Additions to the mycobiota (Agaricales, Basidiomycetes) of Rio Grande do Sul, Brazil

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ABSTRACT – During taxonomic studies on dark-spored agarics from the state of Rio Grande do Sul, in southern Brazil, three previously unrecorded species were found: *Psathyrella coprinoceps* (Berk. & M.A. Curtis) Dennis (Coprinaceae), *Gymnopilus earlei* Murrill, and *Inocybe curvipes* P. Karst. (Cortinariaceae). All the species are described, discussed, and illustrated.

Key words: taxonomy, edible mushrooms, ectomycorrhizal fungi, subtropical fungi.

RESUMO – **Novas citações para a micobiota (Agaricales, Basidiomycetes) do Rio Grande do Sul, Brasil.** Estudos taxonômicos relacionados aos fungos Agaricales *s.l.* de esporada escura no Rio Grande do Sul revelaram a ocorrência de três espécies até então desconhecidas na micobiota sul-rio-grandense: *Psathyrella coprinoceps* (Berk. & M.A. Curtis) Dennis (Coprinaceae), *Gymnopilus earlei* Murrill e *Inocybe curvipes* P. Karst. (Cortinariaceae). São apresentadas descrições, ilustrações e discussões sobre estas espécies.

Palavras-chave: taxonomia, cogumelos comestíveis, fungo ectomicorrízico, fungos subtropicais.

INTRODUCTION

The Agaricales *s.l.* is a group of poorly studied fungi in Brazil, but the state of Rio Grande do Sul, undoubtedly, has the best-studied agaric mycobiota from our country. From the first contributions, made by the priest Johannes Rick (a full list of his publications is found in Fidalgo, 1962 and Mauhs, 2000) until nowadays, several studies have contributed to the knowledge of the agarics from this state. Putzke (1994) provided a Brazilian Agaricales checklist, listing 1.011 taxa, of which approximately 460 were recorded from Rio Grande do Sul State. In spite of this, many agaric genera remain overlooked and need additional studies. This is true especially for those genera belonging to families such as Bolbitiaceae, Coprinaceae, Cortinariaceae, and Strophariaceae, which have been poorly studied.

When collecting for a dark-spored mushroom taxonomic survey (Strophariaceae family), municipality of Santa Maria, in the center of the state of Rio Grande do Sul (Cortez & Coelho, 2004), some previously unrecorded taxa were collected. These species belong to the genera *Gymnopilus* P. Karst and *Inocybe* (Fr.) Fr. of the Cortinariaceae, and *Psathyrella* (Fr.) Quél. of the Coprinaceae. All the collected specimens are fully described, illustrated, and discussed in the present paper.

MATERIAL AND METHODS

All studied material was gathered in the municipality of Santa Maria (29º20’28"-30º00’16"S and 53º30’22"-54º19’32" W), located in the “Depressão Central” region, Rio Grande do Sul State, Brazil. Fresh basidiomata were collected and analyzed macro and microscopically, following usual methodology for the study of agaricoid fungi (Singer, 1986). Line drawings of the microscopic structures were made under a lucida camera. Collected specimens are deposited at the Herbarium SMDB (“Departamento de Biologia, Universidade Federal de Santa Maria”). Families and genera are in the sense of Singer (1986).

RESULTS AND DISCUSSON

Coprinaceae

Psathyrella coprinoceps (Berk. & M.A. Curtis) Dennis, **Kew Bull. Add. Ser.**, v. 3, p. 65. 1970.

(Fig. 1)

Basonym: *Agaricus coprinoceps* Berk. & M.A. Curtis, **J. Linn. Soc.**, **Bot.**, v. 10, p. 290. 1868.

Synonyms: *Naucoria coprinoceps* (Berk. & M.A. Curtis) Sacc., **Syll. Fung.**, v. 5, p. 835. 1887; *Atylospora coprinoceps* (Berk. & M.A. Curtis) Murrill, **Mycologia**, v. 10, p. 21. 1918.

Pileus 4-25 mm diam., hemispheric to slightly conic in young specimens, then becoming convex to convex-umbonate with the maturity; surface humid, glabrous, whitish with vinaceous tints, yellowish at the disc; context thin, fleshy, margin non striate. Lamellae adnexed, vinaceous-brown, edge somewhat darker, membranous. Stipe 7-27 × 0.5-3.5 mm, central or eccentric, cylindrical, whitish, longitudinally striate, with a white basal mycelium. Veil not observed, probably absent. Spore print vinaceous-brown.

Basidiospores 6.4-8 × 4-4.8 µm, ellipsoid, with a thick and smooth wall, purplish-brown but easily discolored when treated with sulphuric acid (H_2SO_4), germ pore present, but reduced. Basidia 16.8-24 × 6.4-8.8 µm, clavate to sub-cylindrical, bearing four (rarely two) sterigmata. Pleurocystidia absent. Cheilocystidia 13.6-28 × 9.6-18.4 µm, pyriform to sphaeropedunculate, hyaline, thin-walled. Pileipellis cellular (hymeniform), with sphaeropedunculate to sub-globose cells. Hymenophoral trama regular, with hyaline hyphae. Clamp connections not observed.

Ecology: growing cespitose in a fallen culm of bamboo in a subtropical forest.

Studied material: BRAZIL, RIO GRANDE DO SUL, **Santa Maria**, Morro do Elefante, 29.I.2002, F. Wartchow 024 (SMDB 9540).

Remarks: *Psathyrella* is a neglected Coprinaceae genus in Brazil, and our field observations indicate that this genus is likely represented by several species in Rio Grande do Sul. The small size of the basidiomata, the absence of pleurocystidia, and the pyriform cheilocystidia, are the diagnostic features of this species (Pegler, 1990). Our collection differs from the descriptions given by Pegler (1983, 1997) on pileus color (whitish-vinaceous, instead of deep brown and hygrophanous), but the habit of the basidiomata and the shape/dimensions of the cheilocystidia and spores are typical of *P. coprinoceps*. *Psathyrella palmigena* (Berk. & M.A. Curtis) Guzmán comes very close, but it has shorter basidiospores (5.5-7 µm) and clavate cheilocystidia (Pegler, 1990). *Psathyrella coprinoceps* is placed in the subgenus *Pannucia* (P. Karst.) A.H. Sm., due to the absence of an annulus, the spores are no longer than 10 µm, and the pyriform cheilocystidia (Pegler, 1983). Recently, Nieves-Rivera (2000) reported the use of this species as food in Haiti, where it is called "djon-djon". *Psathyrella coprinoceps* has a tropical American distribution, and is found in Cuba (Murrill, 1918; Smith, 1972; Pegler, 1990 – type studies), Martinique, Guadaloupe, Dominica, Trinidad (Pegler, 1983), Haiti (Nieves-Rivera, 2000), and Venezuela (Dennis, 1970). In Brazil, this species was only recently reported from the state of São Paulo by Pegler (1997), so the present record is the first from the state of Rio Grande do Sul and the second from Brazil.

Cortinariaceae

Gymnopilus earlei Murrill, **Mycologia**, v. 5, p. 22. 1913.

(Fig. 2)

Synonyms: *Flammula earlei* (Murrill) Murrill, **Mycologia**, v. 5, p. 36. 1913; *G. tenuis* Murrill, **Mycologia**, v. 5, p. 22. 1913; *F. tenuis* (Murrill) Murrill, **Mycologia**, v. 5, p. 36. 1913.

Pileus 25-32 mm diam., convex to hemispheric, yellowish to slightly rusty, surface covered with brownish fibrillose scales, margin with some very fugacious velar remnants, context fleshy, yellowish. Lamellae adnate, initially pale brown to deeply rusty in mature stages, somewhat close. Stipe 17-29 × 5-8 mm, eccentric, sub-cylindrical, pale yellow, surface fibrillose, with long and rusty fibrils. Veil vestigial, appendiculate at the pileus margin, brownish. Spore print rusty brown.

Basidiospores 6.4-8 × 4.8-5.6 µm, broad ellipsoid to ellipsoid, brown in light microscope (in KOH), with a verrucose and thickened wall, not reacting in Melzer's reagent. Basidia 23.2-32.8 × 5.6-8 µm, clavate, tetrasporic, but occasionally bearing two sterigmata. Pleurocystidia 19.2-30.4 × 6.4-8 µm, fusoid to fusoid-ventricose, hyaline, thin walled. Cheilocystidia 20-32 × 5.6-8.8 µm, lageniform to subcapitate, numerous, forming a sterile zone in the gill edge. Pileipellis formed by parallel incrusted brown hyphae. Hymenophoral trama regular. Clamp connections present.

Ecology: gregarious in the roots of a fallen angiosperm trunk (possibly *Melia azedarach* L. – "cinamomo").

Studied material: BRAZIL, RIO GRANDE DO SUL, **Santa Maria**, Tancredo Neves, 28.V.2001, V.G. Cortez 034/01 (SMDB 9252).

Remarks: This species was originally described from Jamaica by Murrill (1913), and is characterized by the pale ferruginous and fibrillose pileus, close lamellae and non-dextrinoid spores (Hesler, 1969). After studying *G. tenuis* Murrill, Hesler (1969) concluded that this species is a synonym of *G. earlei*. According to Dennis (1953), *G. earlei* and several other species of *Gymnopilus* described by Murrill from tropical America are synonyms of *Flammula aureobrunnea* (Berk. & Curt.) Sacc. [= *G. aureobrunneus* (Berk. & M.A. Curtis) Murrill], and *G. tenuis* is considered to be conspecific to *F. chrysopella* (Berk. & M.A. Curtis) Sacc. [= *G. chrysopellus* (Berk. & M.A. Curtis) Murrill]. Recently, Guzmán-Dávalos (1996) included both *G. tenuis* and *G. aureobrunneus* as synonyms of *G. earlei*, however if these three species are identical, *G. aureobrunneus* should be the prior and correct name for the taxon. *Gymnopilus earlei* is accepted here in the sense of Hesler (1969) and Pegler (1997). This species is found in Jamaica (Hesler, 1969), Trinidad (Dennis, 1953), Brazil (Pegler, 1997), and probably must occur in other tropical American countries. According to Guzmán-Dávalos (1996), the Mexican records of *G. earlei* correspond to another species of *Gymnopilus,* and this species seems to be unknown in this country. Based on these data, it is possible to note that *G. earlei* probably does not occur in North America, having a Central and South American distribution. In Brazil, the species is known from the states of São Paulo (Pegler, 1997) and Roraima (Prance, 1987). In this latter work, the author presents the use of *G. earlei* as food by Amazonian Indians of the Yanomami tribe, who calls the mushroom "ala-amok" (Prance, 1987). *Gymnopilus earlei* is recorded here for the first time from Rio Grande do Sul and southern Brazil.

Inocybe curvipes P. Karst., **Hedwigia**, v. 29, p. 176. 1890.

(Fig. 3)

Synonyms: *I. variabillima* Speg., **Ann. Mus. Nac. Buenos Aires**, v. 6, p. 125. 1899; *I. decipientoides* Peck, **Bull. Torrey Bot. Club**, v. 34, p. 100. 1907; *I. globocystis* Velen., **Ceske Houby**, p. 368. 1920; *Artrosporina decipientoides* (Peck) A. Pearson, **Trans. Brit. Mycol. Soc.**, v. 22, p. 28. 1938.

Pileus 9-29 mm diam., conic-convex to umbonate; brownish-cinnamon colored, surface fibrillose to squamulose, dry, margin non-striate, curved, with an arachnoid veil present only in young basidiomata, context thin, cream. Lamellae sinuate to adnexed, yellowish-brown but with some lilaceous tint, with a whitish edge. Stipe 24-49 × 2-5 mm, central, cylindrical, sometimes with an expanded, brownish base, clearing toward the apex, to pale brown or cream. Spore print cinnamon brown.

Basidiospores 8-12 × 5.2-8.2 µm, sub-cylindrical to oblong with an attenuate apex, presenting a spore wall irregularly nodulose, brownish-colored in KOH, germ-pore absent. Basidia 22.4-36 × 6.4-10.4 µm, clavate, tetrasporic. Pleurocystidia 32-61.6 × 12.8-22.4 µm, fusoid to fusoid-ventricose, metuloidal, with a thickened wall, sometimes with apical crystalline incrustations. Cheilocystidia 34.4-56.8 × 13.6-20.8 µm, identical to pleurocystidia. Pileipellis formed by pale brownish, somewhat incrusted prostrate hyphae. Hymenophoral trama regular. Clamp connections present especially at the base of the basidia.

Ecology: gregarious on the soil of *Pinus* spp. plantations, probably ectomycorrhyzal.

Studied material: BRAZIL, RIO GRANDE DO SUL, **Santa Maria**, Universidade Federal de Santa Maria, 28.VIII.2000, V.G. Cortez 040/00 (SMDB 9173); *ibid*, 18.IV.2001, F. Wartchow 001 (SMDB 9185); *ibid*, A.C. Pires & M. Finokiet 02.VI.2003 (SMDB 9524).

Remarks: According to the available literature, this species has been variously interpreted and known by several names. The conifer habitat, the nodulose basidiospores, and the metuloidal pleuro and cheilocystidia are diagnostic features of this species. According to Singer & Digilio (1951) and Wright & Albertó (2002), this is the most common species of *Inocybe* growing in exotic forests of Argentina. It is common in central Rio Grande do Sul, where it grows under *Pinus* spp. plantations and is widespread all over southern and southeastern Brazil. This species is widespread in Europe (Esteve-Raventós & Moreno, 1987) and North America (Grund & Stuntz, 1968; Nishida, 1989), with sporadic records in South America (Singer & Digilio, 1951; Wright & Albertó, 2002 – both authors referred to it as *I. variabillima* Speg. from Argentina). In southern Brazil, this species was reported by Stijve & de Meijer (1993) from the state of Paraná. The present

report is the first one for this species from the state of Rio Grande do Sul. According to Wright & Albertó (2002) this is a toxic mushroom, probably containing muscarine; Stijve & de Meijer (1993), when analyzing southern Brazilian strains of *I. curvipes*, did not find psilocin or psilocybin.

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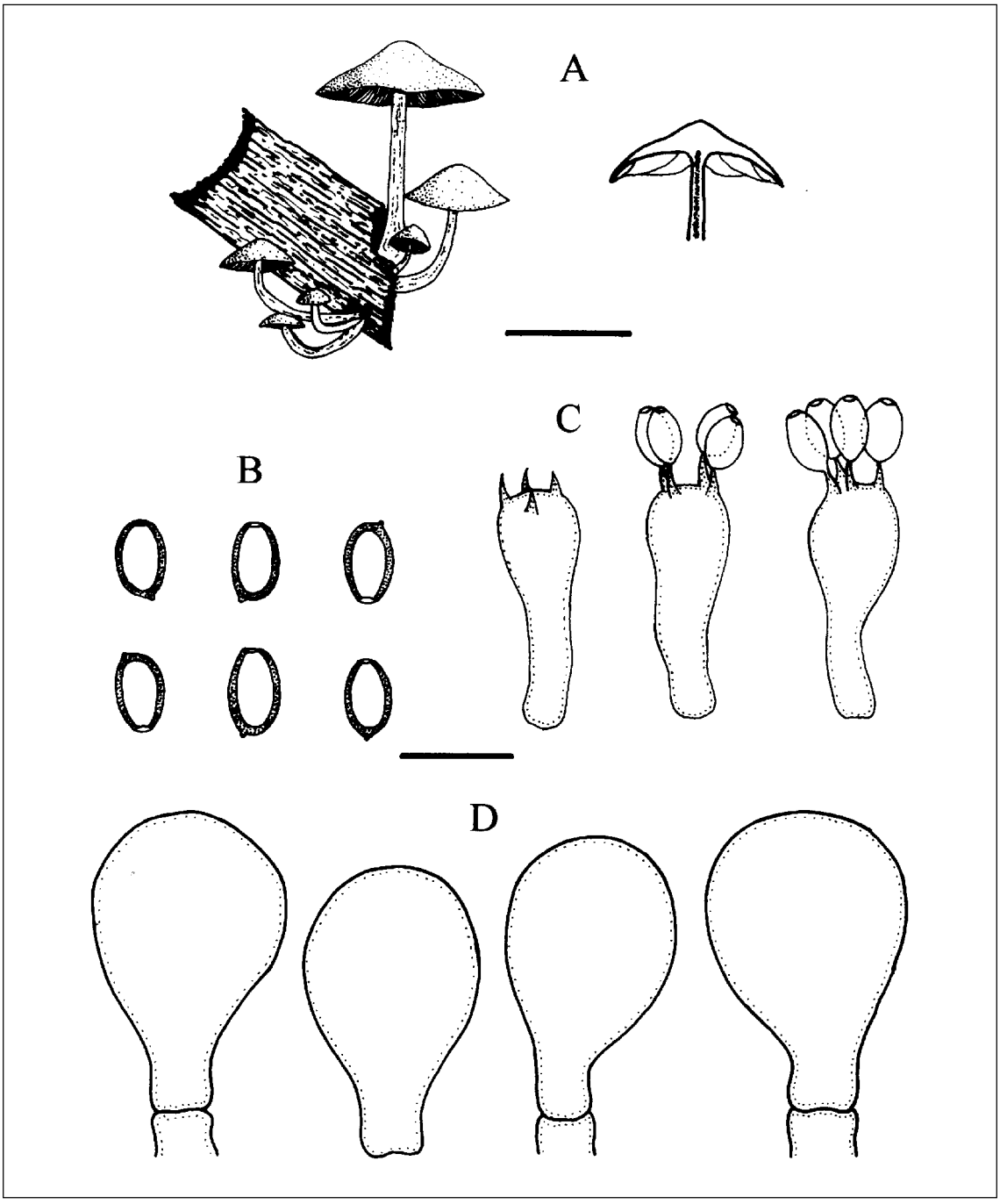

Fig. 1. *Psathyrella coprinoceps* (Berk. & M.A. Curtis) Dennis. **A.** Habit and section. **B.** Basidiospores. **C.** Basidia. **D.** Cheilocystidia. (Bars: **A** = 20 mm; **B-D** = 10 μm).

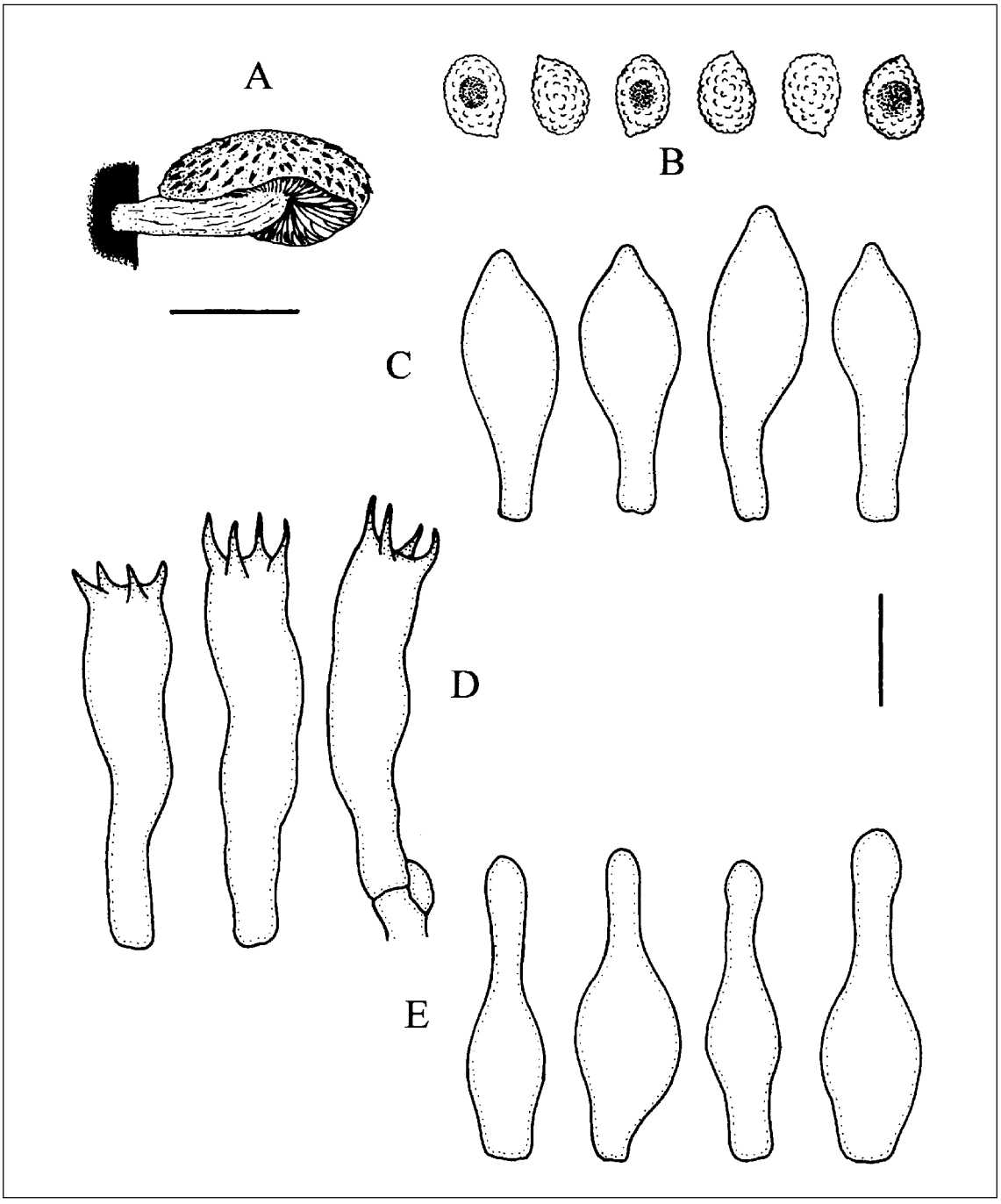

Fig. 2. *Gymnopilus earlei* Murrill. **A.** Habit. **B.** Basidiospores. **C.** Pleurocystidia. **D.** Basidia. **E.** Cheilocystidia. (Bars: **A** = 20 mm; **B-E** = 10 µm).

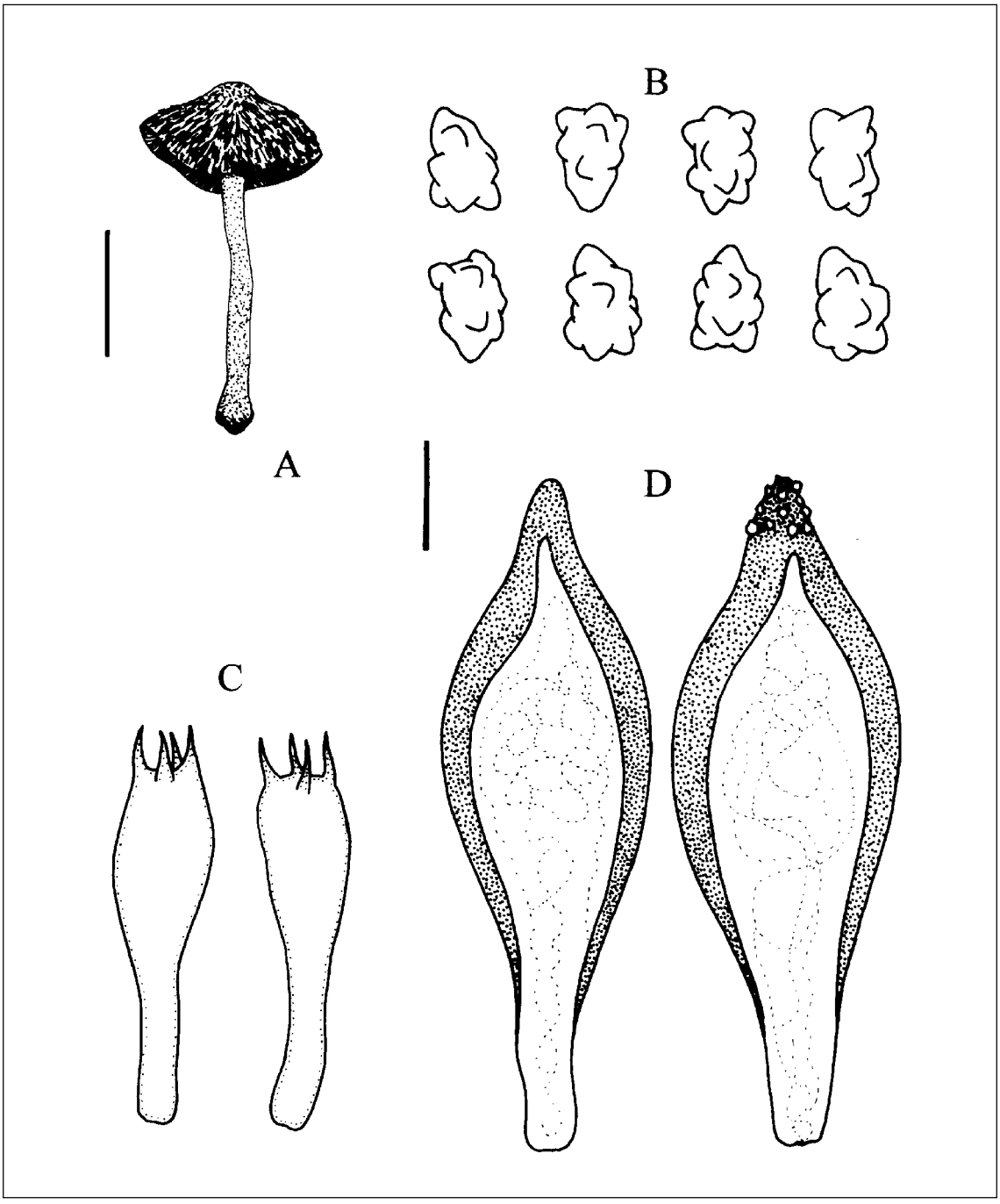

Fig. 3. *Inocybe curvipes* P. Karst. **A.** Habit. **B.** Basidiospores. **C.** Basidia. **D.** Pleurocystidia. (Bars: **A** = 20 mm; **B-E** = 10 µm).