Lactifluus dunensis, a new species from Rio Grande do Norte, Brazil

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Lactifluus dunensis is described as a new species from sand dune area in Brazil. It is characterized by the presence of orange-brown pileus with wrinkled then radially wrinkled at the margin, very long basidia, basidiospore size and abundant thin to slightly thick-walled pileipellis elements. Discussion, description, drawings and photographs of the new species are provided.

Key words – Agaricomycetes – Neotropic – Russulaceae – taxonomy

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Introduction

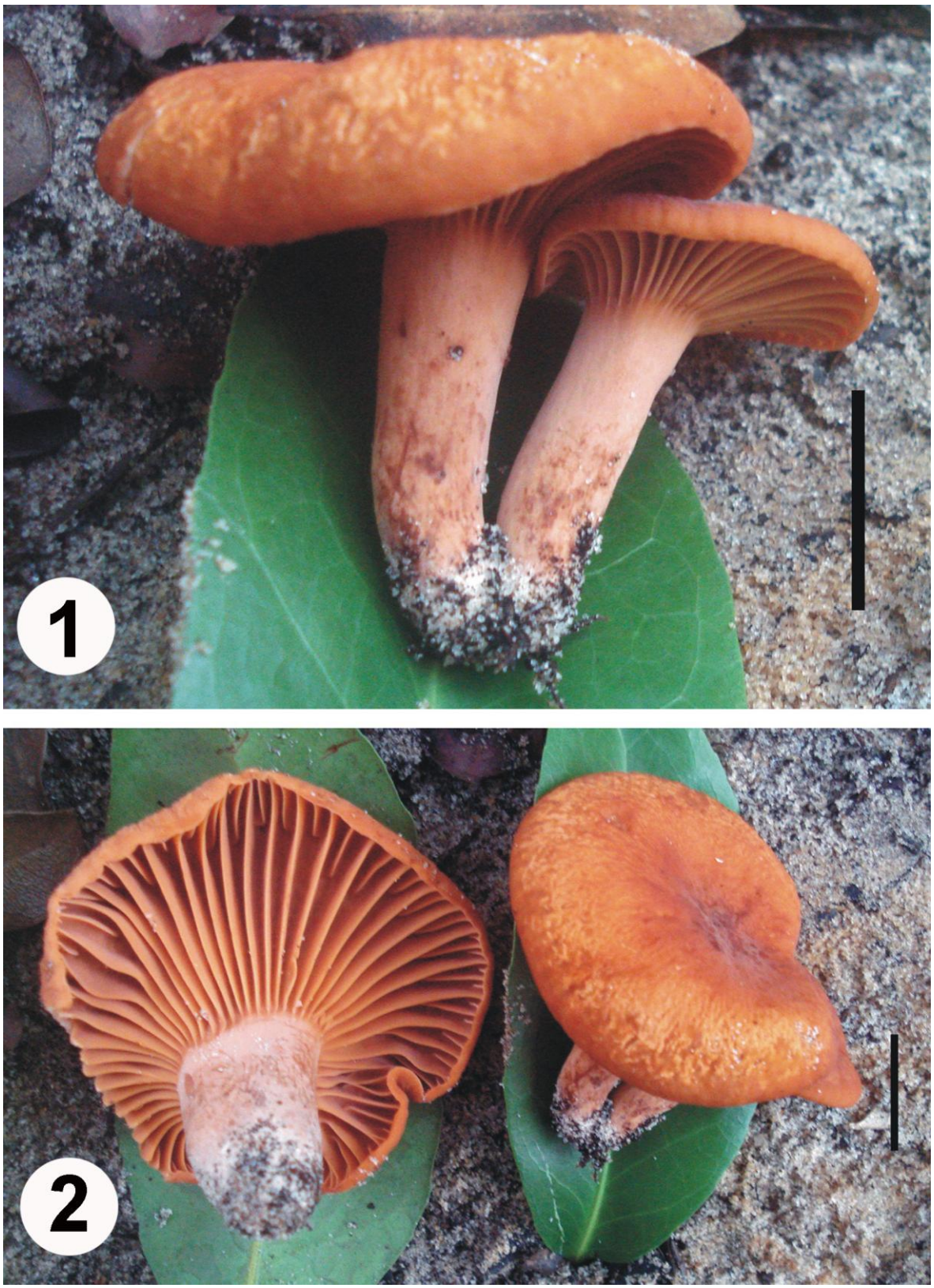
Recent molecular phylogenetic studies showed that *Lactarius* Pers. sensu lato and *Russula* Pers. are paraphyletic (Buyck et al. 2008). The genera accepted at the time were *Russula*, *Multifurca* Buyck & V. Hosft. and an unresolved *Lactarius* that could be treated in two different genera (Buyck et al. 2008). Later Buyck et al. (2010) proposed to conserve *Lactarius* with a conserved type, *La. torminosus* (Schaeff.: Fr.) Pers., with the argument to retain the name *Lactarius* for the larger clade to which *La. torminosus* belongs. Thus less than 20% of taxa have been transferred to *Lactifluus* (Pers.) Roussel (Verbeken et al. 2011, 2012, Stubbe et al. 2012).

From Northeast Brazil, only one species is known, *La. rupestris* Wartchow (Wartchow & Cavalcanti 2010) from the semi-arid of Pernambuco state. Recently we received dry basidiomes and some field notes that correspond to an undescribed species. So we describe here the second milk-cap from the Northeast Brazil and the first from the Atlantic Forest of that region.

Methods

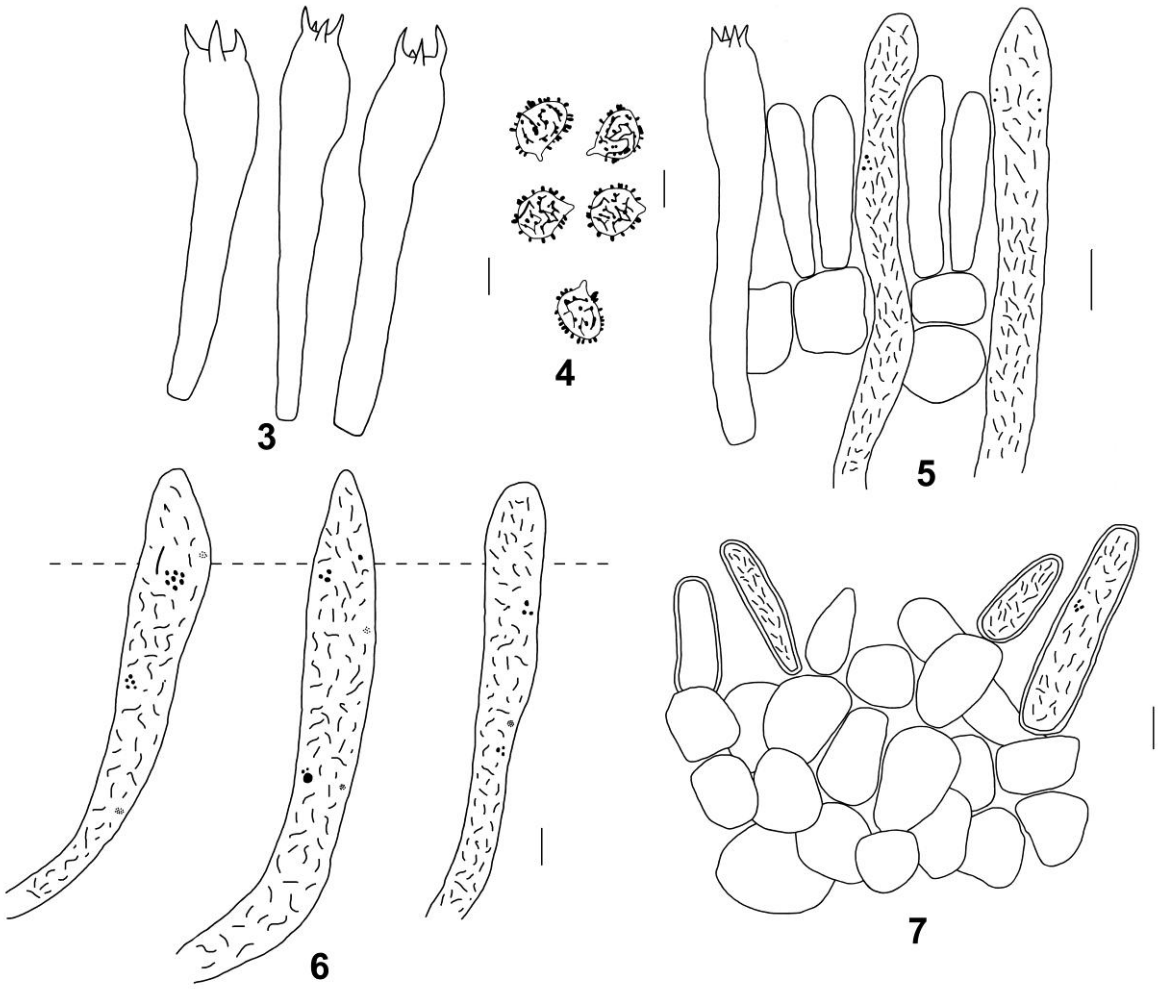
The basidiomes were collected at 'Parque Estadual das Dunas de Natal', municipality of Natal (5°48'S–5°43' S, 35°09'–35°12' W), in the State of Rio Grande do Norte, Northeast Brazil. The area contains elements of Atlantic Forest mixed with some species in common with Caatinga and Coastal Tableland, where species of Leguminosae (all subfamilies), Myrtaceae, Poaceae, Asteraceae and Euphorbiaceae predominate (Freire 1990).

All micromorphological characters were observed from the dry samples and mounted in Congo red solution with 3% KOH, except for basidiospores that were measured in Melzer's reagent. Color codes and names follow Korneup & Wansher (1978).



Figs 1–2 – *Lactifluus dunensis* (holotype). **1** Basidiomes in situ. Bars = 20 mm. (Photo by J. Sousa).

Presentation of basidiospores data follows the methodology proposed by Tulloss et al. (1992), slightly modified here. Statistics are based on 30 basidiospores measured. Abbreviations include **L(W)** = basidiospore length (width) average from a single basidiome, **Q** = the length : width ratio range as determined from all measured basidiospores, and **Qm** = the **Q** value averaged from all basidiospores measured within a single basidiome.



Figs 3–7 – *Lactifluus dunensis* (from holotype and isotype). **3** Basidia. **4** Basidiospores. **5** Hymenium showing basidium, basidioles and pseudocystidia. **6** Pseudocystidia with line showing the higher level of the other hymenial elements. **7** Pileipellis. Bars = 10 µm.

For Scanning electron microscopy (SEM) studies, sections were removed from dried basidiomata and mounted directly on aluminum stubs using carbon adhesive tabs. The fragments were coated with gold using a sputter coater and examined in a Shimadzu SSX-550.

Results

Lactifluus dunensis Sá & Wartchow **sp. nov.** (Figs 1–8)

MycoBank MB803355

Type – BRAZIL. RIO GRANDE DO NORTE. Natal, Parque Estadual das Dunas de Natal, Trilha da Peroba, 21.vi.2012, *J.C. Bezerra s.n.* (UFRN-Fungos 1882 **holotypus!,** JPB 52375 **isotypus!**).

Etymology – regarding the habitat (sand dune area) where the new species was collected.

Pileus 60–110 mm in diam., slightly depressed; pellis dry, finely velvety, wrinkled and radially wrinkled at the margin, irregular surface, brownish orange (KW 6C8) at the context solid in dry. **Lamellae** short decurrent, light brown (KW 7D5), thick, distant; edge smooth, concolorous; lamellulae short short (one lamellula between lamellae), thick, smooth. **Stipe** 30–40mm × 10–20 mm at apex and 9–15 mm at base, central, slightly tapering toward to the base, brownish orange (KW 6C7) smooth, glabrous; context with soft consistence in dry specimens.

Basidiospores (6.1–)6.6–8.2(–8.7) × (5.6–)6.1–7.1(–7.7) µm, **L** = 7.5 µm, **W** = 6.4

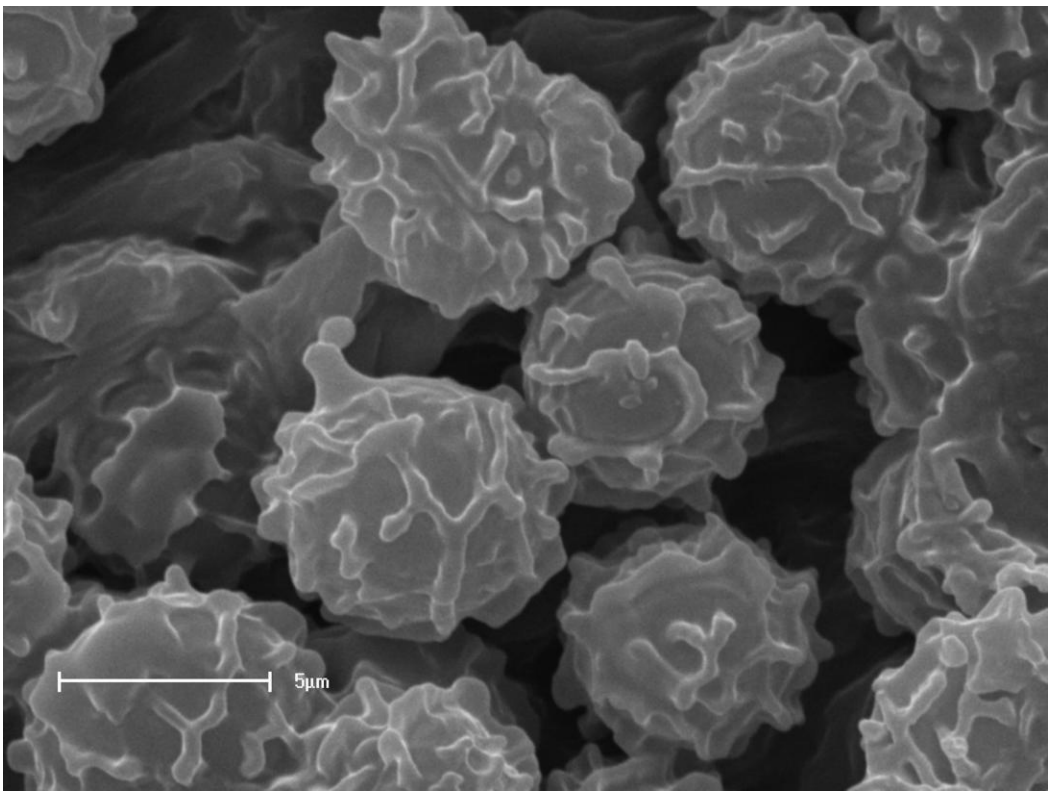


Fig. 8 – Scanning electron micrograph of the basidiospores of *Lactifluus dunensis* (from holotype). Bar = 5 µm.

µm, **Q** = (1.00–)1.10–1.40(–1.50), **Qm** = 1.20 (excluding ornamentation), subglobose to ellipsoid, occasionally globose; ornamentation amyloid, composed of irregular, subspherical to subconical warts, up to 0.8 µm, forming a complete reticulum. **Basidia** 43–66 × 7.5–10 µm, clavate, 4-spored, long and slender, sterigmata 4–6 µm high. **Pleurocystidia** absent. **Pleuropseudocystidia** abundant, slightly emergent, 7.7–9.7 µm diam., with brownish refractive contents, thin-wall, arising from deep in the hymenophoral trama. **Lamella edge** sterile; **marginal cells** 28–33 × 5–6 µm, cylindrical, thin-walled, hyaline. **Hymenophoral trama** composed of abundant sphaerocytes and abundant lactifers. **Pileipellis** a palisade up to 50–60 µm thick; elements of suprapellis cylindrical 23–26 × 5–6 µm, slender, with a rounded apex, slightly thick-walled; subpellis composed of isodiametric cells, 15–20 (–31) × 10–20 (–26) µm, thin-walled. **Clamp-connections** absent.

Habitat – Gregarious on sandy soil in dune vegetation.

Known distribution – only known from the type locality.

Discussion

Lactifluus dunensis is characterized by the orange-brown pileus with wrinkled then radially wrinkled at the margin, very long basidia, basidiospore size and abundant thin to slightly thick-walled pileipellis elements.

According to Verbeken (1998), important characters of the sect. *Rugati* (Pacioni & Lalli) Verbeken are the absence of true pleurocystidia, the presence of typical long and slender basidia and abundant pseupleurocystidia. She also subdivided the sect. *Rugati* into three subsections: subsect. *Volemi*, subsect. *Luteoli* and subsect. *Rugati*. Subsect. *Rugati* is characterized by the presence of elongate spores, with a distinct ornamentation consisting almost of a complete reticulum and the orange-brown pileus colour (Verbeken 1998). These features support the placement of our new species in *Lf.* sect. *Rugati* subsect. *Rugati*.

Verbeken & Walleyn (2010, as *Lactarius*) provided a key that separated the taxa of this subsection by the surface and colour of the pileus and length of the stipe. Among the African taxa, *Lf. volemoides* (Karhula) Verbeken and *Lf.*

pseudovolemus (R. Heim) Verbeken share with *Lf. dunensis* in the colour and the slightly wrinkled pileus (Verbeken & Walleyn 2010). However, they are distinct from our new species as follows:

Lactifluus volemoides from Benin, Zambia and Zimbabwe differs from *Lf. dunensis* in the white lamellae, larger basidiospores 8.5–10 × 6–8.5 µm, **L**= 9.5 µm, **W** = 7 µm, **Q** = 1.15–1.50, **Qm** = 1.40, lower basidiospore ornamentation (0.2 µm high) and the thick-walled terminal elements of the pileipellis, characterizing a lampropalisade (Verbeken & Walleyn 2010).

In addition to pileus colour, the Malagasy *Lf. pseudovolemus* also shares with our new species basidiospores that are somewhat similar in size 7.0–9.0 × 5.4–6.6(–7) µm **L** = 8 µm, **W** = 6 µm, **Q** = 1.24–1.42, **Qm** = 1.33. However, the orange and narrow lamellae, the lower basidiospore ornamentation (0.2 µm high), the presence of 2- or 3-septate suprapellis elements and the true pseudoparenchymatous subpellis are good features to segregate this species from *L. dunensis* (Verbeken & Walleyn 2010).

The European type species of this section, *Lf. rugatus* (Kühner & Romangn.) Verbeken also presents orange-brown pileus and proportionally short stipe. However, it differs from *Lf. dunensis* in the cream coloured with ochraceous or orange shades and slightly bruising brown lamellae, slightly longer and narrower basidiospores (7.8–)8.1–9.5(–9.9) × (5.6–)5.9–6.6(–6.8) µm, the pilleipellis with a lower layer of roundish cells, and the suprapellis with thin-walled hairs 3–4.5 µm wide (Lalli & Pacioni 1992).

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