STUDIES OF COPROPHILOUS ASCOMYCETES

VII. PREUSSIA[1]

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Abstract

The Plectascales and Perisporiales are both artificial taxa each consisting of a miscellaneous assemblage of unrelated genera. The generic name *Perisporium* is not valid for species of Ascomycota (Ascomycetes). The valid name for those species which produce ascocarps is *Preussia* Fuckel. The ascocarps are non-ostiolate (cleistothecia) and their development is the same as that in the Loculo-ascomycetes (producing a pseudothecium). The ascocarp of *Preussia* is thus a cleistothecial pseudothecium. The genus most closely related to *Preussia* is *Sporormia* and the two may be included in the same family Sporormiaceae. *Preussia* is not included in the Phaeotrichaceae on account of the elongated germinal slit and lack of hairs on the peridium of the ascocarp. Twelve species are included with descriptions and illustrations. The type species of *Preussia* is *P. funiculata* Fuckel. Three species are transferred to this genus from *Perisporium*. These are *P. punctata* (Auersw.) Sacc., *P. typharum* Sacc., and *P. vulgare* Corda. One species is transferred from each of the following genera: *Sporormia* (*Sp. fleischhakii* Auersw.), *Muellerella* (*M. nigra* Routien), *Pycnidiophora* (*P. dispersa* Clum), *Anixiopsis* (*A. multispora* Saito and Minoura), and *Thielavia* (*T. indica* Chattop. and Das Gupta). The following three species are described as new: *P. isomera*, *P. terricola*, and *P. purpurea*.

Introduction

The genus *Preussia* was published by Fuckel, who gave a valid diagnosis on the label of his exsiccatum, Fungi rhenan. Suppl., Fasc. III, No. 1750. issued in 1866. It runs as follows:

"*Preussia* Fckl.
Perithecium hyphopodio delicatulo floccoso spurio suffultum, carbonaceum, astomum, dein irregulariter ruptum secedensque. Asci clavati, longe pedunculati, 8 spori paraphysibus nullis. Sporidia oblongo-cylindracea, demum in articulos quatuor ovatos angulatosque, simplices, atro-fuscos secendentia."

And further:
"1750. *Preussia funiculata* Fckl. Syn. *Perisporium* f. Prss. Linn. 24. no. 145. Ad lignum quercinum putridum, rarissime. Hieme. Ca. Hostrichiam."
It is apparent that the genus *Preussia* is distinct from *Perisporium*, a genus first validly published by Fries (1825). The following is a complete transcript of the discussion there:
"182 *Perisporium** (Cb[3]). Peridium innato-superficiale, intus carnoso-gelatinosum, sporidiiferum. *Punctiforme, nullis fibris impositum, in plantis vivis parasiticum.*
"Frequenter occurrunt hujus formae 1. species, praecipue in supina foliorum pagina, glan- /p. 162/ dulas referentes. Hujus loci *Sclerot. speireum* S. M.,

[1]Manuscript received July 26, 1961.
Contribution from the Department of Botany, University of Toronto, Toronto, Ontario. This study was carried out with the assistance of grants in aid of research furnished by the University of Toronto and The National Research Council of Canada.

Scl. Caladii &c. Evidenter prioribus affine; fatendum tamen est me sporangiola nulla vidisse.—Haec tandem est Gasteromycetum forma maxime elementaris."

The "prioribus" in the next to the last sentence appears to refer to the other genera of "Trib. iv. Perisporii", which includes, in order, *Erysiphe*, *Podosphaeria*, *Lasiobotrys*, and *Perisporium*. Since Fries says, in italics, "in plantis vivis parasiticum", the genus *Perisporium* was established for species entirely unrelated to the group here included under *Preussia*. The type species of *Perisporium* appears to be *P. speireum* described by Fries (1815, p. 185; 1822, p. 261) as *Sclerotium speireum*. It was redescribed by Fries (1829, p. 250). The other original species, *Scl. Caladii*, was so published by Schweinitz (1822) and republished by Fries (1822, p. 261), but omitted by Fries (1829) from his later treatment of *Perisporium*.

P. speireum was distributed in Scl. Suec. exs. 206. I have examined a slide of this made from the material at Uppsala and it consists of pycnidia only. It is an Imperfect fungus as are many of the other species included in *Perisporium*. At least one specimen identified as a *Perisporium* is the spermogonial stage of a rust fungus.

Spororrmia fleischhakii was described by Auerswald on the label of Rabenhorst, Fung. eur. No. 921 issued about 1866. Auerswald (1866 and 1868) republished the description twice. For this species the same author (1869) published the new genus *Fleischhakia* with a new specific epithet *F. laevis* Auersw. I have examined the specimen referred to above (in BPI) and consider that it is not conspecific with the one studied by Fuckel as *Preussia funiculata* but that the two are congeneric. Since *Preussia* was validly published prior to *Fleischhakia* it is the correct generic name to use and the latter genus must be treated as a synonym. However, *Preussia fleischhakii* is regarded as a valid species distinct from *P. funiculata*. In the same publication, Auerswald (1869, p. 2) included a second new species, *Fleischhakia punctata*. This is distinct from the other two species mentioned above.

The generic name *Fleischhakia* was used by Rabenhorst (1878) for an entirely different fungus (Discomycete).

Relationship

Preussia is similar to *Sporormia* as indicated by Munk (1957) and the two have frequently been confused. The former is distinguished by the lack of ostiole, the more superficial position of the ascocarp, and the broader, nondehiscent asci. The early stages in the development of the ascocarps are similar in both genera. Spermogonia are produced by at least one species of *Preussia* as well as some of *Sporormia*.

For the most of the species of *Preussia* no adequate means of delimitation is available. Furthermore they are scattered throughout various genera, some of which have been assigned to the unrelated family Aspergillaceae. The most reliable characteristics appear to be the size and relative shapes of the ascospore segments as well as pigment formation in culture. Within the genus there is a great range of variation with respect to the shape of the asci, the length of the stipe, and the arrangement of the asci within the ascocarp. At the one extreme are species such as *P. funiculata* with elongated

asci arranged in a parallel layer very much as in the genus *Sporormia*. At the other extreme, the asci are small, subglobose, and irregularly disposed in the ascocarp. There are, however, many intergradations in these features such that no generic separations can be made. Indeed, it is very difficult to determine where one species ends and the next begins. Most of the species included here in *Preussia* have been studied in culture but much remains to be done with respect to adequate species descriptions and delimitations. In view of the extensive confusion that exists in the literature concerning this genus, it appears desirable to place on record the information and conclusions so far available.

The order Plectascales is not a natural one. As it is now used it contains a miscellaneous group of entirely unrelated genera. *Preussia* has no close affinity with any of the other genera included in either the Plectascales or Perisporiaceae. In its development and morphological structures it belongs with the Loculoascomycetes in spite of the different ascus structure associated with its nondehiscent nature. This has evolved by reduction. The only family available for cleistothecial, saprophytic species belonging in the Loculoascomycetes is the Phaeotrichaceae. On account of the linear germinal slit and lack of hairs, *Preussia* does not belong in this family. There is considerable doubt as to whether the lack of an ostiole and the shape, arrangement, and nondehiscence of the asci are characters of any value in classification at the family level. It seems preferable, for the present, to include *Preussia* in the family Sporormiaceae.

From the time of Auerswald (1866), most authors have recognized the affinity between *Preussia* and *Sporormia*, but the species delimitation and generic position have been in a continual state of doubt and confusion.

Descriptions

Preussia Fuckel (Sporormiaceae, Loculoascomycetes), Fungi rhenan. Suppl., Fasc. III, No. 1750, issued in 1866

Saprophytic; ascocarps superficial, cleistocarpous, unilocular, stromatic, black, shining, glabrous, globose to subglobose, with thin, carbonaceous-membranaceous peridium, with no definite cleavage areas. Asci 8-spored, broadly clavate and arranged in a parallel fascicle or subglobose and irregularly disposed, short to long stipitate, with crozier at base, without pore or thickening in apex and without special means of dehiscence, rarely exhibiting a bitunicate characteristic type of elongation, fairly thick walled and persistent in a water mount while still immature but becoming very fragile and evanescent at the time of maturity of ascospores. Paraphyses usually present in early stages of development but disappearing at maturity except in abnormal ascocarps containing few asci. Ascospores lying parallel in a fascicle or irregularly disposed in a subglobose mass, with three transverse septa, deeply constricted; segments readily separable at maturity (or in some species, as soon as visible), dark brown and opaque with thick wall and elongated germinal slit extending full length of each cell.

Spermogonia have been found in one species only, *P. dispersa*. Similar spermogonia have been found by the author in a few species of *Sporormia*.

The cultural characteristics and development of the ascocarps in species of *Preussia* and *Sporormia* are very similar.

Preussia was republished by Fuckel (1870).

Type species.—*Preussia funiculata* Fuckel.

Key to the Species

1. Ascospores with obliquely transverse septa and with cells nearly equal in size and shape ..... 1. *P. funiculata*
1. Ascospores with transverse septa not oblique, with cells equal or unequal 2
2. Asci large with more distinctly elongated stipe (except in *P. fleischhakii*). Ascospores more than 5 μ broad 3
2. Asci smaller, shorter, with short stipe. Ascospores less than 5 μ broad 7
3. Ascospores 22–37 × 10–14(17) μ ..... 2. *P. punctata*
3. Ascospores less than 9 μ in width 4
4. Mid-cells broader than long, distinctly shorter than end-cells ..... 3. *P. typharum*
4. Mid-cells and end-cells about equal in width, with end-cells only slightly longer than mid-cells 5
5. Ascospore segments over 6 μ in width, stipe very short ..... 4. *P. fleischhakii*
5. Ascospore segments less than 6 μ in width, stipe longer 6
6. Asci over 75 μ in length, with spores extended out in several series at different levels ..... 5. *P. terricola*
6. Asci less than 75 μ in length, with spores in more-compact bundle ..... 6. *P. vulgare*
7. Ascospore segments remaining attached together until near maturity, measuring 7–9 × 4.0–4.5 μ ..... 7. *P. isomera*
7. Ascospore segments separating at a very early stage, smaller 8
8. Asci clavate, 30–40 μ long ..... 8. *P. nigra*
8. Asci subglobose, less than 30 μ long 9
9. Spermogonia present ..... 9. *P. dispersa*
9. Spermogonia absent 10
10. Colony with violet or purple coloration ..... 12. *P. purpurea*
10. Colony without violet or purple coloration 11
11. Ascospores rarely with fewer than 3 septa ..... 10. *P. multispora*
11. Ascospores frequently with fewer than 3 septa ..... 11. *P. indica*

1. ***Preussia funiculata*** (Preuss) Fuckel, Fungi rhenan. Suppl., Fasc. III, No. 1750, 1866. (Figs. 1–12)

≡*Perisporium funiculatum* Preuss, Linnaea, **24,** 143 (1851).

Ascocarps scattered or loosely aggregated, superficial, subglobose, slightly depressed from above, 250–550 μ in diameter, black, shining, smooth, glabrous, nonostiolate. Peridium of ascocarp thin, carbonaceous-membranaceous to slightly coriaceous when young and fresh, becoming very fragile and brittle when dry, splitting irregularly, without definite cleavage areas, composed of nearly isodiametric cells measuring 5–10 μ in diameter. Asci eight-spored, broadly clavate, 75–200 × 20–28 μ (spore-bearing portion 45–80 × 20–28 μ), broadest part above middle, narrowed toward apex, no apical structure visible, gradually narrowed below to a long or very long, slender, nearly cylindrical stipe varying in length from 30 to 60 μ (in culture up to 130 μ), lying in a parallel layer attached at base of ascocarp, with crozier at base, with a thick, firm, persistent wall when young but evanescent at maturity. Asci in some collections with irregular number of abortive ascospores fairly frequent and then only three- to seven- spored. Paraphyses mixed with asci in a parallel layer, filiform, septate with cylindrical or swollen cells 3–8 μ in diameter, sometimes abundant in young ascocarps produced in culture, usually disappearing at maturity. Ascospores crowded in partially overlapping fascicle lying parallel with ascus, nearly cylindrical, 24–38 × 5.0–7.5 μ (mostly

28–32 × 6.0–7.0 μ), four-celled, deeplyc onstricted, very obliquely septate, segments easily separable at maturity, straight or slightly curved, the smooth ascospore wall thick, hyaline at first, then yellow and finally very dark brown and opaque at maturity. Germinal slit longitudinal, extending obliquely entire length of each segment, very distinct. Upper end cell of ascospore 9.0–11 μ long and 6.0–7.0 μ wide, conspicuously narrowed toward end, somewhat conical. End-cells 9.0–11 × 6.0–7.0 μ, only slightly narrowed toward end and broadly rounded. Mid-cells 6.5–7.5 μ long and 6.5–7.0 μ wide, equal in size and shape, only slightly broader and slightly shorter than end-cells. Ascospores rarely with one (end), two (end), or all three septa lacking. One-celled ascospores 30–33 × 8–10 μ, half ascospore (double segment) 16–19 × 6.5–7.5 μ. No conidia and no spermogonia.

Collections examined.—EUROPE: Fuckel, Fungi rhenani 1750, on decaying oak wood, Hostrichiam, Austria (BPI, FH, NY, TRTC). Rabenhorst, Fungi europaei 1433, on damp, decaying fire-hose, coll. Fleischhak (BPI, FH). Krieger, Fungi saxonici 426, on old beehive, Augustusberg, Saxony (BPI, TRTC), 1164, on old bag, Königstein (BPI, NY, TRTC). Petrak, Flora Bohemiae & Moraviae exs. 625, auf Schilfdecke, Mähr-Weisskirchen (BPI, FH). Rehm, Ascomyceten 1044, on dog dung, Gohrau-Worlitz, leg. Staritz, March 1890, as *Perisporium laeve* Auersw. (NY). Thümen, Mycoth. Univ. 161, on straw, Arnstadt, Thüringen, coll. Auerswald, as *Perisporium laeve* Auersw. (in part *Preussia typharum*) (NY, BPI). Zopf, Flora Islebiensis, on rye straw, near Eisleben, April 1873 (in part *Preussia typharum*) (NY). On decayed wood, Smolensk, U.S.S.R., 1895, Jaczewski (BPI). On old sacking, Boolsham Common, Surrey, England, June 22, 1947, (in part *Preussia typharum*) (IMI 16006a) (TRTC 32084, cultured at Toronto, June 1956). On plank lying on ground, Bolton Percy, Yorkshire, England, March 21, 1940, W. G. Bromley (FH, TRTC 32085). On rabbit dung, Brandenburg, Germany, May 10, 1910, O. Jaap (TRTC 34636). QUEBEC: On horse dung, Percé, Gaspé (TRTC). MANITOBA: Culture from tomato seed, April 25, 1940, J. W. Groves, 1-5-1256 B (TRTC 34638). ONTARIO: On dung of rabbit and porcupine. Purbrook, Muskoka, 32428. Lake Timagami, 34635, 34640, 34642, 34643, 34644. Lion's Head, 34641. Burford, Brant, 34637. Singhampton, Grey, 34635. (TRTC.) Gravenhurst, Muskoka, 34639. Penetanguishene, Simcoe, 34634.

In culture the fungus grows fairly rapidly producing white, aerial mycelium with indefinite margin on the colony. Ascocarps are fairly numerous on Leonian's + Y but less abundant on V-8 agar. They are superficial on the agar embedded in the aerial mycelium and normal in appearance except for the size, which is slightly larger than when growing on normal substrata. Ascocarps produced in culture frequently become filled with abundant paraphyses and contain few asci. After a few transfers of the culture there is frequently a progressive decrease in the number of asci with a corresponding increase in the quantity of paraphyses.

In many collections there is a tendency to produce some asci with fewer than eight ascospores. This is due to the disintegration of some of the ascospores while these are still small and hyaline. The remaining normal ascospores

are similar in size and shape to those found in eight-spored asci. These abnormal asci are more abundant in some collections than others.

As with most species of *Preussia*, one, two, or even three of the septa fail to develop in the ascospores. An ascus usually contains some normally septate ascospores along with others with a variable number of missing septa. For example, an ascus may contain seven normal spores and one with only a single septum. If one septum remains, it is the one at the middle, thus producing a spore with two double segments. In the other type of abnormal spore, there is one double segment at one end and two ordinary cells at the other.

Asci have a rather thick, firm wall which in young asci (up to the time of maturity of the ascospores) remains intact when crushed out of the ascocarps in a water mount.

This species can be recognized by means of the obliquely septate ascospores which have four cells nearly equal in size and shape.

2. ***Preussia punctata*** (Auersw.) Cain comb. nov. (Fig. 31)

≡ *Fleischhakia punctata* Auersw., Hedwigia, **8,** 2 (1869).

≡ *Perisporium punctatum* (Auersw.) Sacc., Syll. Fung. **1,** 56 (1882).

Ascocarps superficial, scattered, 500–1500 μ in diameter, black, punctate, nonostiolate. Peridium membranous, becoming brittle and fragile on drying with upper part readily breaking off. Cells of peridium dark brown, opaque, and indistinct with wall minutely punctate. Asci four- to six-spored, clavate-ovoid, 200–300 × 25–35 μ, with a very long stipe, evanescent at maturity. Paraphyses numerous, filiform. Ascospores obliquely in several series, four-celled, cylindric-oval, dark brownish-black, 22–37 × 10–14 μ, partially constricted at the septa and readily separating at maturity. Mid-cells 7–10 × 10–14 (rarely 17) μ, short barrel-shaped, unequal. End-cells subspherical with a flattened end (next to mid-cell), 7–9 × 7.5–10 μ, slightly narrower than mid-cells. Germinal slit extending entire length of each cell, very distinct, extending lengthwise, nearly parallel with ascospore or oblique.

Collections examined.—EUROPE: On decaying wood of *Quercus*, Arnstadt, Thuringia, Dr. Fleischhak, **type** (FH). UNITED STATES: on wood in old disused greenhouse, West Roxbury, Mass., Dec. 1900, Piquet (FH).

Easily recognized by means of the large size of the asci and ascospores. The ascospores are broader in proportion to the length than in any of the other species of *Preussia* and furthermore the ascospores are not as deeply constricted at the septa.

3. ***Preussia typharum*** (Sacc.) Cain comb. nov. (Figs. 25–30)

≡ *Perisporium typharum* Sacc., Atti soc. venet. trent. sci. nat. **2,** 92 (1873).

Culture on Leonian's + yeast extract agar; hyphae forming a moderately thick, dense, cottony layer, white at first, soon changing to gray and then darker, with production of black layer on surface of agar, hyphae turning brown with production of ascocarps, agar turning dark reddish-brown to nearly black, subcultures soon becoming nonfruiting and remaining white; on V-8 vegetable juice agar, less growth with fewer ascocarps, distinct red coloration in agar, with less tendency to go sterile. Ascocarps scattered

or loosely aggregated on natural substrata, often densely clustered on agar in culture, superficial, subglobose, slightly depressed from above, 250–530 μ in diameter, black, shining, smooth, glabrous, in culture covered with a dense layer of light brown hyphae forming a continuous and uniform mat, non-ostiolate. Asci eight-spored (sometimes with fewer than eight, and rarely some of ascospores remaining hyaline), broadly clavate, 80–130 × 18–24 μ (spore-bearing portion 50–80 × 18–28 μ), broadest part near apex, slightly narrowed toward apex, no apical structure visible, gradually narrowed below into a long or very long, slender stipe varying in length from 30 to 100 μ, and about 3–4 μ in width, lying in a parallel layer attached at base of ascocarp, with crozier at base, with thick, firm, persistent wall when young, not elongating in water at maturity, evanescent after drying when mature. Asci in young ascocarps mixed with few, swollen, hyaline cells which disappear at maturity. Sterile ascocarps (in culture) become filled with large, swollen, hyaline cells but no asci. Ascospores crowded in a partially overlapping fascicle lying parallel with ascus, fusiform-cylindrical, (22)26–35(40) × 7.0–8.0(10) μ, four-celled, deeply constricted, septa transverse, or rarely slightly oblique, segments easily separable at maturity, straight or rarely slightly curved, the smooth ascospore wall thick, hyaline at first, then yellow and finally very dark brown and opaque at maturity. Germinal slit longitudinal, extending obliquely entire length of each segment, very distinct. Mid-cells (5)6–7(9) μ long and 8–10 μ wide, width distinctly greater than length, short barrel-shaped. End-cells (8)10–13(16) μ long and 6–8 μ wide, subconical, distinctly longer and narrower than mid-cells. Ascospores rarely with one (end), two (end), or all three septa lacking. One-celled ascospores about 28×8 μ, fusiform-cylindrical, half ascospores about 13–18 × 8.5 μ, subconical. No conidia and no spermogonia.

Collections examined.—EUROPE: Petrak, Flora Bohemiae et Moraviae exs. 963, auf einer Bastdecke, Mähr-Weisskirchen; Schuttplatz, Oct. 1913, F. Petrak (PR 166306). Thümen, Mycoth. Univ. 161 (in part *P. funiculata*) (NY, BPI). Sydow, Mycotheca Marchica 2830, on old basket, Schoeneberg bei Berlin (NY). Zopf, Flora Islebiensis bei Eisleben, on rye straw, April 1873 (with *P. funiculata*) (NY). Rabenhorst, Fungi eur. 1338, on decaying straw, Arnstadiae, 1868, leg. Fleischhak, as *Perisporium Fleischhakii* (BPI, FH), on old sacking, Boolsham Common, Surrey, England, June 22, 1947, S. J. Hughes (IMI 16006a, TRTC 32086) (in part *P. funiculata*). On old sacking, Forge Valley, Yorkshire, England, S. J. Hughes (IMI 13767a, TRTC 32085) cultured, Toronto, 1956. On cow dung, Tamsel, Germany, P. Vogel (TRTC 34630). U.S.A.: Grifiths, West American Fungi 178 as *Perisporium vulgare*, Aberdeen, South Dakota (BPI). On rabbit dung, April 1893, R. Thaxter 1286 B (FH). ONTARIO: On rabbit dung, New Durham, Brant, developed in moist chamber (TRTC 34633). On bird pellets, New Durham, Brant, developed in moist chamber (TRTC 34632). SASKATCHEWAN: On rabbit dung, Beaver Creek, developed in moist chamber (TRTC 34629). On rabbit dung, Saskatoon, developed in moist chamber (TRTC 34631).

One ascus in IMI 13767a had six ascospores one of which was three-septate and the remaining five one-septate with one cell slightly longer than the

other in each case. One ascospore in TRTC 32085 had two cells, one of which measured 18.5×8.5 μ and the other 16.5×8.5 μ.

Preussia typharum can be separated from *P. fleischhakii* by the shape and size of the cells in the ascospores. In the former species there is a greater difference between the size and shape of the end- and mid-cells, the end-cells being slightly longer and the mid-cells distinctly broader and shorter.

4. ***Preussia fleischhakii*** (Auersw.) Cain comb. nov. (Figs. 13–24)

Sporormia fleischhakii Auersw., *in* Rabenh. Fung. eur. 921 (1866) and Hedwigia, **7**, 66 (1868).

Fleischhakia laevis Auersw., Hedwigia, **8**, 2 (1869).

Ascocarps scattered or loosely aggregated, superficial, subglobose, slightly depressed from above, 300–450 μ in diameter, black, shining, smooth, glabrous, nonostiolate. Peridium of ascocarp thin, carbonaceous-membranaceous to slightly coriaceous when young and fresh, becoming very fragile and brittle when dry, splitting irregularly, without definite cleavage areas, composed of nearly isodiametric, angular, four to six straight-sided cells measuring 5–8 μ in diameter. Asci eight-spored, subglobose to very broadly clavate, 43–60 × 20–28 μ including the very short stipe measuring 10–14 μ in length, broadest near middle, narrowed above and below, broadly rounded at apex, no apical structure visible, lying in a parallel layer attached at base of ascocarp, with crozier at base, with a thick, firm, persistent wall when young but evanescent at maturity. Paraphyses mixed with asci in parallel layer, septate with cylindrical to subglobose cells 3–9 μ in diameter, sometimes abundant in young ascocarps produced in culture, usually disappearing at maturity. Ascospores crowded in fascicle lying parallel with ascus and overlapping most of their length, nearly cylindrical, 26–35 × 6.0–7.5 μ, four-celled, deeply constricted, transversely septate, segments easily separable at maturity, straight or slightly curved, the smooth ascospore wall thick, hyaline at first, then yellow and finally very dark brown and opaque at maturity. Germinal slit longitudinal, slightly oblique, extending entire length of each segment. End-cells of ascospore 8–10 × 6.0–7.0 μ, nearly equal in size and shape. Mid-cells 5.5–7.5× 6.0–7.5 μ, longitudinal measurement about equal to width, slightly shorter than end-cells but otherwise similar, ascospores rarely with one septum lacking. No conidia.

Collections examined.—EUROPE: Rabenhorst Fungi europaei 921, on partially decayed wood, Wallendorf, Hungary, coll. Kalchbrenner. ONTARIO: On sheep dung, New Durham, Brant, developed in moist chamber (TRTC 34627). On dung, Nashville, York, developed in moist chamber (TRTC 31723). QUEBEC: On partridge dung, Duchesnay (TRTC 34626).

In culture (TRTC 31723) the fungus grows fairly rapidly producing woolly aerial mycelium with an indefinite margin; white at first but becoming pinkish. Color diffuses into the agar so that Leonian's + yeast extract becomes slightly reddish and V-8 becomes a much darker red. Ascocarps with mature ascospores are produced on both media.

This species can be distinguished from *P. funiculata*, with which it has usually been confused, by means of the ascospore septa which are transverse and not oblique, or rarely only slightly so, and by the broader asci which have a much shorter stipe. In *P. fleischhakii* the four cells of the ascospore are