Pl. 31:
C. coprinaria: apothecia on cattle dung, U. K.: N. Ireland, Ballinderry Waterfoot, 30.I. 1998, R. Anderson (R. And.).
Photo R. Anderson.

37. *Cheilymenia coprinaria* (Cooke) Boud. **Fig. 81; Pl. 31, 32, 57a-b**

≡ *Peziza coprinaria* Cooke, Grevillea 4: 91, 1875.
≡ *Ciliaria coprinaria* (Cooke) Quél., C. R. Ass. Franc. l'avanc. Sci. 11: 406, 1883.
≡ *Lachnea coprinaria* (Cooke) W. Phillips, Man. Brit. Discom. p. 224, 1887.
≡ *Scutellinia coprinaria* (Cooke) Kuntze, Rev. Gen. Pl. 2: 869, 1891.
≡ *Patella coprinaria* (Cooke) Seaver, North Am. Cup-Fungi (Operc.) 171, 1928.
≡ *Humaria coprinaria* (Cooke) Hazslinsky, M. T. Akad. Mathem. Természett. közlem. 21: 265, 1886 [1885?]
≡ *Cheilymenia coprinaria* (Cooke) Boudier, Icon. Mycol., Liste Prélim. [3], 1904.
= *Patella michiganensis* Povah, Mycologia 24: 240, 1932.
≡ *Scutellinia michiganensis* (Povah) Povah, Papers Mich. Acad. Sci. 20: 130, 1935.
= *Humaria gollmeri* P. Hennings, Hedwigia 36: 233, 1897.

Excluded synonyms: *Sepultaria pediseta* Clements, Bot. Surv. Nebraska 4: 13, 1896 ≡ *Lachnea pediseta* (Clements) Saccardo et P. Sydow, Syll. Fung. 14: 758, 1899, synonymised with *C. coprinaria* by DENISON (1964), but it is *C. vitellina*.

Misapplication: *Cheilymenia fimicola* (De Not. et Bagl.) Dennis sensu Dennis, Brit. Ascomyc. ed 2 p. 45, 1978 and sensu auct. – pro parte. – *Cheilymenia fimicola* sensu Arnolds (1982) – pro parte (specimen Arnolds no. 3360).

Excluded: *Cheilymenia coprinaria* sensu Boudier, Icon. Mycol. 2, Pl. 383, 1904, which is *Cheilymenia rubra*. – *Cheilymenia coprinaria* sensu J. Moravec, Čes. Mykol. 22: 34, 1968, which is *Cheilymenia rubra* var. *erubescens* J. Moravec – pro parte. – *Cheilymenia coprinaria* sensu Svrček, Čes. Mykol. 35: 8, 1981, and in herb, which is *Cheilymenia rubra* var. *erubescens* J. Moravec – pro parte. – *Cheilymenia coprinaria* sensu Korf & Gruff, Discom. Exs. 54 – pro parte? (the portion (K – M118154) is *C. parvispora*). – *Cheilymenia coprinaria* sensu Dennis (1978) – pro parte, sensu Maas Geesteranus, Koninkl. Nederl. Nat. Hist. Veren., Wetensch. Meded 80: 18, 1969, which is *C. dennisii*, and sensu auct. pro parte.

Apothecia medium sized, (2) 3–7 (10) mm diam., sessile, scattered to crowded, first subglobose and closed with long hairs, becoming turbinate, cupulate to discoid, fleshy; hymenium yellow-orange, orange, or often orange-red (dried apothecia ochre or orange-brown to reddish-brown), externally concolorous or paler, covered with long, brownish to brown-reddish hairs of irregular size; the hairs

Pl. 32:
C. coprinaria: old aberrant apothecia (with paler hairs) on cattle dung, U. K.: N. Ireland, Moreland's Meadow, 22.IV.2004, R. Anderson (R. And.). Photo R. Anderson.

are conspicuously long and densely aggregated especially in young apothecia, but may be less dense and less conspicuous in old apothecia, and in some collections (especially from high altitudes) they may be shorter than usual.

Apothecial structure. Hymenium about 140–230 µm thick. Hypothecium poorly differentiated from the medulla, consisting of small irregular cells and hyphae which merge with those of the medulla. Medullary excipulum about 70–100 µm thick, composed of hyaline, compact, often inflated, 5–12 µm wide hyphae, forming a textura intricata or subintricata as occasionally mixed with subglobose or elongate cells. Ectal excipulum clearly differentiated, 75–180 µm thick, much thinner towards upper margin, of a textura globulosa to angularis, consisting of 3–5 rows of cells measuring (15) 45–80 (100) µm diam., very large and globose or ellipsoid near the receptacular base and becoming smaller and more angular towards the margin of the receptacle; terminal marginal cells elongate or subpyriform.

Marginal **hairs** brown to dark reddish-brown (exceptionally subhyaline), stiff, bristle-like, mostly straight or occasionally bent, 150–800 (1050) × 15–35 (45) µm (measured at their bases), septate (with mostly thin septa), thick-walled (walls 1.5–4.5 µm thick), rooting, originating deep within the excipular tissue; base bifurcate or usually multifurcate, rarely simple; lateral hairs on flanks much shorter, 50–300 × 10–25 µm, usually paler, less stiff and with thinner walls.

Asci cylindric with rounded tips and attenuated below towards a simple or inconspicuously bifurcate base, 135–230 × 12–15 µm, 8-spored. **Ascospores** uniseriate, ellipsoid, (12.5) 13.5–17 (19) × (6.8) 7.5–9.2 (10.8) µm, mostly 16 × 8.7 µm (only exceptionally, when developed in two per ascus, they may reach up to 20 × 12 µm), subhyaline, without guttules, with yellow refractive content when stained with C^4B; perispore nearly smooth, with only irregular patches, or covered with fine, low, irregular cyanophilous warts 0.1–0.4 µm diam. **Paraphyses** filiform, 3–4 µm wide; apex slightly or more distinctly enlarged, 4.5–7.5 (9.0) µm.

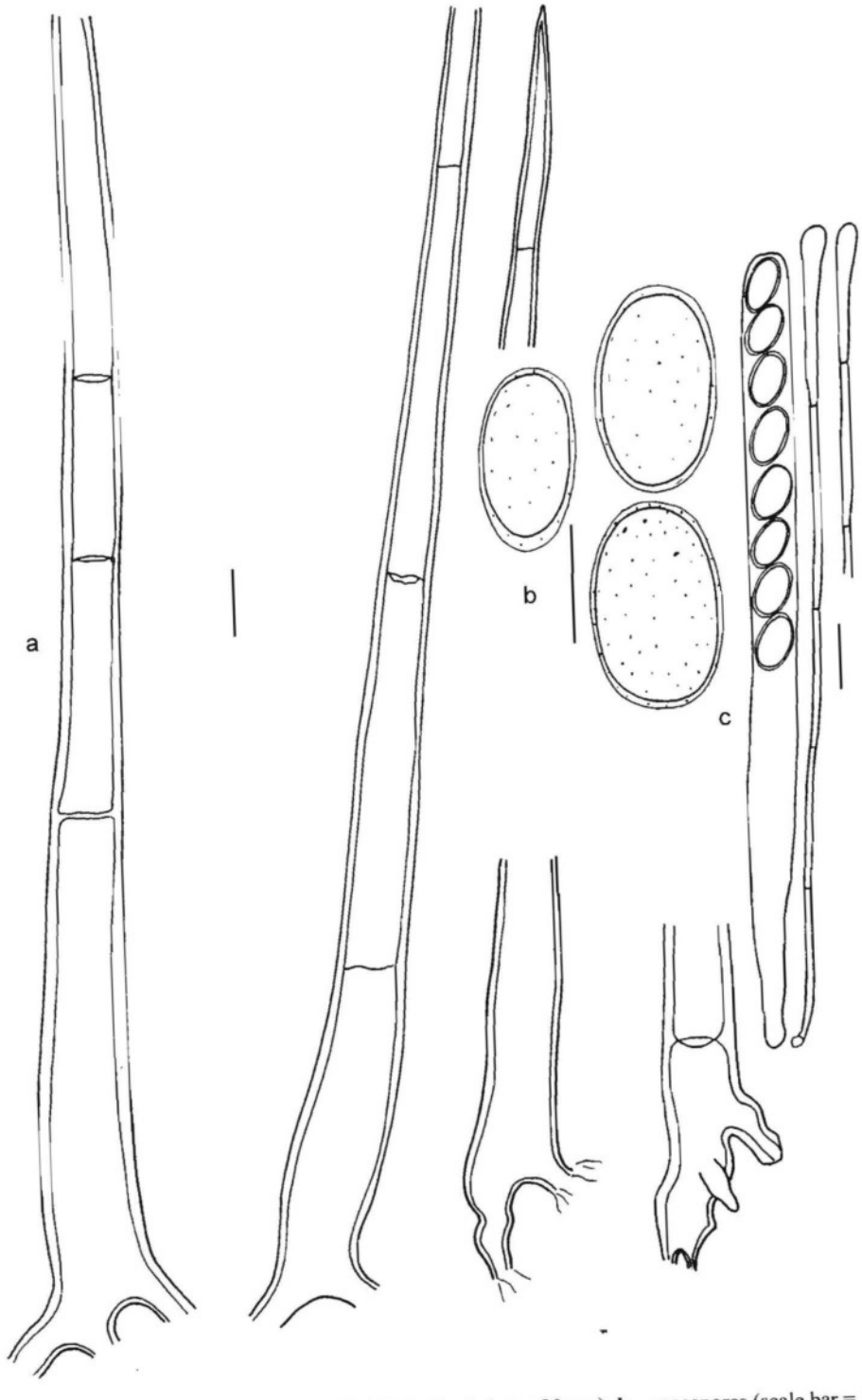

Fig. 81: *Cheilymenia coprinaria*: **a** – marginal hairs (scale bar = 20 µm); **b** – ascospores (scale bar = 10 µm); **c** – asci and paraphyses (scale bar = 20 µm). From holotype.

Habitat and distribution. Coprophilous, cosmopolitan species. Besides the material listed below, Italian collections were recently treated by Doveri et al. (2000) and in Doveri (pers. com. – 2004 in press).

Type material examined. **UNITED KINDGDOM:** Scotland: Rannoch, on horse dung, IX.1875 [labelled: "*Peziza* (*Sarcoscypha*) *hippocopra* Cooke"] (K) – holotype.

Type material of synonyms. **U.S.A:** Michigan, Moose Lake, Tobin Harbor 16.VI.1930, Povah (NY) – holotype of *Patella michiganensis* Povah. – **VENEZUELA:** prope Caracas, Gollmer (S – F 11255) – holotype of *Peziza gollmeri* P. Henn.

Other material examined. **NORWAY:** Oslo, V. Sognsvann, on dung, 29.V.1975, K. Høiland (182595). – **FINLAND:** Tavastia australis, Tammela, Mustiala, in fimo vaccino [associated with *C. gemella*], 26.IX.1866, P. A. Karsten (H – herb. P. Karsten 2463); ibid. 2464 (H); ibid., as *Peziza stercorea* *[ssp.] *gemella*, P. Karsten, Fungi Fenniae Exsiccati 817 (H); Uusimaa, Nurmijärvi kk., Pitkämäki, pasture, Mäkelän talon karjalaidun, 7.VIII.1979, P. Askola 318 (H); Pohjois Savo, Leppävirta, Alakylä, grid 27° E 6924: 563, Juonionjoki, paludified heath forest, on elk dung [associated with *Lasiobolus* sp. and *Pseudombrophila* sp.], V. Haikonen 18638 (H); Etelä-Häme, Janakkala, Koljala, SW margin of the mire Suursuo, mesic heath woods, on dung of elk (*Alces alces*), 5.IX.1978, H. Pietiäinen and J. Piiroinen (H); Etelä-Häme, Lammi, Jahkola, Kilparististä n. 100 m, Jahkolan keskustaan päin, lehmän lannalla laidunniityllä, pasture, cow dung, 3.IX.1981, E. Saarinen [hairs anomalously feebler, up to 600 µm long] (H). – **SWEDEN:** Gotland, Rute par., W of Västrume, Källkärr, on cow dung [apothecia with mostly shorter hairs], 12.V.1953, B. Petterson (UPS – F-015520); Gotland, Hejnum Kallgatburg, on cow dung, 11.VI. 1952, B. Pettersson (UPS – F-015514); Uppland, Knivsta, on cow dung, VIII.1895, K. Starbäck 23 (UPS – F-015515); Uppland, Knutby, W of Lake Kolsjön, in the forest, on elk dung (*Alces alces*) in moist chamber, Uppsala, 11.X.1970, K. and L. Holm (UPS – F-015516); Norrbotten, Hietaniemi, on a fen, S of Armasjärvi. on old cow dung, 23.VIII.1957, O. Lönnqvist 324 (UPS – F-015517); Torne Lappmark, Jukkasjärvi, Ortovare, alt. 700 m., In fimo rangiferino, 22.VII.1927, J. Ax. Nannfeldt 595b (UPS – F-015518); Västergötland, Amnehärad SSE of Skagersvik, oak-hill, on horse dung, 17.VIII.1980, N. Lundqvist 13062 (UPS – F-015513). – **UNITED KINDGDOM:** Northern Ireland, Co Antrim, Mussenden Temple, grid C756357, on cattle dung, exposed semi-improved pasture, 2.I.2004, R. Anderson (R. And.; J. Mor); Northern Ireland, Co Londonderry, Fir Mountain, grid H737850, on cattle dung in improved grass pasture, 6.XI.2003, R. Anderson (R. And.; J. Mor.); Northern Ireland, Co Down, Minowburn, grid J327685, 22.III.1994, R. Anderson (R. And.; J. Mor.); Walles, Anglesey (Ynys Mon), on cow dung, 16.IV.1973, D. A. Reid (K – M116398); Northern Ireland, Co Down, Moreland's Meadow, grid J337697, 22.IV.2004, R. Anderson (R. And.; J. Mor.); Northern Ireland, Lough Neagh, Ballinderry Waterfoot, grid H956810, 30.I.1998, R. Anderson (R. And.). – **NETHERLANDS:** Drente, Mantingen, gem. Westerbork, on cow dung, 18.XII.1974, E. Arnolds A3360 [as *C. fimicola* by Arnolds (1982)] (WAG; L 0352647); Amsterdam, zoological garden, on dung of giraffe, 23.IV.1970, J. van Brummelen 2776 (L 0352678); Zuid-Holland, Westduinen, Ouddorp, km-grid 36-57-52, on cow dung on dunes, in an old meadow, 18.XI.1989, C. Bas 7831 (L 352683). – **BELGIUM:** Antwerpen, Schelle – I.F.B.L: C4.55.11, Maaienhoek, on dung, 1. II.1999, H. De Meulder [as *C. fimicola*] (BR 125465-44); Brabant, Lubbeek – I.F.B.L.: E5.16.23, on cow dung, 12.III.1989, H. De Meulder [as *C. fimicola*] (BR 12283-61); Oost-Vlaanderen, Bazel – I.F.B.L.: C4.44.00, 16.XII. 1972, J. Moens (BR 084310-17). – **GERMANY:** Ötztaler Alpen, Nordtirol, auf Rinderdung östlich plangeross [associated with *C. stercorea*], 26.VIII.1961, Th. Butterfass and J. Poelt (M-0067089). – **CZECH REPUBLIC:** Bohemia, Praha-Chuchle, in fimo vaccino, 21.IV.1945, V. Vacek [as *Lachnea coprinaria* Phil. sensu Massee"] (PRM 178743). – **AUSTRIA:** Pass Gschütt [near Gosau], on cow dung, 20.V.1961, Jiří Kubička [as *C. stercorea* var. *majalis* Svrček] (PRM 615748). – **SPAIN:** Va, Tudela de Duero, Fuentes de Duero, På kospillning [cow dung], 10.II.1996, J. C. Santos [as *C. fimicola*] (S – F23130). – **MACARONESIA:** Azores, Terceria, Torreiro da Macela, above Biscoitos, 10.IV.1978, R. P. Korf, L. M. Kohn., N. Korf, A.Y. Rossman (CUP-MM2002); Azores, Faial, edge of Caldeira, alt. 900 m, on cattle dung, 6. XI. 1996, B. M. Spooner and G. B. Butterfill AZ1311a (K – M48051). – **CHINA:** Guizhou, Guiyang, on cow dung, 1.VII.1988, Li Yu, Zong Yu-chen and Ying Jian-zhe, no. 117 (HMAS 58767; M-0067087). – **MADAGASCAR:** Central Plateau, 30 km S of Ambositra, Ambalamanakana forest, on dung of zebu, 24.I.2002, J. Moravec (J. Mor.).– **U.S.A:** Labrador Lake, Apulia, N. Y., on cow dung, 5.VI.1919, F. J. Seaver (CUP 30773); ibid., E. W. Olive et al. (CUP 11232); Washington Co., Vaughns, north of Hudson Falls, R. C. Burnham's woods, on cow dung [a whole large dung preserved], X.1915, as *Lachnea coprinaria*, Flora of Lake George region, New York, Stewart H. Burnham 7511 (CUP 27511). – **COSTA RICA:** Volcan Poás, Alajuela Prov., mountain meadow near the top, 2600 m., on cow dung, 15.VI.1962, W. C. Denison 1921-1923a – four collections with same data (CUP-CA-13, 14, 15, 16); Volcan Irizu, pasture, on cow dung, 17.VI.1962, W. C. Denison [three collections with of same date ex herb. W. C. Denison 1931-1933a] (CUP-CA-21, 22, 23). – **BRASIL:** Sao Leopoldo, on dung, sine dat., Braun, "comm. Rick"as [*Patella*] (TRTC 53315). – **VENEZUELA:** Merida (opposite), Sierra Nevada, Second Teleferico Station, on dung, 19.VII.1958, R. W. G. Dennis, no. 1835 (K – M118155). – **WEST INDIES:** Porto Rico, Indrerra Baja, 24.I-5.IV, 1923, F. J. Seaver and C. E. Chardon 119, as *Lachnea coprinaria*, West Indian exploration 1464 (CUP-PR 1464). – **CHILE:** Prov. Valdivia, Piedra Blanca, on cow dung in open field [associated with *Cheilymenia stercorea*], 14.IX.1940, R. Santesson S 122 (UPS – F-015534). – **AUSTRALIA:** Victoria, Melba Gully, near Laver's Hill, on cow manure, 16.VI.1963, G. Beaton 128 [reported by Rifai (1968)] (K – M118150); South Australia, Mt. Lofty, on cow dung, 13.VII.1953, C. G. Hansford, WARI 2152 [illustrated by Rifai (1968)] (K – M11848).

Remarks. DENNIS (1978) synonymised *C. coprinaria* with *C. fimicola* (De Not. et Bagl.) Dennis, based on *Arrhenia fimicola* De Not. et Bagl. (nomen dubium, see the discussion under *C. rubra*) and this concept was accepted by some contemporary authors, for instance MAAS GEESTERANUS (1969a, 1969b). However, as already emphasised in MORAVEC (1990b) the apothecia present on the substrate of the syntypes of *Arrhenia fimicola* (S and UPS) represent a different discomycete, described here as *C. dennisii* sp. nov. (see under that taxon), which differs from *C. coprinaria* in having shorter hairs with simpler base and much larger ascospores. My result was confirmed also by YAO and SPOONER (1996), but these authors never examined the syntypes of "*Arrhenia fimicola*" as they argued that apothecia of "*C. fimicola*" are smaller, "*usually around 1 mm or smaller*" than those of *C. coprinaria*. This is not true as the size of the dried (!) apothecia of the syntypes of "*Arrhenia fimicola*" reaches 5 mm in diam.

Cheilymenia coprinaria sensu BOUDIER (1905-1910) is *C. rubra* with much shorter hairs and larger ascospores. Similar misidentification is also in MORAVEC (1968), where under the name *C. coprinaria* is in fact *C. rubra* var. *erubescens* (see under that taxon). Also SVRČEK (1979) considered *C. rubra* var. *erubescens* to be *C. coprinaria*. The misinterpretations were mostly caused by the colour of the hymenium, which was described by COOKE (1875) as "aurantio-rubra vel coccinea". *C. coprinaria* in its correct sense was recognised by LE GAL, (1954), DENISON (1964) and RIFAI (1968), GAMUNDI (1972), BENKERT (1973), PROKHOROV (1989) and others and confirmed by me (MORAVEC 1989) after the examination of the holotype in the K herbarium. *Humaria coprinaria* sensu THIND & WARAITCH (1974), is according to THIND & KAUSHAL (1980) *C. theleboloides*, but I have not examined the specimen.

C. coprinaria is well distinguishable for its small ascospores and long, marginal rooting hairs with multifurcate bases. The ascospores in the holotype measure 15–16.5 (18) × 7.5–9.2 (10.5) µm, and the marginal hairs reach up to 750 × 45 µm.

It is not a considerably variable species, but the collections from Spain (S – F23130) probably represents a distinct form as it differs in having much paler, subhyaline or even hyaline marginal hairs while the lateral hairs are much darker. One collection from Northern Ireland (grid J337697, R. And., see Pl. 32), possesses somewhat paler and generally shorter marginal hairs, only few of them reach 700 µm. Nevertheless, all other features, including the shape of the hairs (in the Spanish collection also their length) are identical with other collections of *C. coprinaria*.

The long hairs with mostly multifurcate bases and the small ascospores with finely verruculose perispore differentiate *C. coprinaria* from *C. dennisii*. The size and ascospore ornamentation distinguish it also from some anomalous collections of *C. stercorea* (those lacking stellate lateral hairs). The very close *C. magnipila* (see below) differs from *C. coprinaria* in having even smaller (especially narrower) ascospores and longer and more robust hairs with wider and more distinctly multifurcate base.

38. *Cheilymenia magnipila* J. Moravec **Figs. 82-83; Pl. 33, 57c-e**

Cheilymenia magnipila J. Moravec, Čes. Mykol. 22: 35, 1968.

Apothecia medium sized, 3–8 (10) mm diam., sessile, solitary to scattered, first subglobose, becoming cupulate to shallowly saucer-shaped, fleshy; hymenium brownish-ochraceous or vividly cinnamon coloured, rarely with orange tinge (hymenium of dried apothecia ochre), externally concolorous or paler, densely covered with long brownish to dark-brown hairs; marginal hairs turned towards the centre of apothecia and so the hymenium is entirely closed by them, especially in young apothecia.

Apothecial structure. Hymenium about 200–230 µm thick. Hypothecium poorly differentiated from the medulla, consisting of small irregular cells and hyphae which merge with those in the medul-

Pl. 33:
C. magnipila: incubated apothecium from dung of wild pig, collected 8.IX. 1990, matured 1.X.1990, New Zealand: Tararua Ranges near Wellington, A. Bell and D. Mahoney (WELTU 507). Photo D. Mahoney.

la. Medullary excipulum about 80–120 µm thick, composed of hyaline, compact, often vesicular or irregularly inflated, 6–18 µm wide hyphae occasionally mixed with elongated cells, forming a textura intricata or subintricata. Ectal excipulum clearly differentiated, 90–200 µm thick, much thinner towards the upper margin, of a textura globulosa to subangularis, consisting of 3–4 rows of cells (10) 40–100 (120) µm diam. which are very large and more globose or ellipsoid near the receptacular base and becoming smaller and subangular towards the margin of the apothecia; terminal marginal cells subclavate.

Marginal **hairs** brown to dark reddish-brown, stiff, bristle-like, mostly straight or occasionally bent, 400–1250 (1600) × 28–50 µm (measured at their bases), septate, acuminate above, conspicuously thick-walled (walls 3.0–5.5 µm thick), rooting, originating deep within the excipular tissue, with widely multifurcate base (rooting complex up to 100µm wide); lateral hairs on the flanks usually paler or hyaline, less stiff or rarely feeble, with thinner walls, and much shorter, some of them flexuous but mostly with rooting bases as in the marginal hairs.

Asci 200–220 × 12–13 µm, cylindric with rounded apex and attenuated towards a simple or inconspicuously bifurcate base, eight-spored (or with 4-6 mature spores per ascus). **Ascospores** uniseriate, narrowly ellipsoid or subcylindric, rarely ovoid-ellipsoid, (11.8) 12–15 (16.5) × (4.9) 5.7–7.5 (8.7) µm, mostly 14 × 7.0 µm (exceptionally, when ascospores develop in number of three or two per ascus, the size of such anomalous spores may reach 18 × 9.6 µm), subhyaline, without guttules (two small guttules were seen in some ascospores observed in vivo), with yellow refractive content when stained with C^4B; perispore usually covered with fine, low, irregular cyanophilous warts 0.1–0.6 µm diam. **Paraphyses** filiform, 2–3 µm wide; apex slightly or more distinctly enlarged, 4.5–6.0 (7.2) µm, filled with pale orange granular pigment (obvious only in fresh material) which stains green in Melzer reagent.

Habitat and distribution. Coprophilous, probably of a cosmopolitan occurrence. Besides the examined material listed below, it was published from Germany (Bayern) by HOHMEYER, LUDWIG & SCHMID

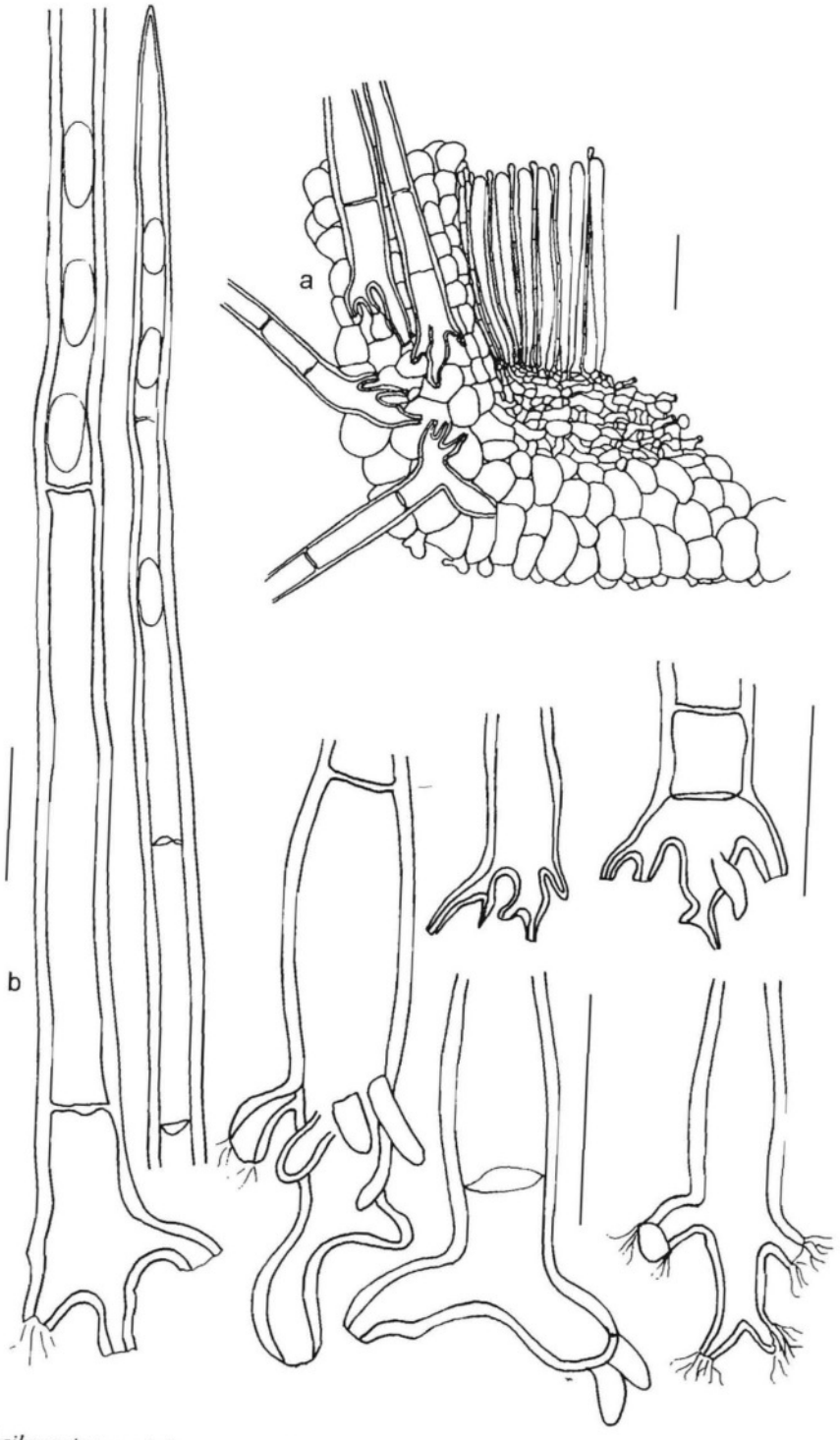

Fig. 82: *Cheilymenia magnipila*: **a** – part of median section through apothecium (scale bar = 100 µm); **b** – marginal hairs. From isotype (J. Mor.)

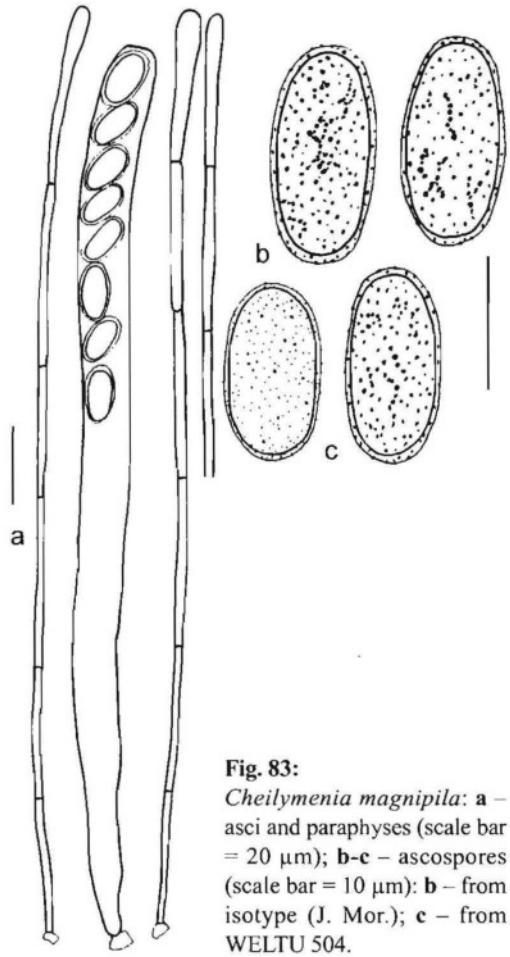

Fig. 83:
Cheilymenia magnipila: **a** – asci and paraphyses (scale bar = 20 µm); **b-c** – ascospores (scale bar = 10 µm): **b** – from isotype (J. Mor.); **c** – from WELTU 504.

(1989). The specimen from India treated by KAR & PAL (1968) as *C. coprinaria* may probably be *C. magnipila* (judging from the ascospore size stated by the cited authors).

Type material examined. CZECH REPUBLIC: Bohemia centralis, Branžež prope Kněžmost (districtus Mladá Boleslav), in fimo vaccino accumulato, 15.V.1966, J. Moravec (PRM 628979) – holotype; ditto (CUP 63104), (BRNM); ditto (BRA); ditto (J. Mor) – isotypes.

Other material examined. SWEDEN: Husdalsbergen, Soerknatten Nature Reserve, Froeskog par., on elk dung, 13.IX.1990, T Laessøe (K – M15587); Østersund, Västerberg, on moose dung, 11.VIII.1982, P. Marstad 55/82 [*as C. fimicola*] (O 182598). – **UNITED KINDGDOM:** Northern Ireland, Co Antrim, Collin Mountain, grid J260705, upland dwarf shrub heath, on cow dung, 1.XI.1997, R. Anderson (R. And.; J. Mor.); Northern Ireland, Co Down, Belvoir Forest, grid J331691, on rabbit dung, 13.XII.2000, R. Anderson (R. And.; J. Mor.). – **GERMANY:** Bayern, Nationalpark Berchtesgaden, b. Kühroint, 1440 m, Fichtenwald, auf Hirschlosung, 13.VIII.1982, H. Schmid-Heckel 8443/2 [as *C. fimicola*] (M-0067084). – **NEPAL:** Chandawari, Rasuwa, on dung in mixed forest, 29.VIII.1969, K. S. Waraitch [as *C. coprinaria*] (PAN 2333 and J. Mor.). – **AUSTRALIA:** Queensland, Nambour, Blackall Ranga, on dung [associated with *C. stercorea* f. *alpina*], 1914, W. N. Cheesman (K – M118151). – **NEW ZEALAND:** North Island, Smith's Creek, Tararua Ranges near Wellington, incubated on dung of wild pig 8.IX.1990, matured 1.X.1990, Ann Bell and Dan Mahoney [hairs up to 1600 µm long, see Pl.33] (WELTU 507; CUP 63714); Aratarawa Ranges near Wellington, on cow dung, Ann Bell, sine dat. [incubation on dung in moist chamber] (WELTU 298; CUP 63713).

Remarks. *C. magnipila* is very close to *C. coprinaria* and may be considered its variety only. Both possess similar rooting bases of marginal hairs and small ascospores. Nevertheless, the apothecia of *C. magnipila* (cinnamon-coloured in the holotype) are never reddish and the marginal hairs are even much robust, length usually 600–1250 µm (but not rarely up to 1600 µm), width up to 50 µm, and their multifurcate bases my reach 100 µm in width. The ascospores are smaller, particularly narrower than those in *C. coprinaria*, not surpassing 15 × 7.5 µm (those matured in eight-spored asci). The perispore is slightly more distinctly verruculose. Moreover, the paraphyses are generally narrower.

An accurate colour aquarelle by E. Ludwig was published by HOHMEYER, LUDWIG & SCHMID (1989).