The circumscription of *A. verruculosa* has also made me take the variety *maritima* (Apin. & Chest.) Arx & Gams (1967: 203) into consideration. It is known only from the type locality, Gibraltar Point near Skegness, Lincoln, England, where it was isolated from litoral soil 9.v.1961 (Apinis & Chesters 1964: 432; BDUN 316, holotype; isotypes in IMI 1024072 and K).

I have examined the Kew specimens and can state that the original description is in some respects incorrect and incomplete. In short it can be said that the peridium, asci, and spores are of the same kind as those in *A. verruculosa*. The asci are cylindrical, not clavate, and the spores do not have a "slimy, smooth, very finely pitted outer layer"; the spines are narrower, up to 1.5 μ long, standing denser than in *A. verruculosa*. The spines of the latter reach 3 μ in length.

Fragments can sometimes be seen at both ends of the spores, which may indicate the presence of appendages (pl. 48*d–f*). It would be interesting to test living specimens of both taxa in Indian ink to see if there is any gelatinous equipment. If caudae really exist, *Apiosordaria* becomes even more similar to *Lacunospora*, with which it has several other connections.

As the only tangible difference between the two organisms refers to the size of the spore ornamentation, we had better accept *maritima* as a variety.

10. *Schizothecium* Corda 1838: 29 emend. Lundq.

Originally monotypic: *Schiz. fimicola* Corda, nom. dub.

Pleurage Fr. 1849: 418; nom. nov. illegit. for *Schizothecium*.

Ixodopsis Karst. sensu Karst., F. Fenn. Exs. 955, 1870, exlusive of the monotype *I. fimicola* (Rob.) Karst. ≡ *Sordaria fimicola* (Rob.) Ces. & DeNot.

Perithecia non-stromatic, ostiolate. *Peridium* pseudo-parenchymatous, membranaceous, 3-layered, with ±isodiametric, swollen cells in the outer layer and tangentially flattened cells in the middle layer; upper part of the perithecia usually clad with tufts of agglutinated, swollen hairs or protuding, inflated cells. Typical *paraphyses* lacking. *Asci* clavate, rarely cylindrical, without apical ring, almost invariably dehiscing below the apex. Spores at first hyaline, fusiform-obovoid, transversely uniseptate at a very early stage; upper cell finally dark brown, smooth, with an upper germ pore; pedicel hyaline, filled with plasma, usually long persistent. — Fimicolous, sometimes herbicolous, terricolous, seed-borne.

A full treatment of the Nordic species has been excluded because of my forthcoming monograph of the genus. They are also too many to be conveniently incorporated in this thesis. These species, their type collections and facultative synonyms, are merely listed here with short annotations on distribution and substrates. The combinations with *Schizothecium* are also validated. Since the genus is the only Nordic member of the family not dealt with in detail in any of my publications, it may be appropriate to give a key to the species.

Schizothecium is characterized and distinguished from *Podospora* principally by the swollen peridial cells and hair tufts, early spore septation, and long persistent, plasma-filled pedicel. There are also many other minor differences that together speak for a separation of the two taxa on the generic level, but a detailed argumentation must be left out here. The reader is referred to other places in this book where the generic classification is discussed.

Only two things will be said about the intricate generic nomenclature. *Schizothecium* became a nomen rejiciendum as the result of the conservations (1969) of *Podospora* with *P. fimicola* sensu Ces. as its type species (p. 121, Donk 1964). But when *Schizothecium* now is considered a genus distinct from *Podospora*, and, besides, is based on Corda's species, the name bears again full legitimacy (Article 14, Note 4 in the present Code). The fact that *S. fimicola* Corda is dubious does in no way jeopardize the generic name, as long as we know that this species is a true *Schizothecium*.

Schizothecium comprises 21 described species (36 names, incl. 2 nomina dubia). The addition of 10 new species makes it 31. The Nordic flora contains 16 species, 3 of which are new.

Key to the Nordic species

1. Asci normally 4-spored; spores ±uniseriate 2
— Asci normally 8-spored 3
— Asci 16-spored 14
— Asci 32-spored 15
2. Asci 95–120 × 9–12 μ; spore head 12–14.5 × 7–9 μ . . . . . *S. nanum* p. 255
— Asci 120–155 × 15–18 μ; spore head 19–24 × 12–14.5 μ . *S. tetrasporum* p. 256
3. Perithecial neck with a conspicuous collar of swollen, agglutinated, up to 50 × 12 μ large, thick-walled, pointed, even claw-like cells: spores uniseriate, surrounded by a gelatinous sheath; spore head 15–19 × 7–8.5 μ . . . . . *S. oedotrichum* p. 255
— Characters different; spores bicaudate 4
4. Spore head 12–13 × 6–8 μ; pedicel isodiametric, conical; caudae short, pulvinate to oblong, truncate . . . . . *S. cervinum* p. 253
— Sporehead larger; pedicel different; caudae lash-like 5
5. Perithecia with 3 kinds of vestiture: — I. tufts or a palisade of agglutinated, swollen hairs, often reduced to large, inflated, protruding cells; II. flexuous hairs; III. rigid, not swollen hairs . . . . . *S. pilosum* p. 255
— Rigid hairs absent 6
6. Vestiture of both type I and II present 7
— Only type I present (basal hyphae not taken into account) 12
7. Asci broadest at the apex; spore pedicel tapering; spore head 22–23 × 11–13 μ, with a subapical germ pore . . . . . *S. pilosum* p. 255
— Asci ±tapering towards the apex; pedicel ±cylindrical 8
8. Spores longer than c. 30 μ 9
— Spores shorter 10

9. Hair tufts very large, up to 335 μ long; spores biseriate; spore head 32–37 × 18–20 μ . . . . . *S. aloides* p. 253
— Tufts shorter, often indistinct; spores ± uniseriate; spore head 30–38 × 21–27 μ . . . . . *S. glutinans* p. 254
10. Hair tufts distinct, up to 120 μ long; spores biseriate; spore head (24–)26–30 × 13–17 μ . . . . . *S. conicum* p. 253
— Tufts shorter, often indistinct 11
11. Spore head 20–24 × 11–13 μ, with a 3.5 μ wide apical cauda; spores ± biseriate; perithecia ± immersed, obpyriform, up to 480 μ wide, with a broad, rugose neck . . . . . *S.* n. sp. p. 256
— Spore head 22–24 × 14–15 μ, with a 5–7 μ wide, flattened apical cauda; spores biseriate; perithecia semi-immersed to superficial . . *S. miniglutinans* p. 254
— Spore head 24–27 × 15–19 μ, with a non-flattened upper cauda; Spores ± biseriate . . . . . *S. squamulosum* p. 256
12 (6″). Hair tufts distinct; spore head longer than 21 μ 13
— Tufts small or lacking, mostly reduced to single, short, inflated hairs or large, acute cells; perithecia ± superficial, oblong to obpyriform, 240–335(–420) μ wide (compare *S.* n. sp., 11′); spores uni-biseriate; spore head 18–20 × 10.5–12 μ, with a c. 3.5 μ wide upper cauda . . . . . *S. vesticola* p. 256
13. Spore head (24–)26–30 × 13–17 μ (compare 10′) . . . . *S. conicum* p. 253
— Spore head 22–25(–27) × 11–13 μ . . . . . *S. hispidulum* p. 254
14 (1‴). All 3 kinds of vestiture present (see 5′), but no distinct hair tufts; spore head 30–36 × 17–20 μ; gelatinous equipment fugacious, consisting of a sheath and an upper and a lower cauda . . . . . *S. simile* p. 256
— Rigid hairs absent; spore head 27–36 × 16–20 μ, without sheath; caudae persistent, the upper one 7–9 μ wide, hollow . . . . . *S. dubium* p. 254
15 (1⁗). All 3 kinds of vestiture present (see 5′, 14′) . . . . . *S. simile* p. 256
— Only type I present; spore head 22–25 × 13–15 μ; gelatinous caudae 2, no sheath . . . . . *S. dakotense* p. 254

1. *Schizothecium aloides* (Fuck.) Lundq. n. comb.

Sordaria aloides Fuck. 1873: 43. — Coll. orig. on cow dung from Lucienstieg at Ragaz, Switzerland, s. dato, Fuckel (G lectotype). — *Sphaeria valsoides* Peck 1879*a*: 79. — *Sordaria coronifera* Grove 1916: 185.

Not uncommon on cow dung in southern Scandinavia, Middle Europe, Canada, and northern USA; also recorded from Tanzania (dubious).

2. *Schizothecium cervinum* (Cain) Lundq. n. comb.

Sordaria cervina Cain 1934: 36. — Holotype on deer dung from Macaulay Centre, Muskoka, Ontario, Canada, (TRTC 5180); not seen.

Principally on elk dung in Sweden (9 finds) and deer dung in Canada and northern USA.

3. *Schizothecium conicum* (Fuck.) Lundq. n. comb.

Cercophora conica Fuck. 1870: 245. — Coll. orig. on horse dung [sic!] from opp. Östrich, Nassau, Hessen, Germany, s. dato, Fuckel, hb. Barbey-Boissier 680 (G lecto-

type). — *Sordaria curvula* de Bary 1866: 133, 198, 208, 209; nom. nud.; ex Wint. 1873*c*: 485; nom. illeg. — *Sordaria curvula* f. *coronata* Wint. 1873*d*: 102. — *Sordaria curvula* v. *tetraspora* March 1884*a*: 12. — *Sordaria pseudominuta* Speg. 1887: 189. — *Ixodopsis fimicola* sensu Karst., F. Fenn. Exs. 955, 1870.

One of the commonest coprophilous Pyrenomycetes ever described. It is distributed all over the Nordic area on various kinds of dung, particularly cow and horse dung; cosmopolitan, but avoids the Tropics.

4. *Schizothecium dakotense* (Griff.) Lundq. n. comb.

Pleurage dakotensis Griff. 1901: 87. — Coll. orig. on cow dung from Brookings, S. Dakota, USA, XI.1899, Carter (NY lectotype).

On cow and horse dung in the south of Sweden (3 finds), Norway, Spain, Canada, northern USA, and on sheep dung in Maderia; also recorded from Mexico.

5. *Schizothecium dubium* (Hans.) Lundq. n. comb.

Sordaria dubia Hans. 1876: 337. — Coll. orig. on cow dung from Ribe, Jutland, Denmark, 6.XI.1874, Hansen (K lectotype). — *Sordaria linguiformis* Cain 1934: 42.

On rabbit and bird(?) dung in southern Sweden (2 finds), sheep dung in northern Norway, cow and sheep dung in Denmark, rabbit and porcupine dung in Canada; also recorded from Holland, Belgium, West Pakistan, and USA.

6. *Schizothecium glutinans* (Cain) Lundq. n. comb.

Sordaria glutinans Cain 1934: 40. — Holotype on rabbit dung from Huntsville, Muskoka, Ontario, Canada (TRTC 5165); not seen.

On horse, rabbit, hare, and field vole dung in southern Sweden (7 finds), on roe deer dung and *Calamagrostis* culms in Denmark, and on dung of various kinds in England, Ireland, Poland, Canada; also recorded from Belgium, France, and Mexico.

7. *Schizothecium hispidulum* (Speg.) Lundq. n. comb.

Sordaria hispidula Speg. 1899: 255. — Coll. orig. on cow dung from La Plata, Argentina, 23.VIII.1888, Spegazzini (LPS 6836). — *Podospora curvula* (de Bary ex Wint.) Niessl v. *charcoviensis* Milov. 1937: 19.

On cow dung in southern Sweden (2 finds), Denmark (3 finds), sheep dung in Iceland; also on dung of various kinds in England, Scotland, Hungary, Ukraine, Corsica, Spain, Madeira, Algeria, Canada, USA, and Argentina.

8. *Schizothecium miniglutinans* (Mirza & Cain) Lundq. n. comb.

Podospora miniglutinans Mirza & Cain 1970: 2030. — Holotype on donkey dung from N of Zimpan, Hidalgo, Mexico, 2.VIII.1961, Cain (TRTC 38801); isotype seen (UPS).

On hare, rabbit, and sheep dung in southern Sweden (12 finds), sheep dung in northern Norway, hare dung in Denmark; also on various kinds of dung in the Netherlands, Hungary, Corsica, Spain, the Canaries, Kenya, South Africa, Canada, USA, and Mexico.

9. *Schizothecium nanum* Lundq. n. sp.

Sordaria minuta Fuck. f. *leptospora* March. 1884*b*: 90. — Coll. orig. on rabbit dung from Hoelaart (=Hoeylaert) near Brussels, Belgium, Spring 1884, Marchal; nonexistent.

Perithecia aggregata, ±superficialia, non-stromatica, ostiolata, ovoidea vel obpyriformia, 240–480 × 150–335 μ, deorsum pilis flexuosis sparse obtecta, sursum pilis brevibus, inflatis, agglutinatis, acutis, septatis, 6–12 μ crassis instructa. *Peridium* pseudoparenchymaticum, semipellucidum, membranaceum, ochraceum, cellulis externis inflatis, angulatis, rotundatis vel conicis. *Paraphyses* carentes. *Asci* 4-spori, 95–120 × 9–13 μ, cylindracei, longe stipitati, sine annulo apicali. *Sporae* uniseriatae, precociter transversaliter uniseptatae; cellula superior demum brunnea, levis, ellipsoidea, extremis subacutis, aequilateralis, 12–14.5 × 7–9 μ, poro germinali apicali instructa; pedicellus hyalinus, cylindraceus, c. 7 × 1.5 μ, plasmate repletus. *Cauda gelatinosa* attenuata, 10–12 × 1.5 μ, fugax, apicaliter et basaliter sporae affixa; cauda basalis pedicellum tegens. Spora suprema normaliter reversa.

Holotype on rabbit dung from E of Nors fishing harbour, Hall par., Gotland, Sweden, 28.VII.1961, Lqt 3078-b (UPS).

Known from southern Sweden (4 finds), Belgium, and the Netherlands.

10. *Schizothecium oedotrichum* Lundq. n. sp.

Greek *oedo-*, swollen, *thrix*, hair, refer to the inflated hairs on the perithecial neck.

Perithecia dispersa, semiimersa, non-stromatica, ostiolata, obpyriformia, 430–600 × 290–400 μ, deorsum pilis flexuosis, sursum pilis (cellulis) agglutinatis, valde inflatis, rectis vel modice curvatis, acutis, 0–1-septatis, 25–60 × 7–12 μ, fasciculis obtusis formantibus instructa. *Peridium* pseudoparenchymaticum, membranaceum, semipellucidum, ochraceum, cellulis externis angulatis, 5–12 μ diam. *Paraphyses* carentes. *Asci* 8-spori, cylindracei, 180 × 14–17 μ, longe stipitati, sine annulo apicali. *Sporae* uniseriatae, precociter transversaliter uniseptatae; cellula superior demum fusco-brunnea, late fusiformis, levis, aequilateralis, 17–22 × 9–12 μ, poro germinali apicali instructa; pedicellus hyalinus, c. 4 × 1.5 μ, cylindraceus vel subclavatus, plasmate repletus. *Stratum gelatinosum* totam sporam cingens, in aqua tumescens, in atramento indico non nigrescens.

Holotype on horse dung from Mustiala, Tammela par., Tavastia australis, s. dato, Karsten under *Iodophanus carneus* (UPS).

Known on horse dung from Sweden (Gotland) and South Finland (2 finds).

11. *Schizothecium pilosum* (Mout.) Lundq. n. comb.

Sordaria pilosa Mout. 1886: 144. — Coll. orig. on rabbit dung from Gomzé, Liège, Belgium, s. dato, Mouton 267 (BR).

On cow and horse dung in Sweden (23 finds), Norway (5 finds), rabbit dung in Belgium, cow dung in Corsica, Spain, and horse dung in Ireland; records from North and South America refer to *Podospora ellisiana* or other species.

12. *Schizothecium simile* (Hans.) Lundq. n. comb.

Sordaria similis Hans. 1876: 336. — Coll. orig. on sheep dung from Rudersdal, Zealand, Denmark, VI.1874, Hansen, non-existent; neotype will be selected later.

On cow and horse dung in Sweden (3 finds), sheep dung in Denmark, cow, donkey, and sheep dung in Corsica, and horse dung in Canada; a few other Canadian records are dubious.

13. *Schizothecium squamulosum* (Cr. & Cr.) Lundq. n. comb.

Sordaria squamulosa Cr. & Cr. 1867: 22. — Coll. orig. on dead *Angelica* stems from Finistère, France, 23.X.1863, Crouan (CO).

On elk, hare, fox, and field vole dung in Sweden (5 finds), *Angelica* stalks in France, maize culms in Hungary, *Salsola* stalks, fowl and rabbit dung in USA; other records from France and England refer to other species.

14. *Schizothecium tetrasporum* (Wint.) Lundq. n. comb.

Sordaria tetraspora Wint. 1871: 161. — Coll. orig. on rat dung from Oederan, Saxony, Germany, Winter; not known to exist; neotype will be selected later.

Common on various kinds of dung, particularly that of rabbit, hare, and small rodents in the whole of Scandinavia, the British Isles, continental Europe, Canada, and USA; also found in Algeria, and recorded from Mexico.

15. *Schizothecium vesticola* (Berk. & Br.) Lundq. n. comb.

Sphaeria vesticola Ber. & Br. 1859: 370. — Coll. orig. on old cloth from Bathcaston near Bath, Somerset, England 24.XII.1858, Broome (K lectotype). — *Sordaria minuta* Fuck. 1873: 44.

Common on various kinds of dung, particularly that of cow and horse, in the whole of Scandinavia, in Iceland, the British Isles, continental Europe, Canada, and USA; also recorded from Algeria, Morocco, West Pakistan, and Mexico.

16. *Schizothecium* n. sp.

On cow dung in Norway (1 find).

11. *Jugulospora* Lundq. n. gen.

Holotype: *J. rotula* (Cooke) Lundq.

Coscinospora Mirza 1963: 248, 1964: 780; unpubl. thesis.—Originally monotypic: *C. rotula* (Cooke) Mirza.