

***MACROLEPIOTA CAPELARIAE* VAR. *SORORIVULPINA*
(BASIDIOMYCOTA, AGARICACEAE)
FROM THE HIGHLANDS OF PERNAMBUCO, BRAZIL**

*Erica S. FALCÃO*¹, *Felipe WARTCHOW*²

¹ Programa de Pós-Graduação em Biologia de Fungos, Centro de Biociências, Universidade Federal de Pernambuco,
Av. Prof. Moraes Rego, 123, CEP 50670-901, Recife, PE, Brazil

² Departamento de Sistemática e Ecologia, Universidade Federal da Paraíba,
CEP 58051-970, João Pessoa, Paraíba, Brazil

e-mail: bach11509312@gmail.com

Abstract: *Macrolepiota* is a widely distributed fungus genus of approximately 40 described taxa, with 15 recorded from Brazil. However, in the north-eastern region of this country only two taxa are known, *M. dunensis* and *M. sabulosa*, both from the State of Rio Grande do Norte. This situation demonstrates the scarcity of studies on this genus, demanding more taxonomic studies in this region. The new variety was collected in a 'brejo de altitude' (evergreen forest enclave) of the Caatinga biome, and in a submontane-montane altitudinal range area in the Atlantic Forest biome. For morphological studies, standardized methods of agaricoid fungi are followed. Here we describe *Macrolepiota capelariae* var. *sororivulpina*, E. Falcão & Wartchow, **var. nov.**, a new variety within sect. *Macrolepiota* characterized by the ochraceous to ochraceous-brownish pileus covered by small appressed squamules, slender stipe usually 2–3 times the diameter of the pileus, and large ovoid-ellipsoid basidiospores (14.5–18.8 or 19 × 9.0–12.0 µm). Within this section, *M. capelariae*, *M. colombiana*, *M. clelandii*, and *M. dolichaula* share in the pileus covering presenting mostly a trichopalisade, but differ in many aspects, as the darker or whitish pileus and smaller basidiospores, except for *M. clelandii* in which they range to 28.5 µm long.

Keywords: Agaricales, Agaricomycetes, fungi, Neotropical, taxonomy

Introduction

Macrolepiota Singer was described with *M. procera* (Scop.) Singer as the type species [19]. It was traditionally defined by having species that macroscopically exhibited large, fleshy basidiomata often with scales on the pileus, white to cream lamellae, and usually present a movable prominent annulus; microscopically, the genus was characterized by exhibiting many species with clamp connections in the septa of the hyphae in the lamellae, white to cream spore print, and thick-walled dextrinoid basidiospores with a metachromatic inner wall in cresyl blue and germ pore caused by interruption of the epispodium and covered by a hyaline cap [20].

After morphological and phylogenetic analysis three clades with strong support were recovered: (1) /macrospora clade with pileus formed by fine furfuraceous scales, smooth stipe, simple annulus, and rare clamp connections; (2) /volvatae clade, characterized by the presence of a volva, finely squamulose stipe, small amygdaliform-ellipsoid basidiospores (<15 µm), and absence of clamp connections at base of cheilocystidia and basidia; and (3) /macrolepiota clade

mostly composed by taxa mostly bearing large scales forming conspicuous plates, and stipe 2–3 times the pileus diameter, covered by fine brown scales [5].

This genus has a wide global distribution, with species cited from Africa, Asia, Australia, the Americas and Europe [7]. In Brazil, 15 taxa are known so far (list in Souza et al., 2022), but only two have been cited previously from the north-eastern region of this country: *M. sabulosa* Fazolino & R.M. Silveira [15] and *M. dunensis* D.S. Freitas & Menolli. These taxa occur in coastal white-sand dunes habitats of the Atlantic Forest biome from the state of Rio Grande do Norte [1, 4]. On the other hand, the new variety described here was found in areas of dense submontane rainforest of Atlantic Forest biome and ‘brejo de altitude’ in the Caatinga [8, 9] of the state of Pernambuco, North-east Brazil.

Thus, based on morphological analyses, *M. capelariae* var. *sororivulpina* var. nov. is proposed here and is fully described and illustrated.

Material and Methods

The new variety was collected in two fragments located in the Atlantic Forest and Caatinga biomes [8, 9] from the State of Pernambuco, Brazil. The ‘Mata do Estado’, localized in the municipality of São Vicente Férrer (7°36'58.32"S, 35°29'52.62"W) is a dense ombrophilous montane Atlantic Forest remnant [16] at an altitude varying between 600 and 640 m [2]. The ‘Parque Municipal Professor João Vasconcellos Sobrinho’ (‘Brejo dos Cavalos’), municipality of Caruaru (8°21'21.6"S 36°1'44.4"W), covers an area of montane rain forest called ‘brejo de altitude’, a habitat that occupies the slopes at intermediate and high altitudes on the windward side of the plateau da Borborema, surrounded by caatinga vegetation at lower altitudes [22].

Color notations and codes are according to [10], indicated by ‘oac’ before a number. Microscopic characters were made from dried material rehydrated in 3% KOH and stained in Congo red for microscopic observation. Microchemical reactions were also noted using Melzer’s reagent to test the amyloidity, and Cresyl Blue to test metachromatism of the basidiospores [21]. For an accuracy statistic, 70 basidiospores were measured for each collection. Also, basidia, cheilocystidia, and pileal and stipe covering elements for each collection were fully analysed and measured. The following abbreviations are used when pertinent: avl = average length, avw = average width, Q = length/width of basidiospores, avQ = the mean Q of all basidiospores ± sample standard deviation. The examined holotype and paratype are deposited in the Herbarium Lauro Pires Xavier (JPB), Departamento de Sistemática e Ecologia, Universidade Federal da Paraíba with voucher numbers JPB 67027 and JPB 67026, respectively.

Taxonomy

Macrolepiota capelariae var. *sororivulpina* E. Falcão & Wartchow, var. nov. (Figures 1- 3)

Mycobank #854146

Type: Brazil, Pernambuco, Caruaru, Brejo dos Cavalos, Parque Municipal João Vasconcelos Sobrinho, on soil in a 'brejo de altitude', 06 Aug 2010, F. Wartchow FW 38/2010 (JPB 67027, **holotypus hic designatus!**).

Etymology - from Latin soror, -i = sister and vulpina = fox color. Allusion to *Lepiota procera* f. *vulpina* Rick (1937).

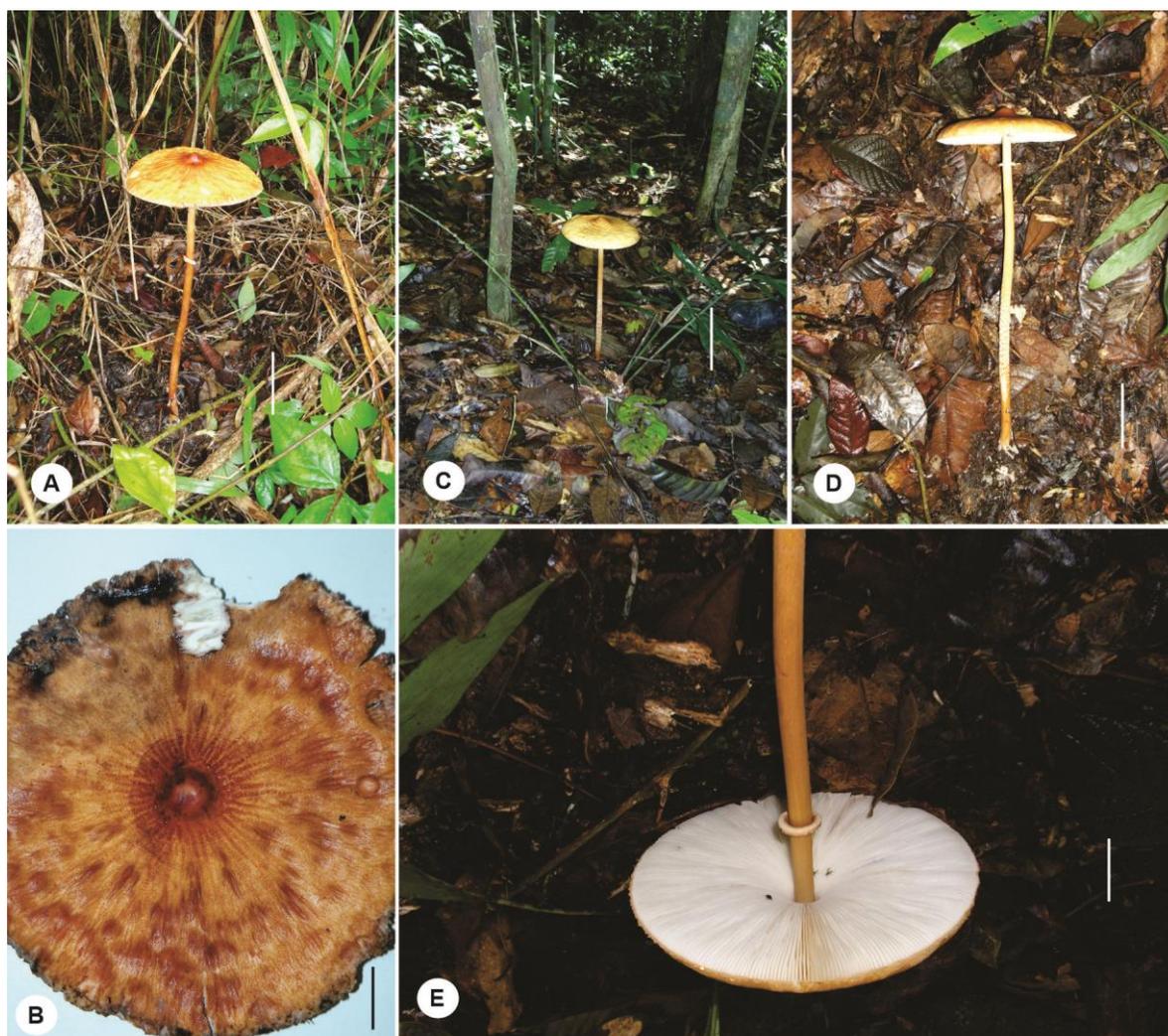


Fig. 1: *Macrolepiota capelariae* var. *sororivulpina* var. nov. General aspect: A-B (holotype), C-D (FW 02/2008) – pileus; E (FW 02/2008) – details of the stipe and hymenophore and annulus. Scale bar = 30 mm and 35mm

Diagnosis: Differs from *Macrolepiota capelariae* var. *capelariae* in the small brownish fibrillose squamules breaking on an ochraceous background, and distinctly larger basidiospores (13.5–) 14.5–19 (–20.0) × (8.5–) 9.0–12.0 (–12.5) μm .

Pileus: 120–150 mm diam., plano-convex with cuspidate umbo, surface pale ochraceous brown (OAC 733) to ochraceous then slightly darker at center; entire at center then gradually radially or concentrically disrupting into small brownish (OAC 700) granular appressed or concolorous with central squamules on an ochraceous ground then scarce or almost absent in the margin; margin entire, non-sulcate non-striate; context fleshy 6–8 mm thick near center, white, unchanging. **Lamellae:** free, close to very close, whitish with slight pale pinkish brown spots on ageing, 7–12 mm broad, edges entire, concolorous with side, unchanging when touched or bruising; lamellulae very common, attenuate to subattenuate with diverse lengths (Fig. 1: E). **Stipe:** 350–380 × 10–12 mm, slightly tapering upward, surface brown (OAC 700) to ochraceous brown disrupting in squamules mostly downward in the stipe, sometimes more appressed squamules in a cream-brown ground; context hollow; stipe base abruptly bulbous about 25 mm wide on which is apparently covered by a membranous white, appressed mantle; volva absent (Fig. 1: A, C-E). **Annulus:** whitish with brownish edge, movable (Fig. 1: E).

Basidiospores [140/2/2] (13.5–) 14.5–19 (–20.0) × (8.5–) 9.0–12.0 (–12.5) μm, av = 16.9 × 10.5 μm, Q = (1.40–) 1.32–1.89 (–1.71), avQ = 1.61 ± 0.10, ellipsoid to amygdaliform in side view, thick-walled, smooth, hyaline, dextrinoid, metachromatic in cresyl blue, with a germ pore caused by an interruption in the episporium on the rounded apex, covered with a hyaline cap in KOH (Fig. 2: C-E). Basidia 31.1–42.3 × 12.8–19.4 μm, clavate, thin-walled, hyaline, mostly 4-spored, but sometimes 1 or 2-spored (Fig. 2: B). Pleurocystidia absent. Lamellae edge mixed, with basidia and some cheilocystidia. Cheilocystidia difficult to analyze, 33–50 × 16.5–25 μm, clavate to broadly clavate, hyaline, thin-walled (Fig. 3: C). Pileus covering a trichodermial palisade to palisade made of catenulate elements measuring mostly 14.7–30.4 × 10.8–20.6 μm subglobose, broadly ellipsoid, ovoid, broadly clavate, sometimes containing chains with narrower elements 6–8 μm diam. in the lower layer, parietal pigment pale yellowish or colorless; parietal pigment or meleos, clampless (Fig. 2: A and Fig. 3: A, C). Clamp connections very rare and difficult to observe, being mostly seen at the base of basidia and basidioles.

Habitat: solitary on soil among litter in montane Atlantic Forest and ‘brejo de altitude’ in the state of Pernambuco, Brazil.

Distribution: Known only from Pernambuco, Brazil.

Additional material examined (Figure 1: C-E): Brazil, Pernambuco, São Vicente Férrer, Mata do Estado, on soil in a submontane-mountain Atlantic Forest rainforest remnant, 26 June 2008, F. Wartchow 02/2008 (JPB 67026).

Identification key for taxa of *Macrolepiota capelariae* var. *sororivulpina* with species with similar pileipellis structure [3, 5, 6, 21, 23]:

1. Basidiospores mostly ≥15 μm long 2
1. Basidiospores mostly ≤15 μm long 3
2. Pileus surface with small granular appressed brownish squamules on a ochraceous ground; basidiospores 14.5–19 (–20.0) × (8.5–) 9.0–12.0 (–12.5) μm, ellipsoid to amygdaliform; cheilocystidia clavate to broadly clavate when observable; pileus covering a palisade to trichopalisade made of catenulate chains of inflated elements ranging to 20 μm in diam.; clamp connections rarely present *M. capelariae* var. *sororivulpina* var. nov.
2. Pileus dark brown centre covered by small dark brown squamules on a whitish ground; basidiospores 13.4–24.8 × 9.6–16.0 μm, ellipsoid; cheilocystidia cylindrical to narrowly lageniform; pileus covering a trichoderm elements to 7–12 μm diam.; clamp connections present *M. clelandii*
3. Pileus with yellow-brown granular squamules, minute and sparse toward margin; cheilocystidia clavate to broadly clavate; pileus covering a short palisade, frequently branched, subcylindrical, clampless, terminal elements subcylindrical to subfusiform, 18–40 (–55) μm long; clamp connections common at the base of basidia and cheilocystidia *M. dolichaula*
3. Pileus with small to large brownish patch-like squamules or breaking up into radially arranged interwoven strips or areolate 4
4. Pileus brownish orange or clay brown, light brown to pale greyish brown pileus with surface mostly breaking up into radially arranged interwoven strips exposing a whitish background, but sometimes into small to large patch-like squamules easily detachable from the pileus; annulus membranous; cheilocystidia narrowly clavate, sometimes clavate, often catenulate; pileus covering with lower layer elements subglobose, broadly clavate to oblong 21–50 × 9–15 μm,

- seldom cylindrical, and upper layer mostly clavate to narrowly clavate; clampless *M. capelariae* var. *capelariae*
4. Pileus white with brown squamules, large to small or areolate to fine granules toward the margin; annulus double, tough; cheilocystidia oblong to clavate rarely utriform; pileus covering a trichoderm formed of catenulate hyphae, 70–110 μm long, rarely branched, subcylindrical, terminal elements subglobose to globose; clamp connections abundant in the stipe *M. colombiana*

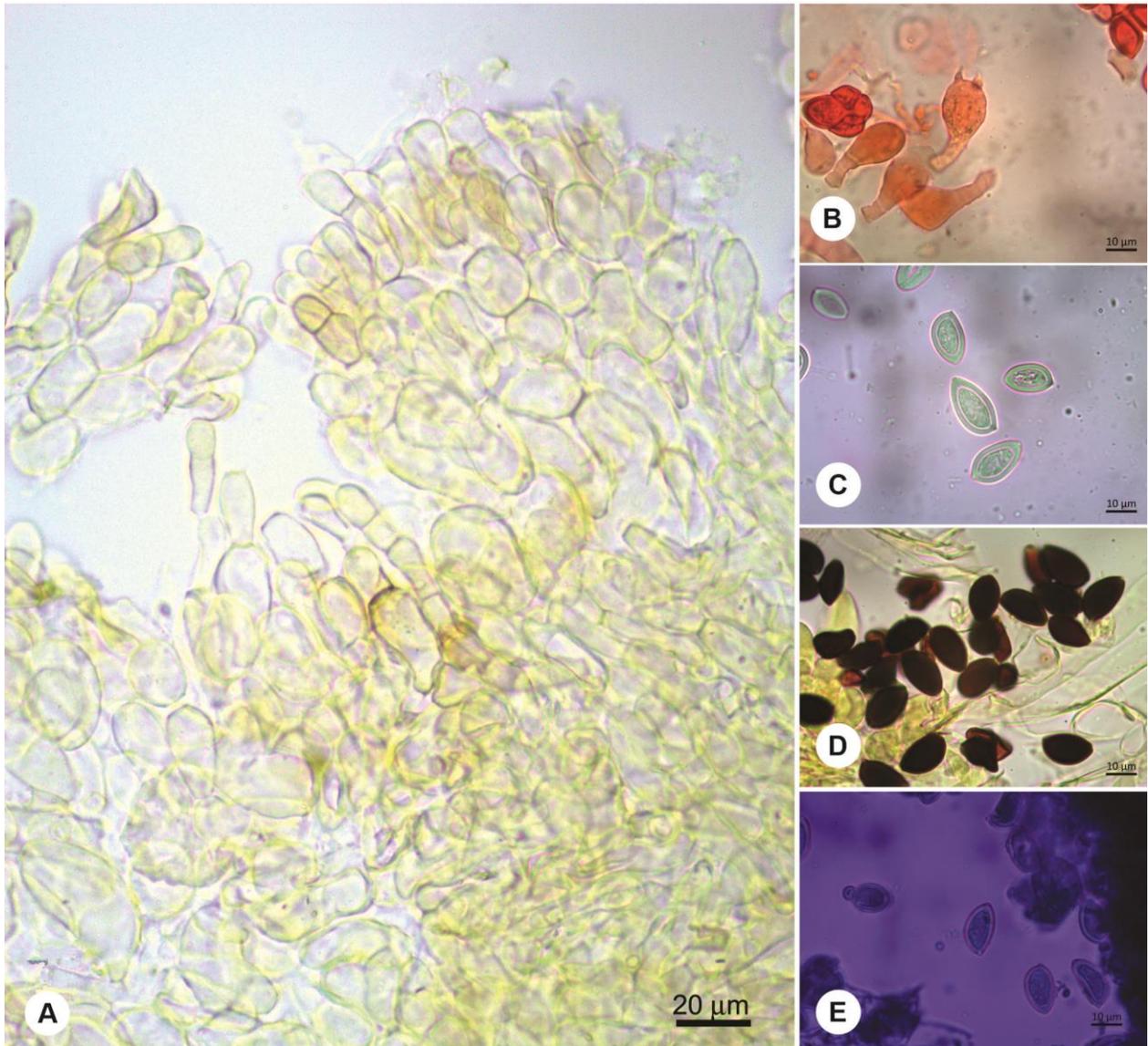


Fig. 2: *Macrolepiota capelariae* var. *sororivulpina* var. nov. (holotype) microscopic features: A – pileus covering; B – basidia in Congo red; C – spores in KOH 3%; D – dextrinoid spores in Melzer; E – metachromatic spores in Cresyl blue. Scale bar = 20 μm and 10 μm

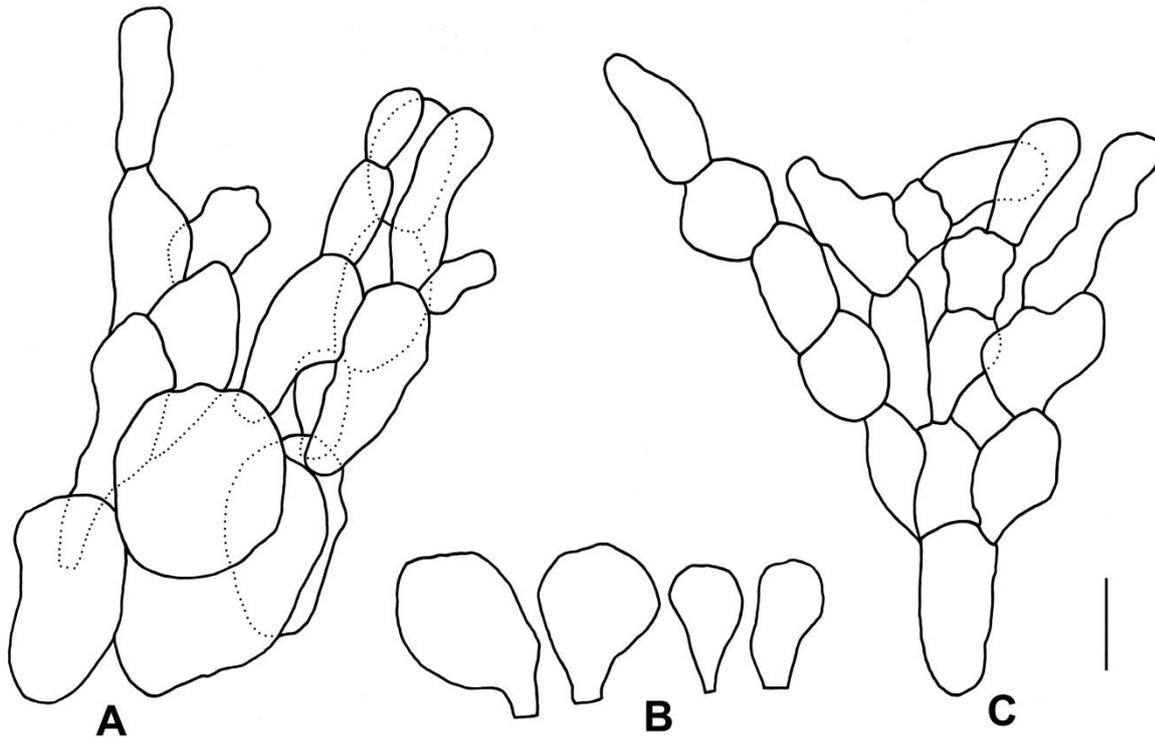


Fig. 3: *Macrolepiota capelariae* var. *sororivulpina* var. nov. microscopic features: A (holotype) – pileus covering; B – cheilocystidia; C (FW 02/2008) – pileus covering. Scale bar = 10 μ m

Discussion

Macrolepiota capelariae var. *sororivulpina* morphologically belongs to the group corresponding to the clade /*macrolepiota* due the presence of a complex annulus, characteristically large ovoid-ellipsoid basidiospores 14.5–18.8 or 19×9.0 –12.0 μ m, and stipe usually 2–3 times the diameter of the pileus [5]. In spite of several attempts at DNA extraction, unfortunately molecular analysis of the material was not possible due the unsatisfactory condition of the materials for this procedure (R. Koroiva, pers. comm.).

Regarding the pileus covering, the new variety can be treated phenetically as close to *M. capelariae* A.D. Souza, C.C. Nascimento & Menolli var. *capelariae*, *M. colombiana* Franco-Mol., and *M. dolichaula* (Berk. & Broome) Pegler & R.W. Rayner, which are characterized by their pileus covering a sort of anticlinal, more inflated and frequently dichotomously ramified in the base, then mostly unbranching and somewhat cylindrical to short-cylindrical hyphae above (C.C. Nascimento, pers. corresp.). Therefore, we need to pay attention to interpretation of the pileus covering structure. According to Largent et al. [11] and Singer [20], when the pileus covering is intermediated to a palisadoderm (structure bearing inflated elements with the terminal ones reaching the same level) and a trichoderm (narrower hyphae with anticlinal orientation and unequal in length) it is called ‘trichodermial-palisade’. In our material, we found both types, a palisade and more frequently a trichodermial-palisade. Apparently, this condition depends upon the age of basidioma or the place of the section was performed. In the paratype

(FW 02/2008), in some parts of its pileus covering we found a palisadoderm and other parts a trichodermial-palisade with more frequency of uninflated elements.

Regarding the characteristics of the new variety, the most evident macroscopic feature is the disrupted ochraceous brown to brownish granular-appressed squamules on an ochraceous or ochraceous-buff background. Important to mention that all other taxa of this group have a whitish background. Indeed the bigger basidiospores measuring $(13.5\text{--}14.5\text{--}19\text{--}20.0) \times (8.5\text{--}9.0\text{--}12.0\text{--}12.5) \mu\text{m}$ with an average of $16.9 \times 10.5 \mu\text{m}$ can also help for variety's determination. Thus, *M. capelariae* var. *sororivulpina* var. nov. is very distinguishable from other taxa with somewhat similar pileus covering structure as follow (Table 1):

Macrolepiota capelariae from Brazil, Argentina and Mexico readily macroscopically differs in the white background pileus. Indeed the smaller basidiospores measuring $12.5\text{--}15.0 \times 7.5\text{--}11.2 \mu\text{m}$ with average $13 \times 8.5 \mu\text{m}$ ($Q= 1.3\text{--}2.0$; $avQ = 1.54$) is also determinant for identify this variety [21].

The following taxa also can be mentioned for comparison: *M. colombiana* resembles in the pileus covering being a palisade of catenulate chains of subglobose elements, but also clearly differs in the smaller basidiospores $12.0\text{--}14.0 \times 7.0\text{--}10.0 \mu\text{m}$, sterile lamellae edge with crowded oblong to clavate cheilocystidia and rarely utriform, and abundant clamp connection on stipe [3]; *M. clelandii* known from southern Australia, is readily recognized because of the largest basidiospores $14.0\text{--}28.5 \times 9.0\text{--}15.5 \mu\text{m}$ in the genus, by the numerous cylindrical to narrowly lageniform cheilocystidia forming a sterile lamellar edge, and frequent presence of clamp connections [6, 23]; and *M. dolichaula* known from some tropical countries of Africa and Asia [1, 5, 12, 13, 14] also differs in the somewhat smaller basidiospores $(10\text{--}12.5\text{--}16.0) \times (6.5\text{--}8\text{--}10.5\text{--}12) \mu\text{m}$, and the presence of frequent clamp connections [5].

Rick [17] briefly described *L. procera* f. *vulpina* Rick as belonging to the 'Procerae' group of its account of *Lepiota* (Pers.) Gray sensu lato. This form was vaguely protologued as having "colore vulpine-fawn et squamis innatis" and "Color *Lep. procerae* generatium est griseo-brunneus". As highlighted by Souza et al. [21], this fungus was described very succinctly and without any indication of type material. Indeed, the color of fox's coat (i.e.- ochraceous brown, see Rizzini [18]) also characterizes *M. capelariae* var. *sororivulpina* described here.

Acknowledgements: The authors wish to acknowledge Dr. Rivete S. Lima ('Laboratório de Anatomia Vegetal'-UFPB) for his kind help in photography of microstructures, and Dr. Cristiano C, Nascimento for providing some insights on taxonomic characterization of *Macrolepiota capelariae* var. *sororivulpina* and allies. We also thank the 'Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES)' for the support given to the work through the 'Financial Aid to Undergraduate Students' (Proc. 314/2022) and for the doctoral grant for EF (Proc. 88887.949178/2024-00); the 'Fundação de Amparo à Ciência e Tecnologia do Estado de Pernambuco' (FACEPE) for the postdoctoral grant for FW (Proc. BFP 0100-2.03/09); and the CNPq for funding the project by support the projects 'Programa de Pesquisa em Biodiversidade' (PPBio Proc. 60/2009) and 'Fungos agaricoides em áreas de Mata Atlântica e Caatinga no Estado da Paraíba' (Edital Universal Proc. 420.448/2016-0) and 'Produtividade em Pesquisa' grant (Proc. 307922/2014-6, Proc. 307947/2017-3 and Proc. 309652/2020-0) to FW. 'Universidade Federal da Paraíba' is also acknowledged here by funding this Project ('Chamada Interna Produtividade em Pesquisa' PROPESQ/UFPB N° 06/2021 Cód. PVA13212-2020).

Table 1: Comparison of *Macrolepiota capelariae* var. *sororivulpina* var. nov. with allied species [3, 5, 6, 15, 21]. N/A when information not available.

Species	Pileus color	Squamules	Stipe (mm)	Annulus	Context	Spores	Cheilo-cystidia	Pileus covering	Clamps	Reference/ Locality
<i>M. capelariae</i>	Dark brown to reddish brown	Small to large patch-like, light brown to pale greyish brown	150–320 × 5–18 mm, bulbous to bulb subglobose; medium brown, finely fibrillose, breaking open into pale brown zigzagging bands	Superior, membranous, beige at the upper side, pale brown at underside, with a broken brownish margin, movable	White unchanging, moderately thick (pileus), hollow with a central white cottony strand (stipe)	12.5–15.0 × 7.5–11.2 μm, Qm = 1.54, ellipsoid to elongate	21–50 × 9.0–15.0 μm, numerous, narrowly clavate to clavate, catenulate, hyaline, thin-walled.	Trichoderm, terminal elements 11.5–32 × 3.0–11 μm, clavate to narrowly clavate, slightly thick to thick-walled	Absent	Souza et al. 2022/Brazil, São Paulo State
<i>M. capelariae</i> var. <i>sororivulpina</i> var. nov.	Pale ochre brown	Small granular appressed concolorous squamules	350–380 × 10–12 mm, tapering towards the apex, brown to ochre brown, breaking into scales, base abruptly bulbous	Superior, double, white with brownish edge, movable	White, unchanging	15.5–18 × 9.5–11.5 μm, Q = 1.32–1.89, ellipsoid to amygdaliform	50–33 × 25–16.5 μm, clavate to broadly clavate	Trichodermial palisade made of catenulate chains of subglobose elements ranging to 10.8–20.6 μm	Rarely present	Brazil, Pernambuco State
<i>M. clelandii</i>	Whitish	Small dark brown fibrillose scales	187 mm long, slender, slightly bulbous, striate, pale brownish	Ample, median or median-superior, fixed, becoming moveable	N/A	13.4–24.8 × 9.6–16.0 μm, Q = 1.6, ellipsoid	24.8–42.4 × 7.2–10.4, numerous, cylindric, cylindro-ventricose or clavate, edge sterile	Trichoderm with elements 22–50 × 7–12 μm, cylindrical, brown walled or with encrusting pigment	Present	Grgurinovic 1997/ South Australia; Vellinga 2003/New Zealand

<i>M. colombiana</i>	White	Large to small or areolate to fine granules, brown	150 × 10 mm, smooth to rugulose, glabrous to finely velutinous, brown, base and context white, becoming greyish-red when exposed	Superior, flaring, double, white, membranous on the inner side, tough, concolourous with the stipe outside, movable	White, change to greyish-red when exposed (pileus and stipe)	12–14 × 7–10 μm, Q = 1.56, ellipsoid to ovoid	17–55 × 8–14 μm, crowded, oblong to clavate, rarely utriform, mostly septate, often branched, edge sterile	Trichodermial palisade, terminal elements 70-110 × 5-12 μm, catenulate chains, smooth or encrusted, rather thin-walled	Abundant (stipe)	Franco-Molano 1999/Colombia
<i>M. dolichaula</i>	White to whitish	Minute, yellow brownish granular to brownish	70–240 × 8–25 mm, white to whitish, subcylindrical, minute farinose granules	Ascending, simple, membranous, whitish	Whitish, becoming orange at the base of the stipe when cut	12.5–16.0 × 8.0–10.5 μm, Q = 1.4, ellipsoid	20–33 × 11–15 μm, clavate to broadly clavate, hyaline, thin-walled	Short palisade branched, subcylindric, clampless, terminal elements subcylindric to subfusiform, 6–15 μm diam.	Common at the base of basidia and cheilocystidia	Pegler 1986/Sri Lanka; Ge et al. 2010/China

REFERENCES

1. Berkeley, M.J, Broome, C.E., 1870, On some Species of the Genus *Agaricus* from Ceylon, *Transactions of the Linnean Society of London*, **27**: 149–152.
2. Ferraz, E.M.N., Rodal, M.J.N., 2006, Caracterização fisionômica-estrutural de um remanescente de floresta ombrófila montana de Pernambuco, Brasil, *Acta Botanica Brasilica*, **20**: 911–926.
3. Franco-Molano, A.E., 1999, A new species of *Macrolepiota* from Colombia, *Actualidades Biológicas*, **21**: 13–17.
4. Freitas, D.S., Menolli Jr., N., 2019, Volvate *Macrolepiota* from Brazil: *M. dunensis* sp. nov., *M. sabulosa* var. *velistellaris* var. nov., and observations on *M. pulchella*, *Mycotaxon*, **134**: 223–239.
5. Ge, Z.W., Yang, Z.-L., Vellinga, E.C., 2010, The genus *Macrolepiota* (Agaricaceae, Basidiomycota) in China, *Fungal Diversity*, **45**: 81–98.
6. Grgurinovic, C.A., 1997, *Larger Fungi of South Australia*, The Botanic Gardens of Adelaide and State Herbarium and The Flora and Fauna of South Australia Handbooks Committee, Adelaide.
7. He, M.Q., Zhao, R.L., Hyde, K.D., Begerow, D., Kemler, M., Yurkov, A., McKenzie, E.H.C., Raspé, O., Kakishimam, M., Sánchez-Ramírez, S., Vellingam, E.C., Halling, R.E., Papp, V., Zmitrovich, I.V., Buyck, B., Ertz, D., Wijayawardene, N.N., Cui, B.K., Schoutteten, N., Liu, X.Z., Li, T.H., Yao, Y.J., Zhu, X.Y., Liu, A.Q., Li, G.J., Zhang, M.Z., Ling, Z.L., Cao, B., Antonín, V., Boekhout, T., da Silva, B.D.B., De Crop, E., Decock, C., Dima, B., Dutta, A.K., Fell, J.W., Geml, J., Ghobad-Nejhad, M., Giachinim, A.J., Gibertoni, T.B., Gorjón, S.P., Haelewaters, D., He, S.H., Hodkinson, B.P., Horak, E., Hoshino, T., Justo, A., Lim, Y.W., Menolli Jr., N., Mešić, A., Moncalvo, J.-M., Mueller, G.M., Nagy, L.G., Nilsson, R.H., Noordeloos, M., Nuytinck, J., Orihara, T., Ratchadawan, C., Rajchenberg, M., Silva-Filho, A.G.S., Sulzbacher, M.A., Tkalčec, Z., Valenzuela, R., Verbeken, A., Vizzini, A., Wartchow, F., Wei, T.Z., Weiß, M., Zhao, C.L., Kirk, P.M., 2019, Notes, outline and divergence times of Basidiomycota, *Fungal Diversity*, **99**: 105–367.
8. IBGE. (2004). Mapas de Cobertura Vegetal dos Biomas Brasileiros. Primeira Aproximação. Ministério do Meio Ambiente, Ministério do Planejamento, Orçamento e Gestão Instituto Brasileiro de Geografia e Estatística, Diretoria de Geociências, Brasília.
9. IBGE., 2012., *Mapa da Área de Aplicação da lei Nº 11.428 de 2006*, 2a edição, Ministério do Meio Ambiente, Instituto Brasileiro de Geografia e Estatística, Diretoria de Geociências, Brasília.
10. Kramer, L.A., 2004, *The Online Auction Color Chart*, Online Auction Color Chart Co., Stanford.
11. Largent, D. L., Johnson, D., Watling, R., 1977, *How to identify mushrooms to genus III: microscopic features*, Mad River Press, Eureka.
12. Pegler, D.N., 1977, A preliminary Agaric Flora of East Africa, *Kew Bulletin Additional Series*, **6**: 1–615.
13. Pegler, D.N., 1986, Agaric flora of Sri Lanka, *Kew Bulletin Additional Series*, **12**: 1– 519.
14. Pegler, D.N., Rayner, R. W, 1969, A contribution to the Agaric flora of Kenya, *Kew Bulletin*, **23**: 347–412.
15. Perez, E.F., Blandón, S.C.S., Alves-Silva, G., Lechner, B.E., Silveira, R.M.B., 2018, Taxonomy and phylogeny of *Macrolepiota*: two new species from Brazil, *Mycologia*, **110**: 930–940.
16. Pietrobom, M.R., Barros, I.C.L., 2002, Pteridófitas de um remanescente de floresta atlântica em São Vicente Férrer, Pernambuco, Brasil: Pteridaceae, *Acta Botanica Brasilica*, **16**: 457–479.
17. Rick, J., 1937, Agarici Riograndenses, *Lilloa*, **1**: 307–346.
18. Rizzini, C.T., 1955, *Latim para Botânicos*, Fundação Gonçalo Moniz, Salvador.
19. Singer, R., 1948, Diagnoses fungorum novorum Agaricalium, *Sydowia*, **2**: 26–42.
20. Singer, R., 1986, *The Agaricales in Modern Taxonomy*, 4th ed., Koeltz Scientific Books, Koenigstein.
21. Souza, A.D., Nascimento, C.C., Freitas, D.S., Menolli Jr., N., 2022, *Macrolepiota capelariae* (Agaricaceae, Basidiomycota): a new species from the Brazilian Atlantic Rainforest with extended records to Argentina and Mexico, *Phytotaxa*, **576**: 265–278.
22. Tavares, M.C.G., Rodal, M.J.N., Melo, A.L., Lucena, M.F.A., 2000, Fitossociologia do componente arbóreo de um trecho de floresta ombrófila montana do Parque Ecológico João Vasconcelos Sobrinho, Caruaru, Pernambuco, *Naturalia*, **25**: 243-270.

23. Vellinga, E.C., 2003, *Chlorophyllum* and *Macrolepiota* (Agaricaceae) in Australia, *Australian Systematic Botany*, **16**: 361–370.

**MACROLEPIOTA CAPELARIAE VAR. SORORIVULPINA (BASIDIOMYCOTA, AGARICACEAE)
DE PE CULMILE PERNAMBUCO, BRAZILIA**

(Rezumat)

Macrolepiota este un gen de ciuperci destul de răspândit, cu aproximativ 40 de taxoni, dintre care 15 se regăsesc și în Brazilia. Cu toate acestea, din regiunea de nord-est a țării au fost descriși doar doi taxoni, *M. dunensis* și *M. sabulosa*, toți din statul Rio Grande do Norte. Această situație demonstrează deficitul de studii despre acest gen, și necesitatea mai multor studii taxonomice în această regiune. Noua varietate descrisă a fost colectată de la altitudine din biomiul Caatinga și dintr-o zonă altitudinală submontană-montană din biomiul Pădurii Atlantice. Pentru studiile morfologice s-au utilizat metodele standardizate, utilizate în cazul ciupercilor agaricoide. Acest studiu descrie o nouă varietate de ciupercă (*Macrolepiota capelariae* var. *sororivulpina*) ce aparține sect. *Macrolepiota*, caracterizată prin pălărie ocracee până la ocraceo-brunie, acoperită de scvame mici adrese, picior subțire, de obicei de 2-3 ori diametrul pălăriei și bazidiospori mari, ovoid-elipsoidali (14,5-18,8 sau $19 \times 9,0-12 \mu\text{m}$). În cadrul acestei secțiuni, *M. capelariae*, *M. colombiana*, *M. clelandii* și *M. dolichaula* prezintă în învelișul pălăriei o trichopalisadă, dar diferă în multe aspecte, precum pălăria mai închisă la culoare sau albicioasă și bazidiospori mai mici, cu excepția *M. clelandii* la care bazidiosporii au dimensiuni de până la 28,5 μm .

Received: 22.04.2024; Accepted: 25.06.2024