The discovery of *Neolentinus cirrhosus* (*Gloeophyllales, Basidiomycota*) in the Neotropics

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**Abstract.** *Neolentinus* is a brown-rot genus (order *Gloeophyllales*) rarely found in the Neotropics. The only known species in the region is *N. cyatiformis*, reported from Argentina. This paper reports the discovery of a second species of *Neolentinus* in the Neotropics: *N. cirrhosus*. The species has a set of unique characteristics: lentinoid habit, squamulose pileus with ciliate/pilose margin, decurrent lamellae, small basidiospore size, and habitat on sand, with soil-incrusted sclerotium. The species is described, illustrated and discussed.

**Key words:** Agaricomycetes, Agaricomycetidae, Caatinga, Fungi, taxonomy

**Introduction**

*Neolentinus* is a lentinoid genus characterized by the presence of skeletal and generative hyphae, the absence of hyphal pegs, mostly regular lamellar trama, and producing brown rot (Rune 1994). Hibbett & Vilgalys (1993) showed that members of this group do not belong to *Lentinus* or *Panus*, two white-rot genera. More recently, in analyses of amino acids (*rpb2, atp6, tef1*) and nucleotide (*nuc-LSU, nuc-SSU, 5.8S rRNA*) sequences (Garcia-Sandoval et al. 2011) and ITS (Zhang et al. 2018), *Neolentinus* was found to be clustered with many brown-rot fungi such as *Boreostereum*, *Chaetodermella*, *Donkioporia*, *Gloeophyllum*, *Heliocybe* and *Veluticeps*, in a clade corresponding to the order *Gloeophyllales*.

The type species of this genus is *N. kauffmanii*, described by Alexander H. Smith under the name *Len- tinus* in a study of a supposed disease causing brown rot in *Picea sitchensis* (Bier & Nobles 1946). Later, many other species were described, but only one from South America, *N. cyatiformis* (Lechner & Wright 2002, as *N. schaefferi*). Two species of the genus occur in soil: *N. papuanus* and *N. cirrhosus* treated here. In studies of lentinoid fungi from the Brazilian semi-arid region (Drechsler-Santos et al. 2012), I discovered *N. cirrhosus* for the first time from the Neotropics.

**Materials and methods**

*Neolentinus cirrhosus* was collected near a water reservoir at the locality called Juá dos Vieiras, Viçosa do Ceará Municipality, Ceará State, Northeast Brazil. The region comprises the ‘Área de Proteção Ambiental (APA) Planalto da Ibiapaba’ federal reserve and comprises mostly carrasco, a tall-shrubby vegetation that is relatively closed and xerophilous, with a high density of woody plants, especially small trees (3–4 m high) with thin trunks (Araújo & Martins 1999; Lima et al. 2011).

Microscopic observations were made from material mounted in 3% KOH, floxin solution and Melzer’s reagent. Color codes follow Kelly (1965). Presentation of basidiospore data follows the methodology proposed by Tulloss et al. (1992), slightly modified. Measurements and statistics are based on 30 spores. Abbreviations include L(W) = average basidiospore length (width), Q = length: width ratio range as determined from all measured basidiospores, and Qm = Q value averaged from all basidiospores measured. Description of basidiospore shape follows the methodology suggested by Bas (1969), based on a variation of the ‘Q’ value: globose (1.00–1.05), subglobose (1.05–1.15), broadly ellipsoid (1.15–1.30), ellipsoid (1.30–1.60), elongate (1.60–2.00), cylindric (2.00–3.00) and bacilliform (> 3.00). The material is deposited at JPB (Thiers, continuously updated).
Results and discussion

Neolentinus cirrhosus (Fr.) Redhead & Ginns, Trans. Mycol. Soc. Japan 26: 357. 1986. (Figs 1–2)

Basionym: Lentinus cirrhosus Fr., Adami Afzelii fungi Guineenses...: 7. 1837.
≡ Porcillaria cirrhosa (Fr.) Kuntze, Rev. Gen. Pl. 2: 865. 1891. = Lentinus chudaei Har. & Pat., Bull. Soc. Mycol. Fr. 28: 145. 1912.

Description. Basidiomes small, solitary. Pileus 29 mm in diam., plane-convex and deeply umbilicate; dark grayish brown (81.d.gy.y.Br), covered by pale grayish brown (80.gy.y.Br) squamules; margin ciliate/pilose; context 1.5 mm thick; dirty white, unchanging. Lamellae adnate to subdecurrent, subcrowded; dark brown (75.deep y Br), 2.5 mm broad, somewhat dichotomous; edge entire, concolorous; lamellulae frequent, of diverse lengths. Stipe 15 × 6 mm, central, equal but swollen toward base, dark brown (78.d.y Br), covered by sand incrustations; context solid, fibrous, dirty white; sclerotium subterranean 60 × 6 mm, rooting with sand incrustations.

Basidiospores 7.1–10.2(–10.7) × (2.6–)3.1–3.6 µm, (L = 8.4 µm; W = 3.3 µm; Q = (2.15–)2.26–2.83(–3.24); Qm = 2.58), inamylloid, hyaline colorless in KOH 3%, cylindrical to occasionally bacilliform, smooth, thin-walled, adaxial surface straight; hilar appendix small but well visible, subapical; frequently one or two guttule. Basidia 20–23 × 5.5–6 µm, mostly 4-sterigmate, up to 1.5–3.5 µm long, thin-walled, hyaline, clamps present. Basidioles clavate. Cystidia absent; lamella edge presenting some slightly thick-walled hyphae emerging from the lamellar trama; very few (two observed) fusoid-ventricose cystidiod bodies 26 × 6 µm, very thin-walled, colorless in KOH and Melzer’s reagent. Lamellar trama subregular to slightly irregular, but mostly with descendant construction, with subparallel to slightly interwoven hyphae 2–4.5 µm in diam., thin to slightly thick-walled to 1.5 mm thick, colorless in KOH. Pileus context a lose matrix containing thick-walled skeletal hyphae ranging to 5 µm wide with walls to 1.5 µm (sometimes 2 µm) thick and somewhat frequent blunt knobs; filamentous hyphae very common, up to 4 µm wide and dichotomous to ramified, all elements densely interwoven but slightly anticlinal near pileipellis. Pileipellis a epicutis up to 300 µm thick, with anticlinal hyphae 3–6.5 µm thick, dark brown in mass then individually melleous, wall thickening to 2 µm; erect to suberect attenuate tuffs of anticlinal hyphae 300 × 58 µm (measured at base) with hyphae 3–4.5(–6.5) µm in diam., mostly thick-walled. Clamp connections present on almost all septa observed.

Known distribution. Mauritania, Zimbabwe and now Neotropics, in the semiarid region of Brazil.

Notes. Neolentinus cirrhosus was originally described from Guinea as a member of Lentinus (Fries & Nyman 1837). Later the epithet was transferred to Pocillaria by Kuntze (1891). Hariot & Patouillard (1912) described Lentinus chudaei from Mauritania. Pegler (1983) studied the materials and synonymized these epithets under the name Lentinus cirrhosus. Finally, Rune (1994), based on morphology, asserted a high degree of separation of Neolentinus from other white-rot lentinoid genera, confirming

Figure 1. Neolentinus cirrhosus. A – basidiome in side view; B – details of stipe apex and lamellae. Scale bars = 15 mm.
Figure 2. Neolentinus cirrhosus. A – basidiospores; B – basidia; C – generative hyphae. D – skeletal hyphae. Bars = 10 µm for all microstructures.

the placement of the epithet cirrhosus in this genus. More recently, Zmitrovich and Kovalenko (2016) introduced new data for delimitation of lentinoid fungi: for example, dimitic context with ‘fibrohyphae’ (uninflated with collapsed appendages) elements, basidia > 30 µm long, and basidiospores with navicular or fusoid tendency. However, they still maintain the epithet cirrhosus in Neolentinus. Since the Brazilian collection agrees with the type specimen analyzed by Pegler (1983), I continue to consider it in the genus Neolentinus.

This species is characterized by the lentinoid habit, squamulose pileus with ciliate/pilose margin, decurrent or less fibrillose or squamulose surface and stipe with a subterranean rooting base. Although not mentioned in the protologue, the accompanying figure 1 depicted an apparent soil incrustation in the subterranean portion of the stipe. Later, Pegler (1983) analyzed the holotype and also observed the stipe with rooting base, but without indication of an underground sclerotium as observed in N. cirrhosus. Microscopically, he also observed cheilocystidia and more elongated basidiospores, 8.5–13 × 3.7–4.5 µm (10 ± 0.5 × 4.2 ± 0.3) µm, Qm = 2.38, in N. papuanus.

Known originally from Guinea and Mauritania, this study gives the first report of Neolentinus cirrhosus from the Neotropics.

Specimen examined. BRAZIL, Ceará, Área de Proteção Ambiental Serra da Ibiapaba, Viçosa do Ceará, Juás dos Vieiras, near a dam of a water reservoir, 03°30′46″S and 41°15′51″W, 607 m, 25 April 2013, F. Wartchow 13/2013 (JPB 638956).

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