Revision of the genus *Podospora*[1]

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A key is provided for the 64 recognized species of *Podospora*. The genus is restricted to species in which the ascospores have an apical germ pore, a basal hyaline cell, and gelatinous appendages. Illustrations are given for 56 species. Detailed descriptions are included for species which are not readily available and the remaining species are briefly described. The following 10 new species found on dung are described and illustrated: ***P. alloeochaeta*** from Mexico; ***P. didyma***, Quebec; ***P. dolichopodalis***, Louisiana and Mexico; ***P. gigantea***, Louisiana and Arkansas; ***P. karachiensis***, Pakistan; ***P. macropodalis***, Mexico; ***P. mexicana***, Mexico; ***P. miniglutinans***, Mexico; ***P. pistilata***, Mexico; ***P. venezuelensis***, Venezuela, Mexico, Louisiana, South Pacific. The following new combinations are proposed: ***P. aloides*** (*Sordaria aloides* Fuckel), ***P. apiculifera*** (*S. apiculifera* Speg.), ***P. argentinensis*** (*S. argentinensis* Speg.), ***P. austro-americana*** (*Hypocopra austro-americana* Speg.), ***P. ellisiana*** (*Pleurage ellisiana* Griff.), ***P. longicollis*** (*Schizothecium longicollis* Ames), ***P. seminuda*** (*Sordaria seminuda* Griff.), ***P. tarvisina*** (*Philocopra tarvisina* Sacc.), and ***P. vesticola*** (*Sphaeria vesticola* Berk. & Br.).

Introduction

In this paper the genus *Podospora* of the Sordariaceae is used for species which have ascospores provided with an apical germ pore, a basal hyaline cell (here referred to as the primary appendage), and gelatinous secondary appendages. In a few of the species the gelatinous appendages are atypical, reduced, or absent. Species in which the ascospores are not of this characteristic type are excluded and will be dealt with in future publications.

A typical species, such as *P. fimicola*, has a hyaline cell which is cut off at the base of the young ascospore to form a pestle-shaped primary appendage which remains colorless and devoid of contents while the upper cell turns dark olivaceous black. There is a long lash-like flexible, gelatinous, hyaline secondary appendage attached to the apex of the ascospore, and another similar secondary appendage attached to the distal end of the primary appendage. The upper secondary appendage is frequently eccentrically attached. The primary appendage may be longer than the dark part of the spore as in *P. dolichopodalis*, small as in *P. cervina*, *P. curvuloides*, *P. nannopodalis*, *P. pilosa*, and *P. seminuda*, or minute as in *P. apiculifera*, *P. australis*, and *P. gigantea*. The primary appendage varies in width, from the slender form in species such as *P. vesticola*, to the very broad type represented by *P. immersa*. Secondary appendages are absent in *P. austro-americana*, *P. curvispora*, *P. fimbriata*, and *P. inaequalis*. In *P. immersa* and *P. longicaudata* the secondary appendages are numerous and cover the entire spore. The lower secondary appendage is short and reduced to a subglobose mass enclosing the primary appendage in *P. cervina* and *P. seminuda*. The upper secondary appendages are tufted in *P. communis*, *P. decipiens*, *P. gwynne-vaughaniae*, *P. hyalopilosa*, *P. ostilingospora*, and *P. pleiospora*.

For a review of the history and taxonomic concept of the genus *Podospora* see Cain (1934, 1962). An account of the nomenclatural status of the genus was published by Donk (1964). We consider that *Podospora* Césati in Rabenhorst was validly published as a new genus in Klotzschii Herb. Viv. Mycol., Ed. 2, No. 259. 1856, Hedwigia, 1 (15): 103. 1856, and Bot. Zeit. 14: 429. 1856, and that it was not a new name for *Schizothecium fimicola* Corda.

In each of these publications reference is made to *Schizothecium fimicolum* Corda and it is evident that the two fungi were considered to be similar. However, the publications read "*Podospora fimicola* Ces." and hence published as a new genus and a new species, not a transfer of the specific epithet from *Schizothecium*. *S. fimicolum* Corda was not actually given as a synonym. Any suggestion of the two fungi being specifically the same is due to error in identification since it is now clear that they are two entirely different fungi.

[1]This study was carried out with the assistance of grants furnished by the University of Toronto and the National Research Council of Canada.

Podospora

Podospora Césati, in Rabenh., Klotzsch Herb. Viv. Mycol. ed. 2, No. 259. 1856; also Bot. Zeit. 14: 429. 1856; and Hedwigia, 1 (15): 103. 1856.
= *Malinvernia* Rabenhorst, Hedwigia, 1: 116. 1857.
= *Cercophora* Fuckel, Jahrb. Nass. Ver. Nat. 23–24: 244. 1869.
= *Ixodiopsis* Karsten, Bidr. Kann. Finlands Nat. Folk 23: 6. 1873.
= *Philocopra* Spegazzini, Anales Soc. Sc. Argent. 9: 192. 1880.
= *Eusordaria* Zopf, Zeit. Natur. 56: 542. 1883.

Saprophytic, predominantly coprophilous. Perithecia superficial or rarely more or less immersed, non-stromatic, ostiolate, light brown or olivaceous to black, bare or with hairs of various kinds; peridium thin membranaceous to thick coriaceous, pseudoparenchymatous. Asci 4-, 8-, or multi-spored, in basal fascicle, mostly clavate, less commonly cylindrical, fusoid, or saccate; apical ring less distinct than in *Sordaria*, sometimes not visible at least until fully matured. Paraphyses more commonly ventricose-filiform, less commonly vesicular or filiform. Ascospores biseriate, uni- to multi-seriate, more or less clavate in the beginning, hyaline at first then through olivaceous to dark brown to nearly black; mature spores ellipsoid, at least, in face view; primary appendage usually basal, cylindrical to clavate, or reduced to a small apiculum; secondary appendages present or rarely absent; germ pore at or near the apex, circular. Phialides present or absent, when present flask-shaped, obclavate, or reduced to small peg-like structures with collarettes.

TYPE SPECIES: *Podospora fimicola* Césati.

KEY TO THE SPECIES OF *Podospora*

1. Peridium thin, membranaceous, consisting of swollen cells; hairs agglutinated, other type of hairs may or may not be present; exospore thin 2
1. Peridium membranaceous with angular cells or coriaceous; hairs, if present, not agglutinated; exospore thin or thick 18

2. Primary appendage very small and more or less triangular 3
2. Primary appendage larger, cylindrical or clavate 4

3. Spores less than 15 μ long, with distinct secondary appendages ..... 13 *P. cervina*
3. Spores over 15 μ long, without secondary appendages ..... 48 *P. nannopodalis*

4. Primary appendage clavate, very evanescent; spores inequilateral; secondary appendages absent; tendency to grow on substrates other than dung 5
4. Primary appendage cylindrical, fairly persistent; spores not inequilateral; secondary appendages present; coprophilous 7

5. Spores concave on one side ..... 18 *P. curvispora*
5. Spores flattened on one side 6

6. Apical cells of the agglutinated hairs fimbriate; asci 8-spored ..... 29 *P. fimbriata*
6. Apical cells of the agglutinated hairs usually not fimbriate; asci 4-spored ..... 37 *P. inaequalis*

7. Perithecia with agglutinated hairs only; peridium consists of distinctly swollen cells 8
7. Perithecia with short agglutinated hairs as well as flexuous hairs; peridial cells not so distinctly swollen 14

8. Asci 4-spored ..... 63 *P. tetraspora*
8. Asci more than 4-spored 9

9. Asci 8-spored 10
9. Asci more than 8-spored 13

10. Spores uniseriate when cut out 11
10. Spores biseriate from the very beginning 12

11. Spores more than 28 μ long, upper secondary appendage grooved ..... 20 *P. curvuloides*
11. Spores less than 28 μ long, upper secondary appendage not grooved ..... 66 *P. vesticola*

12. Spores more than 30 μ long, agglutinated hairs very long forming a crown at the top ..... 3 *P. aloides*
12. Spores usually less than 30 μ long, agglutinated hairs much smaller and do not form a crown ..... 19 *P. curvula*

13. Asci 16-spored ..... 26 *P. dubia*
13. Asci 32-spored ..... 22 *P. dakotensis*

14. Asci 8-spored ..... 32 *P. glutinans*
14. Asci more than 8-spored 16

15. Ascospores 29–33 × 19–22 μ ..... 32 *P. glutinans*
15. Ascospores 20–24 × 12–17 μ ..... 46 *P. miniglutinans*

16. Asci 16-spored 17
16. Asci 32-spored ..... 2 *P. alloeochaeta*

17. Lower secondary appendage lash-like and surrounds the primary appendage, upper secondary appendage lash-like ..... 61 *P. similis*
17. Lower secondary appendage lash-like and does not surround the primary appendage, upper secondary appendage linguiform ..... 40 *P. linguiformis*

18. Hairs on the neck scattered, short, usually straight, and erect (except *P. gigantea* which has hyphal hairs and papillae) 19
18. Hairs not as above 37

19. Hairs inflated at the apex 20
19. Hairs not inflated at the apex 21

20. Primary appendage apical; secondary appendages absent ..... 21 *Anopodium ampullaceum*
20. Primary appendage basal; secondary appendages present ..... 38 *P. inflatula*

21. Secondary appendages more or less triangular, broad and short, covering a part of spores including the small primary appendage ..... 59 *P. seminuda*
21. Secondary appendages not as above 22

22. Primary appendage reduced to a small apiculum 23
22. Primary appendage not reduced to apiculum 26

23. Secondary appendages taenioid, especially at their bases 24
23. Secondary appendages grooved, not taenioid ..... 50 *P. papilliformis*

24. Asci 4-spored; spores less than 100 μ long 25
24. Asci 8-spored; spores more than 100 μ long ..... 31 *P. gigantea*

25. Spores up to 50 μ long ..... 6 *P. apiculifera*
25. Spores over 50 μ long ..... 10 *P. australis*

26. Asci 8-spored 27
26. Asci more than 8-spored 33

27. Dark part of ascospore usually becoming septate ..... 24 *P. didyma*
27. Dark part of ascospore normally without septum 28

28. Peridium of perithecium coriaceous 29
28. Peridium of perithecium thin and membranaceous 31

29. Ascospores 52–60 × 28–32 μ ..... 30 *P. fimicola*
29. Ascospores smaller 30

30. Ascospores biseriate ..... 7 *P. appendiculata*
30. Ascospores uniseriate ..... 47 *P. minor*

31. Ascospores 41–52 × 25–27 μ ..... 53 *P. pistillata*
31. Ascospores smaller 32

32. Primary appendage small, 4–8 × 3 μ ..... 52 *P. pilosa*
32. Primary appendage 11–14 × 3–4 μ ..... 27 *P. ellisiana*
32. Primary appendage 19–25 × 5.0–7.5 μ ..... 44 *P. mexicana*

33. Asci 32-spored....65 *P. venezuelensis*
33. Asci more than 32-spored.... 34

34. Asci 128-spored.... 35
34. Asci 256-spored....8 *P. araneosa*

35. Spores less than 25 μ long.... 36
35. Spores over 25 μ long....34 *P. hirsuta*

36. Spores up to 19 μ long....60 *P. setosa*
36. Spores over 19 μ long....62 *P. tarvisina*

37. Hairs tubercular in the upper part, upper secondary appendages numerous, united into a lyre-shaped tuft; several small secondary appendages at the base of spores forming a "skirt".... 38
37. Hairs not tubercular.... 40

38. Asci 8-spored.... 39
38. Asci more than 8-spored....55 *P. pleiospora*

39. Spores less than 35 μ long....9 *P. argentinensis*
39. Spores more than 35 μ long....23 *P. decipiens*

40. Hairs in tufts.... 41
40. Hairs not in tufts, flexuous or lacking.... 48

41. Asci 4-spored.... 42
41. Asci more than 4-spored.... 43

42. Spores less than 34 μ long....15 *P. comata*
42. Spores more than 34 μ long....5 *P. anserina*

43. Asci 8-spored.... 44
43. Asci more than 8-spored.... 45

44. Secondary appendages small, completely enveloping the spore....36 *P. immersa*
44. Secondary appendages long, lash-like, one at the apex of spore and one at the distal end of primary appendage which is swollen near the middle and at the distal end....56 *P. prethopodalis*

45. Asci 64-spored, clavate....54 *P. platensis*
45. Asci more than 64-spored, broadly clavate to saccate.... 46

46. Asci 128- or 156-spored, saccate, without apical ring, spores 14–16 μ long....17 *P. curvicolla*
46. Asci more than 256-spored.... 47

47. Asci 512-spored, spores 17–23 μ long....42 *P. longicollis*
47. Asci 1024-spored, spores 15.5–17.5 μ long....45 *P. millespora*

48. Asci 4-spored....4 *P. anomala*
48. Asci more than 4-spored.... 49

49. Asci 8-spored.... 50
49. Asci more than 8-spored.... 61

50. Secondary appendages absent, hairs absent.... 51
50. Secondary appendages present.... 52

51. Spores flattened on one side....11 *P. austro-americana*
51. Spores not flattened....64 *P. unicaudata*

52. A single secondary appendage at the upper end of spores and one at the distal end of primary appendage.... 53
52. Upper secondary appendages more than one.... 57

53. Spores uniseriate....51 *P. perplexens*
53. Spores biseriate, asci usually swelling considerably in water.... 54

54. Hairs only slightly undulated, primary appendages cylindrical-clavate, 14–21 × 5.0–7.5 μ.... ....39 *P. karachiensis*
54. Hairs distinctly flexuous or absent, primary appendages longer.... 55

55. Spores less than 26 μ long....43 *P. macropodalis*
55. Spores more than 29 μ long.... 56

56. Spores less than 22 μ wide; primary appendage more or less clavate, hairs flexuous..... .....25 *P. dolichopodalis*
56. Spores more than 22 μ wide, primary appendage cylindrical, hairs absent.....58 *P. pyriformis*

57. Secondary appendages enveloping spore.....41 *P. longicaudata*
57. Secondary appendages not enveloping spore..... 58

58. Four septate secondary appendages at the upper end of spores..... 59
58. Two tufts of secondary appendages at the apex of spores and at the distal end of the primary appendage.....49 *P. ostlingospora*

59. Only one secondary appendage at the distal end of primary appendage.....35 *P. hyalopilosa*
59. Four secondary appendages at the distal end of the primary appendage..... 60

60. Primary appendages covered with a gelatinous sheath, numerous small secondary appendages at the base of spores.....33 *P. gwynne-vaughaniae*
60. Not as above.....16 *P. communis*

61. Asci 64-spored..... 62
61. Asci 256-spored.....28 *P. eminens*

62. Spores 26–32 μ long; two small secondary appendages at the apex of spores, two similar appendages at the distal end of primary appendage.....1 *P. adelura*
62. Spores 17–21 μ long; one lash-like secondary appendage at the apex of spores and one similar appendage at the distal end of primary appendage..... 63

63. Primary appendage 11–25 μ long.....12 *P. brasiliensis*
63. Primary appendage about 40 μ long.....14 *P. collapsa*

Descriptions of Species of Podospora

1. *Podospora adelura* (Griff.) Cain, Can. J. Bot. 40: 459, 1962.

This is known only from the type collection on rabbit dung from Auburn, Ala. The specimen has not been located. According to Griffiths (1901) it differs from *P. pleiospora* in the darker peridium, shorter ascospores, shorter and broader primary appendage, and the narrower and longer upper secondary appendage. In *P. adelura* there is a secondary appendage terminating the primary appendage. In *P. pleiospora* this is lacking but there are two to four secondary appendages at the base of the primary one. In *P. adelura* the secondary appendages are reduced to two strands.

2. ***Podospora alloeochaeta*** sp. nov. (Fig. 1)

Peritheciis sparsis, paene superficialibus, 500–600 × 275–325 μ, pyriformibus; pilis longis flexuosis, canis, septatis, circiter 1.5 μ in diam, et pilis brevibus, conglutinatis ex cellulis turgidis praeditis. Collo perithecii elongato-conico vel paene cylindraceo, papillis ornato. Peridio perithecii tenui membranacea. Cellulis peridii maioribus, turgidis olivaceo-brunneis, usque ad 16 μ diam. Ascis 32-sporis, clavatis 200–250 × 40–50 μ, superno rotundatis, annulo incrassato vix

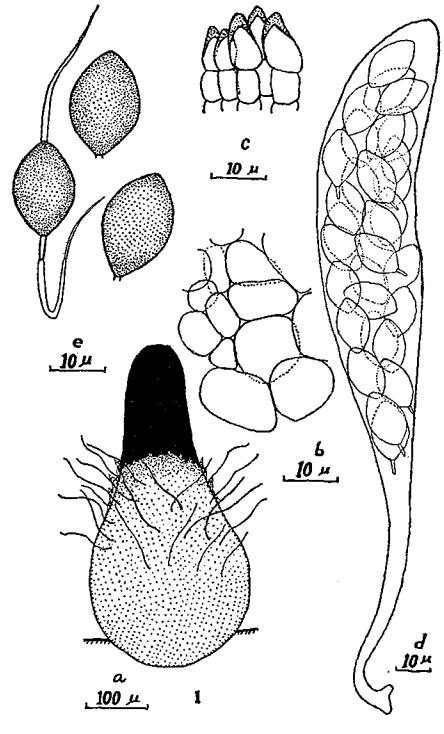


FIG. 1. *Podospora alloeochaeta* (type, TRTC 39490). *a.* Perithecium. *b.* Cells of peridium. *c.* Agglutinated hairs. *d.* Ascus. *e.* Mature ascospores.

spectabile ad apicem praeditis, inferne in stipitem longam attenuatis. Paraphysibus ventricosis, evanescentibus. Ascosporis 3–5 seriatis, ellipsoideis 15.5–18.5 × 11–13.5 μ fusco-brunneis et opacis, exosporis tenuis praeditis; primaria appendice brevi, tenui, cylindracea, 4–5.5 × 1–5 μ. Appendice secundaria et superiore ad apicem ascosporae symmetrice alligata, longa, simili flagello, evanescenti, singulata. Appendice secundaria et inferiore singulata ad terminum appendicis primariae alligata; foramine germinali ad apicem sporae, circiter 1.5 μ diam.

TYPUS: in fimo (TRTC 39490). In University of Toronto Herbarium.

Perithecia scattered, more or less superficial, 500–600 × 275–325 μ, pyriform, with long, flexuous, gray, septate hairs about 1.5 μ in diam mixed with short agglutinated hairs consisting of swollen cells; neck long-conical to almost cylindrical, blackened with papillae; peridium thin membranaceous, consisting of large swollen olivaceous-brown cells up to 16 μ across. Asci 32-spored, clavate, 200–250 × 40–50 μ, rounded at the apex; apical ring not distinct; stipe more than one-third the length of ascus. Paraphyses ventricose, evanescent. Ascospores 3- to 5-seriate, ellipsoid, 15.5–18.5 × 11–13.5 μ, narrowed toward both ends, dark brown and opaque, exospore thin; primary appendage short slender, cylindrical 4–5.5 × 1–5 μ; secondary appendages long lash-like, evanescent, one at the apex of the spores and one at the distal end of the primary appendage; germ pore apical about 1.5 μ in diameter.

ETYMOLOGY: Greek, *alloeos* = different, and *chaete* = hair, refers to two different types of perithecial hairs.

HOLOTYPE: On burro dung from El Casco, Durango, Mexico; Aug. 13, 1960. R. F. Cain (TRTC 39490).

This species is very close to *P. glutinans*, from which it differs in having 32-spored asci and larger spores. Other species that show some affinity are *P. dakotensis*, which differs in having only agglutinated hairs and larger spores, and *P. dubia*, which differs in having only agglutinated hairs, 16-spored asci, and larger spores.

3. ***Podospora aloides*** (Fuckel) comb. nov. (Figs. 2–3)

= *Sordaria aloides* Fuckel, Jahrb. Nass. Ver. Nat. 27–28: 43. 1873.

= *Sordaria curvula* De Bary var. *aloides* (Fuckel) Winter, Abh. Nat. Ges. Halle 13(1): 102. 1873.

= *Ixodiopsis fimicola* Karsten, Acta Soc. Fauna Fl. Fenn. 2(6): 78. 1881.

= *Sordaria coronifera* Grove, Journ. Bot. 54: 85. 1916.

= *Pleurage curvula* (De Bary) Kuntze var. *coronifera* (Grove) C. Moreau, Encycl. Mycol. 25: 235. 1953.

= *Podospora coronifera* (Grove) Cain, Can. J. Bot. 40: 459. 1962.

Perithecia 800–1200 × 450–600 μ, upper part with long fascicles of agglutinated hairs up to 150–250 μ long. Asci 8-spored, 200–250 × 42–48 μ, with a small but distinct apical ring. Ascospores biseriate, ellipsoid, 31–40 × 15–23 μ; exospore thin; primary appendage slender, 10–13 × 2.5–3 μ; secondary appendages lash-like, one eccentrically attached to spore apex, another similarly attached to distal end of primary appendage; germ pore slightly eccentric, about 1.5 μ in diameter. Phialides flask-shaped or elongated clavate; phialospores globose or ovoid, 2–2.5 × 1.5–2 μ.

TYPE: On cow dung from Luciensteig near Ragaz, Switzerland (Fung. rhen. 2549).

SPECIMENS EXAMINED: CANADA: Ontario: TRTC 5226, 14989, 16256, 22800, 24605, 30206, 32841, 33457, 33671, 36454, 40823. SWITZERLAND: Herb. Barbey-Boissier 678 (NY).

Specimens determined as *P. coronifera* are the same as authentic material of *Sordaria aloides* Fuckel.

This species is distinguished from *P. curvula* by its longer perithecial hairs and larger perithecia, asci, and ascospores.

4. *Podospora anomala* (Griff.) Cain, Can. J. Bot. 40: 459. 1962.

Perithecia 500 × 300 μ, pyriform, surrounded by a dense growth of green or brown mycelium; neck papilliform. Asci 4-spored, cylindrical, 165–190 × 18–21 μ. Paraphyses ventricose, agglutinated, longer than asci. Ascospores uniseriate, ellipsoid to subglobose, 18–21 × 13–16 μ; primary appendage equaling spore in length, cylindrical; with a long lash-like secondary appendage of variable size at the apex of spore, a similar secondary appendage at the distal end of primary appendage.

Known only from the type on cow dung, greenhouse, New York City. No type specimen

is available and the above description is taken from Griffiths (1901). This appears to be a good species of *Podospora*, readily distinguished by the dense mycelial growth and four-spored asci.

5. *Podospora anserina* (Ces. in Rabenh.) Niessl, Hedwigia, 22: 156. 1883. (Fig. 4)
= *Hypocopra erecta* Speg., Anal. Soc. C. Argent. 10: 15. 1880 (LPS 6843, examined).
= *Sordaria erecta* (Speg.) Sacc., Syll. Fung. 1: 239. 1882.
= *Podospora erecta* (Speg.) Niessl, Hedwigia, 22: 156. 1883.
= *Sordaria communis* (Speg.) Sacc. var. *tetraspora* Speg., Anal. Mus. Nac. Buenos Aires, 6: 253. 1899.

For additional synonymy see C. Moreau (1953).

Perithecia 400–600 × 300–375 μ, pyriform to subglobose; neck short conical; with a few tufts of hairs at the base of neck; hairs straight, brown, nonseptate or sparingly septate, up to 250 μ long and about 3 μ wide. Asci 4-spored, 200–280 × 19–29 μ, with a small apical ring. Ascospores obliquely uniseriate, ellipsoid, 34–40 × 18–20 μ; exospore thin; primary appendage cylindrical, 25–30 × 5 μ; secondary appendages lash-like, upper one eccentrically attached to the apex of spore, length about double that of spore and about 8 μ wide at the base, two small, very fugaceous secondary appendages attached to primary appendage near base; germ pore apical, about 1.5 μ in diameter. Phialides small, peg-like; phialospores globose to ovoid, 1.5–2 μ in diameter.

REPRESENTATIVE SPECIMENS EXAMINED: CANADA: Ontario: TRTC 5169. U.S.A.: Arkansas: TRTC 38137; Colorado: TRTC 38056; Connecticut: NY; Indiana: TRTC 38422; Louisiana: TRTC 37240; Massachusetts: UM 762; Ohio: Stratton 237 (23–1) (OS); MEXICO: TRTC 40972; BRAZIL: RFC 6783; ARGENTINA: LPS 6830; PARAGUAY: LPS 6857. SOCIETY ISLANDS: Tautira: TRTC 33711. GERMANY: RFC 6500. ITALY: Cavara-Fung. Longobardiae 226.

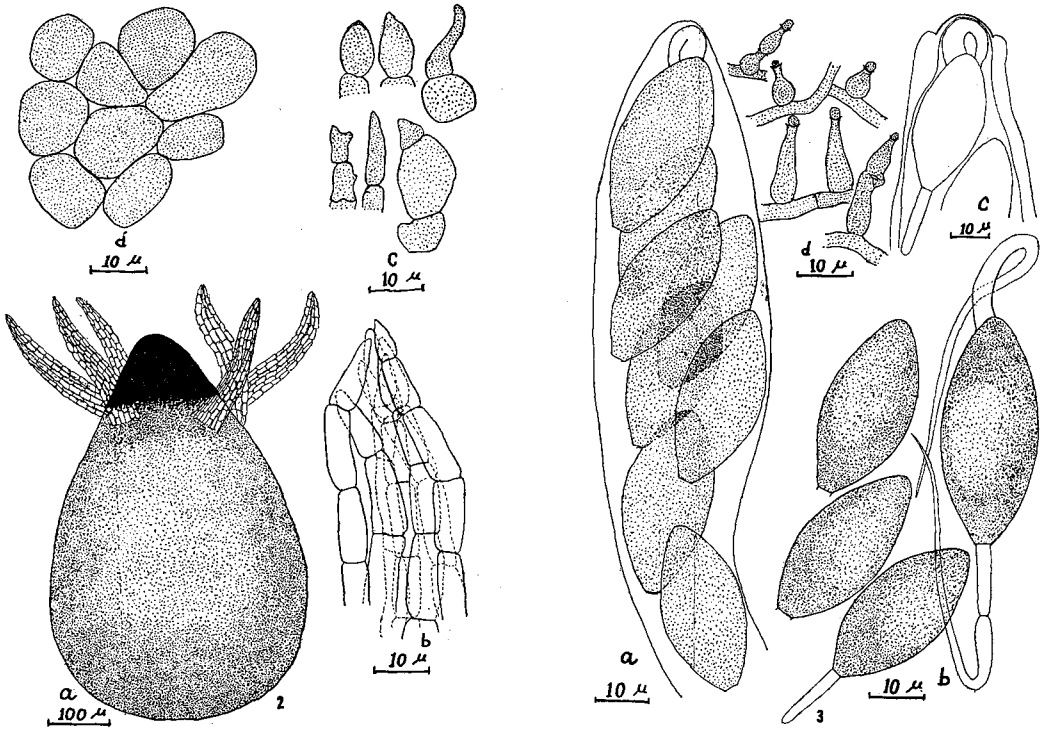


FIG. 2. *Podospora aloides*. *a*. Ascus. *b*. Mature ascospores. *c*. Ascus apex. *d*. Phialides.
FIG. 3. *Podospora aloides*. *a*. Perithecium. *b*. Fascicle of agglutinated hairs. *c*. Upper parts of hairs. *d*. Cells of peridium.

This is one of the most common and widely distributed species of *Podospora*. *P. comata* Milovtzova is a closely related species which can be separated from *P. anserina* by its shorter and narrower spores.

Traverso (1907) treated this species as a synonym of *P. pauciseta* (Ces.) Trav., but this conclusion remains doubtful.

6. ***Podospora apiculifera*** (Speg.) comb. nov. (Fig. 5)

=*Sordaria apiculifera* Speg. Anal. Mus. Nac. Buenos Aires, 6: 251. 1899.

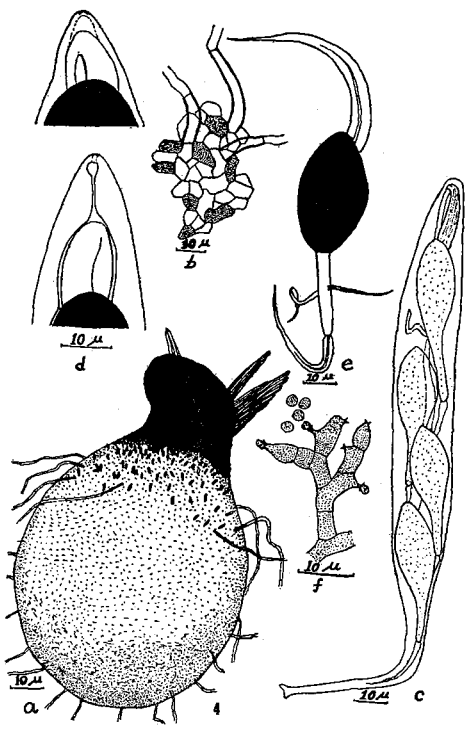
=*Pleurage apiculifera* (Speg.) C. Moreau, Encycl. Mycol. 25: 252. 1953.

Perithecia scattered or loosely aggregated, at first immersed, then erumpent or semi-immersed, 450–800 × 300–550 μ, subglobose to pyriform; neck papilliform, black, with scattered, short, straight, 1- to 4-septate, brown, hyaline-tipped hairs measuring up to 80 × 4 μ; peridium membranaceous, dark olivaceous-brown, consisting of small angular cells. Asci 4-spored, 250–320 × (25–)30–40(–45) μ, apical ring not visible; stipe 50–80 μ long. Paraphyses filiform, septate longer than asci, abundant. Ascospores uniseriate, ellipsoid, 41–50 × 20–28(–35) μ, exospore thick, primary appendage basal, reduced to a small apiculum usually 1.5–3 μ long, rarely up to 10 × 8 μ or indistinct; secondary appendages long, lash-like, upper one eccentrically attached to the apex of spore, taenioid, about 10 μ wide at the base, lower one similar, less distinctly taenioid and symmetrically attached to the base of the spore; germ pore apical, about 4 μ in diameter.

TYPE: On horse dung from La Plata, Argentina, collected May 1888 by C. Spegazzini (LPS 6833).

SPECIMENS EXAMINED: ARGENTINA: LPS 6833. MEXICO: TRTC 36493, 36604, 36780, 38792, 38794, 38800, 39273, 40880–40887, 41080–41085. U.S.A.: Arkansas: TRTC 38135; Massachusetts: in BUS 753.

This species is closely related to *P. australis* but has smaller spores.



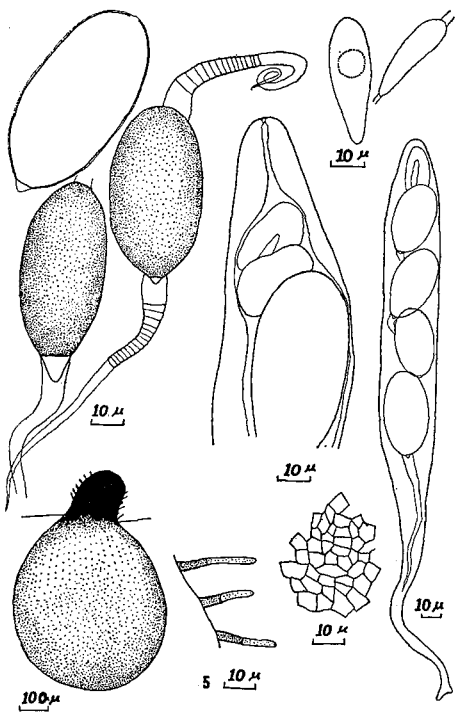


FIG. 4. *Podospora anserina*. *a*. Perithecium. *b*. Portion of peridium from the upper part of perithecium. *c*. Ascus. *d*. Apices of asci. *e*. Ascospore. *f*. Phialides.

FIG. 5. *Podospora apiculifera* (LPS 6833). *a*. Perithecium. *b*. Hairs from the neck region. *c*. Cells of peridium. *d*. Ascus. *e*. Ascus apex. *f*. Young ascospores. *g*. Mature ascospores, upper one drawn to show the germ pore.

7. *Podospora appendiculata* (Auersw.) Niessl, Hedwigia, 22: 156. 1883. (Fig. 6)
=*Sordaria winteri* Karst. Mycol. Fenn. 2: 251. 1873. From description.
=*Podospora winteri* (Karst.) Niessl, Hedwigia, 22: 156. 1883.
=*Sordaria longispora* Batista & Pontual, Bot. Agric. Pernam. 15: 39. 1948.
For additional synonymy see C. Moreau (1953).

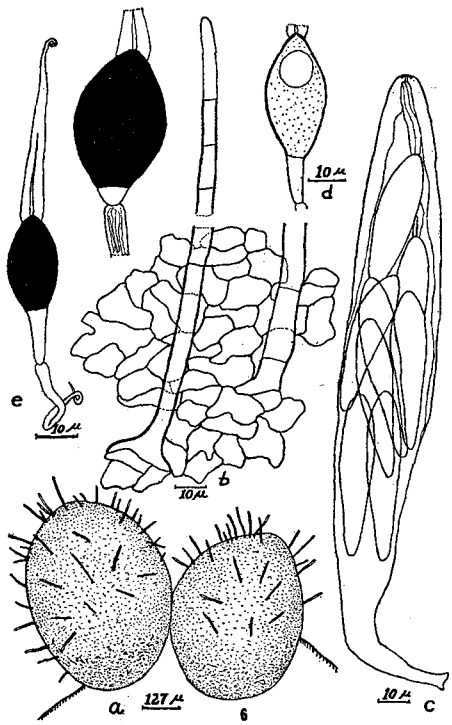
Perithecia superficial, 500–900 × 310–550 μ, ovoid, with short, straight, scattered, septate, brown, hyaline-tipped hairs measuring 42–100 × 2.5–4 μ. Asci 8-spored, 190–240 × 25–35 μ, with small apical ring. Ascospores biseriate, ellipsoid 25–32(–35) × (12–)13–17 μ; exospore thick; primary appendage triangular to somewhat cylindrical, 13–19 × 4–6 μ; upper secondary appendage lash-like, hollow at the base, symmetrically attached to the apex of spore, a similar but smaller secondary appendage at the distal end of the primary appendage; germ pore apical, about 1.5 μ in diameter.

TYPE: On rabbit dung from Germany, collected by Auerswald.

DISTRIBUTION: CANADA: Ontario, Quebec, Nova Scotia. U.S.A.: Idaho, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Washington, D.C. BRAZIL, GERMANY, SWEDEN; also reported from BELGIUM, U.K., FRANCE, LUXEMBURG, SPAIN, FINLAND, CZECHOSLOVAKIA, WEST PAKISTAN, JAVA, PANAMA.

8. *Podospora araneosa* (Cain) Cain, Can. J. Bot. 40: 459. 1962. (Fig. 7)

Perithecia immersed or semi-immersed, 520–760 × 400–575 μ, pyriform, densely covered with long, flexuous, slender, grayish brown, septate hairs; neck stout, papilliform, covered with short, straight, brown, hyaline-tipped, sparingly septate hairs 30–90 μ long and about 2 μ wide. Asci 256-spored, clavate, 300–350 × 52–63 μ, with a small apical ring. Ascospores multiseriate, ellipsoid, 11–15 × 6.5–8.5 μ; exospore thin; primary appendage cylindrical,



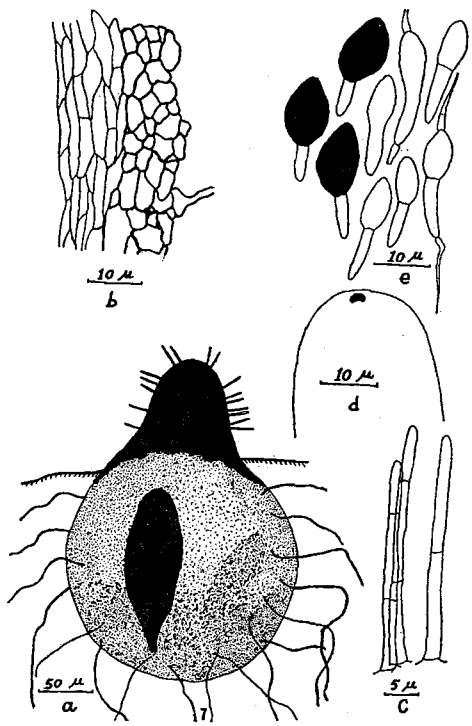


FIG. 6. *Podospora appendiculata* (TRTC 32382). *a.* Perithecia. *b.* A portion of peridium with hairs. *c.* Young ascus. *d.* Immature ascospores. *e.* Two ascospores, one in the lower limits of size and the other exceptionally large.

FIG. 7. *Podospora araneosa* (TRTC 5212). *a.* Perithecium. *b.* Peridium in section. *c.* Hairs from the neck. *d.* Ascus apex. *e.* Ascospores at different stages of development.

about 6.5–8 × 2 μ; with a single lash-like secondary appendage at the apex of the spore and a similar secondary appendage at the distal end of the primary appendage; germ pore slightly eccentric, about 1 μ in diameter.

TYPE: Developed in laboratory on rabbit dung from Bear Island, Lake Timagami, Ontario, Canada, by R. F. Cain (TRTC 5211).

SPECIMENS EXAMINED: CANADA: Ontario: TRTC 5211, 5212, 5287, 5288, 32111, 36648, 36659; Quebec: TRTC 36503. U.S.A.: Louisiana: TRTC 38176; New York: TRTC 24409, 36071, RFC 5056.

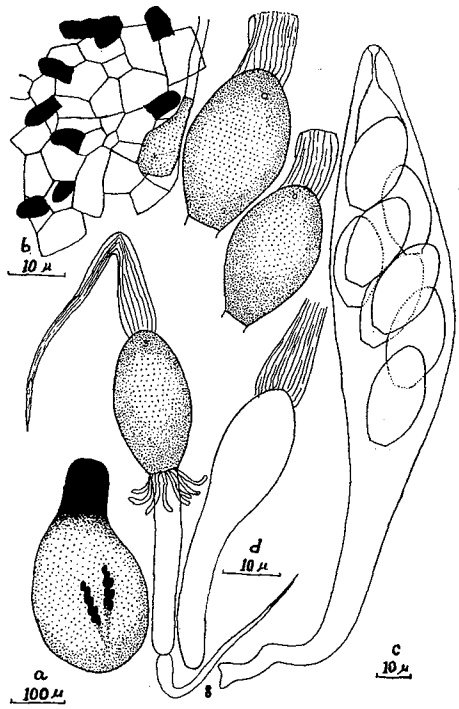
This species somewhat resembles *P. curvicolla*, from which it can easily be distinguished by its smaller spores, which are collected in the central part of the ascus, and by the nature of the perithecial hairs, which are short and not united into fascicles.

9. ***Podospora argentinensis*** (Speg.) comb. nov. (Fig. 8)

=*Sordaria argentinensis* Speg., Anal. Mus. Nac. Buenos Aires, 23: 49. 1912.

=*Pleurage argentinensis* (Speg.) C. Moreau, Encycl. Mycol. 25: 252. 1953.

Perithecia scattered, immersed or semi-immersed, rarely almost superficial, 445–600 × 225–500 μ, globose to pyriform, upper part of the perithecia with black tubercles; neck papilliform to short cylindrical, completely covered with black papillae; peridium thin, membranaceous, dark brown, cellular structure clearly visible. Asci 8-spored, clavate, 180–200 × 30–40 μ, narrowly rounded at the apex; apical apparatus not distinct; stipe moderately long. Paraphyses filiform above, ventricose below, very fugaceous. Ascospores biseriate, ellipsoid, (23–)26–34 × 12–20 μ; exospore thin; primary appendage cylindrical or slightly clavate, 35–40 × 6–8 μ; upper secondary appendages united into a lyre-shaped structure which is sometimes very much extended; a single lash-like secondary appendage at distal end of primary appendage which is very fugaceous and rarely seen; a whorl of small secondary appendages at the base of the primary appendage; germ pore eccentric, 1.5–2.5 μ in diameter.



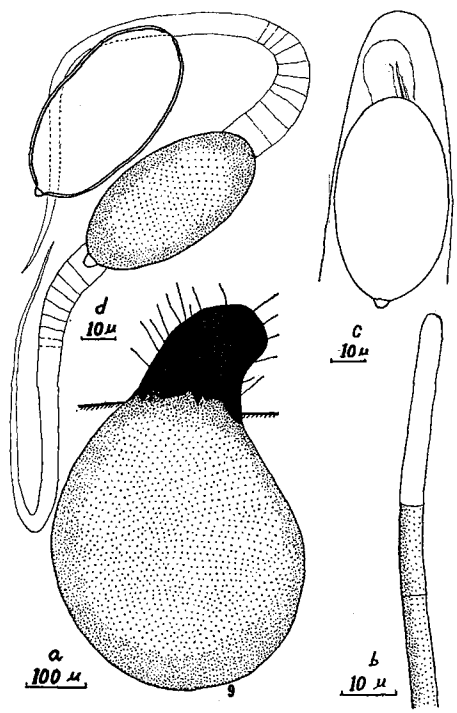


FIG. 8. *Podospora argentinensis* (LPS 6843). *a.* Perithecium. *b.* Peridium from upper part of perithecium showing tubercular hairs. *c.* Ascus. *d.* Ascospores, lower left still young.

FIG. 9. *Podospora australis* (Type, LPS 6842). *a.* Perithecium. *b.* Hair from the neck. *c.* Ascus apex. *d.* Ascospores, upper one drawn to show the germ pore.

TYPE: On mule dung. from Cebollar, La Rioja, Argentina, collected Jan. 14, 1910, by Spegazzini (LPS 6843).

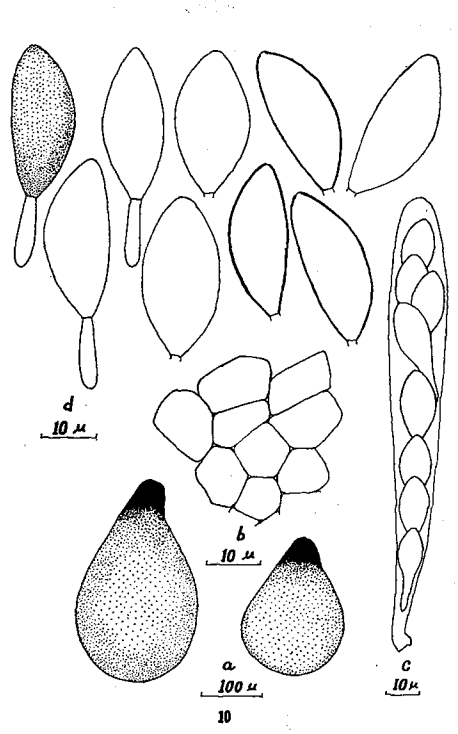
SPECIMENS EXAMINED: ARGENTINA: LPS 6843. MEXICO: TRTC 36945, 37409, 37776, 40889–40892. U.S.A.: Wyoming: TRTC 40871.

This species comes very close to *P. decipiens*, from which it can easily be distinguished by its smaller spores and the secondary appendage at the distal end of the primary appendage.

10. *Podospora australis* (Speg.) Niessl, Hedwigia, 22: 156. 1883. (Fig. 9)
= *Hypocopra australis* Speg., Anal. Soc. Ci. Argent. 10: 16. 1880.
= *Sordaria australis* (Speg.) Sacc., Syll. Fung. 1: 239. 1882.
= *Pleurage taenioides* Griff., Mem. Torrey Bot. Club, 11: 58. 1901.
= *Sordaria taenioides* (Griff.) Sacc., Syll. Fung. 17: 602. 1905.
= *Sordaria macrura* Bayer, Acta Soc. Sci. Nat. Moraviae, 1: 95. 1924.
= *Podospora taenioides* (Griff.) Cain, Can. J. Bot. 40: 460. 1962.

Perithecia 800–1200 × 320–600 μ, exposed portion including the neck covered with short straight, septate, brown, hyaline-tipped hairs measuring 30–80 × 3–4 μ; peridium membranaceous or slightly coriaceous, dark brown and opaque, cellular structure not distinctly visible. Asci 4-spored, cylindrical 290–360 × 37–45 μ; apical ring not distinct; stipe very long. Ascospores uniseriate, elongate-ellipsoid, 56–62 × 25–30 μ; exospore thick; primary appendage reduced to very small basal apiculum, 1–5 μ long and about 4 μ wide at the base; upper secondary appendage long, taenioid about 11 μ wide at the base, slightly eccentrically attached; lower secondary appendage similar, completely covering the apiculum; germ pore apical, about 2.5 μ in diam. Phialides without a swollen base, with a distinct collarette; phialospores globose to ovoid, about 2.5 μ in diameter.

TYPE: On the dung of *Myopotamus coypus* from Recoleta, Buenos Aires, Argentina,



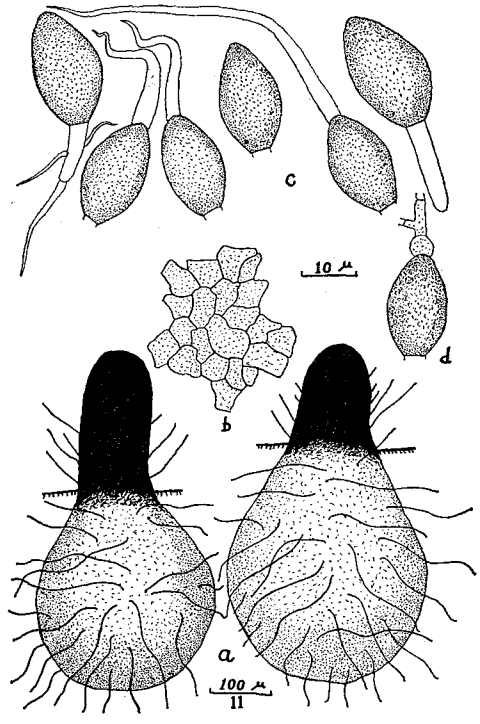


FIG. 10. *Podospora austro-americana* (type, LPS 6844). *a.* Perithecia. *b.* Cells of peridium. *c.* Immature ascus. *d.* Ascospores.
FIG. 11. *Podospora brasiliensis* (Type. TRTC 35593). *a.* Perithecia. *b.* Cells of peridium. *c.* Six ascospores. *d.* Germinating ascospore.

collected by Spegazzini, June 6, 1880 (LPS 6842).

SPECIMENS EXAMINED: CANADA: Ontario: TRTC 5204, 5205, 5277–5279, 19577, 31258, 36883, RFC 6493, 12231; Alberta TRTC 39031. MEXICO: TRTC 36477, 36554, 36586, 36598, 36602, 36604, 36606, 36713, 36741, 36793, 36800, 37040, 37410, 37414, 37416, 37417, 41078, 41079. URUGUAY: TRTC 39305. ARGENTINA: LPS 6838, 6842. SWEDEN: Lundqvist 3076b (TRTC).

The writers have seen the type material of this species and found it to be the same as *P. taenioides.*

11. ***Podospora austro-americana*** (Speg.) comb. nov. (Fig. 10)

= *Hypocopra austro-americana* Speg., Anal. Soc. Ci. Argent. 10: 137. 1880.

= *Hypocopra austro-americana* Speg. var. *Agave-americana* Speg., Anal. Soc. Ci. Argent. 12: 107. 1881.

= *Sordaria austro-americana* (Speg.) Sacc., Syll. Fung. 1: 237. 1882.

= *Podospora castorinospora* Cain, Can. J. Bot. 40: 450. 1962.

Perithecia 200–500 × 150–320 μ, pyriform to ovate-conical. Asci 8-spored, clavate, 130–150 × 17–22 μ, apical apparatus indistinct. Ascospores biseriate, fusoid-ellipsoid, flattened on one side, 24–31 × 10–13 μ; exospore thin; primary appendage clavate, 13–18 μ long, 3.5–4 μ wide at the broadest point, fugaceous; secondary appendages not observed; germ pore apical about 1 μ in diam. Phialides small, peg-like, scattered on the mycelium; phialospores hyaline, ovate, about 3.5 × 2 μ.

TYPE: On *Pircunia dioica* from San Jose de Flores, Buenos Aires, Argentina, C. Spegazzini, June 25, 1880 (LPS 6844).

SPECIMENS EXAMINED: ARGENTINA: LPS 6844, 7025. PANAMA: Canal Zone: TRTC 31726.

12. *Podospora brasiliensis* Cain, Can. J. Bot. 40: 449. 1962. (Fig. 11)

Perithecia 500–800 × 350–430 μ, sparingly covered with long, septate, flexuous, light brown hairs measuring about 2 μ in diam. Asci 64-spored, clavate, 220–260 × 50–60 μ, with a small apical ring. Ascospores multiseriate, ellipsoid, 17–21 × 10–12 μ; exospore thin; primary appendage cylindrical or slightly clavate, 11–25 × 4–5 μ; a single secondary appendage measuring 10–12 × 2 μ at the distal end of the primary appendage, another measuring 15–26 × 2.5–3 μ attached symmetrically to spore apex, frequently one or two small secondary appendages measuring 3–7 × 1.5–3 μ attached to the primary appendage near the base; germ pore eccentric, 1.5–2.5 μ in diam. Phialides and phialospores absent.

TYPE: Developed in moist chamber in laboratory, Toronto, January 1960 R.F.C., on dung of Sucuri (snake) from Recife, Brazil, collected June 27, 1957, by Dr. A. Chaves Batista (TRTC 35593).

SPECIMENS EXAMINED: BRAZIL: TRTC 35593. MEXICO: TRTC 40985. SOCIETY ISLANDS: Tautira: TRTC 38698.

This species somewhat resembles *P. pleiospora* but in general has smaller spores. It has a single secondary appendage at the apex of the spore and one at the distal end of the primary appendage. There are only one or two secondary appendages attached to the side of the primary appendage near its base.

13. *Podospora cervina* (Cain) Cain, Can. J. Bot. 40: 459. 1962. (Fig. 12)

Perithecia 300–450 × 250–300 μ, with short, agglutinated, light brown, septate hairs consisting of swollen cells. Asci 8-spored, cylindrical, 120–150 × 10–12 μ; apical ring indistinct. Ascospores uniseriate, ellipsoid, 11–14 × 7–8 μ; primary appendage short, triangular, about 2 μ long, surrounded by broad, secondary appendage about 8–11 × 4–5.5 μ, a similar but smaller and more evanescent secondary appendage at apex of spore; germ pore eccentric, about 1 μ in diam.

TYPE: Developed in laboratory on deer dung from Macaulay Centre, Muskoka, Ontario, Canada, R. F. Cain, Aug. 21, 1932 (TRTC 5180).

SPECIMENS EXAMINED: CANADA: Ontario: TRTC 5180, 5181, 5224, 5225, 37555, 38280, 40844; Quebec: TRTC 36440. U.S.A.: Wyo.: TRTC 32033, 32068, 32070. SWEDEN: Lundqvist 1210b, 1673*d*, 3787*c* (TRTC).

This species has agglutinated hairs as in *P. glutinans.* The secondary appendage is similar to the one in *P. seminuda.*

14. ***Podospora collapsa*** (Griff.) Cain, Can. J. Bot. 40: 459. 1962. (Fig. 13)

= *Pleurage collapsa* Griff., Mem. Torrey Bot. Club, 11: 89. 1901.

=*Philocopra collapse* (Griff.) Sacc., Syll. Fung. 17: 607. 1905.

Perithecia 500–600 × 300–450 μ, exposed portion of the perithecium covered with long, flexuous, septate, brown hairs, 2–2.5 μ wide; peridium thin membranaceous, semitransparent, at first greenish below but soon becoming brown; cellular structure indistinct. Asci 64-spored, clavate, to fusiform, about 210 × 65 μ. Ascospores multiseriate, ellipsoid, 15–21 × 9.5–15 μ; exospore thin; primary appendage about 40 μ long, slightly clavate, collapsing readily at maturity; secondary appendages very small and evanescent, one at the apex of the ascospore about 1.5 μ wide at the base, a similar appendage at the distal end of the primary appendage; germ pore small, eccentric, about 1 μ in diameter.

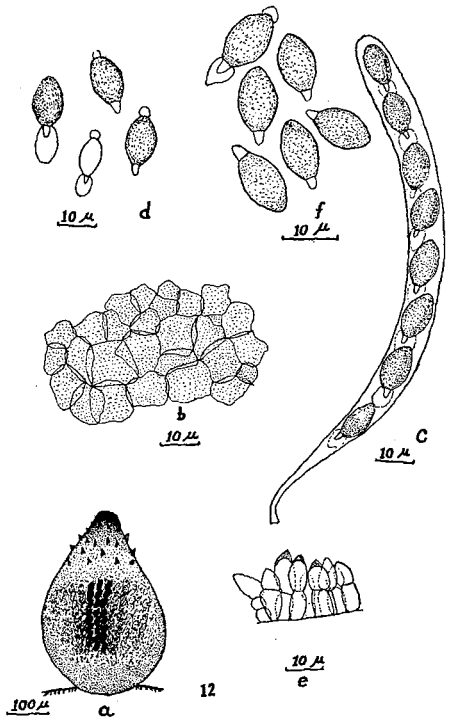
TYPE: Developed on rabbit dung in laboratory by D. Griffiths, collected by Percy Wilson, Jan. 1900, from Bronx Park, New York City (U.S.A.).

SPECIMENS EXAMINED: U.S.A.: Ohio: Stratton (OS).

By the nature of its primary appendage it appears to approach *P. pleiospora* but can readily be delineated by the nature of the perithecial hairs, by the number of spores per ascus, by the size of spores, and by the nature of the secondary appendages.

15. *Podospora comata* Milovtzova, Trans. Inst. Bot. Charkov. 2: 20. 1937. (Fig. 14)

Perithecia scattered, semi-immersed or almost superficial, 280–640 × 190–250 μ, pyriform, dark brown to almost black, with straight, sparingly septate, brown hairs measuring 100–600 × 2–4 μ, sometimes forming a few tufts at base of neck; neck papilliform or conical, blackened with papillae; peridium thin, membranaceous, brown, consisting of indistinct cells. Asci 4-spored, rounded at the apex, cylindrical-clavate, 160–200 × 16–27 μ, with a small apical ring; stipe 50–70 μ long. Paraphyses abundant, filiform, septate, longer than the asci. Ascospores uniseriate, ellipsoid, 26–32(–35) × 15–



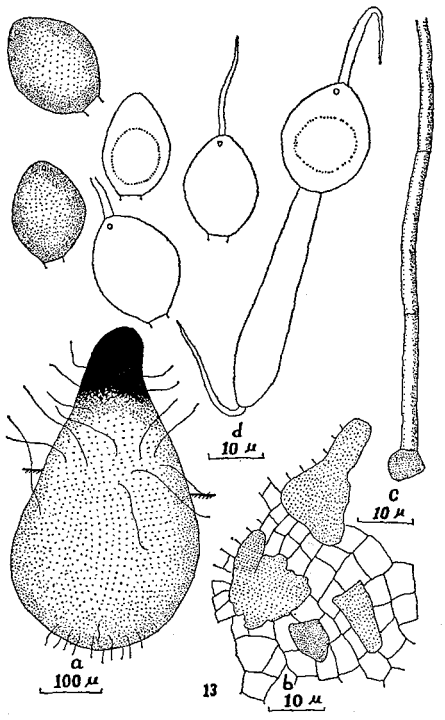


FIG. 12. *Podospora cervina* (Type, TRTC 5180). *a.* Perithecium. *b.* Cells of peridium. *c.* Ascus. *d.* Ascospores at different stages of development. *e.* Agglutinated hair. *f.* Mature ascospores.

FIG. 13. *Podospora collapsa. a.* Perithecium. *b.* Cells from upper part of peridium. *c.* Single hair. *d.* Ascospores.

17.5(–19) μ, dark brown and opaque, narrowly rounded at the apex, truncate at the base; exospore thin; primary appendage basal, cylindrical 11–24 × 4.5–6 μ; secondary appendages lash-like, upper one eccentrically attached near the apex of the spore, longer than spore and 4.5–5 μ wide at base, lower one similar, attached to distal end of primary appendage, occasionally two very small, fugaceous secondary appendages can be seen attached to the primary appendage near the middle; germ pore apical, 1.5–2.5 μ in diameter.

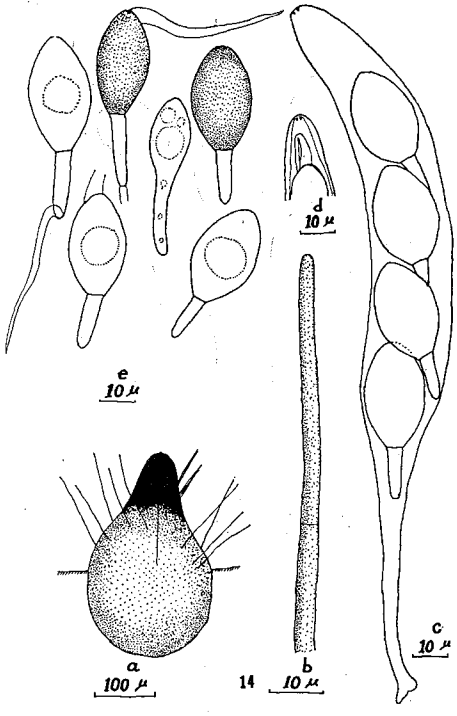
TYPE: On horse dung from Charkov Botanical Garden, Charkov, U.S.S.R., collected July 15, 1931 (not seen).

SPECIMENS EXAMINED: MEXICO: 40874–40879. LIBERIA: Thaxter (FH).

This species is very close to *P. anserina* from which it can readily be distinguished, in general, by its smaller dimensions.

16. *Podospora communis* (Speg.) Niessl, Hedwigia, 22: 156. 1883. (Fig. 15)
= *Hypocopra communis* Speg., Anal Soc. Ci. Argent. 10: 14. 1880.
= *Sordaria communis* (Speg.) Sacc., Syll. Fung. 1: 231. 1882.
= *Sordaria vestita* Zopf, Zeits. Naturw. 56: 556. 1883.
= *Podospora vestita* (Zopf.) Wint., Rabenh. Krypt. Flora, 1(2): 176. 1885.
= *Sordaria macrostoma* Speg., Anal. Mus. Nac. Hist. Nat. Buenos Aires, 6: 252. 1899.
= *Sordaria communis* var. *brachyura* Speg. Anal. Mus. Nac. Hist. Nat. Buenos Aires, 6: 253. 1899.
= *Pleurage vestita* (Zopf.) Griff., Mem. Torrey Bot. Club, 11: 76. 1901.
= *Bombardia vestita* (Zopf.) Migula, Thome's Krypt. Flora, 10(1): 126. 1913.
= *Sordaria occidentalis* Batista & Pontual, Bol. Agric. Pernam. 15: 38. 1948.
= *Pleurage macrostoma* (Speg.) C. Moreau, Encycl. Mycol. 25: 262. 1953.

Perithecia 650–1000 × 300–500 μ, covered up to the neck with long, flexuous, olivaceous or brown, septate hairs or almost bare; neck conical to cylindrical, blackened with papillae; peridium thin, membranaceous, almost black,



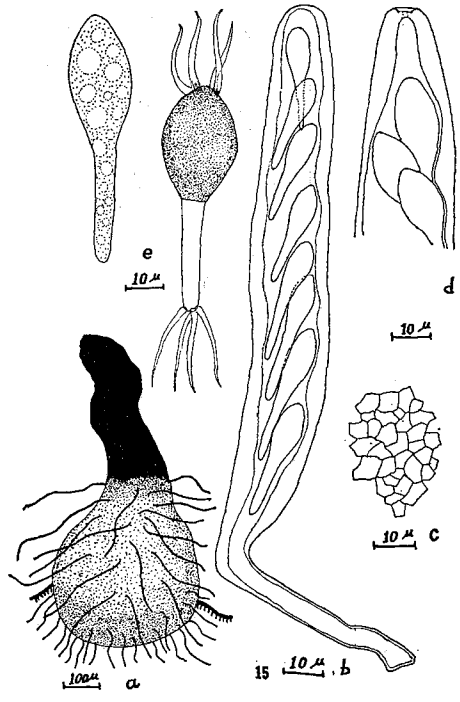


FIG. 14. *Podospora comata* (TRTC 1181). *a.* Perithecium. *b.* Single hair. *c.* Ascus. *d.* Ascus apex. *e.* Ascospores at different stages of development.

FIG. 15. *Podospora communis*. *a.* Perithecium. *b.* Young ascus. *c.* Cells of peridium. *d.* Ascus apex. *e.* Ascospores, one on the left is still young.

and opaque near the neck, olivaceous and semitransparent below. Asci 8-spored, clavate, 180–210 × 26–32 μ, swelling considerably in water, apical ring distinct. Ascospores biseriate, ellipsoid, 28–36 × 17–21 μ, primary appendage cylindrical, 25–35 × 5–6 μ; four short secondary appendages near apex of spores; four similar appendages at the distal end of the primary appendage. Germ pore apical, about 2 μ in diam. Phialides and phialospores as in *P. anserina* (Ces.) Niessl.

TYPE: On cow dung from Buenos Aires, Argentina, C. Spegazzini, April 20, 1880 (LPS 6845).

SPECIMENS EXAMINED: CANADA: Ontario: TRTC 5209, 5210, 5283–5286, 31519, 35525, 36878, 40841–40843, 41134. U.S.A.: Florida: TRTC 31175, 31176; Louisiana: TRTC 37388, 38174; New York: TRTC 37596; Ohio: Stratton (OS); Tennessee: TENN: 13689. MEXICO: TRTC 36737, 36838, 36966, 37006, 37412, 37419, 37426, 37445, 41092–41106. BRAZIL: IPA 193, RFC 6344. ARGENTINA: LPS 6829, 6832, 6845. GERMANY: RFC 6479.

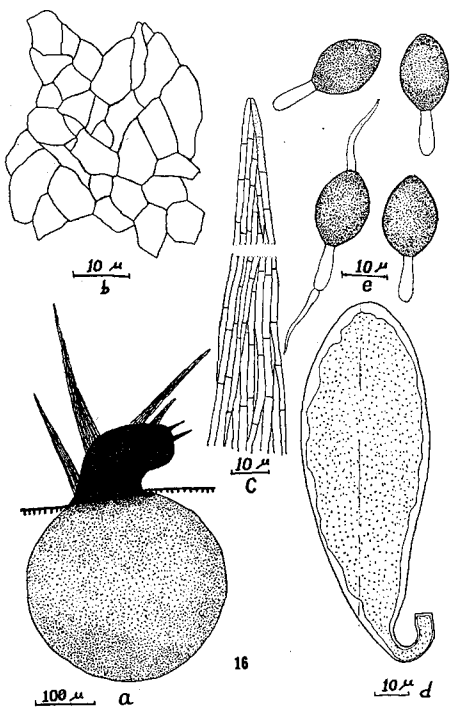
The writers have examined type specimens of *P. communis* (Speg.) Niessl (LPS 6845) and *Sordaria macrostoma* Speg. (LPS 6832) and did not find them different from *Podospora vestita* (Zopf.) Winter. *Sordaria communis* var. *tetraspora* Speg. is a synonym of *P. anserina*, and *S. communis* var. *macrura* Speg. is a synonym of *P. decipiens*. *Sordaria communis* var. *brachyura* is the same as the type of the species.

The authors have also seen the type specimen of *Sordaria occidentalis* Batista & Pontual (IPA 193) and did not find it different from *P. communis*.

17. *Podospora curvicolla* (Winter) Niessl, Hedwigia, 22: 156. 1883. (Fig. 16)

For synonymy see Cain (1934).

Perithecia 350–700 × 350–450 μ; neck with few tufts of long, olivaceous-brown, sparingly septate, agglutinated hairs which are undulate,



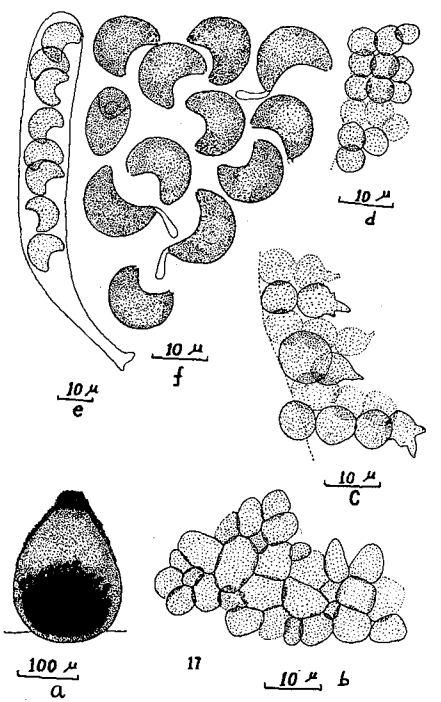


FIG. 16. *Podospora curvicolla*. *a*. Perithecium. *b*. Cells of peridium. *c*. Tuft of hairs. *d*. Young ascus (ascospores not shown). *e*. Ascospores.

FIG. 17. *Podospora curvispora* (type, TRTC 22439). *a*. Perithecium. *b*. Cells of peridium. *c*. Agglutinated hairs from the base of the neck. *d*. Agglutinated hairs from the mid region of the perithecium. *e*. Ascus. *f*. Ascospores.

up to 350 μ long and about 2 μ wide. Asci 128- to 256-spored, widely clavate to saccate, 250–300 × 60–100 μ; apical ring not seen; stipe short. Ascospores irregularly multiseriate, ellipsoid, 14–16 × 8–11 μ; exospore thin; primary appendage slightly clavate, 7–9 × 3 μ; a single lash-like, very fugaceous secondary appendage at apex of spore; a similar secondary appendage at the distal end of the primary appendage; germ pore apical, about 1.5 μ in diam. Phialides and phialospores absent.

TYPE: On mouse dung collected in woods near Oederan (Saxonia) Germany, in the autumn of 1871 (not seen).

SPECIMENS EXAMINED: CANADA: Ontario: TRTC 5182–5184, 5227–5229, 36319, 36355, 36463, 36643, 36912, 38143, 46833, 41130; Quebec: TRTC 36446, 36502; Manitoba: RFC 6585; Alberta: TRTC 39887; U.S.A.: Florida: TRTC 31166, RFC 13290; Idaho: TRTC 39874; Nevada: TRTC 39924; Ohio: Stratton 230 (18–1) (OS); Virginia: TENN 14739. MEXICO: TRTC 40986. BRAZIL: TRTC 41086, in IPA 194. GERMANY: Krieger, F. Sax. 33.

P. curvicolla forms a complex of species along with *P. hirsuta*, *P. longicollis*, *P. millispora*, *P. platensis*, *P. setosa*, and *P. tarvisina*. It was originally described with the ascus bearing 128 spores. Mouton (1886) reported 256- and 512-spored form of this species from Belgium. North American specimens mostly have 256-spored asci. Asci with 128 spores have been reported only once by Griffiths (1901). This species can be distinguished by its long, undulated, slender hairs, saccate asci, and small spores.

18. *Podospora curvispora* (Cain) Cain, Can. J. Bot. 40: 459. 1962. (Fig. 17)
= *Sordaria curvispora* Cain and Groves, Can. J. Res. C, 26: 492. 1948.
= *Pleurage curvispora* (Cain) C. Moreau, Encycl. Mycol. 25: 256. 1953.

Perithecia 350–450 × 200–230 μ, covered on the upper part with agglutinated hairs which form a layer rather than being in tufts. Asci 8-spored, cylindrical, 100–110 × 11–13 μ. Ascospores uniseriate, strongly curved and concave on one side, 11–13(–17) × 6–8 μ; exospore thin; primary appendage clavate, slender, fugaceous, about 5 μ in length; secondary appendages absent; germ pore apical, about 1 μ in diam. Phialides and phialospores absent.

TYPE: Isolated in agar culture from seeds of *Daucus carota* Linn. var. *sativa* DC., from Gilroy, Calif., U.S.A. (TRTC 22439).

SPECIMENS EXAMINED: U.S.A.: California: TRTC 22439.

This species belongs to the *P. curvula* series. Within this series, it forms a group of species (with *P. fimbriata* and *P. inaequalis*), characterized by inequilateral or curved spores, loss of secondary appendages, which is related to their habitat (a tendency to grow upon substrata other than dung), and very fugaceous, small, clavate primary appendages.

19. *Podospora curvula* (De Bary) Niessl, Hedwigia, 22: 156. 1883. (Fig. 18)
= *Malinvernia breviseta* Fuckel, Jahrb. Nass. Ver. Nat. 23–24: 243. 1869.
= *Sordaria curvula* De Bary var. *coronata* Winter, Abh. Nat. Ges. Halle, 13 (1): 102. 1873.
= *Podospora micrura* (Speg.) Speg. Bol. Acad. Nac. Ci. Cordoba, 27: 359. 1923.
= *Sordaria pseudominuta* Speg., Bol. Acad. Nac. Ci. Cordoba, 11: 189. 1887.
= *Sordaria hispidula* Speg., Anal. Mus. Nac. Buenos Aires, 6: 255. 1899.
For additional synonymy see Cain (1934).

Perithecia 500–1100 × 300–400 μ, with tufts of agglutinated hairs consisting of swollen cells. Asci 8-spored, clavate, 150–220 × 22–30 μ; apical ring very small. Ascospores biseriate, ellipsoid, 23–28(–32) × 13–16(–18) μ; primary appendage slender, cylindrical, 8–12 × 2 μ; upper secondary appendage slightly eccentric, about 3 μ wide at the base and twice as long as the spore; a similar secondary appendage at the distal end of the primary appendage; a very small and very fugaceous secondary appendage at the base of the primary appendage; germ pore slightly eccentric, about 1.5 μ in diam. Phialides flask-shaped, about 10 × 5 μ; phialospores globose to ovoid, 2–3 μ in diameter.

TYPE: On mouse and rabbit dung from Frieburg, Baden, Germany, collected by De Bary (not seen).

SPECIMENS EXAMINED: CANADA: Ontario: TRTC 5185, 5230–5233, 12169, 14987, 19571, 23396, 31511, 32986, 33452, 35517, 36452, 36627, 36635, 41127, RFC 12232; B.C.: TRTC 40396. Quebec: RFC 12202, 12367. U.S.A.: Arkansas: TRTC 40872; Michigan: (MICH); New York:

TRTC 40850 (MICH); Ohio: Stratton (OS); Oregon: TRTC 40727; S. Dakota: TRTC 40440; Wyoming: TRTC 32018, 32026, 32074. GERMANY: Herb. Barbey-Boissier 679, Fung. rhen. 2037. U.K.: Plowright's Sphaer. Brit. 43, in Cooke's Fung. Brit. Exs. 587. SWEDEN: Lundqvist 3426*b*, 3489*f* (TRTC). ARGENTINA: LPS 6826, 6836, 6842. CHILE: LPS 6860.

It has been suggested by several authors that this species is probably the same as *Schizothecium fimicolum* Corda. Since Corda's material is not available anywhere, this point cannot be settled. Thus it is better to use the name *P. curvula* for this species.

It differs from *P. vesticola* in having larger dimensions and biseriate spores.

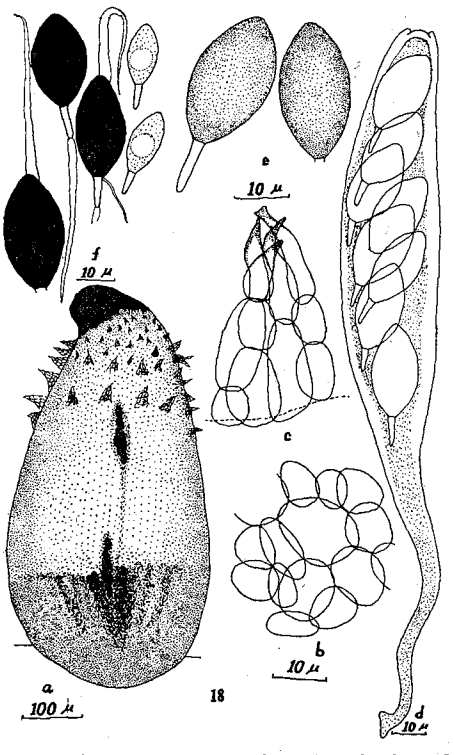
20. *Podospora curvuloides* Cain, Can. J. Bot. 40: 453–454. 1962. (Fig. 19)

Perithecia 550–1100 × 350–550 μ, ovate-pyriform to pyriform with a few small clusters of agglutinated hairs around the base of the neck. Asci 8-spored, cylindrical-clavate, readily becoming clavate under the pressure of cover slip, 270–310 × 25–30 μ (swelling up to 38 μ wide under cover slip); apical ring not distinct. Ascospores uniseriate, easily becoming biseriate above, elongate-ellipsoid, 31–41 × 17–20 μ, primary appendage basal, slender, cylindrical, 4–5 × 1.5–2 μ; upper secondary appendage symmetrical, grooved on one side, cylindrical, 50–80 μ long and 5–6 μ wide; lower secondary appendage at the distal end of the primary appendage, fugaceous, 30–40 μ long and 1.5–2 μ wide at base; germ pore apical, about 2 μ in diameter.

TYPE: Cow dung from Sao Leopoldo, Rio Grande do Sul, Brazil, collected March 11, 1936, by Alfons Thèobald (TRTC 35446).

SPECIMENS EXAMINED: MEXICO: TRTC 36769, 40888. BRAZIL: TRTC 35446, 36769.

This species is very close to *P. glutinans* Cain, but differing from it in the absence of flexuous hairs, in exhibiting larger dimensions in every respect, and in the nature of the upper secondary appendages.



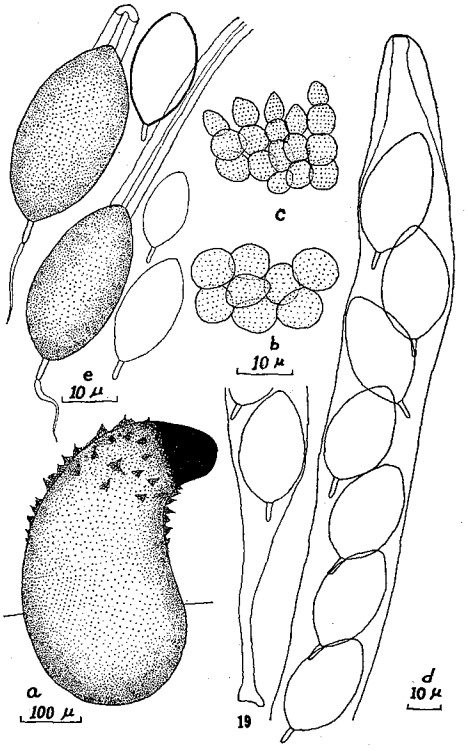


FIG. 18. *Podospora curvula*. *a*. Perithecium. *b*. Cells of peridium. *c*. Agglutinated hairs. *d*. Ascus. *e*. Two mature ascospores. *f*. Two young and three mature ascospores.

FIG. 19. *Podospora curvuloides* (type, TRTC 35446). *a*. Perithecium. *b*. Cells of peridium. *c*. Agglutinated hairs. *d*. Ascus. *e*. Ascospores at different stages of development.

21. *Anopodium ampullaceum* Lundqvist. Botaniska Notiser, 117: 356. 1964. (Fig. 20)

Perithecia pyriform to globose, 410–500 × 335–430 μ; neck papilliform or short conical, about 150 μ long and 180 μ broad at the base; hairs scattered, short, straight, hyaline to yellowish brown, septate, swollen at apex, measuring about 40 × 4 μ, confined to base of neck; peridium thin, membranaceous, yellowish brown, semitransparent; cellular structure not very distinct in the upper part but quite distinct in the lower part. Asci 8-spored, clavate, 200–240 × 25–32 μ, rounded and perforate at apices; stipe rather long. Paraphyses filiform, septate, as long as or longer than the asci. Ascospores biseriate, ellipsoid, 27–32 × 16–19 μ, dark brown, when young and hyaline resembling a flask with round bottom and long neck; opaque at maturity; primary appendage apical, narrow, clavate, frequently curved, about 15 × 2.5 μ; secondary appendages absent; germ pore basal, about 2.5 μ in diameter.

TYPE: On hare dung, Sweden.

SPECIMEN EXAMINED: SWEDEN: Lundqvist 2371*d*.

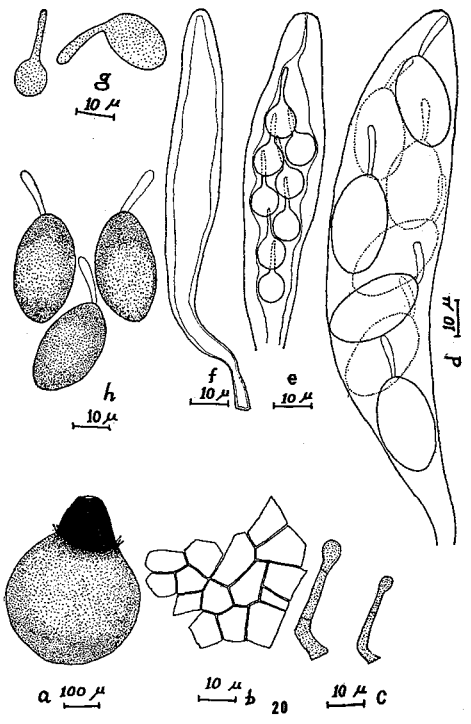
Anopodium was published by Lundqvist as a new genus. In addition to *A. ampullaceum* he published *A. epile* Lundqvist. Both of these species are closely related to *Pleurage dagobertii* C. Moreau, and all three are doubtfully distinct from *Podospora*.

22. ***Podospora dakotensis*** (Griff.) comb. nov. (Fig. 21)

=*Pleurage dakotensis* Griff., Mem. Torrey Bot. Club, 11: 87–88. 1901.

=*Philocopra dakotensis* (Griff.) Sacc., Syll. Fung. 17: 607. 1905.

Perithecia 500–800 × 250–500 μ, upper part of perithecium covered with tufts of short, brown, agglutinated hairs consisting of thin-walled swollen cells. Asci 32-spored, 240–300 × 35–45 μ; apical ring not visible. Ascospores multiseriate, ellipsoid, 18–24 × 13–15 μ; exo-



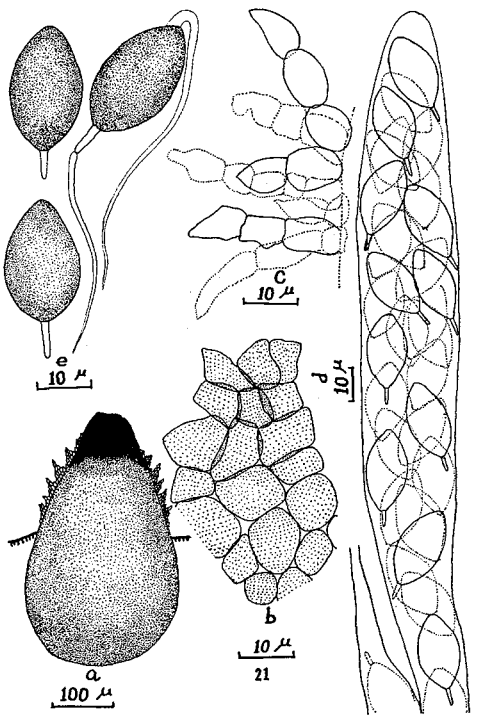


FIG. 20. *Anopodium ampullaceum* (Lundqvist 2371*d*). *a*. Perithecium. *b*. Cells of peridium. *c*. Two hairs from the base of neck. *d*. Mature ascus. *e*. Young ascus showing ascospores. *f*. Abortive ascus. *g*. Young ascospores. *h*. Mature ascospores.

FIG. 21. *Podospora dakotensis*. *a*. Perithecium. *b*. Cells of peridium. *c*. Agglutinated hairs. *d*. Ascus showing ascospores. *e*. Ascospores.

spore thin; primary appendage short, slender, about 8 × 1.5 μ; upper secondary appendage long, eccentrically attached, about 60 × 3 μ, very fugaceous; a similar secondary appendage at the distal end of the primary appendage; germ pore apical, about 1.5 μ in diameter.

TYPE: On rabbit dung from Brookings, South Dakota, U.S.A. (not seen).

SPECIMENS EXAMINED: CANADA: Ontario: TRTC 5186, 5234, 5235. U.S.A.: Mass.: TRTC 12228. MEXICO: TRTC 36824, 36825, 36557, 36837, 36923, 36930, 36933, 37418.

This species is very closely related to *P. dubia* from which it can readily be distinguished by means of its smaller perithecia, asci and spores and by its 32-spored asci.

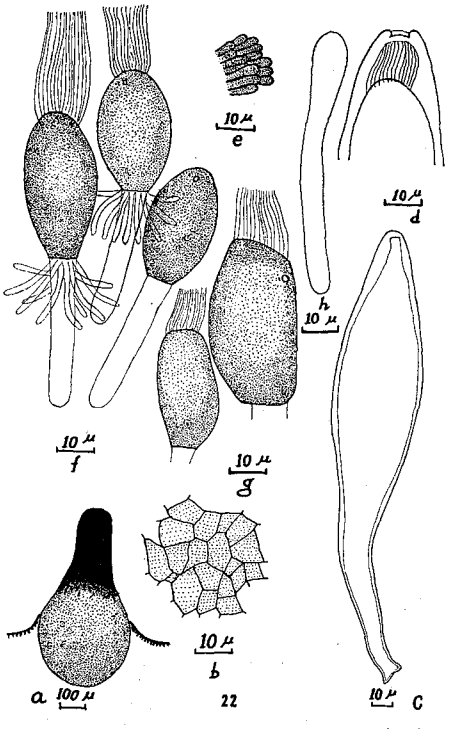
23. *Podospora decipiens* (Winter) Niessl, Hedwigia, 22: 156. 1883. (Fig. 22)
= *Sordaria communis* (Speg.) Sacc. var. *macrura* Speg., Anal. Mus. Nac. Buenos Aires, 6: 257. 1899.

For additional synonymy see Cain (1934).

Perithecia 600–800 × 350–450 μ, with scattered, black papillae on the upper part of the perithecia. Asci 180–250 × 40–55 μ; apical ring distinct. Ascospores biseriate, ellipsoid, 35–46 × 19–23 μ; primary appendage cylindrical, 40–60 × 7–8 μ; a lyre-shaped tuft of secondary appendages at spore apex, about 22 × 13 μ; several small secondary appendages at the base of the primary appendage; germ pore eccentric, below apex of spore, about 2 μ in diameter. Phialides absent.

TYPE: On cow and horse dung from Pohlenz, Germany.

SPECIMENS EXAMINED: CANADA: Ontario: TRTC 5187, 5236–5239, 31637, 35721, 36472, 36628, 38151, 40827, RFC 12233; Saskatchewan: U.S.A.: Arkansas: TRTC 38134; Colorado: TRTC 37391, 38101, 38120, 41001; Idaho: TRTC 39455; Kansas: TRTC 39337; Louisiana: TRTC 38129; Montana: TRTC 35773; New York: TRTC 37609, Griffiths (NY); South



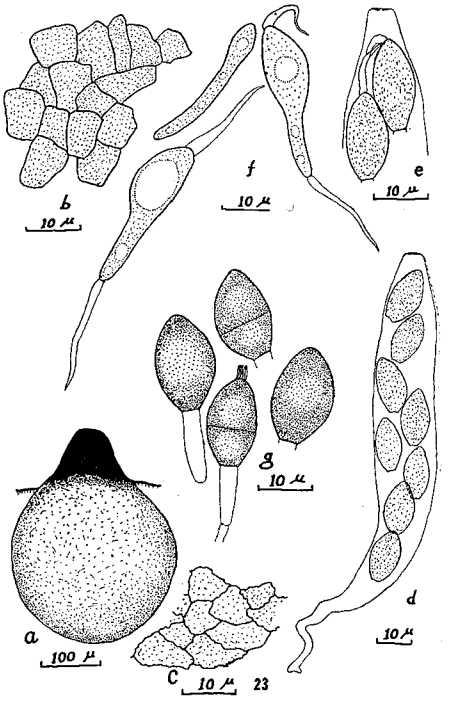


FIG. 22. *Podospora decipiens*. *a*. Perithecium. *b*. Cells of peridium. *c*. A young ascus (ascospores not shown). *d*. Ascus apex. *e*. Papillae from the neck. *f*. Three mature normal ascospores. *g*. Two abnormal ascospores. *h*. A young ascospore.

FIG. 23. *Podospora didyma* (type, TRTC 36637). *a*. Perithecium (hairs not shown). *b*. Cells of peridium from upper region. *c*. Cells of peridium from the base. *d*. Ascus. *e*. Ascus apex. *f*. Young ascospores. *g*. Mature ascospores (two of them showing septa).

Dakota: TRTC 39455; Wyoming: TRTC 39082, 39127, 40403, 40405, 40409. MEXICO: TRTC 36489, 36553, 36714, 36785, 36807, 36843, 36846, 36995, 37014, 37424, 37460, 40996–41000. SOCIETY ISLANDS: Moorea: TRTC 35523. ARGENTINA: in LPS 6831, 6833. FRANCE: in Desmaziere's, Plantes Cryptogames de France 97.

This species is very common and widely distributed. It is closely related to *P. argentinensis* and *P. pleiospora*. *P. argentinensis* has smaller ascospores and *P. pleiospora* has multispored asci.

24. ***Podospora didyma*** sp. nov. (Fig. 23)

Peritheciis sparsis, immersis vel partim immersis, 350–450 × 250–300 μ, globosis vel piriformibus; collo nigro papilliformi, circiter 80 × 80 μ, papillis ornato; peridio perithecii tenui, membranaceo, fulvo, semitranslucido, ex celluli non-distincta haud translucidis composito. Ascis octosporis, cylindraceis vel clavatis, 140–155 × 15–20 μ, parte sporis praedita longa 90–100 μ, superne truncatis, annulo incrassato ad apicem praeditis, in stipitem circiter 50 μ longum attenuatis. Paraphysibus filiformibus, septatis. Ascosporis uniseriatis vel biseriatis, ellipsoideis vel inaequilateralibus, 15.5–17.5 × 9.5–10.5 μ, 1-septatis, brunneis, haud translucidis; primaria appendice cylindracea, hyalina, 10–12 × 3.5–4.0 μ, ad basem ascosporae alligata; secundariis appendicibus gelatinosis, hyalinis, similibus flagello; secundaria et superiore appendice, circiter 20–25 × 3 μ, ad apicem ascosporae symmetrice alligata, secundaria et inferiore appendice simili, ad ultimam partem primariae appendicis alligata; foramine germinali, excentrico, parvo, rotundo, circiter 1.5 μ diam.

TYPUS: in fimo (TRTC 36637). In University of Toronto Herbarium.

Perithecia scattered, immersed or semi-immersed, 350–450 × 250–300 μ, globose to pyriform, with black, papilliform neck, about 80 × 80 μ, covered with dark brown papillae; peridium very thin, membranaceous, yellowish brown, consisting of indistinct cells with irregular walls; hairs on the neck small, very fine, hyaline, disappearing with age. Asci eight-spored, cylindrical or clavate, 140–155 × 15–20 μ, with spore-bearing part 90–100 μ long; stipe about 50 μ long; ascus apex truncate, perforate, and with a distinct apical ring. Paraphyses filiform, septate, abundant, longer than asci. Ascospores uni- or bi-seriate, ellipsoid, frequently slightly flattened one side, dark brown and opaque when mature, 15.5–17.5 × 9.5–10.5 μ, often with two oil globules; spores becoming 1-septate after maturation; the septum forming usually just below the middle; exospore thin; primary appendage cylindrical, basal, 10–12 × 3.5–4.0 μ; secondary appendages lash-like; one symmetrical secondary appendage at the apex of the spore measuring about 20–25 × 3 μ; a single similar secondary appendage at the distal end of the primary appendage which is slightly longer than the upper one; germ pore eccentric, circular, about 1.5 μ in diameter.

ETYMOLOGY: Greek *didymos* = twin, referring to the two-celled spores.

HOLOTYPE: On partridge dung from Laurentide Park, Quebec, R. F. Cain, Sept. 4, 1959 (TRTC 36637).

HABITAT: Dung of partridge, rabbit.

DISTRIBUTION: CANADA: Ontario: TRTC 5241; Quebec: TRTC 36637.

This species has a very distinct ring in the apex of the ascus and the spores become septate after maturation. The presence of a septum has been found in several genera of Sordariaceae and probably represents side lines of evolution in these genera.

25. ***Podospora dolichopodalis*** sp. nov. (Fig. 24)

Peritheciis sparsis, immersis vel partim immersis, 750–1050 × 500–600 μ, pyriformibus vel ovatis; pilis, longis, ad basem colli, flexuosis, septatis, inferne brunneis, superne hyalinis praeditis vel nudis; collo perithecii conico-papilliformi, vel brevi, cylindraceo, 180–250 × 150–180 μ, nigro; peridio perithecii tenui, membranaceo, inferne olivaceo-brunneo et superne brunneo. Ascis octosporis, clavatis, 230–250 × 35–40 μ, superne perforatis, annulo brevo, incrassato ad apicem, praeditis, inferne attenuatis in stipitem longum. Paraphysibus septatis, longitudinatis, inferne ventricosis, superne cylindraceis. Ascosporis biseriatis, ellipsoideis, 29–42 × (14–)16–21 μ, superne late rotundatis, inferne aliquante truncatis, valde brunneis, et haud translucidis; primaria appendice cylindraceo-clavata, (38–)45–57 × 7–10 μ ad basem ascosporae alligata; secundariis appendicibus longis, striatis, similibus

flagello; secundaria et superiore appendice longa circiter 80 μ et basi lata 7–9 μ, ad apicem ascosporae excentrice alligata; secundaria et inferiore appendice parviore, basi lata 7–8 μ, ad ultimum partem primariae appendicis alligata; foramine germinali ad apicem ascosporae, 2–2.5 μ diam.

TYPUS: in fimo (TRTC 39491). In University of Toronto Herbarium.

Perithecia scattered, immersed or semi-immersed, 750–1050 × 500–600 μ, pyriform to ovoid, with a few long flexuous, septate hairs below the neck which are brown in the lower part and hyaline above, or almost bare; neck papilliform-conical to short-cylindrical 180–250 × 150–180 μ, blackened with papillae; peridium thin, membranaceous, olivaceous-brown at the base, brown above. Asci 8-spored, clavate 230–250 × 35–40 μ; apical ring very small; stipe about one-third the length of ascus. Paraphyses abundant, filiform above, ventricose below, septate, agglutinated. Ascospores biseriate, ellipsoid 29–42 × (14–)16–21 μ, broadly rounded at the apex somewhat truncate at the base, dark brown, and opaque; exospore thin; primary appendage basal, cylindric clavate (38–)45–57 × 7–10 μ; secondary appendages lash-like, longitudinally striate, upper one eccentrically attached, about 80 μ long and 7–9 μ wide at base, lower one at the distal end of the primary appendage, smaller than the upper one, and 7–8 μ wide at the base; germ pore almost apical, 2–2.5 μ in diameter.

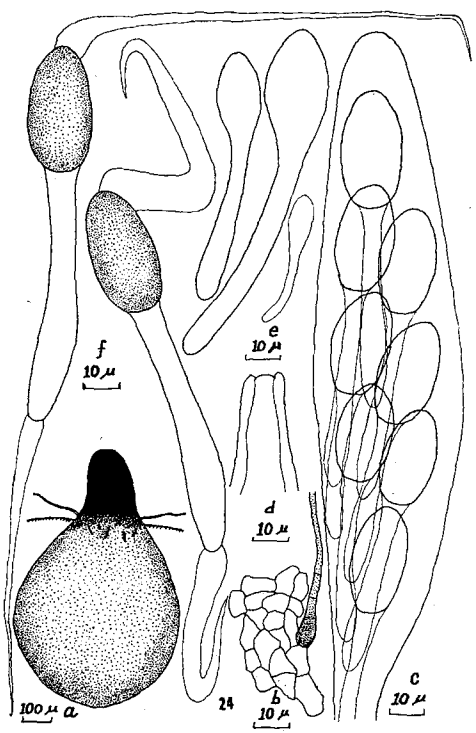
ETYMOLOGY: Greek, *dolichos* = long, *podos* = foot, appendage.

HOLOTYPE: On cow dung from Colfax, Louisiana, U.S.A., collected August 23, 1960, by R. F. Cain (TRTC 39491).

HABITAT: dung of cow.

DISTRIBUTION: U.S.A.: Louisiana: TRTC 38132, 39491. MEXICO: 39492.

The asci in this species swell up considerably in water and eventually disappear. Before this, the spores tend to gather in the upper part of asci. The primary appendages are very long and



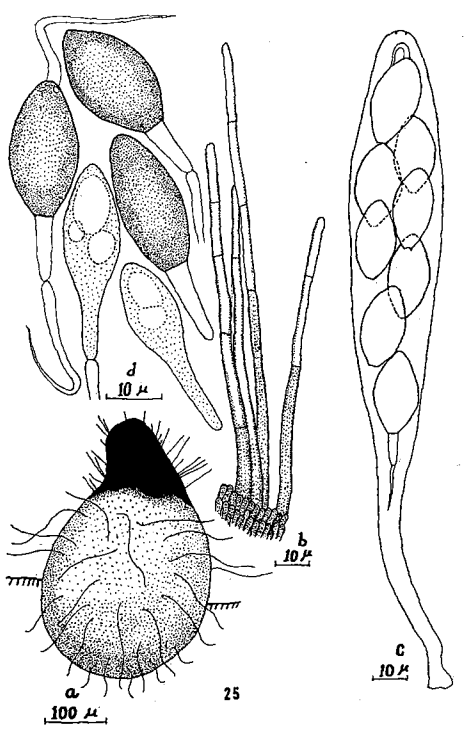


FIG. 24. *Podospora dolichopodalis* (type, TRTC 39491). *a.* Perithecium. *b.* Cells of peridium from the upper part of perithecium. *c.* Ascus. *d.* Ascus apex. *e.* Young ascospores. *f.* Mature ascospores.

FIG. 25. *Podospora ellisiana. a.* Perithecium. *b.* Hairs from the neck. *c.* Ascus. *d.* Ascospores, two still young.

are broadest below the distal end. The secondary appendages are striated, the upper one being eccentric.

26. *Podospora dubia* (Hansen) Niessl, Hedwigia, 22: 156. 1883.

Perithecia 1000–1500 × 500–750 μ, oblong-conical, upper part covered with short, light brown, agglutinated hairs. Asci 16-spored, clavate-fusiform, spore-bearing part 204–280 × 36–52 μ, rounded at the apices; stipe very long. Ascospores biseriate, ellipsoid, 27–34 × 15–19 μ, olivaceous brown, opaque; primary appendage about half the length of spores; upper secondary appendage long, lash-like, longitudinally striate; lower secondary appendage at the distal end of the primary appendage and shorter than the upper one; germ pore apical, about 2.0 μ in diameter.

TYPE: On sheep dung from Denmark, collected in November 1874 (not seen).

SPECIMENS EXAMINED: U.S.A.: Colorado: TRTC 41740. WEST PAKISTAN: Karachi: TRTC 41770.

The type is not available. The two specimens examined by the writers are in full agreement with the description given by Hansen. From the description given by Hansen, it appears to be very closely related to *Podospora dakotensis* from which it can easily be distinguished by its larger perithecia, asci, and spores and by its 16-spored asci.

27. ***Podospora ellisiana*** (Griff.) comb. nov. (Fig. 25)

= *Pleurage ellisiana* Griff., Mem. Torrey Bot. Club, 11: 72–73. 1901.

= *Sordaria ellisiana* (Griff.) Sacc. & Sacc., Syll. Fung. 17: 601. 1905.

Perithecia 450–650 × 300–400 μ; neck papilliform, with short, straight brown, septate hairs, lighter in color at the tip, and measuring 50–150 × 2.5–4 μ; lower part of perithecia with long, brown, septate, flexuous hyphae. Asci 8-spored, clavate, 200–250 × 22–26 μ; apical ring distinct; stipe about 100 μ long. Ascospores biseriate, ellipsoid, 21–27 × 11–14 μ; exospore thin; primary appendage slightly tapering toward the distal end, 11–14 × 3–4 μ; upper secondary appendage long, eccentric; lower secondary appendage similar, at the distal end of primary appendage; both secondary appendages longer than spore and 2–3 μ wide at the base; germ pore eccentric, 1.5–2.5 μ in diameter.

TYPE: On cow dung from Englewood, New Jersey, U.S.A., collected by Ellis in August, 1899 (not seen).

SPECIMENS EXAMINED: CANADA: Ontario: TRTC 5188–5190, 5240, 5242, 5243; Quebec: TRTC 19572.

This species is very close to *P. pilosa*, which differs in having smaller spores and primary appendages.

Cain (1934) placed this species under the synonymy of *P. pilosa* but a more careful examination of the figures and description given by Mouton and Griffiths and the examination of the specimens at hand indicate that these represent two distinct species.

28. *Podospora eminens* (Cain) Cain, Can. J. Bot. 40: 459. 1962. (Fig. 26)

Perithecia superficial, 750–1300 × 700–900 μ, pyriform, bare or with a few flexuous hairs at the base. Asci 512-spored, broadly clavate, 450–500 × 140–160 μ; stipe short. Ascospores multiseriate, ellipsoid, 24–26 × 16–17 μ; primary appendage clavate, 11–12 × 6–8 μ; upper secondary appendage single, eccentric; lower one at the distal end of the primary appendage, hollow in the center; both secondary appendages about 50 μ long and 4 μ wide at the base; germ pore eccentric, 1.5–2 μ in diameter.

TYPE: On deer dung from Lake Timagami, Ontario, Canada (TRTC 5309). Known only from the type collection.

This species differs from *P. curvicolla* in the absence of fascicled hairs on the neck, in its larger asci, distinctly clavate and larger primary appendages, and eccentric germ pores.

29. *Podospora fimbriata* (Bayer) Cain, Can. J. Bot. 40: 459. 1962. (Fig. 27)

?= *Sordaria vratislaviensis* A. Schmidt, Jahresb. Schles. Ges. p. 32. 1912.

= *Sordaria fimbriata* Bayer, Acta Soc. Sci. Nat. Moraviae, 1: 111. 1924.

= *Bombardia lunata* Zickler, Planta, 22: 573–613. 1934.

= *Pleurage fimbriata* (Bayer) Page, Trans. Brit. Mycol. Soc. 40: 536. 1957.

Perithecia 400–700 × 320–430 μ, ovoid to pyriform, with short, agglutinated hairs on the upper part; hairs up to 50 μ long, with distal cell usually fimbriate. Asci 8-spored, cylindrical; spore-bearing part 100–150 × 9.5–13.5 μ; stipe variable in length, 40–200 μ, slender. Paraphyses

filiform, septate. Ascospores uniseriate, with their convex side facing each other, flattened on one side, boat-shaped in face view, 17–20 × 7.5–9.5 μ; exospore thin; primary appendage basal, narrow, clavate, 6–7.5 × 2 μ, collapsing readily; secondary appendages absent; germ pore apical, about 1 μ in diameter. Phialides abundant, obclavate or flask-shaped, with a very distinct collarette, phialospores hyaline, globose to ovoid, about 2 μ in diameter.

TYPE: On goose dung from Jilove near Prague, Czechoslovakia, collected by Baudys (not seen).

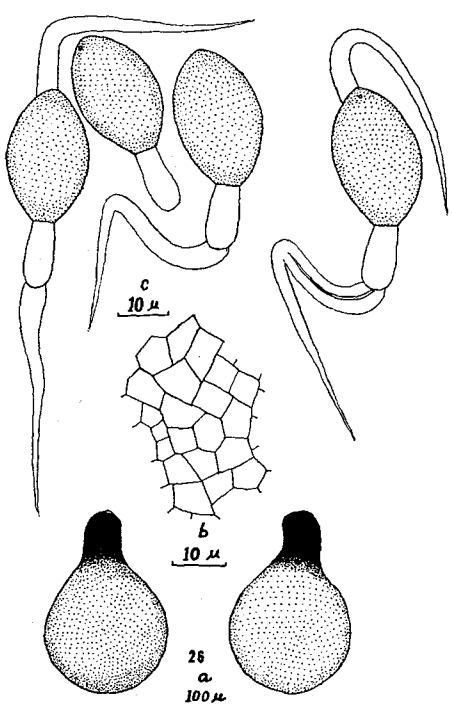
SPECIMENS EXAMINED: CANADA: Saskatchewan: RFC 6592. U.S.A.: Ala.: RFC 6421; Conn.: RFC 6420. GERMANY: Krieger, Fung. Sax. 2453, 2454 (TRTC) sub. *Sordaria vesticola* (Berk. & Br.) Hoehnel.

As suggested by Cain and Groves (1948), it is possible that *Podospora fimbriata* is the same species as *Sordaria vratislaviensis* A. Schmidt. The authors did not see an authentic specimen of the latter. If they should prove to be the same, then Schmidt's epithet is the correct one for the species since it is the earlier of the two.

30. *Podospora fimicola* Ces. in Rabenh., Klotzschii Herb. Viv. Mycol. Ed. 2. No. 259. 1856; Bot. Zeit. 14: 429. 1856; Hedwigia, 1: 103. 1856. (Fig. 28)

For synonymy see Cain (1934).

Perithecia superficial 900–1200 × 550–800 μ; upper part of the perithecium as well as the neck covered with short, straight, septate, brown, hyaline-tipped hairs measuring about 60–100 × 4 μ. Asci 8-spored, clavate, 350–475 × 45–60 μ; apical ring small. Ascospores biseriate, oblong-ellipsoid, 52–60 × 28–32 μ; exospore thick; primary appendage pestle-shaped, 45–50 μ long and about 5 μ wide near the distal end; upper secondary appendages eccentric, about 100 μ long and 16 μ wide at the base; lower one attached to the distal end of the primary appendage, about 100 μ long and 9 μ wide at the base; germ pore apical, about 4 μ in diameter. Phialides absent.



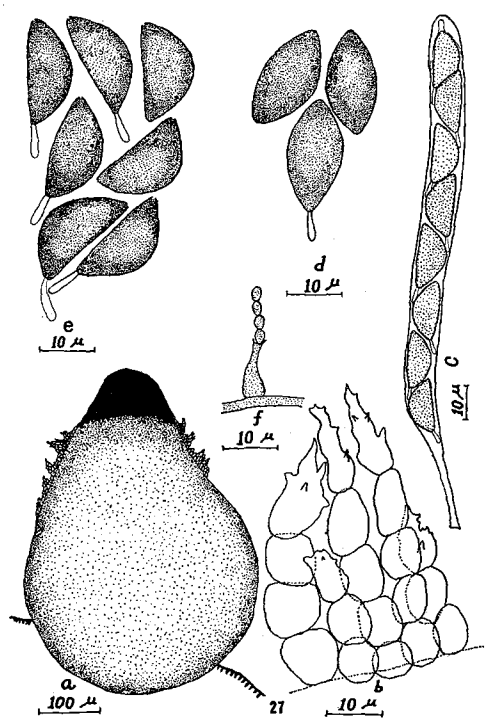


FIG. 26. *Podospora eminens* (Type, TRTC 5309). *a.* Perithecia. *b.* Cells of peridium. *c.* Mature ascospores.

FIG. 27. *Podospora fimbriata*. *a.* Perithecium. *b.* Agglutinated hairs. *c.* Ascus. *d.* Ascospores (viewed from the curved side). *e.* Ascospores (in side view). *f.* Phialides.

TYPE: On cow dung from Brescia, Italy (in Klotzsch Herb. Viv. Mycol. ed. 2. No. 259).

SPECIMENS EXAMINED: CANADA: Ontario: TRTC 191. 5244–5247, 14991, 16258, 22799, 31525, 35447, 36455, 36876, 40460. U.S.A.: Conn.: (NY). MEXICO: TRTC 41002, 41003. GERMANY: Krieger, Fung. Sax. 32; Fung. rhen. 2037 (NY). ITALY: Klotzsch 259 (PAV). SWEDEN: Lundqvist 3119a (TRTC).

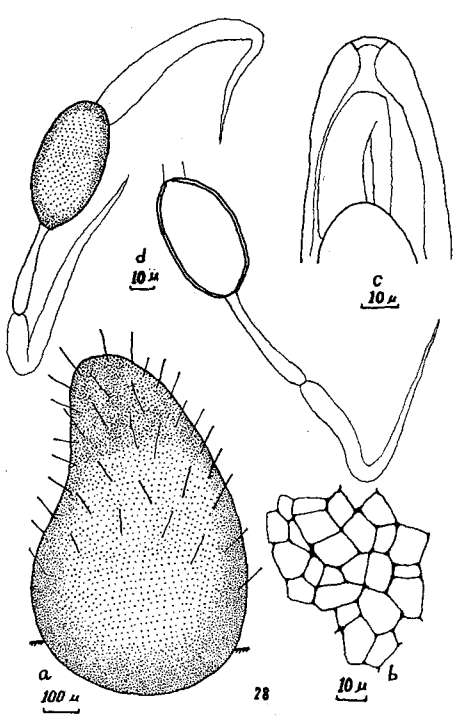
It has been suggested by various authors that this species is the same as *Schizothecium fimicolum* Corda. Unfortunately Corda's specimen is no longer available. From the figures, given by Corda, one can be sure that his species is not the same as *Podospora fimicola* Ces.

31. ***Podospora gigantea*** sp. nov. (Fig. 29)

Peritheciis sparsis, immersis, globosis vel piriformibus, 1300–2000 × 600–900 μ, brunneis vel nigris opacisque, hyphis flexuosis, brunneis vel cano-brunneis, septatis, raro, ramosis, 2–3 μ diam, inferne tumidis dense praeditis. Collo perithecii brevi vel longo, cylindraceo nigro, opaco, 350–900 × 300–500 μ. Peridio perithecii tenui, membranaceo vel aliquantulum crasso et coriaceo, atro-brunneis, forma cellulari vix spectabili praedito. Ascis octosporis, clavatis, 600–900 × 80–120 μ, superne et inferne attenuatis, annulo incrassato, vix spectabili, ad apicem praeditis, longe stipitatis, (200–400 μ longis). Paraphysibus filiformibus, septatis et amplis. Ascosporis biseriatis, oblongo-ellipsoideis, 110–132 × 46–54 μ, primum hyalinis, deinde ochraceo-brunneis, postremo valde brunneo-nigris et haud translucidis; primaria appendice triangula vel conoidea, 1.5–3.5 μ longis, hyalina, ad basem ascosporae alligata; secundaria et superiore appendice longa, gelatinosa, taenioidea basi lata circiter 40 μ; secundaria et inferiore appendice lata circiter 30 μ, ad basem ascosporae alligata; foramine germinali uno, ad apicem ascosporae, circiter 3.5 μ diam.

TYPUS: in fimo (TRTC 38899). In University of Toronto Herbarium.

Perithecia scattered, immersed, globose to pyriform, 1300–2000 × 600–900 μ, brown to



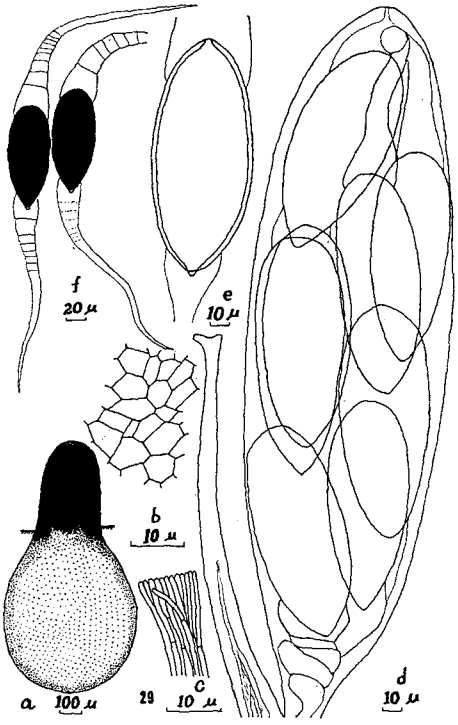


FIG. 28. *Podospora fimicola*. *a*. Perithecium. *b*. Cells of peridium. *c*. Ascus apex. *d*. Ascospores, one drawn to show the germ pore.

FIG. 29. *Podospora gigantia* (type, TRTC 38899). *a*. Perithecium. *b*. Cells of peridium. *c*. Papillae from the ostiolar region. *d*. Ascus. *e*. Ascospore showing germ pore. *f*. Ascospores.

black and opaque, with a dense growth of flexuous, brown or grayish brown, septate, sparingly branched hyphae 2–5 μ in diameter; basal cell of hypha usually swollen; neck stout, short to long cylindrical, black, opaque, 350–900 × 300–500 μ, completely covered with a dense layer of short olivaceous, 1- to 4-septate papillae; ostiole prominent at the apex of the neck; peridium thin, membranaceous to fairly thick and somewhat coriaceous, brown to almost black, cellular structure visible only with difficulty. Asci 8-spored, clavate, 600–900 μ long and 80–125 μ wide in central region, narrowing towards both ends, with an indistinct thickened ring in apex, with stipe 200–400 μ long. Paraphyses filiform, septate, and abundant. Ascospores biseriate, oblong-ellipsoid, 110–132 × 46–54 μ, hyaline at first, then yellowish brown and finally brownish black; exospore thick; primary appendage represented by a small hyaline conical basal apiculum about 1.5–3.5 μ long, cut out from the spore proper by a septum at a very young stage; secondary appendages very long, broad, taenioid, upper one more distinctly so, about 40 μ wide at the base, and covering about one-sixth of the spore; lower secondary appendage similar, about 30 μ at the base; germ pore apical about 3.5 μ in diameter.

ETYMOLOGY: Greek, *gigantos* = giant, refers to the giant size of the spores.

HOLOTYPE: On cow dung from Walker, Livingston Parish, Louisiana (U.S.A.), R. F. Cain, August 23, 1960 (TRTC 38899).

HABITAT: Found only on cow dung.

DISTRIBUTION: U.S.A.: Louisiana: TRTC 38899; Arkansas: 38900.

It is closely related to *P. australis* and *P. apiculifera*, but differs from them in not only having larger perithecia, asci, and spores, but also having 8-spored asci.

32. ***Podospora glutinans*** (Cain) Cain, Can. J. Bot. 40: 460. 1962. (Fig. 30)

Perithecia 450–900 × 250–450 μ, pyriform, covered on the upper part with short agglutinated hairs consisting of thin-walled, swollen cells and on the lower part with long, flexuous, sparingly septate hairs measuring about 1.5–2 μ in diameter. Asci 8-spored, cylindrical, 190–220 × 24–28 μ, without a distinct apical ring; stipe 30–40 μ long. Ascospores uniseriate, broadly ellipsoid, 29–33 × 19–22 μ; exospore thin; primary appendage slender, 8–14 × 1.5–2.5 μ; upper secondary appendage symmetric, long; lower one similar, at distal end of primary appendage; germ pore apical 2–3 μ in diameter.

ETYMOLOGY: Latin, *glutinare* = to glue together, referring to the agglutinated hairs.

TYPE: On rabbit dung from Muskoka, Ontario, Canada (TRTC 5165).

SPECIMENS EXAMINED: CANADA: Ontario: TRTC 5165–5168, 35761, 35964. MEXICO: TRTC 36769, 36963, 41004.

This species comes close to *P. dubia*, which has 16-spored asci.

33. *Podospora gwynne-vaughaniae* (Page) Cain, Can. J. Bot. 40: 460. 1962.

Perithecia about 1000 × 500 μ, pyriform, with few flexuous hairs. Asci 8-spored, clavate, with a distinct apical ring. Ascospores biseriate, ellipsoid, 40–46 × 22–25 μ; exospore thin; primary appendage cylindrical, surrounded by a mucilagenous sheath which gives rise to several (usually four) long secondary appendages at the distal end of the primary appendage, four similar secondary appendages at the apex of spore; germ pore apical, 1.5–2 μ in diameter.

TYPE: On rabbit dung from Leonard's Lee, Sussex, England (IMI 77666).

The writer has seen a permanent slide of this species sent by Miss W. M. Page. This slide was not in good condition; therefore, the above description is mainly based on the original description given by Page. This species undoubtedly is very close to *P. communis* from which it can easily be distinguished by its larger spores and by the nature of its lower secondary appendages.

34. *Podospora hirsuta* Dang., Le Botaniste, 10: 347. 1907.

Perithecia semi-immersed, subglobose-conical, hirsute, brownish-black, with a long, curved neck, surrounded by a white or brown mycelium connecting the perithecia with each other; hyphae septate, brown or hyaline; mycelium somewhat fluffy. Asci 128-spored. Ascospores ellipsoid, 25–30 × 14 μ, dark brown; primary appendage basal, cylindrical, about 20 μ long. Phialides peg-like, with phialospores globose and in chains.

This species is known only from the type specimen, which has not been located. Thus, the above description is taken from Dangeard

(1907). It appears to be a good species of *Podospora*. C. Moreau (1953) treated it as a synonym of *P. setosa*. He obviously was misled by Chenantais (1919), who misunderstood Dangeard when the latter wrote "Les dimensions du renflement sont alors de 15 μ en longueur sur 10 μ en largeur; la longueur de pedicelle est de 20 μ ... le renflement s'entoure bientot d'une membrane épaisse dont la couleur olive passe ensuite au brun fonce; la longueur des spores est alors de 25 à 30 μ sur une largeur de 14 μ environ." It is quite clear that 25–30 μ is the length of the dark part of the spores as pointed out by Saccardo (1913) and not of the dark part plus the primary appendage as interpreted by Chenantais (1919).

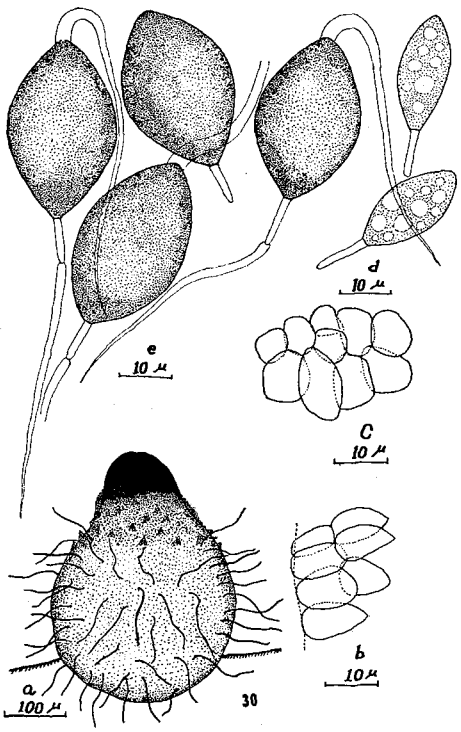
35. *Podospora hyalopilosa* (Stratton) Cain. Can. J. Bot. 40: 460. 1962. (Fig. 31)

Perithecia 450–750 × 275–450 μ, pyriform; neck with short, straight or somewhat flexuous, hyaline, septate hairs, measuring 12–80 × 1.5–2 μ; exposed part of perithecia covered with flexuous, septate hairs. Asci 8-spored, clavate, 180–220 × 26–32 μ, swelling rapidly in water up to 65 μ in width; apical ring not distinct. Ascospores biseriate at first, becoming clustered below the apex before discharge, ellipsoid, 18–31 × 13–20 μ; exospore thin; primary appendage clavate, characteristically constricted at the base, 18–31 × 6–9 μ; single secondary appendage at the distal end of the primary appendage; four secondary appendages at the apex of spores, usually about 20 × 4 μ but sometimes greatly elongated; germ pore apical, about 1.5 μ in diameter.

TYPE: On cow dung from Oxford, Ohio, U.S.A., collected by Stratton, October 22, 1914 (OS, Stratton 238, 24–1).

SPECIMENS EXAMINED: CANADA: Ontario: TRTC 5248, 5249. U.S.A.: Colorado: TRTC 37402, 38094, 41009; Ohio: Stratton 238, 24–1 (OS). MEXICO: TRTC 37428, 41005–41008.

This species is close to *P. communis*, from which it can easily be distinguished by its characteristic hairs, primary appendage, and single lower secondary appendage.



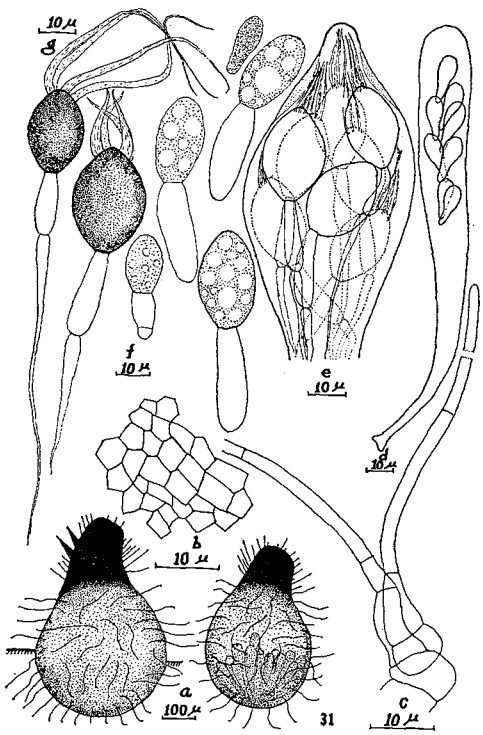


FIG. 30. *Podospora glutinans* (type, TRTC 5165). *a.* Perithecium. *b.* Agglutinated hairs. *c.* Cells of peridium. *d.* Young ascospores. *e.* Mature ascospores.

FIG. 31. *Podospora hyalopilosa*. *a.* Perithecia. *b.* Cells of peridium. *c.* Hairs. *d.* Young ascus. *e.* Mature ascus. *f.* Young ascospores at different stages of development. *g.* Mature ascospores.

The size of spores is quite variable even in the same perithecium. Often a few asci may have less than eight spores, then one or more spores are abnormally large, measuring up to 41 μ long and primary appendage measuring 32–46 × 13–15 μ.

36. *Podospora immersa* (Stratton) Cain, Can. J. Bot. 40: 460. 1962. (Fig. 32)

Perithecia scattered, immersed, 730–890 × 380–580 μ, pyriform; neck with a few tufts of short, straight, septate, light brown hairs measuring up to 75 × 2–3 μ. Asci 8-spored, clavate, 260–325 × 40–60 μ; apical ring very small. Ascospores biseriate, ellipsoid, 30–43(–55) × 19–25 μ; exospore thin; primary appendage clavate, as long as or longer than the spore and 10–12 μ wide at the broadest point below the distal end; secondary appendages very small, numerous, covering the entire spore; germ pore apical, about 1.5 μ in diameter.

TYPE: On cow dung from near Georgetown, Ohio, U.S.A., R. Stratton, Sept. 7, 1914 (not seen).

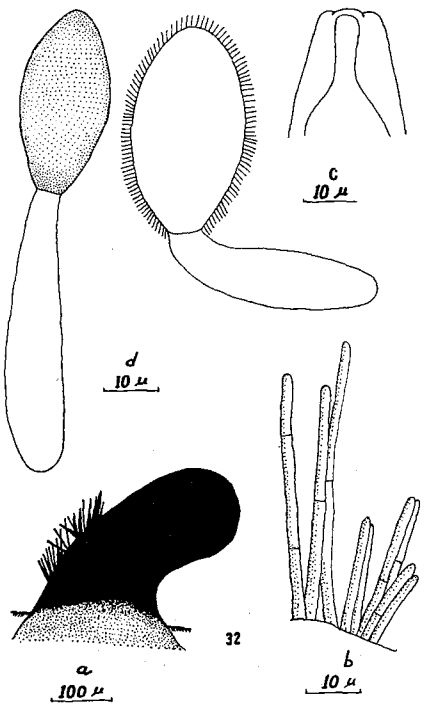
SPECIMENS EXAMINED: U.S.A.: Louisiana: TRTC 38065, 38652; Oklahoma: TRTC 38060, 40873. MEXICO: TRTC 40860.

This species is very peculiar in the nature of its secondary appendages and can readily be identified by the characteristic spores.

37. *Podospora inaequalis* (Cain) Cain, Can. J. Bot. 40: 460. 1962. (Fig. 33)

Perithecia superficial, 240–430 × 110–180 μ, covered with a layer of agglutinated cells which are more densely aggregated toward the apex of perithecia. Asci 4-spored, cylindrical, 90–115 × 11–14 μ; apical ring not distinct. Ascospores uniseriate, inequilateral in side view with one side almost straight, ellipsoid in face view, (14–)17–24 × 10–13 μ; exospore thin; primary appendage slender, clavate, 4–8 × 1–2.5 μ, fugaceous; secondary appendages absent; germ pore eccentric, on the side with greater curvature, 2–3.5 μ in diameter. Phialides absent.

TYPE: Isolated in culture from seeds of *Daucus carota* Linn. var. *sativa* DC. from Minneapolis, Minn., U.S.A. (TRTC 22440).



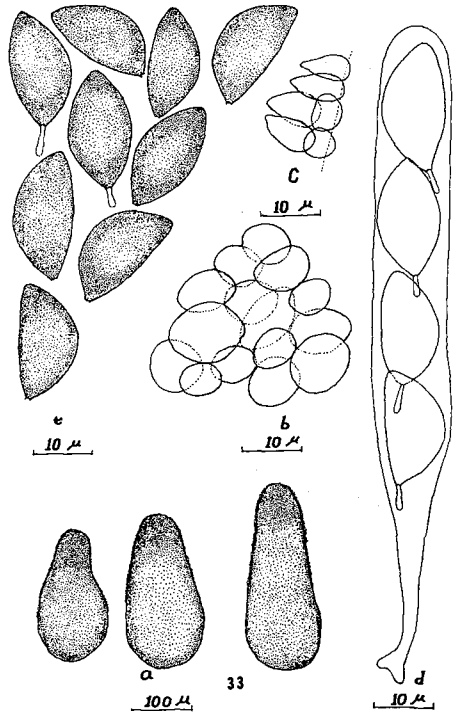


FIG. 32. *Podospora immersa*. *a*. Upper part of perithecium. *b*. Hairs from the neck. *c*. Ascus apex. *d*. Ascospores, one showing the secondary appendages.

FIG. 33. *Podospora inaequalis* (type, TRTC 22440). *a*. Perithecia. *b*. Cells of peridium. *c*. Agglutinated hairs. *d*. Ascus. *e*. Ascospores.

SPECIMENS EXAMINED: U.S.A.: California: RFC 12111; Minnesota: TRTC 12049, 22440.

This species can readily be identified by the nature of its perithecial hairs, 4-spored asci, shape of spores, and absence of secondary appendages.

38. *Podospora inflatula* Cain, Can. J. Bot. 40: 454–455. 1962. (Fig. 34)

Perithecia 350–630 × 220–400 μ, pyriform, with short, straight, 1- to 4-septate, light brown hairs with inflated tips measuring up to 8 μ in diam; hairs 30–60 × 3–5 μ. Asci 8-spored, clavate, 180–230 × 28–34 μ, with small thickened apical ring. Ascospores biseriate, ellipsoid, 23–32 × 12–16 μ; exospore thin; primary appendage basal, cylindrical, 24–34 × 4–6 μ; secondary appendages lash-like, upper one eccentric, 30–40 μ long and about 5 μ wide at the base, lower one similar, narrower, attached to the distal end of the primary appendage; germ pore apical, about 1 μ in diam. Phialides and phialospores absent.

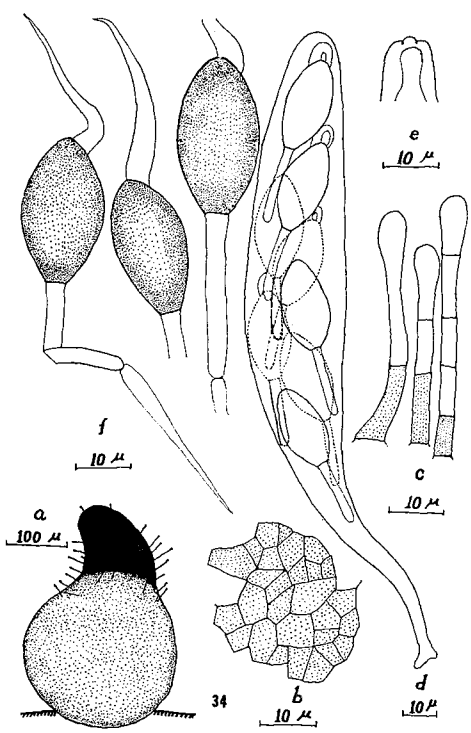
TYPE: Isolated in pure culture on agar medium from horse dung collected from Tautira, Society Islands by L. S. Olive (TRTC 32681).

SPECIMENS EXAMINED: MEXICO: TRTC 41010. BRAZIL: TRTC 37081. SOCIETY ISLANDS: Tautira: TRTC 32681, 33713.

This species can be recognized easily by the inflated perithecial hairs.

39. ***Podospora karachiensis*** sp. nov. (Fig. 35)

Peritheciis sparsis, immersis, globosis, 400–500 × 300–400 μ. Collo parvo, papilliformi, nigro, pilis brevibus, rectis vel undulatis, aseptatis vel raribus 1-septatis, pallido-nigris, longis usque ad 80 μ et latis 1.5–2.5 μ tecto. Peridio perithecii tenui, membranaceo, pallido, olivaceo-brunneo, semitranslucido hyphis flexuosis, pallido-olivaceis, tenuibus, circiter 2 μ diam tectis. Ascis octosporis (saepe 1 vel 2 ascosporis abortivis), parte sporis praedita circiter 100 × 40 μ, in aqua aliquantum tumefactis, celeriter ruptis, sine annulo incrassato spectabili in apice, inferne longe stipitatis. Ascosporis biseriatis, ellipsoideis,



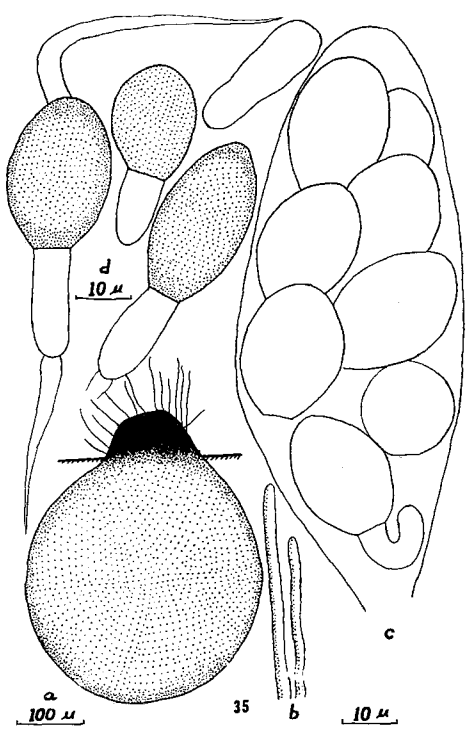


FIG. 34. *Podospora inflatula* (type, TRTC 32681). *a*. Perithecium. *b*. Cells of peridium. *c*. Hairs from the upper part of the perithecium. *d*. Ascus. *e*. Ascus apex. *f*. Ascospores.

FIG. 35. *Podospora karachiensis* (type, TRTC 39493). *a*. Perithecium. *b*. Hairs from the neck. *c*. Asci. *d*. Ascospores, uppermost young.

16–30 × 12–19 μ, ad apicem late rotundatis, ad basem truncatis; primaria appendice subcylindracea, 14–21 × 5–7.5 μ; secundaria et superiore appendice simili flagello, ad apicem ascosporae excentrice alligata, longa circiter 40 μ et basi lata circiter 7 μ; secondariae et inferiore appendice ad terminum primoriae appendicis alligata circiter 40 × 7 μ, simili flagello; foramine germinali circiter 2 μ diam, leviter excentrico, prope partem superiorem ascosporae sito.

TYPUS: in fimo (TRTC 39493). In University of Toronto Herbarium.

Perithecia immersed, scattered, globose, 400–500 × 300–400 μ; neck short papilliform, black, covered with abundant, short, straight or slightly undulated, stiff, non-septate or rarely 1-septate, black hairs up to 80 μ long and 1.5–2.5 μ wide. Perithecia covered with flexuous, light olivaceous, fine hyphae about 2 μ wide; peridium thin, membranaceous, light olivaceous brown, semitransparent, with cellular structure not clear. Asci 8-spored (often one or two spores abortive), spore bearing part about 100 × 40 μ, swelling considerably in water, very fugaceous; with no thickened ring visible in apex; stipe fairly long. Ascospores biseriate, ellipsoid, 16–30 × 12–19 μ, broadly rounded at the apex, truncate at the base; quite variable in size; exospore thin; primary appendage cylindrical-clavate, 14–21 × 5–7.5 μ. Secondary appendages lash-like, upper one slightly eccentric, about 40 μ long and about 7 μ wide at the base, lower one at the distal end of the primary appendage and similar to upper one; germ pore slightly eccentric, about 2 μ in diameter.

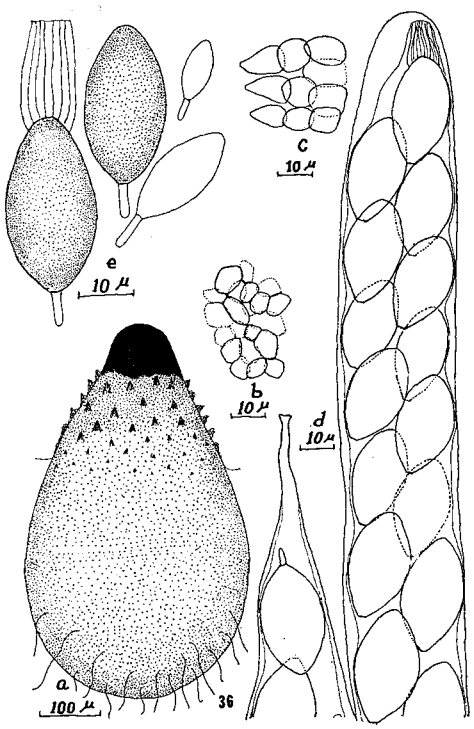
ETYMOLOGY: Named after the type locality.

HOLOTYPE: On donkey dung from Gandhi Garden, Karachi, W. Pakistan, collected Nov. 29, 1962, by Mrs. T. Wasif (TRTC 39493).

HABITAT: Donkey dung.

DISTRIBUTION: Known only from W. Pakistan (TRTC 39493).

In this species, as in *P. communis*, *P. hyalopilosa*, *P. dolichopodalis*, and *P. macropodalis*, the asci swell up considerably in water at maturity with spores crowded in the upper part, but it



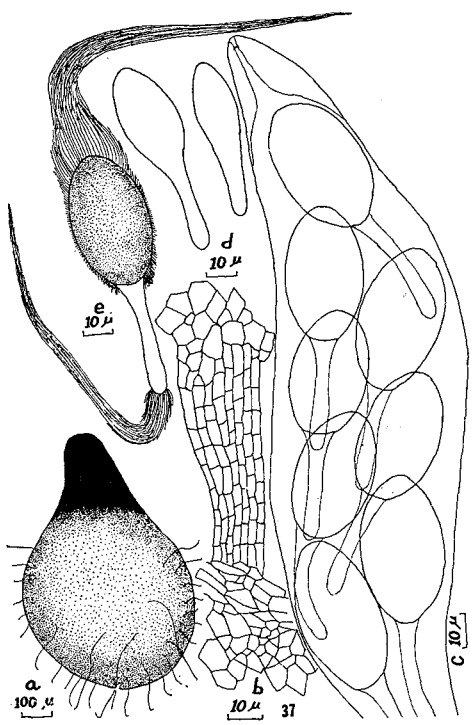


FIG. 36. *Podospora linguiformis* (type, TRTC 5256). *a.* Perithecium. *b.* Cells of peridium. *c.* Agglutinated hairs. *d.* Ascus. *e.* Ascospores, two on the right still young.

FIG. 37. *Podospora longicaudata. a.* Perithecium. *b.* Cells of peridium from below the neck. *c.* Ascus. *d.* Young ascospores. *e.* Mature ascospore.

can easily be distinguished from other species by its perithecial hairs, spore size, and appendages.

40. *Podospora linguiformis* (Cain) Cain, Can. J. Bot. 40: 460. 1962. (Fig. 36)

Perithecia 600–750 × 400–550 μ, pyriform; exposed part covered with short agglutinated hairs, with long, flexuous, septate, light brown hairs intermixed with them and more abundant on the lower part. Asci 16-spored, clavate-cylindrical, 300–350 × 34–40 μ; apical ring not distinct. Ascospores biseriate, ellipsoid, 28–33 × 15–17.5 μ; exospore thin; primary appendage basal, short slender, cylindrical, about 8 × 1.5–2.5 μ; secondary appendage broad, almost cylindrical, hollow, thick, linguiform, at the apex of the spore, measuring 24–36 × 6–8 μ, upper part fugaceous and becoming indistinct; germ pore apical, about 2.5 μ in diameter.

TYPE: On horse dung from Bear Island, Lake Timagami, Ontario, Canada (TRTC 5256).

SPECIMENS EXAMINED: CANADA: Ontario: TRTC 5256; Manitoba: RFC 6587; Saskatchewan: TRTC 39001. U.S.A.: Idaho: TRTC 39456; Wyoming: TRTC 39081, 39116.

This species belongs to the *P. curvula* series by virtue of its agglutinated perithecial hairs, and slender, primary appendages. It can easily be distinguished by its 16-spored asci and linguiform upper secondary appendage.

41. *Podospora longicaudata* (Griff.) Cain, Can. J. Bot. 40: 460. 1962. (Fig. 37)

Perithecia 600–900 × 450–650 μ, globose to pyriform, without hairs but the immersed portion is covered with dark brown, septate, branched hyphae. Asci 8-spored, clavate, 280–300 × 32–42 μ, with small apical ring. Ascospores biseriate, ellipsoid, 35–53 × 19–30 μ, rounded at both ends; exospore fairly thick; primary appendage somewhat clavate, 30–40 μ long and 6–7 μ wide at the broadest point near the distal end; secondary appendages numerous, covering the entire spore, shortest near the middle, increasing in length toward the ends, upper ones very much elongated and united into a very long lash-like striated secondary appendage measuring up to 300 μ long, numerous similar secondary appendages united into a similar filament, at distal end of the primary appendage; germ pore apical, about 2.5 μ in diameter.

TYPE: On cow dung from Rooks Co., Kansas, U.S.A., collected July, 1899, by Bartholomew (not seen).

SPECIMENS EXAMINED: MEXICO: TRTC 37436, 40894, 40895, 41121. BRAZIL: RFC 7392. PUERTO RICO: in Seaver & Chardon 1271 (NY). WEST PAKISTAN: TRTC 41087, 41088.

This species has a very wide range in spore size. Stratton (1921) found some spores even smaller than those found by the writers.

42. ***Podospora longicollis*** (L. Ames) comb. nov. (Fig. 38)

= *Philocopra setosa* (Winter) Sacc. var. *longicolla* Marchal, Bull. Soc. Roy. Bot. Belg. 23(2): 91. 1884.

= *Schizothecium longicolle* L. Ames, Sydowia, 5: 120. 1951.

= *Pleurage longicollis* (L. Ames) Boedijn, Persoonia, 2(3): 312. 1962.

Perithecia immersed, 575–1200 × 350–550 μ, pyriform, with fine, flexuous, light colored hairs; neck rather long, variable in length, 115–240 μ wide at the base, black and opaque, often covered with a few tufts of long, black hairs up to 600 μ long and about 3 μ wide at the base; peridium thin, membranaceous, light olivaceous brown, semitransparent. Asci about 512-spored, clavate to saccate, 370–390 × 100–140 μ, apical ring not seen; stipe short. Ascospores multiseriate, ellipsoid, 17–23 × 10–12 μ; exospore thin; primary appendage somewhat clavate, 8–10 × 3–4 μ; secondary appendages small, lash-like, one at the apex of spore and one at the distal end of primary appendage; germ pore apical, about 1.5 μ in diameter. Phialides absent.

TYPE: Isolated from deteriorating material obtained from Barro Colorado, Canal Zone, in 1932 by L. Ames (not seen).

SPECIMENS EXAMINED: CANADA: Alberta: TRTC 40528. ARGENTINA: in LPS 6842.

This species is very close to *Podospora curvicolla* and *P. millispora* from which it differs in having 512-spored asci and larger spores.

Marchal (1884) described a fungus on rabbit dung from Belgium under the name *Philocopra setosa* var. *longicolla*. Mouton (1886) examined his specimen and found that it had 512-spored asci. Most likely it is the same as *Podospora longicollis*.

43. ***Podospora macropodalis*** sp. nov. (Fig. 39)

Peritheciis sparsis, partim immersis, 410–520 × 220–270 μ, piriformibus, nudis vel pilis olivaceo-brunneis, longis, flexuosis, septatis tectis. Collo cylindraceo, nigro, nudo. Peridio perithecii tenui, membranaceo, olivaceo-brunneo, ex cellulis angulatis composito. Ascis octosporis, clavatis, in aqua valde inflatis, superne rotundatis, annulo parvo ad apicem praeditis, in stipitem breviorem inferne attenuatis. Ascosporis biseriatis, late ellipsoideis, 21.5–25.5 × 15–17.5 μ, parte latissima medio, brunneis et opacis; primaria appendice hyalina, cylindracea, 25–29 × 4.5–5.0 μ, ad basem ascosporae alligata; secundaria et superiore appendice ad apicem ascosporae excentrice alligata, simili flagello, longa circiter 35 μ et basi lata 5 μ; secundaria et inferiore appendice simili, sed angustiore et longiore, ad terminum primariae appendicis alligata. Foramine germinali parvo, ad apicem ascosporae sito.

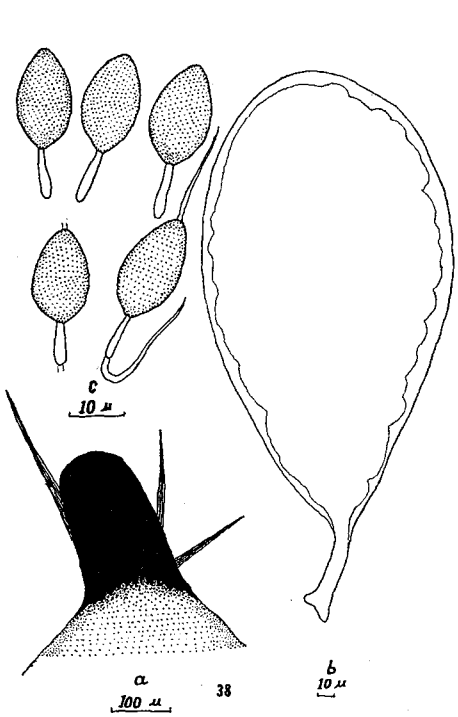
TYPUS: in fimo (TRTC 39494). In University of Toronto Herbarium.

Perithecia scattered, semi-immersed, 410–520 × 220–270 μ, pyriform, with a few flexuous, septate, olivaceous brown hairs or almost bare; neck cylindrical, blackened with papillae, bare; peridium thin, membranaceous, olivaceous-brown, consisting of angular cells. Asci 8-spored, clavate, breaking up at maturity, swelling greatly in water; apical ring small; stipe very short. Ascospores biseriate, broadly ellipsoid, 21.5–25.5 × 15–17.5 μ, broadest in the middle, narrowed toward both ends, brown and opaque; exospore thin; primary appendage basal, cylindrical, hyaline, 25–29 × 4.5–5.0 μ; secondary appendages lash-like, upper eccentrically attached to spore near apex, about 5 μ wide at the base and about 35 μ long; lower one attached to the distal end of the primary appendage, longer than the spore, narrower than the upper one. Germ pore apical.

ETYMOLOGY: Greek, *makros* = large, long, *podos* = foot.

HOLOTYPE: On burro dung from North of Tepic, Nayarit, Mexico, August 16, 1960 by R. F. Cain (TRTC 39494).

This species somewhat resembles *P. communis* from which it differs in having smaller spores and single upper and lower secondary appendages.



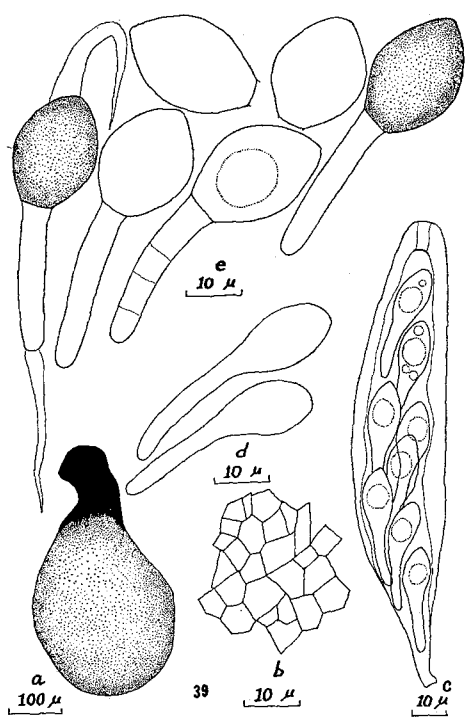


FIG. 38. *Podospora longicollis*. *a*. Upper part of perithecium. *b*. Ascus. *c*. Ascospores.
FIG. 39. *Podospora macropodalis* (type, TRTC 39494). *a*. Perithecium. *b*. Cells of peridium. *c*. Ascus. *d*. Young ascospores. *e*. Mature ascospores.

44. ***Podospora mexicana*** sp. nov. (Fig. 40)

Peritheciis sparsis, immersis vel partim immersis, 500–750 × 350–500 μ, piriformibus vel subglobosis, pilis longis, flexuosis, septatis, nigro-brunneis, circiter 2 μ latis tectis. Collo papilliformi vel brevi cylindraceo, nigro, pilis brevis, singulatim dispositis, rectis, 12–20 × 2.5–3.5 μ, brunneis, aseptatis vel raro 1- vel 2-septatis tectis. Peridio perithecii tenui, membranaceo, pallido-brunneo, semitranslucido. Ascis octosporis, clavatis, 200–250 × 45–55 μ, ex parte latissima prope medium sursum paulim attenuatis, superne late rotundatis, annulo incrassato parvo, vix spectabili in apice praeditis, inferne in stipitem longum attenuatis. Paraphysibus latis, septatis, agglutinatis et levissime inflatis. Ascosporis biseriatis, ellipsoideis, 26–34 × (16–)18–22(–25) μ, ab utroque termino late rotundatis, brunneo-nigris et haud pallucidis; primaria appendice basilari, cylindracea, prope basem attenuata, 19–25 × 5.0–7.5 μ; secundaria et superiore appendice longis, simili flagello, ad apicem ascosporae excentrice alligata, longa circiter 50 μ et basi lata 6–7 μ; secundaria et inferiore appendice simili sed angustiore et longiore, ad terminum primariae appendicis alligata. Foramine germinali 2 μ diam, ad apicem ascosporae sito.

TYPUS: in fimo (TRTC 39394). In University of Toronto Herbarium.

Perithecia scattered, immersed or semi-immersed, 500–700 × 350–500 μ, pyriform to subglobose, covered with long, flexuous, blackish-brown, septate hairs about 2 μ in diameter; neck papilliform or short cylindrical, black and with papillae, covered with separate, short, straight brown aseptate or rarely 1- to 2-septate hairs measuring 12–20 × 2.5–3.5 μ; peridium thin, membranaceous, light brown, and semitransparent. Asci 8-spored, clavate or cylindric-clavate, 200–250 × 45–55 μ, broadest near the middle, broadly rounded and perforate at the apex; apical ring indistinct; stipe long, about one-third the length of ascus. Paraphyses broad, septate with cells slightly swollen. Ascospores biseriate, ellipsoid, 26–34(–40) × (16–)18–22(–25) μ, broadly rounded at each end, blackish brown and opaque; exospore thick; primary appendage basal, cylindrical, somewhat constricted at the base, 19–25(–32) × 5.0–7.5 μ; secondary appendage long, lash-like, upper one eccentrically attached to the apex of ascospore, about 50 μ long and 6–7 μ wide at the base, lower one similar, but attached to the distal end of the primary appendage and much narrower and longer. Germ pore apical, 2 μ in diameter.

ETYMOLOGY: Named after the type locality.

HOLOTYPE: On burro dung from continental divide, Route 48, N of Durango, Durango, Mexico (TRTC 39394).

HABITAT: Dung of burro, cow, deer.

DISTRIBUTION: CANADA: Alberta: TRTC 38949. U.S.A.: New York: TRTC 37598. MEXICO: TRTC 36769, 36945, 36960, 37436, 37465, 39394, 39395, 40934.

This species has a wide variation in spore size and shape. In Alberta specimens, spores are 31–40 × 20–25 μ; otherwise they are not much different from the Mexican specimens. This species somewhat resembles *P. ostingospora*, from which it differs in being smaller throughout and in having a single upper secondary appendage.

45. *Podospora millespora* (A. Schmidt) Cain, Can. J. Bot. 40: 460. 1962.

Perithecia scattered, superficial, 800–1700 × 630–960 μ, bare or with few hyphae; neck long, cylindrical, 190–240 μ long, black, bare or with few tufts of brown, few-celled hairs; peridium thin, membranaceous, olivaceous, consisting of cells measuring about 16–17 μ in diam. Asci about 1024-spored, broadly clavate, 540–580 μ long and about 110 μ wide before maturity, dissolving at maturity; paraphyses filiform. Ascospores ellipsoid, 15.5–17.5 × 9.5–11.5 μ, olivaceous brown; primary appendage basal, clavate, 7.5–9.5 × 3.5 μ; with a narrow lash-like secondary appendage at the apex of the spore about 2 to 3 times as long as the spore.

TYPE: On dung of mule from Amani, East Africa (not seen).

The writers were not able to see specimens of this species. The above description is adopted from the one given by A. Schmidt. This species belongs to the section containing *P. curvicolla* and comes very close to *P. longicollis*. However, it can be distinguished from other species of the section by the large number of spores (over 1000) in the ascus.

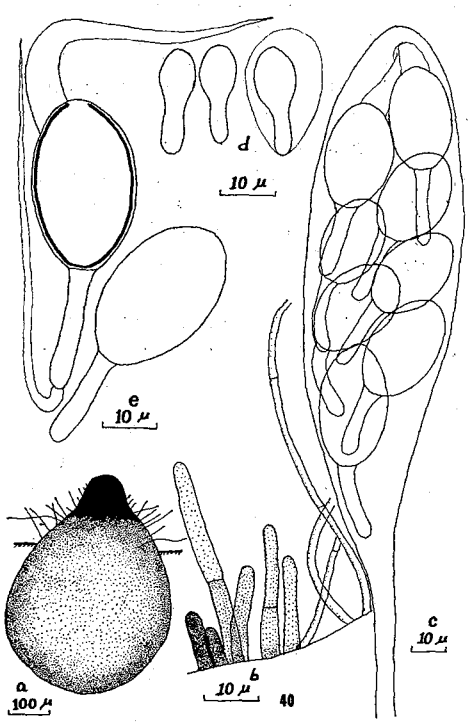
46. ***Podospora miniglutinans*** sp. nov. (Fig. 41)

Peritheciis sparsis, superficialibus, conoideo-piriformibus, 350–550 × 175–275 μ, superne

nigris, inferne olivaceo-brunneis, parvis uvis cellularum conglutinarum tectis, pilis longis, flexuosis brunneis, 150–200 × 1.5–2.5 μ, remote septatis vestitis. Collo papilliformi, nigro, aliquando valde prolato et turbinato. Peridio tenui, membranaceo semitranslucido. Ascis octosporis, cylindraceis, 160–200 × 18–22 μ, annulo vix spectabili, incrassato ad apicem praeditis, inferne in stipitem longum circiter 50 μ attenuatis, cellulis magnis, turgidis, hyalinis, vesiculosis circumventis. Ascosporis uniseriatis, late ellipsoideis, 20–24 × 12–17 μ, primum olivaceis, postremo valde olivaceo-nigris et haud translucidis. Appendice primaria cylindracea, hyalina, tenui, 5–8 × 2.0–2.5 μ ad basem ascosporae alligata. Appendice secundaria et superiore ad apicem ascosporae symmetrice alligata, hyalina, cava, longa 20–25 μ et 4–6 μ diam. Appendice secundaria et inferiore indistincta, singula, hyalina, flagello simili, angustiora, ad terminum appendicis primariae alligata. Foramine germinali 1.5 μ diam, rotundo ad apicem ascosporae.

TYPUS: in fimo (TRTC 38801). In University of Toronto Herbarium.

Perithecia scattered, superficial, pyriform-conical, 350–550 × 175–275 μ, black above, olivaceous-brown below, covered with long, slender, flexuous, sparingly septate, brown hairs measuring 150–200 × 1.5–2.5 μ, mixed with brown tubercles or very short, septate, agglutinated hairs each consisting of a terminal more elongated cell and a few subglobose cells. The agglutinated hairs are more conspicuous toward the upper part of the perithecium where they cover large areas but not forming distinct tufts; neck papilliform or more elongated to cylindrical or bluntly conical, covered with a layer of tubercles. Peridium thin, membranaceous, semitransparent with distinct, angular cells. Asci 8-spored, cylindrical, becoming clavate after swelling in water, 160–200 × 18–22 μ, broadly rounded above with indistinct, thickened ring in apex, tapering below into a stipe measuring about 50 μ in length, surrounded by a few large, swollen,



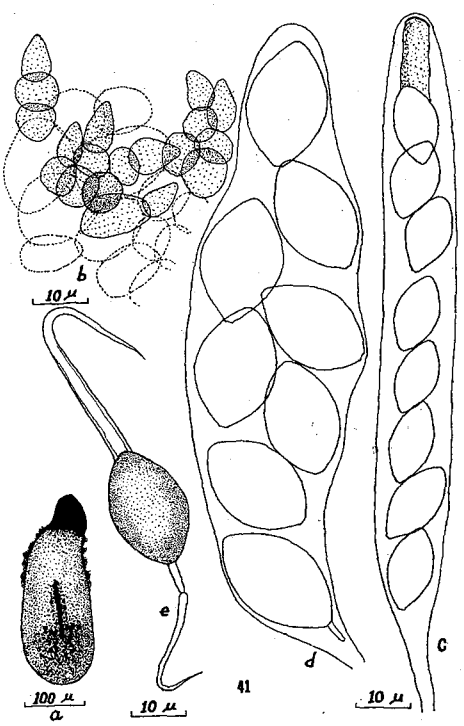


FIG. 40. *Podospora mexicana* (type, TRTC 39394). *a.* Perithecium. *b.* Hairs from the neck. *c.* Ascus. *d.* Young ascospores. *e.* Mature ascospores, one drawn to show the germ pore.

FIG. 41. *Podospora miniglutinans* (Type, TRTC 38801). *a.* Perithecium. *b.* Cells of peridium, also showing the agglutinated hairs. *c.* Ascus with uniseriate ascospores. *d.* Ascus abnormally swollen in water with ascospores changed to biseriate arrangement. *e.* Ascospores.

hyaline, vesicular cells. Ascospores uniseriate, sometimes becoming irregularly biseriate in central portion after asci swell in water, broadly ellipsoid, 20–24 × 12–17 μ, ranging through olivaceous to dark olivaceous-black and opaque. Primary appendage slender, cylindrical, 5–8 × 2.0–2.5 μ, attached to base of ascospore. Upper secondary appendage lash-like, gelatinous, attached symmetrically to apex of ascospore, hyaline, appearing hollow, measuring 20–25 μ in length and 4–6 μ in diameter at base. Lower secondary appendage much narrower than the upper one, lash-like, indistinct, attached to end of primary. Germ pore circular, apical, about 1.5 μ in diameter.

ETYMOLOGY: Latin, *minus* = smaller and the species name *glutinans*.

HOLOTYPE: In moist chamber on burro dung from N of Zimapan, Hidalgo, Mexico, Aug. 21, 1961, Cain (TRTC 38801).

HABITAT: On dung of burro and rabbit.

SPECIMENS EXAMINED: MEXICO: Durango: TRTC 36802, 36961, 37421, 37427. Jalisco: TRTC 36820, 36969. Durango: TRTC 36961, 37421, 37427. Hidalgo: TRTC 38801. Puebla: TRTC 40894.

This species resembles *P. glutinans* but differs in having smaller ascospores. In *P. minuta* the ascospores are slightly shorter and considerably narrower as well as more pointed toward the ends. In *P. minuta* the upper secondary appendage is much narrower than in *P. miniglutinans* and is eccentrically attached at the apex of the ascospore. *P. miniglutinans* differs further in having numerous long flexuous hairs mixed with the agglutinated ones.

47. ***Podospora minor*** Ell. & Ever., Amer. Nat. 31: 341. 1897.

Perithecia more or less superficial, 400–900 × 400–550 μ, ovate-conical to pyriform, black, and opaque, with short, sparingly septate, brown hairs; peridium thick, coriaceous, black, and opaque. Asci 8-spored, cylindrical, 170–400 × 20–24 μ, rounded at apex; stipe short, evanescent; paraphyses filiform above and ventricose below, longer than asci. Ascospores obliquely uniseriate, ellipsoid to ovate, 30–45 × 20–24 μ, brown; primary appendage short, cylindrical, or clavate; secondary appendages long, lash-like, upper longer and attached to apex of spore, lower smaller, and attached to the distal end of primary appendage.

TYPE: On old stalk of *Zea mays*, July, 1896, Rooks Co., Kansas, U.S.A. (Bartholomew 2204) (not seen).

The writers did not see collections of this species. The above is adopted from the descriptions given by Griffiths (1901) and C. Moreau (1953). Griffiths' description is based on the type specimen. This species seems to be intermediate between *P. appendiculata* and *P. fimicola* in all the important characters.

48. *Podospora nannopodalis* Cain, Can. J. Bot. 40: 456. 1962. (Fig. 42)

Perithecia superficial, 700–900 × 500–600 μ, ovate, light olivaceous brown, upper part covered with tufts of brown, agglutinated hairs, neck conical. Asci 8-spored, clavate, 160–200 × 25–28 μ, apical ring not visible; stipe 60–100 μ long. Paraphyses in the form of large vesicular, evanescent cells surrounding the asci. Ascospores biseriate, ellipsoid, usually broadest slightly above the middle, 18–22 × 11–13 μ, dark brown, and opaque; exospore thin; primary appendage basal, triangular to almost short cylindrical, 3–7 × 3 μ; secondary appendages not observed; germ pore slightly eccentric, about 1 μ in diameter.

TYPE: On deer dung from Stoddard Brook, Allegany State Park, New York (U.S.A.) June 11, 1961 (TRTC 37078).

SPECIMENS EXAMINED: U.S.A.: New York: TRTC 37078; Wyoming: 40407.

This species represents an end line in *P. curvula* series. It is characterized by the triangular primary appendage and the loss of secondary appendages.

49. *Podospora ostlingospora* Cain, Can. J. Bot. 40: 456. 1962. (Fig. 43)

Perithecia 750–1400 × 450–700 μ, pyriform to ovate, black, covered, when young, with scattered, rough-walled, brown, flexuous hairs, which become narrower and lighter toward the apex, bare at maturity; papillae 300–500 × 150–160 μ; peridium thin, membranaceous to slightly coriaceous, brown with numerous, small, darker and opaque patches. Asci 8-spored, clavate, 300–350 × 50–70 μ, with small ring at apex, evanescent; stipe 100–125 μ long. Ascospores

biseriate, ellipsoid, 47–58 × 25–34 μ, exospore thick; primary appendage basal, cylindrical-clavate, 44–58 μ long and 6–8 μ wide near the distal end; upper secondary appendages forming two tufts, attached to opposite sides near the apex of the spores, tufts 40 μ or more long, their apices are very evanescent, lower secondary appendage single, lash-like at the distal end of the primary appendage measuring up to 110 μ long and 5–6 μ wide at the base; germ pore apical, circular, about 3 μ in diameter.

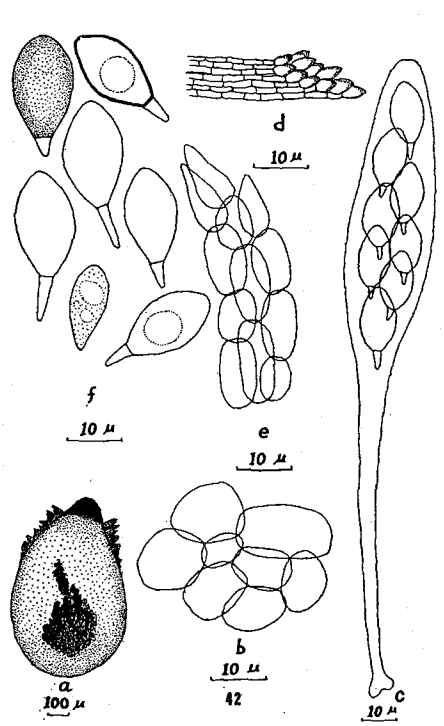
TYPE: On burro dung from Cd. del Maiz, San Luis Potosi, Mexico, Aug. 19, 1969, R. F. Cain (TRTC 36738).

SPECIMENS EXAMINED: MEXICO: TRTC 36738, 36809, 36925, 36939, 37060, 37067, 37423, 39367, 41014.

The spores of this species are somewhat like those of *P. fimicola*; however, *P. ostlingospora* differs markedly in the nature of perithecial hairs, peridium, and secondary appendages and in size of spores.

50. *Podospora papilliformis* Cain, Can. J. Bot. 40: 457. 1962. (Fig. 44)

Perithecia 900–1050 × 600–700 μ, pyriform to subglobose, exposed part covered with long, flexuous, brown, sparingly septate hairs measuring 500–600 × 2.5–3 μ; neck with short, straight, septate, brown, acicular or cylindrical hairs measuring 50–100 × 3–4 μ. Asci 8-spored, clavate, 350–450 × 65–85 μ, with a distinct apical ring; stipe about 90 μ long. Ascospores biseriate, ellipsoid, 54–58 × 30–33 μ, exospore thick; primary appendage short, papilliform, about 10 × 8 μ, upper secondary appendage eccentric, crescent-shaped in cross section, about 100–150 μ long and about 10 μ wide at the base in side view and about 15 μ wide in other view; lower secondary appendage at



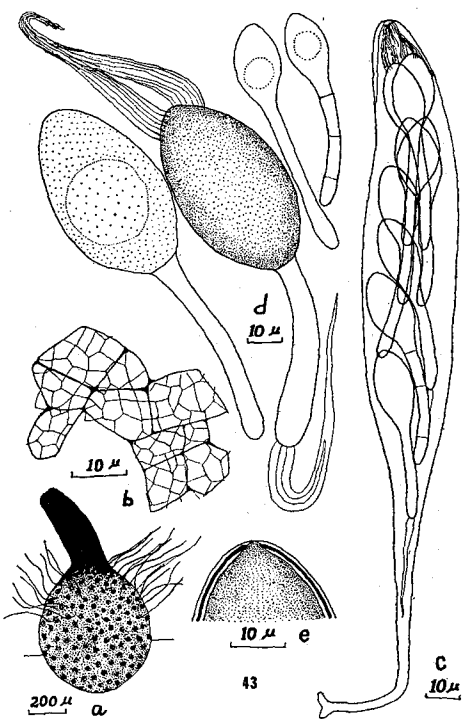


FIG. 42. *Podospora nannopodalis* (type, TRTC 37078). *a.* Perithecium. *b.* Cells of peridium. *c.* Ascus. *d.* Cells and papillae of the neck. *e.* Agglutinated hairs. *f.* Ascospores at different stages of development, upper right shows the germ pore.

FIG. 43. *Podospora ostlingospora* (type, TRTC 36738). *a.* Perithecium. *b.* Cells of peridium. *c.* Ascus. *d.* Ascospores, two on the right, still young. *e.* Upper part of ascospore showing the germ pore and exospore, mesospore and endospore.

distal end of primary appendage, hollow, about 100–150 μ long and 9–10 μ wide at base, germ pore apical, about 3–4 μ in diameter.

TYPE: On donkey dung collected from Los Chorros, near Caracas, Venezuela, H. H. Whetzel and A. S. Mueller, March 1, 1939 (TRTC 37080).

SPECIMENS EXAMINED: MEXICO: TRTC 36953, 37034. VENEZUELA: TRTC 37080.

This species can readily be identified by its large spores, small primary appendages, and grooved upper and hollow lower secondary appendages.

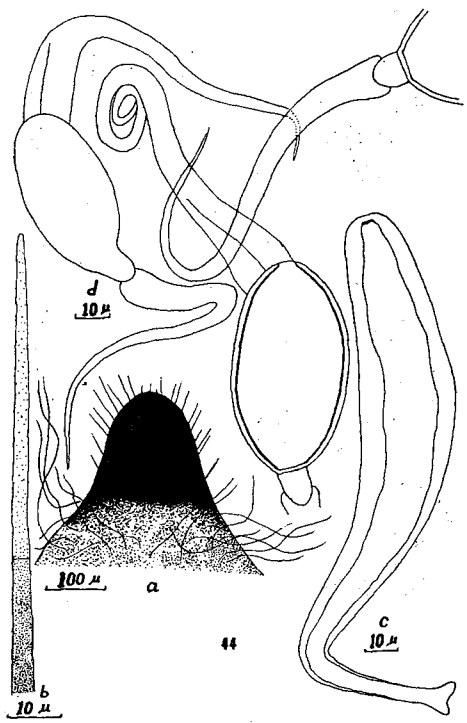
51. *Podospora perplexens* (Cain) Cain, Can. J. Bot. 40: 460. 1962. (Fig. 45)

Perithecia erumpent or almost superficial from the very beginning, 850–1270 × 450–600 μ, pyriform, exposed portion, including the neck, covered with long flexuous, septate, hyaline to light brown hairs which are 4–5 μ wide; neck stout, cylindrical to elongate-conical, about 300–500 × 250 μ. Asci 8-spored, cylindrical, 250–340 × 26–30 μ, with very small apical ring; stipe about 110 μ long. Paraphyses filiform, septate, slightly longer than the asci, and 3–4 μ wide, abundant and fairly persistent. Ascospores obliquely uniseriate, ellipsoid, 34–40 × 19–23 μ, exospore thin; primary appendage basal, cylindrical, 20–40 × 6–7 μ; secondary appendages lash-like, upper one eccentric, about 90 μ long and 10–11 μ wide at the base, hollow in the center, lower one about 50 μ long and 4–5 μ wide at the base; germ pore eccentric, about 1 μ in diameter. Phialides small peg-like, phialospores almost spherical, about 3 μ in diameter.

TYPE: On horse dung from Bear Island, Lake Timagami, Ontario, Canada (TRTC 5200).

SPECIMENS EXAMINED: CANADA: Ontario: TRTC 5200, 5265–5268, 36534. U.K.: TRTC 12505.

The ascospores, although typically uniseriate in this species, may become biseriate when the perithecia are crushed under the cover slip.



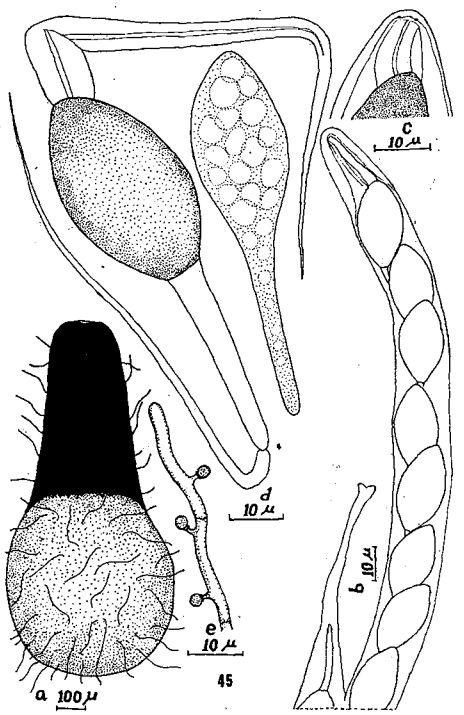


FIG. 44. *Podospora papilliformis* (type, TRTC 37080). *a.* Upper part of perithecium. *b.* Single hair from the neck. *c.* Ascus (ascospores not shown). *d.* Ascospores, lowermost showing the germ pore, one on the left still young and the one on right with only base shown.

FIG. 45. *Podospora perplexens* (type, TRTC 5200). *a.* Perithecium. *b.* Ascus. *c.* Ascus apex. *d.* Ascospores, one on the right is still young. *e.* Phialides.

52. *Podospora pilosa* (Mouton) Cain, Can. J. Bot. 40: 460. 1962. (Fig. 46)
= *Sordaria pilosa* Mouton, Bull. Soc. Roy. Bot. Belg. 25: 144. 1886.
= *Pleurage pilosa* (Mouton) C. Moreau, Encycl. Mycol. 25: 264. 1953.

Perithecia 350–450 × 190–250 μ, ovoid to pyriform; neck conical to short cylindrical, provided with short, straight, nonseptate or rarely septate, brown hairs, up to 100 μ long, and about 2.5 μ wide at base. Asci 8-spored, clavate, 140–210 × 19–22 μ, broadest at the apex, narrowing below, without distinct apical ring, stipe 40–90 μ long. Paraphyses ventricose-filiform, agglutinated, evanescent. Ascospores biseriate, sometimes becoming uniseriate, ellipsoid, 18–21 × 11–14 μ; exospore thin, primary appendage basal, 4–8 × 3 μ; two lash-like secondary appendages, one at the apex of the spore 4 μ wide at the base and longer than spore, the other at the distal end of the primary appendage, similar but more narrow than the upper one; germ pore eccentric, 1–1.5 μ in diameter.

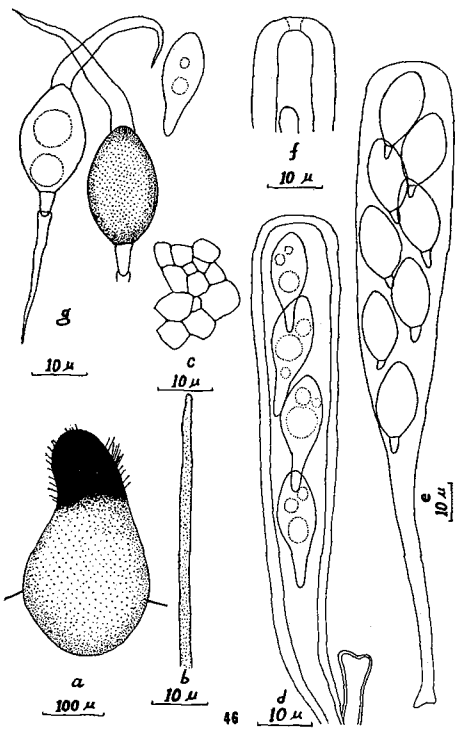
TYPE: On rabbit dung from Gomze Forest, near Liege, Belgium (not seen).

SPECIMENS EXAMINED: SWEDEN: Lundqvist 3379*a*, 3405*a* (UPS).

This species has a very characteristic ascus which is broadest at the apex and tapers below into a fairly long stipe. Its position is very near to *P. ellisiana* from which it differs in the shape of its asci and smaller dimensions. It also somewhat resembles *P. didyma*, which differs in the shape of the ascus, in the very distinct apical ring and the smaller 1-septate spores.

53. ***Podospora pistillata*** sp. nov. (Fig. 47)

Peritheciis sparsis, superficialibus vel partem immersis, 400–550 × 300–400 μ, piriformibus vel ovatis; collo papilliformi vel brevi cylindraceo



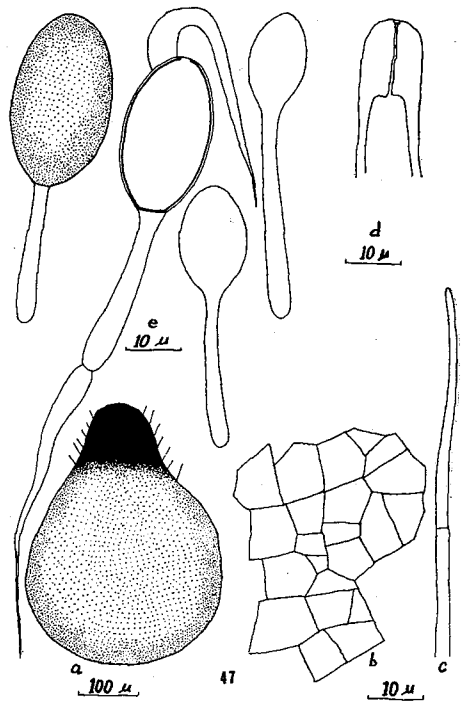


FIG. 46. *Podospora pilosa* (Lundqvist, 3379*a*). *a*. Perithecium. *b*. Single hair from the neck. *c*. Cells of peridium. *d*. Young abnormal ascus having only four ascospores. *e*. A mature normal ascus with eight ascospores. *f*. Ascus apex. *g*. Ascospores, one in the center mature, one on left immature and the one on right still young.

FIG. 47. *Podospora pistillata* (type, TRTC 39585). *a*. Perithecium. *b*. Cells of peridium. *c*. Single hair from the neck. *d*. Apex of a young ascus. *e*. Ascospores, two on right still young, second from left drawn to show the germ pore.

papillis nigris et pilis brevis, septatis, usque ad 120 × 4 μ tecto; peridio perithecii membranaceo vel leviter coriaceo, brunneis. Ascis octosporis, clavatis, 325–350 × 55–65 μ, superne late rotundatis, annulo incrassato parvo vix spectibili; ad apicem praeditis, inferne in stipitem mediocriter longum attenuatis. Paraphysibus filiformibus. Ascosporis biseriatis, oblongo-ellipsoideis vel ellipsoideis, 41–52 × 25–27(–30) μ, brunneis vel paene nigris et haud translucidus; primaria appendice pistillata, 35–50 × 6.0–7.5 μ, ad basem ascosporae alligata; secundaria et superiore appendice ad apicem ascosporae excentrice alligata, longa circiter 90 μ et basi lata 16 μ; secundaria et inferiore appendice simili sed longiore, basi lata 8–9 μ, ad terminum primariae appendicis alligata; foramine germinali circiter 2.5 μ diam.

TYPUS: in fimo (TRTC 39585). In University of Toronto Herbarium.

Perithecia scattered, superficial to semi-immersed, 400–550 × 300–400 μ, pyriform, to ovoid; neck papilliform to short cylindrical, blackened with papillae, covered with scattered, short, septate, brown, hyaline-tipped hairs up to 120 μ long and about 4 μ wide; peridium membranaceous to slightly coriaceous, brown, opaque, with cellular structures not distinctly visible. Asci 8-spored, clavate, 325–350 × 55–65 μ, broadly rounded at apex, with small apical ring; stipe fairly long. Paraphyses filiform. Ascospores biseriate, oblong-ellipsoid or ellipsoid, 41–52 × 25–27(–30) μ, broadly rounded at the apex, rounded to truncate at base, dark brown to almost black, and opaque; exospore thick; primary appendage pestle-shaped, at base of ascospore, 35–50 μ long, 6–7.5 μ wide near distal end; secondary appendages long, lash-like, upper one eccentrically attached to spore apex, about 90 μ long and 16 μ wide at base, lower one at distal end of the primary appendage, longer than upper one and 8–9 μ wide at base; germ pore about 2.5 μ in diameter.

ETYMOLOGY: Latin, *pistillum* = pestle, refers to the pestle-shaped primary appendage.

HOLOTYPE: On cow dung from North of Tehuacan, Puebla, Mexico, Aug. 13, 1961, R. F. Cain (TRTC 39585).

HABITAT: Dung of cow and goat.

DISTRIBUTION: Known only from Mexico (TRTC 39585, 36485).

This species is very close to *P. fimicola* Ces. from which it can be distinguished by means of its smaller spores.

54. *Podospora platensis* (Speg.) Niessl, Hedwigia, 22: 156. 1883. (Fig. 48)
=*Philocopra platensis* Speg., Anal. Soc. Ci. Argent. 12: 107. 1881.

Perithecia scattered, immersed or semi-immersed, 500–650 × 350–410 μ, subglobose to pyriform, with long, flexuous, brown, sparingly septate hairs; neck papilliform to conical, black, with few tufts of erect, subcylindrical hairs, fascicles 150–250 × 20–40 μ, hairs olivaceous-brown sparingly septate, up to 250 μ long and 2–2.5 μ wide; peridium thin, membranaceous, olivaceous brown, consisting of angular cells. Asci 64-spored, fusoid, or broadly clavate, 275–310 × 45–70 μ, (up to 150 μ wide according to Spegazzini), broadest in the middle, narrowed toward each end, narrowly rounded at apex, with distinct apical ring; stipe short, up to one-fourth the length of asci. Paraphyses ventricose-filiform, septate, evanescent, smaller than asci. Ascospores irregularly multiseriate, ellipsoid, 18–20.5 × 11–12.5 μ, rounded at each end, brown and opaque; exospore thin; primary appendage basal, cylindrical, 9–15 × 2–4 μ; secondary appendages lash-like, upper one slightly eccentrically attached to apex of spore, 30–60 μ long and about 2 μ wide at base, lower one similar, attached to distal end of the primary appendage; germ pore apical, about 1.5 μ in diameter. Phialides absent.

TYPE: On dung of *Cavia leucopyga* May, 1881, Rio de La Plata, Argentina (not seen).

SPECIMENS EXAMINED: CANADA: Ontario: TRTC 35954, 36711, 41132. URUGUAY: TRTC 39304.

The type specimen is described as having spores measuring 20–22 × 15–17 μ. However, Spegazzini described another specimen of this species with spores as small as 18 × 12 μ. The Ontario collections of the species fall within the lower limits.

55. *Podospora pleiospora* (Winter) Niessl, Hedwigia, 22: 156. 1883. (Fig. 49)
=*Podospora decipiens* var. *pleiospora* (Wint.) Chen., Bull. Soc. Mycol. France. 35: 114. 1919.

For additional synonymy see Cain (1934).

Perithecia 600–1000 × 375–550 μ, pyriform to globose; upper portion provided with tubercular hairs and a few elongated, septate, brown, flexuous hairs. Asci generally 32-spored, occasionally 16 or 64-spored, fusoid or clavate, 310–360 × 60–100 μ, apical ring very small. Ascospores multiseriate, ellipsoid, 25–33 × 15–20 μ (in 16-spored asci 31–36 × 19–24 μ). Primary appendages cylindrical 25–50 × 5–8 μ, surrounded at the base with several small secondary appendages; upper secondary appendages closely united into an apical tuft about 20–30 × 6 μ. Germ pore circular, eccentric about 3.2 μ in diameter. Phialides and phialospores not seen.

TYPE: On rabbit dung from Harth forest, near Leipzig, Germany (not seen).

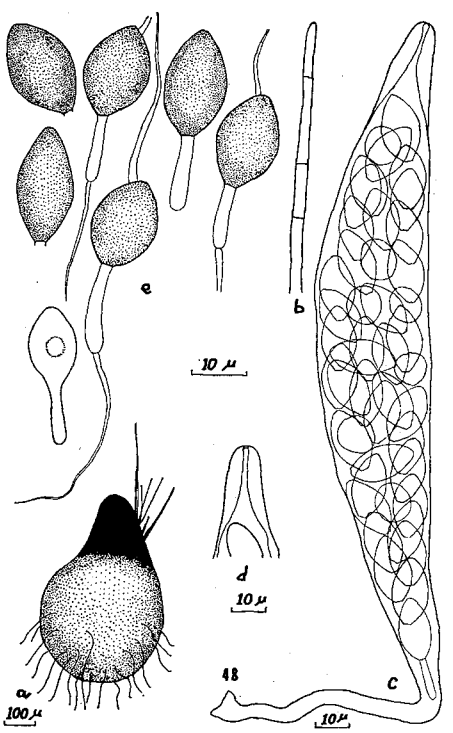
SPECIMENS EXAMINED: CANADA: Ontario: TRTC 5269–5271, 36517, 38149, 39368, 41131. U.S.A.: Louisiana: TRTC 38130; Ohio: Stratton 236(22–1) (OS). MEXICO: TRTC 36968, 41018, 41019. GERMANY: in F. rhen. 934 (PAV).

This species is very close to *Podospora decipiens* but differs in the 32-spored asci (rarely they may be 64- or 16-spored).

56. *Podospora prethopodalis* Cain, Can. J. Bot. 40: 458–459. 1962. (Fig. 50)

Perithecia 420–550 × 250–400 μ, subglobose to pyriform, with long, flexuous, remotely septate, brown hairs; neck with few tufts of straight, brown, remotely septate hairs measuring 50–250 × 2 μ. Asci 8-spored, broadly clavate, 200–250 × 40–55 μ, without distinct apical ring. Ascospores biseriate ellipsoid, (15–)25–35(–45) × (10–)14–18(–22) μ; exospore thin; primary appendages swollen in the middle and at the distal end, 17–35 × 6–8 μ; secondary appendages lash-like, upper one eccentric, 20–40 × 5–9 μ, lower one similar but narrower; germ pore eccentric, about 2 μ in diameter.

TYPE: On horse dung from Tautira, Society Islands, L. S. Olive, June 28, 1956 (TRTC 33715).



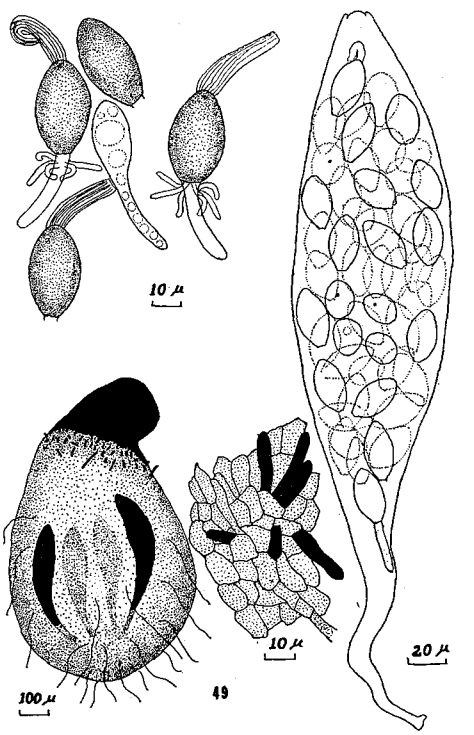


FIG. 48. *Podospora platensis* (TRTC 35954). *a.* Perithecium. *b.* Single hair from the neck. *c.* Ascus. *d.* Ascus apex. *e.* Ascospores, lowermost still young.

FIG. 49. *Podospora pleiospora. a.* Perithecium. *b.* Cells of peridium from the upper part of perithecium, also showing the tubercular hairs. *c.* Ascus. *d.* Ascospores, one in the center is still young.

SPECIMENS EXAMINED: MEXICO: TRTC 36768, 36975, 37408, 37415, 38808, 40863, 41020, 41021. SOCIETY ISLANDS: TRTC 33715, 33717, 35270. W. PAKISTAN: TRTC 40867, 41089.

This species can very easily be recognized by its characteristic primary appendages. The spores are very variable in size and shape, especially in Mexican and Pakistan specimens.

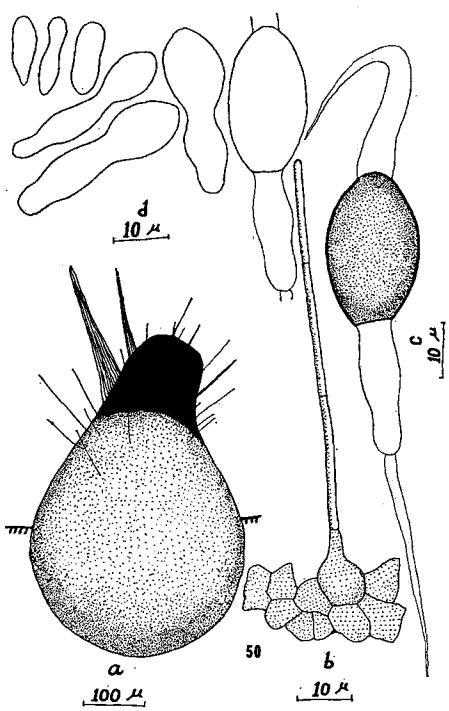
57. *Sordaria pseudominuta* Speg., Bol. Acad. Nac. Ci. Cordoba 11: 189. 1887 (Fig. 51)
=*Sordaria hispidula* Speg., Anal. Mus. Nac. Buenos Aires, 6: 255. 1899.
=*Pleurage hispidula* (Speg.) C. Moreau, Encycl. Mycol. 25: 259. 1953.

Perithecia scattered or in small groups of 3–5, superficial or semi-immersed, 425–1000 × 350–600 μ, ovoid to pyriform, covered with short, agglutinated, olivaceous gray hairs measuring up to 50 μ long, consisting of thin-walled, swollen cells with the upper cell somewhat thick-walled and with acute apex; neck short, black, papilliform and covered with papillae; peridium thin, membranaceous, olivaceous, consisting of somewhat swollen cells. Asci 8-spored, cylindrical, 200–220 × 15–20 μ, broadly rounded at apex, apical ring not distinct; stipe about 60 μ long. Ascospores biseriate, 20.5–26.5 × 11–16.5 μ, ellipsoid, narrowly rounded at both ends, dark brown and opaque; exospore thin; primary appendage slender, cylindrical, 8–16 × 2 μ; secondary appendage long, lash-like, upper one eccentrically attached to the apex of the spore, about 3 μ wide; lower one similar, attached to the distal end of the primary appendage; germ pore slightly eccentric, about 1.5 μ in diameter.

TYPE: On cow dung from Ushuvaia, Argentina, collected May 1882. (LPS 6826).

SPECIMENS EXAMINED: ARGENTINA: LPS 6826, 6836 Type of *S. hispidula.*

The above description is that of the type of *S. pseudominuta.* At first we made an attempt to maintain this as a distinct species. However,



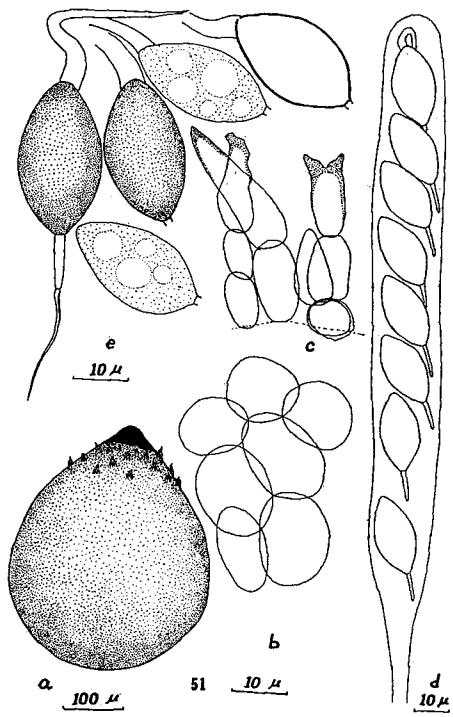


FIG. 50. *Podospora prethopodalis* (type, TRTC 33715). *a.* Perithecium. *b.* Cells of peridium also showing a single hair. *c.* Mature ascospore. *d.* Ascospores at different stages of development.

FIG. 51. *Sordaria pseudominuta* (type, LPS 6826). *a.* Perithecium. *b.* Cells of peridium. *c.* Agglutinated hairs. *d.* Ascus. *e.* Two immature and three mature ascospores, one on extreme right drawn to show the germ pore.

the differences between this and *P. curvula* are so insignificant that the best solution seems to be to combine them. The type collection of *Sordaria hispidula* is the same. Consequently, *S. pseudominuta*, *S. hispidula*, and *S. micrura* are all synonyms of *Podospora curvula*.

58. *Podospora pyriformis* (Bayer) Cain, Can. J. Bot. 40: 460. 1962. (Fig. 52)

Perithecia 800–1200 × 500–700 μ, subglobose to pyriform, without hairs. Asci 8-spored, clavate, 400–450 × 45–65 μ; apical ring not distinct. Ascospores biseriate, ellipsoid, 37–48 × 22–29 μ; exospore thin; primary appendage basal, cylindrical, 33–55 × 8–11 μ; secondary appendages lash-like, longitudinally striated, upper eccentrically attached to apex of spore, usually about 100 × 8–10 μ, lower one, at the distal end of the primary appendage, narrower and smaller than the upper one, both secondary appendages sometimes very much drawn out, especially in water mounts; germ pore almost apical, about 1.5 μ in diameter.

TYPE: On horse dung from Prague, Czechoslovakia, 1920 (not seen).

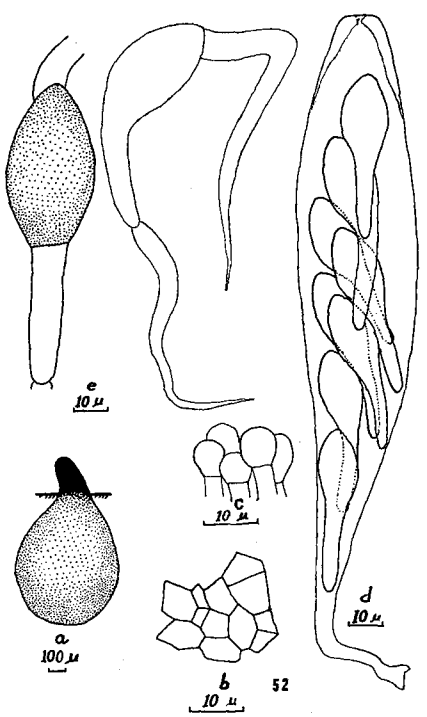
SPECIMENS EXAMINED: CANADA: Ontario: TRTC 5373; Quebec: TRTC 36429. U.S.A.: Louisiana: TRTC 37388, 38095. MEXICO: TRTC 41016, 41017. SWEDEN: Lundqvist, Fl. Suecica 3425k (UPS).

Spore measurements given by Bayer are in the lower range of those given by Cain and by C. Moreau and of those reported by the authors in this paper; otherwise, according to the description, there is no other significant difference in Bayer's specimens.

59. ***Podospora seminuda*** (Griff.) comb. nov. (Fig. 53)

=*Sordaria seminuda* Griff., Mem. Torrey Bot. Club, 11: 50–51. 1901.

Perithecia semi-immersed, 500–600 × 300–430 μ, subglobose to pyriform; neck as well as exposed portion of perithecium with short, straight, brown, hyaline-tipped, sparingly septate hairs or bare. Asci 8-spored, cylindrical,



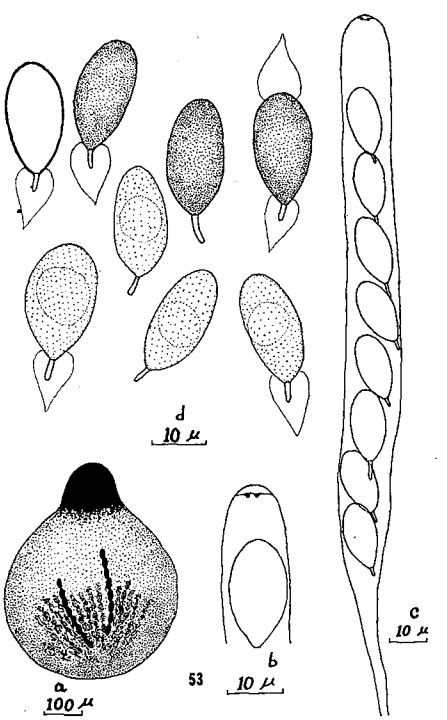


FIG. 52. *Podospora pyriformis*. *a*. Perithecium. *b*. Cells of peridium. *c*. Papillae from the neck. *d*. Ascus. *e*. Ascospores, one on right is still young.

FIG. 53. *Podospora seminuda* (TRTC 32325). *a*. Perithecium (hairs not shown). *b*. Ascus apex. *c*. Ascus. *d*. Ascospores, lower five immature.

180–200 × 12–14 μ; apical ring distinct; stipe moderately long. Paraphyses filiform, septate, usually smaller than asci, fairly persistent. Ascospores obliquely uniseriate, ellipsoid, or oblong-ellipsoid, 16–22 × 10–12 μ; exospore thin; primary appendage basal, small, slender, cylindrical, 3–6 × 1–1.5 μ, with a triangular secondary appendage covering the primary appendage as well as the base of the spore; evanescent, upper secondary appendage similar, very evanescent, rare, and observed with great difficulty; germ pore apical, 1–1.5 μ in diameter.

TYPE: On horse dung collected by Griffiths and Lange from Summit, Montana, U.S.A. (not seen).

SPECIMENS EXAMINED: CANADA: Alberta: TRTC 38857, 38870, 38987. U.S.A.: Montana: TRTC 36850; Wyoming: TRTC 32325.

This species appears very strange at first because of the nature of the secondary appendages on the spores. However, this type of secondary appendage is also found in *P. cervina*, which is otherwise not closely related. This interesting species has some of the characteristics of *Podospora* and some of *Strattonia*. Griffiths (1901) placed it in the genus *Sordaria* because of the "perforation" at the apex of the ascus. This character is now known not to be restricted to *Sordaria* and is also very distinct in several species of *Podospora*. The apical germ pore, basal primary appendage, and the presence of secondary appendages further strengthen the view that it belongs to the genus *Podospora*.

60. *Podospora setosa* (Winter) Niessl, Hedwigia, 22: 156. 1883. (Rehm Asco. 136 (NY) isotype, examined).

=*Philocopra coeruleotecta* Rehm., Ann. Bot. 9: 363. 1911. (Jolivette-Sax (FH) isotype, examined).

=*Podospora coeruleotecta* (Rehm) Cain, Can. J. Bot. 40: 459. 1962.

For additional synonymy see Cain (1934).

Perithecia 450–620 × 350–400 μ, subglobose, often surrounded at the base with a growth of light-colored mycelium, upper part covered with scattered, non-septate, straight, brown, hyaline-tipped hairs measuring 50–300 × 3.5–4 μ; these hairs may be closely placed but not tufted as in *P. curvicolla*. Asci 128-spored, clavate 240–300 × 45–60 μ; apical ring not seen, stipe about one-fifth the length of ascus. Ascospores irregularly multiseriate, ellipsoid, (15–) 17–19 × 10–12 μ; exospore thin; primary appendage cylindrical, 6–8 × 2–2.5 μ; secondary appendages lash-like, usually longer than spores and variable in length, upper one eccentric, lower one attached to the distal end of the primary appendage; germ pore almost apical, about 1.5 μ in diameter.

TYPE: On goose dung from Ruechmarsdorf, near Leipzig, Germany (not seen).

SPECIMENS EXAMINED: U.S.A.: Wisconsin: Jolivette-Sax (FH). GERMANY: Rehm Asco. 136 (NY).

Cain (1934) described a fungus under this name which has spores measuring 19–24 × 11–16 μ. This and the specimen in Krieger, Fungi sax. 835 (TRTC), under *P. setosa* belong to *P. tarvisina* (Sacc.) Mirza and Cain.

61. ***Podospora similis*** (Hansen) Niessl, Hedwigia, 22: 156. 1883. (Fig. 54)

For synonymy see C. Moreau (1953).

Perithecia 550–650 × 300–400 μ, pyriform, exposed portion covered with a dense growth of long, flexuous, septate, olivaceous-brown hairs about 2–3.5 μ in diam; neck with a few fascicles of agglutinated, 1- to 3-celled, brown hairs present at the base. These short hairs consisting of swollen cells, obliterated by the long, flexuous hairs. Asci 16-spored, fusoid-clavate, 210–350 × 40–60 μ, without a distinct apical ring. Paraphyses filiform, septate, longer than asci. Ascospores biseriate, ellipsoid, 24–38 × 15–23 μ; exospore thin; primary appendage slender, cylindrical, 7–10 × 2–3 μ; secondary appendages lash-like, very fugaceous, upper one at the apex of spores, about 50 × 6 μ, lower one surrounding the primary appendage, about 80 × 6 μ; germ pore apical, about 1.5 μ in diameter.

TYPE: On sheep dung from Rudersdal, Selande, Denmark, Hansen, June 1874 (not seen).

SPECIMENS EXAMINED: CANADA: Ontario: TRTC 5203, 5276.

The presence of agglutinated hairs and slender primary appendage would place this species in the *P. curvula* series. It stands out very distinctly in this group by the nature of its lower secondary appendage, the presence of flexuous hairs as well as the agglutinated ones.

62. *Podospora tarvisina* (Sacc.) comb. nov. (Fig. 55)

=*Philocopra tarvisina* Sacc., Syll. Fung. 1: 250. 1882.

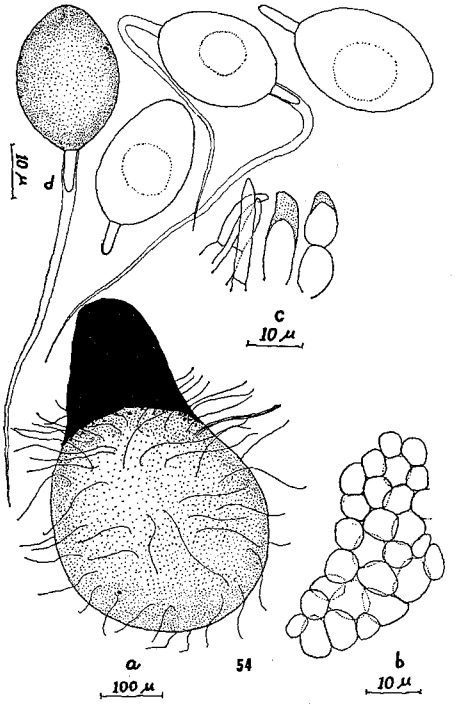
=*Philocopra setosa* (Winter) Sacc. var. *tarvisina* (Sacc.) Traverso, Fl. Ital. Crypt. 2(2): 437. 1907.

Perithecia scattered, superficial, 500–800 × 400–500 μ, pyriform; neck papilliform to short cylindrical, neck as well as the upper part of perithecia covered with straight, brown, septate, hyaline-tipped hairs measuring up to 150 μ long and 3–5 μ wide; peridium thin, membranaceous, olivaceous brown, almost opaque; cellular structure not very clear. Asci 128-spored, fusoid, 300–380 × 65–85 μ, broadest near the middle, narrowed toward both ends, with distinct apical ring; stipe about one-fourth the length of ascus. Ascospores irregularly multiseriate, ellipsoid, 19–24 × 11–16 μ, broadly rounded at both ends; exospore thin; primary appendage slightly eccentric, about 40 μ long and 2 μ wide at base, lower one similar, attached to the distal end of primary appendage; germ pore apical, 1.5–2 μ in diam. Phialides peg-like, small; phialospores hyaline, almost spherical, 2–4 μ in diameter.

TYPE: On cow dung from the Province of Treviso, Italy, collected by C. Spegazzini in September, 1877 (not seen).

REPRESENTATIVE SPECIMENS EXAMINED: CANADA: Ontario: TRTC 5273–5275. U.S.A.: Florida: TRTC 31172; Indiana: TRTC 38421; Wisconsin: TRTC 33342. MEXICO: TRTC 40840. GERMANY: Krieger, Fung. Sax. 835 (TRTC). BELGIUM: Roumeguere, Fung. Gallici Exs. 3444 (NY). LIBERIA: Thaxter, in *P. crinita* (FH).

This species is very close to *Podospora setosa* from which it can easily be distinguished by its larger spores and asci. Spegazzini (1878) placed the type specimen under *P. setosa*. Saccardo (1882) separated it under the name *Philocopra tarvisina* and gave the spore measurement as 25 × 15 μ. Traverso (1907) examined the type and found that the spores measured 20–25 ×



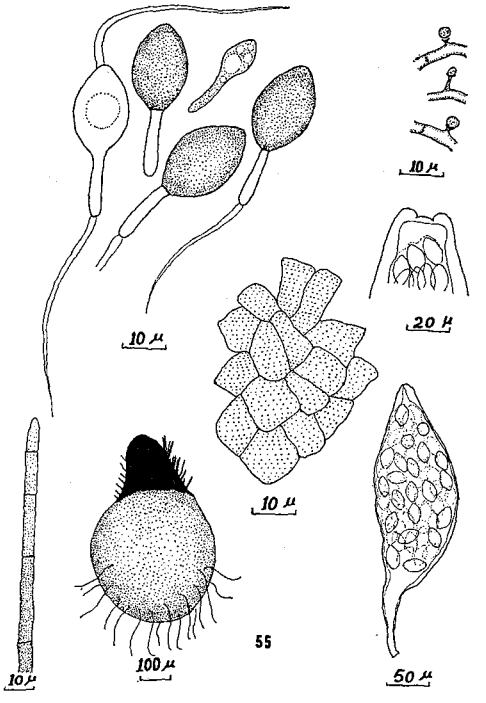


FIG. 54. *Podospora similis*. *a*. Perithecium. *b*. Cells of peridium. *c*. Agglutinated hairs from the base of the neck. *d*. Ascospores, three on right immature.

FIG. 55. *Podospora tarvisina*. *a*. Perithecium. *b*. Cells of peridium. *c*. Single hair from the neck. *d*. Ascus. *e*. Ascus apex. *f*. Two young and three mature ascospores. *g*. Phialides.

12–15 μ. Specimens from Ontario, Canada, described by Cain (1934) under *Sordaria setosa* exhibited spores measuring 19–24 × 11–16 μ and should be placed here.

63. *Podospora tetraspora* (Winter) Cain, Can. J. Bot. 40: 460. 1962. (Fig. 56)

For synonymy see Cain (1934).

Perithecia scattered, superficial, 400–600 × 150–260 μ, elongate ovoid, to oblong-conical, with short, olivaceous-brown, septate agglutinated hairs. Asci 4-spored, cylindrical, 100–140 × 15–19 μ; with small apical ring. Ascospores obliquely uniseriate, ellipsoid, 19–22.5 × 11–13 μ, exospore thin; primary appendage short, slender, cylindrical, about 10 × 2 μ; secondary appendages lash-like, upper one slightly eccentric, lower one at distal end of primary appendage; germ pore apical, about 1.5 μ in diameter. Phialides flask-shaped, about 10 × 4 μ, phialospores globose or ovate, 2–2.5 μ in diameter.

TYPE: On mouse dung from near Oederan, Saxony, Germany, collected by Winter in the autumn of 1871 (not seen).

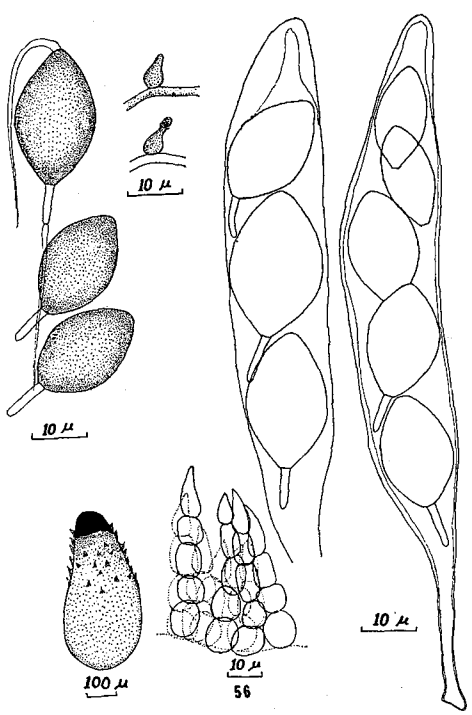
SPECIMENS EXAMINED: CANADA: Ontario: TRTC 5206, 5207, 5280–5282, 32239, 35767, 36458, 36884, 38813; Quebec: TRTC 32007. MEXICO: TRTC 41107, 38802. U.K.: Plowright, Sphaer. Brit. 45(MICH). GERMANY: RFC 6477.

This species belongs in the *P. curvula* series. It is very close to *P. vesticola* from which it can easily be distinguished by its 4-spored asci.

64. *Podospora unicaudata* (C. Moreau & M. Moreau ex Smith) Cain, Can. J. Bot. 40: 460. 1962. (Fig. 57)

=*Pleurage unicaudata* C. Moreau & M. Moreau ex Smith, Trans. Brit. Mycol. Soc. 40: 488. 1957. (C. and M. Moreau, Bull. Soc. Bot. France 102: 123–124. 1955).

Perithecia 250–500 × 150–300 μ, pyriform, bare. Asci 8-spored, cylindric-clavate, 140–160 × 20–26 μ, with small apical ring. Paraphyses filiform, septate. Ascospores biseriate, ellipsoid 17–29 × 13–17 μ; exospore thin; primary appendage basal, somewhat pestle-shaped, 15–19 μ long and 3–4 μ wide at the distal end; secondary appendages absent; germ pore apical,



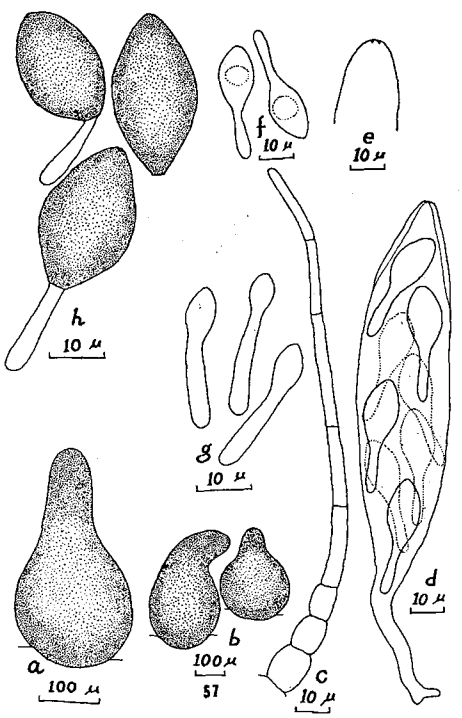


FIG. 56. *Podospora tetraspora*. *a*. Perithecium. *b*. Agglutinated hairs. *c*. Two abnormal asci, one on left with three ascospores and the other on right with five ascospores. *d*. Mature ascospores. *e*. Phialides.

FIG. 57. *Podospora unicaudata* (from culture by C. Moreau). *a*. Perithecium. *b*. Perithecia. *c*. Paraphyses. *d*. Ascus. *e*. Ascus apex. *f*. Immature ascospores. *g*. Young ascospores. *h*. Mature ascospores.

1.5–2.5 μ in diameter. Phialides and phialospores absent.

TYPE: Isolated in pure culture from felt lining of an ammunition box stocked in a gold mine in South Africa.

SPECIMENS EXAMINED: CANADA: Ontario: TRTC 40822, 41090. MEXICO: TRTC 41094. SOUTH AFRICA: C. Moreau.

This species is different because it lacks secondary appendages. However, it seems to be a good species of *Podospora* because of the nature of its perithecia, asci, and spores.

65. ***Podospora venezuelensis*** sp. nov.

(Figs. 58–59)

Peritheciis sparsis, partim superficialibus vel paene immersis, 650–1200 × 380–750 μ, subglobosis vel piriformibus, olivaceo-brunneis vel brunneis, pilis brevibus, septatis, circiter 50 × 2.5–3.0 μ ornatis vel denudatis. Collo perithecii papilliformibus vel brevi cylindraceo, nigro, circiter 300 × 150 μ, papillis parvis, brunneis tecto. Peridio perithecii levi, olivaceo-brunneo vel brunneo, tenui, membranaceo, semitranslucido, ex cellulis parvis distincte spectabilibus compositis. Ascis 32-sporis, clavatis, 250–300 × 55–100 μ, sursum paulatim attenuatis, et superne late rotundatis vel truncatis, annulo incrassato vix spectabili, ad apicem praeditis, inferne in stipitem parvum attenuatis. Paraphysibus septatis, conglutinatis, fugacibus superne filiformibus, inferne vesiculosis, ex cellulis parietibus tenuibus praeditis compositis. Ascosporis multiseriatis, ellipsoideis, 22–32 × 14–19 μ, atro-brunneis et opacis; primaria appendice clavatis, longa 19–27 μ, basi lata 4 μ, apici lata 6 μ, ad basem ascosporae alligata; secundaria et superiore appendice simili flagello, hyalina, gelatinosa, ad apicem ascosporae excentrice alligato, longa 15–25(–50) μ, basi lata 3–5 μ, striata; secundaria et inferiore appendice simili, ad ultimam partem primariae appendicis alligata; foramine germinali parvo, ad apicem ascosporae, circiter 1.5 μ diam.

TYPUS: in fimo (TRTC 38697). In University of Toronto Herbarium.

Perithecia scattered, partially or nearly immersed, sometimes becoming nearly superficial, subglobose to pyriform, 650–1200 × 380–750 μ, olivaceous brown to brown, with short, brown,

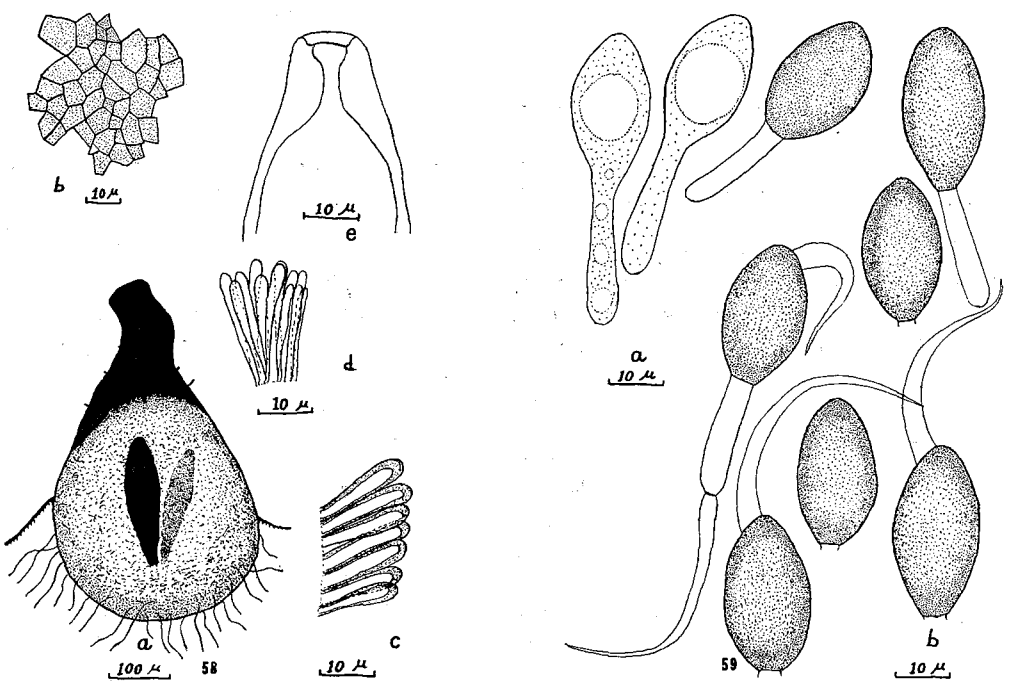


FIG. 58. *Podospora venezuelensis* (type, TRTC 38697). *a.* Perithecium. *b.* Cells of peridium. *c.* Papillae from the neck. *d.* Papillae from ostiolar region. *e.* Ascus apex.

FIG. 59. *Podospora venezuelensis*. *a.* Ascospores, two on the left young, one on right immature. *b.* Mature ascospores.

septate hairs on the upper part measuring up to 50 × 2.5–3.0 μ or almost bare. Neck of perithecium papilliform to short cylindrical, black up to 300 × 150 μ, covered with small dark brown or almost black papillae. Peridium smooth, light olivaceous brown to light brown, membranaceous, semitransparent, cellular structure very clearly visible, cells small. Asci 32-spored, clavate 250–320 × 55–100 μ, narrowed toward the upper end, broadly rounded to somewhat truncate at apex with inner membrane attached to scarcely visible apical ring, gradually narrowed below into a short stipe. Paraphyses consisting of very thin-walled cells, filiform, septate above, ventricose and agglutinated below, evanescent. Ascospores in several series, ellipsoid 22–32 × 14–19 μ, becoming dark brown and opaque; exospore thin; primary appendage clavate, 19–27 μ long about 4 μ wide near base and about 6 μ wide near apex, attached to base of ascospore; upper secondary appendage long, lash-like, hyaline, gelatinous, eccentric, 15–25 μ long or sometimes more, 3–5 μ wide at base, longitudinally striate, lower secondary appendage similar, attached to extremity of primary appendage; germ pore small, apical, about 1.5 μ in diameter.

ETYMOLOGY: Named after the type locality, Venezuela.

HOLOTYPE: On donkey dung in moist chamber, Toronto, Dec. 1942, from Los Choros, near Caracas, Venezuela, collected March 1, 1939, by H. H. Whetzel and A. S. Mueller (TRTC 38697).

SPECIMENS EXAMINED: VENEZUELA: TRTC 38697. MEXICO: Nayarit: Tepic, TRTC 39971. U.S.A.: La.: Livingston Parish: Walker, TRTC 36773. SOUTH PACIFIC: Tautira: TRTC 33705, 33716.

In Mexican collections, the perithecia are lighter in color and are olivaceous brown. They are almost bare or with very short, straight brown, remotely septate hairs. In the collection from Venezuela, there were found a few perithecia with 64-spored asci. In these cases the perithecia are slightly darker with more prominent hairs. In addition, both perithecia and asci are larger. Though the spores are smaller as should be expected, in the Venezuela collection, there are not enough differences to keep them as separate entities.

66. ***Podospora vesticola*** (Berk. & Broome) comb. nov. (Fig. 60)

= *Sphaeria vesticola* Berk & Broome., Ann. & Mag. Nat. Hist. 3(3): 370. 1859.

= *Sordaria minuta* Fuckel, Jahrb. Nass. Ver. Nat. 27–28: 441. 1873.

= *Hypocopra vesticola* (Berk. & Broome) Sacc., Syll. Fung. 1: 246. 1882.

= *Podospora minuta* (Fuckel) Niessl, Hedwigia, 22: 156. 1883.

= *Pleurage minuta* (Fuckel) Kuntze, Rev. Gen. Plant. 3(3): 505. 1898.

= *Bombardia minuta* (Fuckel) Kirsch., Krypt. Fl. Brand. 7(2): 182. 1911.

= *Sordaria vesticola* (Berk. & Broome) v. Hoehnel., Ann. Mycol. 16: 45. 1918.

Perithecia scattered, more or less superficial, 400–700 × 200–330 μ, ovoid, with short agglutinated hairs; hairs usually smaller than those of *P. curvula*, cells of the hairs thin-walled, swollen, elongated, upper cell usually with one point, rarely a few may be fimbriate; neck short,

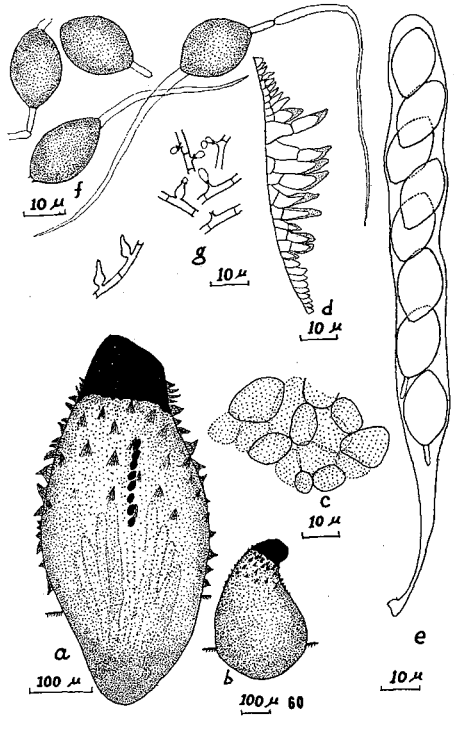


FIG. 60. *Podospora vesticola*. (TRTC 5259). *a*. Perithecium. *b*. Perithecium. *c*. Cells of peridium. *d*. Agglutinated hairs. *e*. Ascus with spore arrangement slightly changed. *f*. Mature ascospores. *g*. Phialides.

papilliform; peridium thin, membranaceous, transparent, light olivaceous brown. Asci 8-spored, cylindrical, 140–170 × 15–17 μ; apical ring not distinct; stipe short. Ascospores obliquely uniseriate but becoming easily biseriate under the pressure of the cover slip, ellipsoid, 17–20 × 11–14 μ; exospore thin; primary appendage slender, cylindrical 6–8 × 2 μ; secondary appendages lash-like, upper one slightly eccentric, lower one similar in shape, at distal end of primary appendage; germ pore almost apical, 1.5–2 μ in diameter. Phialides small, flask-shaped, or represented by very small peg-like out-growths with collarettes. Phialospores hyaline, ovoid or globose, about 2 μ in diameter.

TYPE: On the lining of an old gown, from Batheaston, England (not seen).

REPRESENTATIVE SPECIMENS EXAMINED: CANADA: Ontario: TRTC 5257–5260; Alberta: TRTC 1180; Saskatchewan: TRTC 1184; British Columbia: TRTC 41120; Quebec: TRTC 32007; Arctic Region: TRTC 40854. U.S.A.: Idaho: TRTC 39895; New York: TRTC 37381; Wyoming: TRTC 39074. MEXICO: TRTC 36820. U.K.: Berkeley, (K). GERMANY: Krieger 2453. SWEDEN: Lundqvist 3439*a* (TRTC).

The writers have seen the type of *Sphaeria vesticola* and found it to be the same as *P. minuta* as this species has usually been interpreted. Fuckel's type has not been seen. Von Höhnel (1918) proposed the new combination *Sordaria vesticola*. The writers have seen his specimen and found it to be *Podospora fimbriata*. Marchal (1884) reported a small spored variety *Leptospora* on rabbit dung from Belgium. He gave the spore measurements as 12–13 × 8 μ and stated that its perithecia were also smaller than the type. Wicker (1962) has recently described a form of this species with the following measurements: perithecia 350–500 × 200–300 μ; asci 100–120 × 8–12 μ; ascospores 9–13 × 6.5–10 μ. Apparently her fungus is the same as Marchal's variety *Leptospora*. We have seen neither Wicker's nor Marchal's specimens; they may represent a new species.

Alphabetical List of Specific Epithets

Synonyms are printed in italics. Names not in italics are treated alphabetically in the text. The generic name is given in parentheses. Specific epithets with a *Podospora* or *Sordaria* combination not listed below are considered as not belonging in the genus *Podospora* and will be dealt with in future publications.

adelura (Griff.) Sacc. & D. Sacc. (*Philocopra*) 1905 = Podospora adelura
adelura Griffiths (*Pleurage*) 1901 = Podospora adelura
adelura (Griff.) Cain (Podospora) 1962
alloeochaeta Mirza & Cain (Podospora)
aloides (Fuckel) Mirza & Cain (Podospora)
aloides Fuckel (*Sordaria*) 1873 = Podospora aloides
amphicornis (Ellis) Kuntze (*Pleurage*) 1898 = Podospora appendiculata
amphicornis (Ellis) Ellis & Ev. (*Podospora*) 1892 = Podospora appendiculata
amphicornis (Ellis) Sacc. (*Sordaria*) 1882 = Podospora appendiculata
amphicornis Ellis (*Sphaeria*) 1876 = Podospora appendiculata
ampullaceum Lundqvist (Anopodium) 1964
anomala Griffiths (*Pleurage*) 1901 = Podospora anomala
anomala (Griffiths) Cain (Podospora) 1962
anomala (Griffiths) Sacc. (*Sordaria*) 1905 = Podospora anomala
anserina (Ces. in Rabenh.) Migula (*Bombardia*) 1913 = Podospora anserina
anserina Ces. in Rabenh. (*Malinvernia*) 1857 = Podospora anserina
anserina (Ces. in Rabenh.) Kuntze (*Pleurage*) 1898 = Podospora anserina
anserina (Ces. in Rabenh.) Niessl (Podospora) 1883
anserina (Ces. in Rabenh.) Winter (*Sordaria*) 1873 = Podospora anserina
anserina Ces. in Rabenh. (*Sphaeria*) 1857 = Podospora anserina
apiculifera (Speg.) C. Moreau (*Pleurage*) 1953 = Podospora apiculifera
apiculifera (Speg.) Mirza & Cain (Podospora)
apiculifera Speg. (*Sordaria*) 1899 = Podospora apiculifera
appendiculata (Auersw.) C. Moreau (*Pleurage*) 1953 = Podospora appendiculata
appendiculata (Auersw.) Niessl (Podospora) 1883
appendiculata Auersw. (*Sordaria*) 1872 = Podospora appendiculata
araneosa (Cain) C. Moreau (*Pleurage*) 1953 = Podospora araneosa
araneosa (Cain) Cain (Podospora) 1962
araneosa Cain (*Sordaria*) 1934 = Podospora araneosa
argentinensis (Speg.) C. Moreau (*Pleurage*) 1953 = Podospora argentinensis
argentinensis (Speg.) Mirza & Cain (Podospora)
argentinensis Speg. (*Sordaria*) 1912 = Podospora argentinensis
australis Speg. (*Hypocopra*) 1880 = Podospora australis
australis (Speg.) Niessl (Podospora) 1883
australis (Speg.) Sacc. (*Sordaria*) 1882 = Podospora australis
austroamericana Speg. (*Hypocopra*) 1880 = Podospora austroamericana
austroamericana (Speg.) Mirza & Cain (Podospora)

austroamericana (Speg.) Sacc. (*Sordaria*) 1882 = Podospora austroamericana
brasiliensis Cain (Podospora) 1962
breviseta Fuckel (*Malinvernia*) 1869 = Podospora curvula
breviseta Karsten (*Sordaria*) 1873 = Podospora appendiculata
cervina (Cain) C. Moreau (*Pleurage*) 1953 = Podospora cervina
cervina (Cain) Cain (Podospora) 1962
cervina Cain (*Sordaria*) 1934 = Podospora cervina
coeruleotecta Rehm (*Philocopra*) 1911 = Podospora setosa
coeruleotecta (Rehm) Cain (*Podospora*) 1962 = Podospora setosa
collapsa Griffiths (*Pleurage*) 1901 = Podospora collapsa
collapsa (Griff.) Sacc. (*Philocopra*) 1905 = Podospora collapsa
collapsa (Griff.) Cain (Podospora) 1962
comata Milovtzova (Podospora) 1937
communis Speg. (*Hypocopra*) 1880 = Podospora communis
communis (Speg.) Niessl (Podospora) 1883
communis (Speg.) Sacc. (*Sordaria*) 1882 = Podospora communis
conica Fuckel (*Cercophora*) 1869 = P. curvula
conica (Fuckel) Griff. & Seaver (*Pleurage*) = Podospora curvula
coronifera (Grove) Cain (*Podospora*) 1962 = Podospora aloides
coronifera Grove (*Sordaria*) 1916 = Podospora aloides
curvicolla (Winter) Migula (*Bombardia*) 1913 = Podospora curvicolla
curvicolla (Winter) Sacc. (*Philocopra*) 1882 = Podospora curvicolla
curvicolla (Winter) Kuntze (*Pleurage*) 1898 = Podospora curvicolla
curvicolla (Winter) Niessl (Podospora) 1883
curvicolla Winter (*Sordaria*) 1871 = Podospora curvicolla
curvispora (Cain) C. Moreau (*Pleurage*) 1953 = Podospora curvispora
curvispora (Cain) Cain (Podospora) 1962
curvispora Cain (*Sordaria*) 1948 = Podospora curvispora
curvula (DeBary) Kirschstein (*Bombardia*) 1911 = Podospora curvula
curvula (DeBary) Kuntze (*Pleurage*) 1898 = Podospora curvula
curvula (DeBary) Niessl (Podospora) 1883
curvula DeBary (*Sordaria*) 1866 = Podospora curvula
curvuloides Cain (Podospora) 1962
dagobertii C. Moreau Not validly published (Probably belongs in Anopodium (No. 21).)
dakotensis (Griff.) Sacc. (*Philocopra*) 1905 = Podospora dakotensis
dakotensis Griffiths (*Pleurage*) 1901 = Podospora dakotensis
dakotensis (Griff.) Mirza & Cain (Podospora)
decipiens (Winter) Kirschstein (*Bombardia*) 1911 = Podospora decipiens
decipiens (Winter) Zopf (*Eusordaria*) 1883 = Podospora decipiens
decipiens (Winter) Niessl (Podospora) 1883
decipiens Winter (*Sordaria*) 1873 = Podospora decipiens
didyma Mirza & Cain (Podospora)
dolichopodalis Mirza & Cain (Podospora)
ellisiana Griffiths (*Pleurage*) 1901 = Podospora ellisiana
ellisiana (Griff.) Mirza & Cain (Podospora)
ellisiana (Griff.) Sacc. & Sacc. (*Sordaria*) 1905 = Podospora ellisiana
eminens (Cain) Cain (Podospora) 1962
eminens Cain (*Sordaria*) 1934 = Podospora eminens
erecta Speg. (*Hypocopra*) 1880 probably = Podospora anserina
erecta (Speg.) Niessl (*Podospora*) 1883 probably = Podospora anserina
erecta (Speg.) Sacc. (*Sordaria*) 1882 probably = Podospora anserina
eximia Peck (*Sphaeria*) 1876 = Podospora appendiculata
fimbriata (Bayer) Page (*Pleurage*) 1957 = Podospora fimbriata
fimbriata (Bayer) Cain (Podospora) 1962
fimbriata Bayer (*Sordaria*) 1924 = Podospora fimbriata
fimicola Karsten (*Ixodiopsis*) 1881 = Podospora aloides
fimicola (Ces.) Kuntze (*Pleurage*) 1898 = Podospora fimicola
fimicola Ces. (Podospora) 1856
fimicolum Corda (*Schizothecium*) 1838 (Species cannot be determined and no specimen has been found.)
fimiseda (Fuckel) Kirschstein (*Bombardia*) 1911 = Podospora fimicola
fimiseda Fuckel (*Cercophora*) 1869 = Podospora fimicola
fimiseda (Fuckel) Griff. (*Pleurage*) 1901 = Podospora fimicola
fimiseda (Fuckel) Niessl (Podospora) 1883 = Podospora fimicola
fimiseda (Fuckel) Ces & DeNot. (*Sordaria*) 1863 = Podospora fimicola
gigantea Mirza & Cain (Podospora)
glutinans (Cain) Cain (Podospora) 1962
glutinans Cain (*Sordaria*) 1934 = Podospora glutinans
gwynnevaughaniae Page (*Pleurage*) 1960 = Podospora gwynnevaughaniae
gwynnevaughaniae (Page) Cain (Podospora) 1962
hirsuta Dangeard (Podospora) 1907
hirsuta (Dangeard) Sacc. & Traverso (*Sordaria*) 1911 = Podospora hirsuta
hispidula (Speg.) C. Moreau (*Pleurage*) 1953 = Podospora curvula
hispidula Speg. (*Sordaria*) 1899 = Podospora curvula
hyalopilosa (Stratton) (*Pleurage*) 1921 = Podospora hyalopilosa
hyalopilosa (Stratton) Cain (Podospora) 1962
hyalopilosa (Stratton) Cain (*Sordaria*) 1934 = Podospora hyalopilosa
immersa Stratton (*Pleurage*) 1921 = Podospora immersa
immersa (Stratton) Cain (Podospora) 1962
inaequalis (Cain) Cain (Podospora) 1962
inaequalis Cain (*Sordaria*) 1934 = Podospora inaequalis
inflatula Cain (Podospora) 1962
karachiensis Mirza & Cain (Podospora)
linguiformis (Cain) Cain (Podospora) 1962
linguiformis Cain (*Sordaria*) 1934 = Podospora linguiformis

longicaudata Griffiths (*Pleurage*) 1901 = Podospora longicaudata
longicaudata (Griff.) Cain (Podospora) 1962
longicaudata (Griff.) Sacc. & D. Sacc. (*Sordaria*) 1905 = Podospora longicaudata
longicollis (L. Ames) Boedijn (*Pleurage*) 1962 = Podospora longicollis
longicollis (L. Ames) Mirza & Cain (Podospora)
longicolle L. Ames (*Schizothecium*) 1951 = P. longicollis
longispora Batista & Pontual (*Sordaria*) 1948 = Podospora appendiculata
macropodalis Mirza & Cain (Podospora)
macrostoma (Speg.) Moreau (*Pleurage*) 1953 = Podospora communis
macrostoma Speg. (*Sordaria*) 1899 = Podospora communis
macrura Bayer (*Sordaria*) 1924 = Podospora australis
mexicana Mirza & Cain (Podospora)
micrura Speg. (*Hypocopra*) 1880 = Podospora curvula
micrura (Speg.) Speg. (*Podospora*) 1923 = Podospora curvula
millespora A. Schmidt (*Philocopra*) 1912 = Podospora millespora
millespora (A. Schmidt) Cain (Podospora) 1962
miniglutinans Mirza & Cain (Podospora)
minor (Ell. & Ever.) Griff. (*Pleurage*) 1901 = Podospora minor
minor Ell. & Ever. (Podospora) 1897
minor (Ell. & Ever.) Sacc. & Syd. (*Sordaria*) 1899 = Podospora minor
minuta (Fuckel) Kirschstein (*Bombardia*) 1911 = Podospora vesticola
minuta (Fuckel) Kuntze (*Pleurage*) 1898 = Podospora vesticola
minuta (Fuckel) Niessl (*Podospora*) 1883 = Podospora vesticola
minuta Fuckel (*Sordaria*) 1873 = Podospora vesticola
nannopodalis Cain (Podospora) 1962
ostlingospora Cain (Podospora) 1962
papilliformis Cain (Podospora) 1962
pilosa (Mouton) C. Moreau (*Pleurage*) 1953 = Podospora pilosa
pilosa (Mouton) Cain (Podospora) 1962
pilosa Mouton (*Sordaria*) 1886 = Podospora pilosa
pistillata Mirza & Cain (Podospora)
platensis Speg. (*Philocopra*) 1881 = Podospora platensis
platensis (Speg.) Mirza & Cain (Podospora)
pleiospora (Winter) Kirschstein (*Bombardia*) 1911 = Podospora pleiospora
pleiospora (Winter) Sacc. (*Philocopra*) 1882 = Podospora pleiospora
pleiospora (Winter) Kuntze (*Pleurage*) 1898 = Podospora pleiospora
pleiospora (Winter) Niessl (Podospora) 1883
pleiospora Winter (*Sordaria*) 1871 = Podospora pleiospora
pseudominuta Speg. (*Sordaria*) 1887 = Podospora curvula
pyriformis (Bayer) Cain (Podospora) 1962
pyriformis Bayer (*Sordaria*) 1925 = Podospora pyriformis
seminuda (Griff.) Mirza & Cain (Podospora)
seminuda Griffiths (*Sordaria*) 1901 = Podospora seminuda
setosa (Winter) Migula (*Bombardia*) 1913 = Podospora setosa
setosa (Winter) Sacc. (*Philocopra*) 1882 = Podospora setosa
setosa (Winter) Kuntze (*Pleurage*) 1898 = Podospora setosa
setosa (Winter) Niessl (Podospora) 1883
setosa Winter (*Sordaria*) 1873 = Podospora setosa
similis (Hansen) Sacc. (*Philocopra*) 1882 = Podospora similis
similis (Hansen) C. Moreau (*Pleurage*) 1953 = Podospora similis
similis (Hansen) Niessl (Podospora) 1883
similis Hansen (*Sordaria*) 1877 = Podospora similis
superior Griffiths (*Pleurage*) 1901 = Podospora appendiculata
superior (Griff.) Sacc. & D. Sacc. (*Sordaria*) 1905 = Podospora appendiculata
taediosa (Speg.) C. Moreau (*Pleurage*) 1953 (Possibly = Podospora decipiens.)
taediosa Speg. (*Sordaria*) 1899 (Identity uncertain.)
taenioides Griffiths (*Pleurage*) 1901 = Podospora australis
taenioides (Griff.) Cain (Podospora) 1962 = Podospora australis
taenioides (Griff.) Sacc. & D. Sacc. (*Sordaria*) 1905 = Podospora australis
tarvisina Sacc. (*Philocopra*) 1882 = Podospora tarvisina
tarvisina (Sacc.) Mirza & Cain (Podospora)
tetraspora (Winter) Griff. (*Pleurage*) 1901 = Podospora tetraspora
tetraspora (Winter) Cain (Podospora) 1962
tetraspora Winter (*Sordaria*) 1871 = Podospora tetraspora
unicaudata C. Moreau & M. Moreau ex Smith (*Pleurage*) 1957 = Podospora unicaudata
unicaudata (C. Moreau & M. Moreau ex Smith) Cain (Podospora) 1962
valsoides (Peck) Sacc. (*Sordaria*) 1882 (Probably = Podospora appendiculata.)
valsoides Peck (*Sphaeria*) 1879. (Probably = Podospora appendiculata.)
venezuelensis Mirza & Cain (Podospora)
vesticola (Berk. & Broome) Mirza & Cain (Podospora)
vesticola Berk. & Broome (*Sphaeria*) 1859 = Podospora vesticola
vestita (Zopf) Migula (*Bombardia*) 1913 = Podospora communis
vestita Zopf (*Eusordaria*) 1883 = Podospora communis
vestita (Zopf) Griff. (*Pleurage*) 1901 = Podospora communis
vestita (Zopf) Winter (*Podospora*) 1885 = Podospora communis
vestita (Zopf) Sacc. & D. Sacc. (*Sordaria*) 1905 = Podospora communis
vratislaviensis A. Schmidt (*Sordaria*) (Possibly = Podospora fimbriata.)
winteri (Karsten) Niessl (*Podospora*) 1883 = Podospora appendiculata
winteri Karsten (*Sordaria*) 1873 = Podospora appendiculata

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