo circumdatae, ellipsoideae, apicibus rotundatis sed saepius attenuatoribus, $12\text{--}14 \times (7\text{--})7.5\text{--}9\text{--}(9.5)\ \mu\text{m}$ magnae, primum hyalinae vel fulvibrunneae, maturitate confirmata atribrunneae et opacae, foramen germinale distinctum, circa $2\ \mu\text{m}$ diametro crassum et foramen apicale minus exhibentes.

HOLOTYPE: In Alcis alcis fimo lectus est, apud Little White River, in twp. Poulin (1B) vocato, in Algoma comitatu, in Ontario provincia Canadensis regni, 14 Sept. 1956, *Cain*, TRTC 32615. In Museo Regi Ontarioensis Cryptogamarum herbario.

Colonies on modified Leonian's agar medium spreading broadly, white, fibrous, forming dense growths of fine appressed hyphae, reverse uncoloured. Perithecia scattered, bare, semisuperficial to erumpent, ovoid, $390\text{--}500 \times 310\text{--}375\ \mu\text{m}$; neck short, dome-shaped, covered with small papillae, black, distinct; ostiole small, indistinct; peridium

brown by reflected light, subcoriaceous, 30–35 μm thick, appearing in surface view of angular to interlocking cells, consisting of three layers, an outer layer about 4–5 cells thick, of quadrate to angular, thick-walled, dark brown cells measuring 8–10(–12) \times 5–6 μm , a middle layer about 2–3 cells thick, of elongate to oblong, thin-walled, hyaline cells measuring 8–12(–15) \times 2.5–3 μm , and an inner layer about 5–6 cells thick of elongated, thin-walled, hyaline cells measuring 20–25 \times 1–2 μm . Asci 8-spored, cylindrical, 115–185 \times 9.5–12.5 μm , rounded at the apices, terminating in a stipe of rather variable length measuring 20–100 μm long; apical ring quite indistinct. Paraphyses very abundant, filiform, septate, hyaline, longer than and mixed with the asci. Ascospores obliquely uniseriate, one-celled, surrounded by a hyaline gelatinous sheath reaching a width of about 5 μm , ellipsoidal, rounded at the ends but frequently somewhat narrowed, 12–14 \times 7–8.5(–9.5) μm , ranging from hyaline when young to yellow-brown, finally dark brown and opaque at maturity, with each containing a distinct basal germ pore about 2 μm in diameter and a much smaller apical pore (visible only after bleaching), frequently orientated with the larger pore directed upwards in the lower spores. Phialides abundant, hyaline, reduced to collarettes on short-celled aerial hyphae. Conidia one-celled, ovoid, smooth, hyaline, dry, 3–4 \times 2–3 μm .

ETYMOLOGY: Greek *mikros* ($\mu\kappa\rho\sigma$) meaning small and *sperma* ($\sigma\pi\epsilon\rho\mu\alpha$) meaning seed, referring to the small size of the ascospores.

SPECIMENS EXAMINED: CANADA: ONTARIO: Algoma Dist.: Nickel Twp., moose dung, 21.VI.1961, Cain et al., TRTC 39528; Poulin Twp. (1B), Little White River, moose dung, 14.IX.1956, Cain, TRTC 32615. FRANCE: Corsica: Canton de Bonifacio: 3 km NE of Bonifacio, just S of Fontanaccia, cow dung, 15.V.1965, Lundqvist 4435b (UPS); Golfe de Santa Manza, 1 km W of Gurgazo, cow dung, 15.V.1965, Lundqvist 4436a (IMI, S, TRTC, UPS). MEXICO: TAMAULIPAS: N of Ciudad Victoria, Padilla, burro dung, 22.V.1962, Lemke, TRTC 39529.

The diagnostic features of *F. microsperma* are the small ascospore size (Fig. 25), indistinct apical germ pore, 8-spored asci, and the variable length of the stipe. In other species with 8-spored asci the spores are much larger. The only other species with such small spores is *F. macromischa*, but this taxon has 4-spored asci and somewhat more subglobose spores. The two germ pores can usually be detected in most species under standard illumination, but in *F. microsperma* the apical pore is so minute that the spores must be bleached to readily observe it.

In the European collections, the ascospores are slightly wider with a spore width of about 8.5–9.5 μm , more tapered towards the apices, contain a more distinct apical pore, and the ascial stipe is more constant in length. These minor variations in morphology would appear to be insignificant taxonomically, being merely reflections of differences in the populations.

The only other species of *Fimetariella* for which cultural information is available is *F. rabenhorstii* that was cultured by Udagawa (1980). He reported broadly spreading, darkly pigmented colonies with submerged mycelium, which is consistent with the observations provided by Krug and Scott (1994) for *B. bombardioides* (Auersw. in Niessl) Moreau in

the related genus *Bombardioidea*. Cultural data were also provided by Moreau (1953) for *B. stercoris* (DC.:Fr.) Lundq. that he referred to as a 4-spored form of *Sordaria bombardioides* Auersw. in Niessl. On cornmeal agar, Moreau (1953) obtained a dense growth of white, fibrous, superficial mycelium, which compares favourably with the observations for *F. microsperma*.

The anamorph in *F. microsperma* (Fig. 22) consists of reduced phialides in the form of collarettes for which Arx and Gams (1967) introduced the term pleurophialide. This state reminds one of *Cladorrhinum* Sacc. & Marchal that was reported by Arx and Gams (1967) as the anamorph for *Apiosordaria verruculosa* (Jensen) Arx & Gams. In *Bombardioidea bombardioides*, Krug and Scott (1994) observed an anamorph consistent with *Angulimaya* Subram. & Lodha. No anamorph was reported by Udagawa (1980) for *F. rabenhorstii*, although he observed chlamydospores.

Fimetariella rabenhorstii (Niessl in Rabenh.) Lundq., Bot. Not. 117: 239. 1964 Figs. 26–29

≡ *Sordaria rabenhorstii* Niessl in Rabenh., Hedwigia, 11: 180. 1872, and Fungi Europaei Exsicc. 1528. 1872

≡ *Hypocopra rabenhorstii* (Niessl in Rabenh.) Sacc., Syll. Fung. 1: 245. 1882

≡ *Pleurage rabenhorstii* (Niessl in Rabenh.) Kuntze, Rev. Genera Plant 3(2): 505. 1898

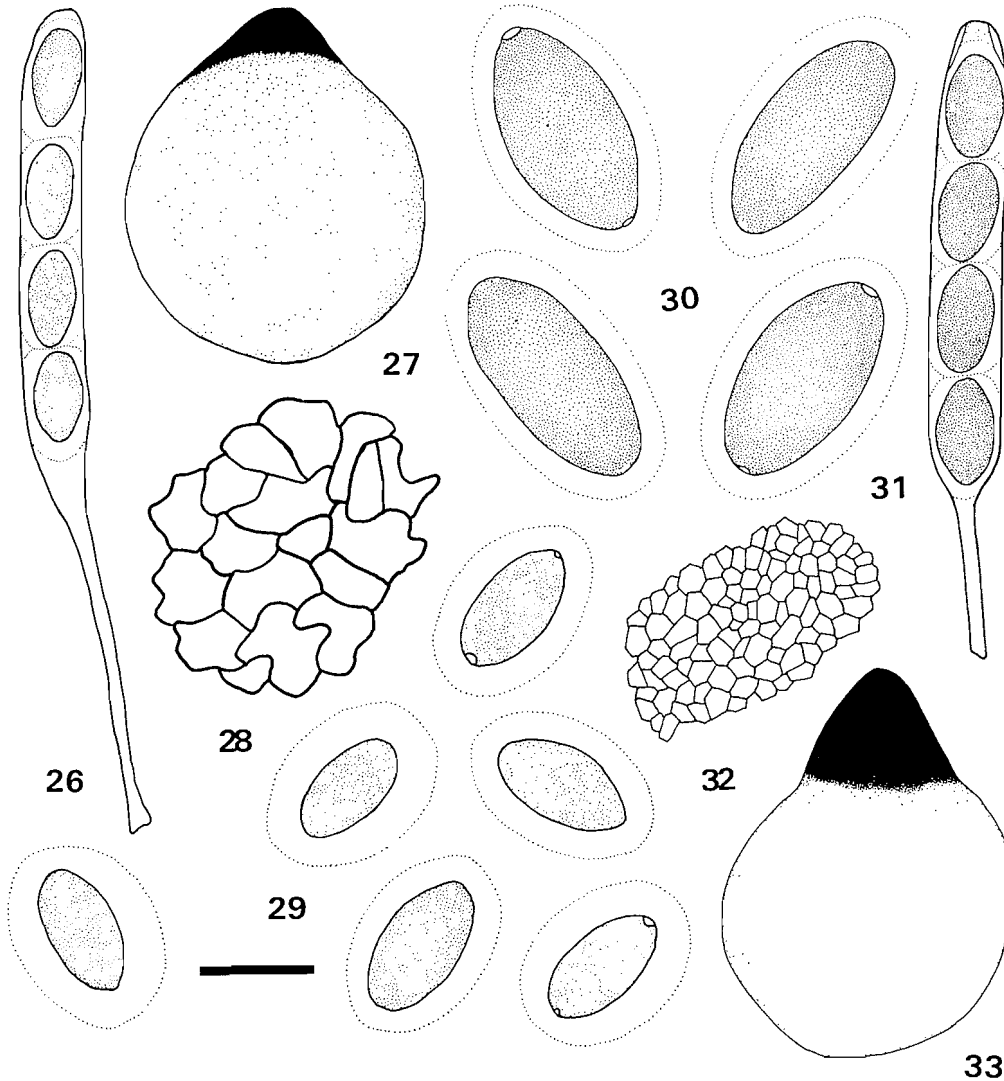
Perithecia scattered or loosely clustered, bare, semi-immersed to erumpent, subglobose to ovoid, 500–600 \times 300–420 μm ; neck very short, dome-shaped to conical, covered with small papillae, black; ostiole very small, indistinct; peridium brown by reflected light, subcoriaceous, 25–30 μm thick, appearing in surface view of angular to interlocking cells, consisting of three layers, an outer layer about 2–3 cells thick, of short-elongate to somewhat quadrate, thick-walled, dark brown cells measuring 6–10 \times 2–4 μm , a middle layer about 5–6 cells thick, of elongated, thin-walled, hyaline cells measuring 12–18 \times 3–4 μm , and an inner layer about 1–2 cells thick, of short-elongate, thin-walled, hyaline cells measuring 5–8 \times 1–2 μm . Asci 4-spored, cylindrical, 110–160 \times 10–11 μm , rounded and thickened at the apices, terminating in a fairly long stipe measuring 40–90 μm long; apical ring very indistinct or sometimes apparently lacking. Paraphyses abundant, filiform, broader towards the base but not constricted, septate, hyaline, longer than and mixed with the asci. Ascospores obliquely or vertically uniseriate, one-celled, surrounded by a rather narrow hyaline gelatinous sheath, ellipsoidal, somewhat narrowed towards the ends, 14–17 \times 8–9 μm , ranging from hyaline when young to yellow-brown, finally dark brown and opaque at maturity, with each containing a prominent basal germ pore about 1–1.5 μm in diameter and a much smaller apical pore (often visible only after bleaching), frequently orientated with the larger pore directed upwards in the lower spores.

ETYMOLOGY: Latinized, from the name of the German mycologist, L. Rabenhorst.

SPECIMENS EXAMINED: BELGIUM: FLANDERS: Blankenberghe, rabbit dung, VII.1884, Mouton, under type of *Hypocopra dunarum* (BR). CANADA: ALBERTA: Jasper Natl. Park, Miette Hot Springs, moose dung, 4.VIII.1962, Luck-Allen, TRTC 38861, 38965, 39905, 45429. Rocky Mt. Forest

Figs. 26–29. *Fimetariella rabenhorstii* (Fungi Europ. Exsicc. 1528). Fig. 26. Ascus and ascospores. Scale bar = 19 μm . Fig. 27. Perithecium. Scale bar = 165 μm . Fig. 28. Peridium in surface view. Scale bar = 11 μm . Fig. 29. Ascospores showing terminal germ pores. Scale bar = 13 μm .

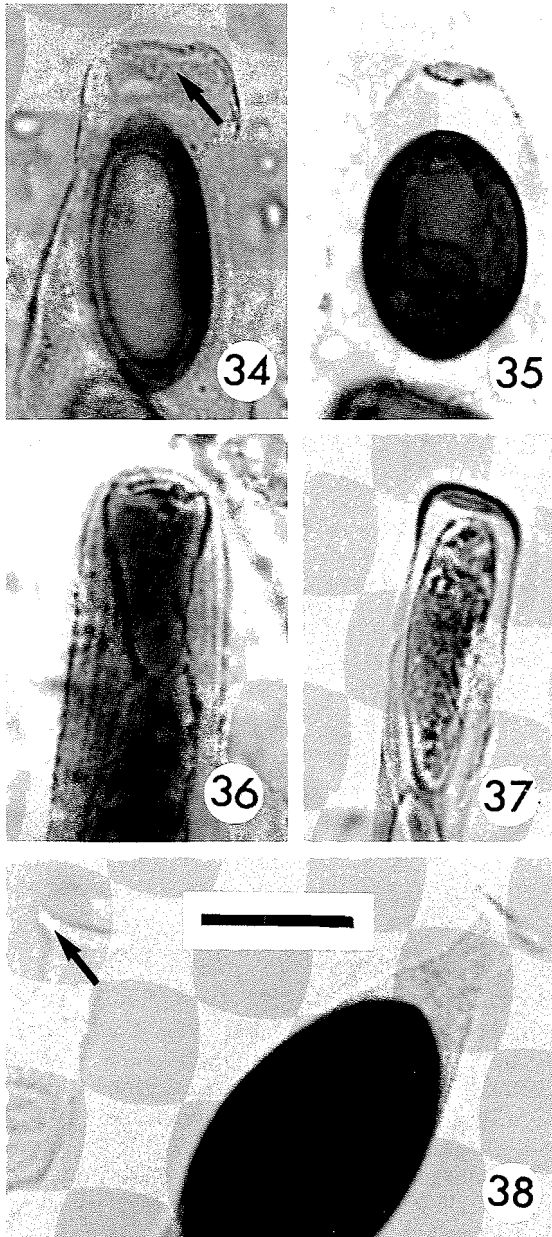
Figs. 30–33. *Fimetariella tetraspora* (TRTC 39101). Fig. 30. Ascospores showing terminal germ pores. Scale bar = 17 μm . Fig. 31. Ascus and ascospores. Scale bar = 37 μm . Fig. 32. Peridium in surface view. Scale bar = 33 μm . Fig. 33. Perithecium. Scale bar = 180 μm .



Reserve, Kananaskis Valley, Dutch Creek, wapiti dung, VIII.1965, *Guccione*, TRTC 45462. NEW BRUNSWICK: Albert Co.: Fundy Natl. Park, Alma, moose dung, 19.VIII.1963, *Cain*, TRTC 46271, Maple Grove Trail, moose dung, 18.VIII.1963, *Cain*, TRTC 41935, Point Wolf, deer dung, 20.VIII.1963, *Cain*, TRTC 46270. NOVA SCOTIA: Cape Breton: Broad Cove, deer dung, 12.VIII.1963, *Cain*, TRTC 44473, 44484, 46321. ONTARIO: Algoma Dist.: Cuthbertson Twp. (196), Mississagi River, porcupine dung, 29.VII.1956, *Cain*, TRTC 36873. Bruce Co.: Formosa, rabbit dung, 19.VII.1932, *Cain*, TRTC 45459; Lucknow, rabbit dung, 10.VII.1930, *Cain*, TRTC 45456; Port Elgin, rabbit dung, 10.VII.1930, *Cain*, TRTC 5119; Teeswater, rabbit dung, 7.I.1932, *Cain*, TRTC 35937, 36001; Brinkman's Corners, rabbit dung, 12.VII.1930, *Cain*, TRTC 35915; Lion's Head, rabbit dung, 13.VII.1930, *Cain*, TRTC 45455;

Oliphant, rabbit dung, 12.VII.1930, *Cain*, TRTC 5142. Grey Co.: Berkeley, rabbit dung, 7.VII.1930, *Cain*, TRTC 5143; Durham, rabbit dung, 9.VII.1930, *Cain*, TRTC 45457. Halton Co.: S of Ballinafad, rabbit dung, 14.VI.1958, *Cain*, TRTC 45430. Manitoulin Dist.: Manitoulin Island, Sheguiandah, rabbit dung, 1.VIII.1933, *Cain*, TRTC 45460. Muskoka Dist.: Huntsville, Fairy Port Inn, rabbit dung, 13.IX.1931, *Cain*, TRTC 35932, Island in Fairy Lake, 5.IX.1931, *Cain*, TRTC 36034. Nipissing Dist.: Algonquin Prov. Park, Cache Lake, porcupine dung, 1.IX.1939, *Cain*, TRTC 36667. Thunder Bay Dist.: Lake Superior Prov. Forest, Poshkokogan River, moose dung, 5.VIII.1965, *Cain*, TRTC 43513. Victoria Co.: Fenelon Falls, rabbit dung, 15.IX.1931, *Cain*, TRTC 45461; Oakwood, rabbit dung, 15.IX.1931, *Cain*, TRTC 36390. York Co.: N of Mt. Albert, rabbit dung, 25.IX.1936, *Cain*, TRTC

Figs. 34–38. Ascal apical rings. Fig. 34. *Fimetariella apotoma* (TRTC 42408). Ascus with rather indistinct ring (arrow). Scale bar = 16 μm . Fig. 35. *Fimetariella brachycaulina* (TRTC 39641). Mature ascus with distinct, thickened ring. Scale bar = 17 μm . Fig. 36. *Fimetariella dolichopoda* (TRTC 42238). Young ascus with thickened ring. Scale bar = 17 μm . Fig. 37. *Fimetariella dunarum* (Mouton 271). Young ascus with distinct, thickened ring. Scale bar = 23.5 μm . Fig. 38. *Fimetariella tetraspora* (Lqt 16549t). Mature ascus with prominent ring. Note broad upper flange (arrow) in this collection. Scale bar = 13.5 μm .



45458. QUEBEC: Gaspé West: base of Mt. Albert, deer dung, 21.VII.1963, *Cain*, TRTC 46272. CZECHOSLOVAKIA: MORAVIA: Brno, deer dung, spring, *Niessl*, Fungi Europaei Exsicc. 1528 (B, G, NY, S, UPS, TRTC-slides, ZT), hare dung, summer, *Niessl*, under *Sporormia leporina* (S, TRTC-slides). DENMARK: sine loco, deer dung (as goat dung), 23.III.1875, *Hansen*, Fung. Fimicorum Exmpl. Exsicc.

p. 22(4) (C). SWEDEN: DALARNA: Transtrand par.: Fulunäs, moose dung (as elk dung), α . 6.VII.1959, *Lundqvist* 2183a (TRTC). UPPLAND: Älvkarleby par.: 4 km NE of Gårdsjär, moose dung (as elk dung), 30.VI.1965, *Lundqvist* 4602a (TRTC). U.S.A.: COLORADO: Larimer Co.: Rocky Mt. Natl. Park, Fall River, wapiti dung, 19.VIII.1957, *Cain*, TRTC 45168. IDAHO: Fremont Co.: Targhee Pass, wapiti dung, 1.IX.1962, *Cain*, TRTC 39460. WYOMING: Teton Co.: Moran, moose dung, 3.VII.1955, *Cain*, TRTC 32318.

The characteristic features of *F. rabenhorstii* are the 4-spored asci, very thin ascal apical ring that occasionally may be lacking, and the small ascospores. *Fimetariella macromischa* also has 4-spored asci and small ascospores but can be distinguished by the more subglobose shape and slightly smaller size of the spores as well as the thickened ascal apical ring. In *F. microsperma*, the spores are similar in size, but this taxon has 8-spored asci and a very minute apical germ pore.

Udagawa (1980) successfully cultured this species and reported the presence of chlamydoconidia. Apparently no phialidic anamorph was observed as in *F. microsperma*, which is the only other species for which cultural information is available. Culturally the colonies are darker, being more typical of the Lasiosphaeriaceae than those observed in *F. microsperma*.

The collection described by Udagawa (1980) is interesting because it was isolated from tropical soil, most previous collections being obtained from herbivorous dung in the northern boreal zone. This isolate appears to agree favourably with typical material of *F. rabenhorstii* except for the slightly larger ascospores.

***Fimetariella tetraspora* Krug, sp.nov.** Figs. 30–33, 38

Perithecia dispersa, glabra, immersa, subpyriformia, quasi albida, 600–650 \times 500–550 μm magna; peritheci collum breve, conicum, glabrum, atribrunneum aut quasi nigrum, distinctum, circa 150–200 μm longum; peridium pallide fulvum, membranaceum, 15–25 μm crassum, e cellulis parvissimis, angulatis aut serpentine intricatis, hyalinis, cum parietibus tenuibus textum. Asci quadrispori aut raro quinquiespori et sexspori, cylindricei, 190–230 \times 22–25 μm magni, in apice attenuati et truncati, basin versus in stipitem 25–45 μm longum attenuati; annulum apicale distinctissimum, incrassatius. Paraphyses numerosae, filiformes, septatae, hyalinae, guttulatae. Ascosporae primum oblique uniseriales, unicellulares, vagina hyalina gelatinosa circa 8 μm lata postremo circumdatae, ellipsoideae, in apice attenuatae, (30–)32–36(–38) \times 17–19(–20) μm magnae, primum hyalinae vel olivaceae, maturitate confirmata atribrunneae et opacae, foramen germinale apicale prominens, circa 2.5–3 μm diametro crassum et foramen basilare aliquanto minus, circa 2–2.5 μm diametro crassum exhibentes.

HOLOTYPE: In equorum fimo lectus est, apud Sundance, in Crook comitatu Wyomingensium finium, in imperio U.S.A., 3 Sept. 1962, *Cain*, TRTC 39101. In Museo Regi Ontariensis Cryptogamarum herbario.

Perithecia scattered, bare, embedded, subpyriform, appearing almost white, 600–650 \times 500–550 μm ; neck short, conical, stout, bare, very dark brown to almost black, distinct, about 150–200 μm long, with dark yellow-brown, thick-walled, oblong cells measuring 8–10 \times 2–3 μm ;

ostiole small, rather indistinct; peridium light yellowish brown by reflected light, semitransparent, membranaceous, 15–25 μm thick, appearing in surface view of very small, angular to interlocking, thin-walled, hyaline cells measuring 5–8 \times 2–4 μm . Asci 4-spored, or rarely 5- and 6-spored, cylindrical, 190–230 \times 22–25 μm , narrowed and truncated at the apices, tapering into a fairly long stipe measuring 25–45 μm long; apical ring very prominent, somewhat thickened. Paraphyses very abundant, filiform, septate, hyaline, guttulate, longer than and mixed with the asci. Ascospores initially obliquely uniseriate, one-celled, surrounded by a hyaline gelatinous sheath reaching a width of about 8 μm , ellipsoidal, slightly narrowed towards the ends, (30–)32–36(–38) \times 17–19(–20) μm , ranging from hyaline when young to olivaceous, finally very dark brown and opaque at maturity, with each containing a prominent apical germ pore measuring about 2.5–3 μm in diameter and a slightly smaller basal pore measuring about 2–2.5 μm in diameter, frequently orientated with the larger pore directed downwards in the lower spores.

ETYMOLOGY: Greek *tetra* ($\tau\epsilon\tau\alpha$) meaning four and *spora* ($\sigma\pi\omicron\rho\alpha$) meaning seed, referring to the 4-spored asci.

SPECIMENS EXAMINED: HUNGARY: BÁCS-KISKUN: 20 km W of Kecskemet, Fülöphaza, roe deer dung in sand dunes with steppe vegetation, 26.V.1987, *Lundqvist* 16549t (S). U.S.A.: WYOMING: Crook Co: Sundance, horse dung, 3.IX.1962, *Cain*, TRTC 39101.

This species has a semitransparent, almost colourless peridium with thin-walled, hyaline cells. In this respect it differs from all other species in which the peridium is pigmented and is composed of thick-walled, brownish cells. The 4-spored asci and relatively large ascospores are additional diagnostic features. The only species that might be confused is *F. dolichopoda* that besides the dark peridium differs in possessing asci with a longer stipe and more pronounced apical ring.

The Hungarian collection differs in having a peridium that is very slightly pigmented, with more distinct cellular structure in surface view composed of slightly thick-walled cells and the apical ring has a slightly broader upper flange

(Fig. 38). These deviations are considered to be insignificant, since both collections are from dry arid habitats.

Relationships

Lundqvist (1964) considered that *Fimetariella* was not a close relative of *Sordaria* Ces. & de Not. but rather should be phylogenetically derived within an assemblage including *Podospora* Ces. Subsequently, Lundqvist (1972) placed *Fimetariella* and *Bombardioidea* in the Lasiosphaeriaceae that he separated from the Sordariaceae sensu stricto on the basis of the presence of true filiform paraphyses, cylindrical-clavate asci, typically two, multicelled, biserially to multiserially arranged ascospores, and the presence of gelatinous appendages in most genera. Recently, Guarro et al. (1991) and A. Cannon (personal communication) questioned the validity of the distinction between these families. Certainly the presence of one-celled ascospores is rarely found in *Podospora*-like fungi, as discussed by Krug (1989). As I pointed out (Krug 1989), if *Fimetariella* is related to *Podospora*, then this is also true of *Periamphispora*. If one looks at culture criteria, it is observed that members of the Sordariaceae are cultured relatively easily, grow relatively rapidly in axenic culture, and rarely produce anamorphs, whereas members of *Podospora* and related fungi are frequently more difficult to culture, produce relatively slow-growing dark colonies, and anamorphs are frequently present. Although little culture data are available for *Fimetariella* and *Bombardioidea*, that which is available is consistent with data for *Podospora*-like fungi. This is also true for *Periamphispora*. For the present I believe that *Fimetariella* and related genera should be retained in the Lasiosphaeriaceae until additional information, such as molecular sequence data, becomes available.

Since one-celled ascospores are atypical within the Lasiosphaeriaceae, one might have a tendency to confuse genera possessing this type of spore with members of the Sordariaceae sensu stricto, in which the spores are typically one-celled. To emphasize the distinction between the three genera with minor pores in the ascospores, a key to these genera is provided.

Key to genera with ascospores containing minor pores

- 1. Ascocarps confluent at bases, ostiolar region almost indistinguishable; peridium composed of an outer rind, medial noncellular gelatinous matrix and an inner pseudoparenchyma *Bombardioidea*
- 1. Ascocarps scattered, not confluent, with distinct ostiole; peridium composed entirely of pseudoparenchyma 2
- 2. Asci cylindrical; ascospores uniseriate, with invagination of sheath about larger germ pore causing a halo, papilla lacking *Fimetariella*
- 2. Asci clavate; ascospores biserial, with protruding germ pore lacking halo, small papilla between cytoplasm and inner wall present *Periamphispora*

Acknowledgments

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