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# A new species of *Pseudoplectania* (Sarcosomataceae, Pezizales) from Venezuela

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**Summary**

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A new species of the genus *Pseudoplectania* (Sarcosomataceae, Pezizales) was collected on wood in a tropical forest in southern Venezuela, at Gran Sabana, Canaima National Park, Bolívar State; species of the genus *Pseudoplectania* are characterized by having a deep cup shaped sessile or stipitated apothecia, covered by coiled or twisted hairs, J- asci containing 8 globose, smooth, hyaline ascospores; the new species can be distinguished from the rest of the species in the genus in having small short-stipitate apothecia, cylindrical hyaline paraphyses and ascospores with small scattered warts visible only in material stained with aqueous Congo Red; ornamented ascospores have not been previously described in the genus.

**Key words:** discomycetes, ascospore ornamentation, Congo Red, Pseudoplectania, neotropics, Fungi.

**Resumen**

Iturriaga, T., M. Mardones & H. Urbina. 2012. Una nueva especie de *Pseudoplectania* (Sarcosomataceae, Pezizales) de Venezuela. *Kurtziana* 37 (1): 73-78.

Una nueva especie perteneciente al género *Pseudoplectania* (Sarcosomataceae, Pezizales) fue coleccionada creciendo sobre madera en un bosque tropical del Sur de Venezuela, en la Gran Sabana, Parque Nacional Canaima, Estado Bolívar; las especies de *Pseudoplectania* se caracterizan por poseer un apotecio discoide, profundo, que puede ser sésil o estipitado y que se encuentra cubierto por tricomas espiralados o entorchados, ascos J- que contienen 8 ascosporas globosas, hialinas y de pared lisa; la nueva especie se distingue del resto de las especies del género por la presencia de un apotecio pequeño y estipitado, paráfisis hialinas y cilíndricas y ascosporas ornamentadas con pústulas no cianofílicas visibles sólo en montajes en reactivo Rojo Congo; las ascosporas ornamentadas no han sido descriptas para otras especies del género.

**Palabras clave:** discomycetes, esporas ornamentadas, Fungi, neotrópico, Pseudoplectania, Rojo Congo.

## Introduction

*Pseudoplectania* and *Plectania* are morphologically similar genera that were proposed by Fuckel (1870); these genera are similar in having blackish discoid apothecia covered on the outside by a dark tomentum. Differences are that *Pseudoplectania* species have globose spores and *Plectania* species have spores that are ovoid to ellipsoid. Some authors have suggested that the two genera are synonyms (Korf 1970, 1972, Paden 1983, Zhuang & Wang 1998, Calonge & Mata 2002, Calonge et al. 2003). The primary

morphological difference between the genera is a single character, ascospore shape. Korf (1973) observed that *Plectania* species have globose spore primordia. In addition, both genera have *Conoplea* anamorphs. Paden (1983), following Korf (1957), separated *Plectania* into four sections: *Sphaerosporae, Plectania, Curvatisporae,* and *Plicosporae,* and the members with globose ascospores were placed into the section *Sphaerosporae.*

Other authors accept both genera based on morphological and molecular data (Donadini 1987, Landvik et al. 1997, Harrington et al. 1999, Hansen & Knudsen 2000, Perry et al. 2007). According to Li and Kimbrough (1995) the genera differ in spore wall ontogeny; ascospores of *Pseudoplectania* lack a secondary wall layer but *Plectania* has a secondary spore wall layer. This layer is cyanophilic when mounted in cotton blue and observed under a light microscope. Donadini (1987) considered the genera different on criteria such as differences in the number of nuclei in the ascospores, the non-cyanophilic spores in *Pseudoplectania* and low rate of spore germination in *Pseudoplectania*. Harrington et al. (1999) using 18S rRNA gene sequences found that *Plectania* is more closely related with the genus *Galiella* while *Pseudoplectania* is related to *Donadinia*. However, Perry et al. (2007) using partial sequences of nuLSU rDNA concluded that *Plectania* and *Donadinia* are more closely related. Even when there is not convincing evidence to support one or the other of these positions, both studies separate *Plectania* from *Pseudoplectania,* hence, we consider *Plectania* and *Pseudoplectania* as different taxa.

A specimen referred to the genus *Pseudoplectania* was collected on wood in a gallery forest in the locality of Luepa, Gran Sabana, Canaima National Park, Bolívar State, southern Venezuela. Characters of the specimen include its disc-shaped apothecia, tomentose black receptacle, dark brown to black hymenium and globose hyaline ascospores. It differs from all other species included in the genus *Pseudoplectania* by a combination of characters: small ascomatal size compared with the rest of species, its short stipe, cylindrical hyaline paraphyses and ornamented ascospores.

## Materials and methods

Protocols for morphological examination and sectioning followed those outlined in Iturriaga and Korf (1990). Congo red in water was used as a stain for observing wall details (ornamentation) in asci and ascospores. Cotton blue in lactic acid was used to observe structures and tissues in sections and squashed material.

## Results

**Pseudoplectania ryvardenii** Iturr., Mardones & H. Urbina**, sp. nov.**

VENEZUELA. **Bolívar State**, Gran Sabana. Canaima National Park, Gallery forest in Luepa. N 0671180, W 0646970, 1410 msnm, T. Iturriaga, & H. Urbina. 657, 13.VII.2003. On dead wood. *Holotypus specie* (VEN402017). **Figs. 9-12.**

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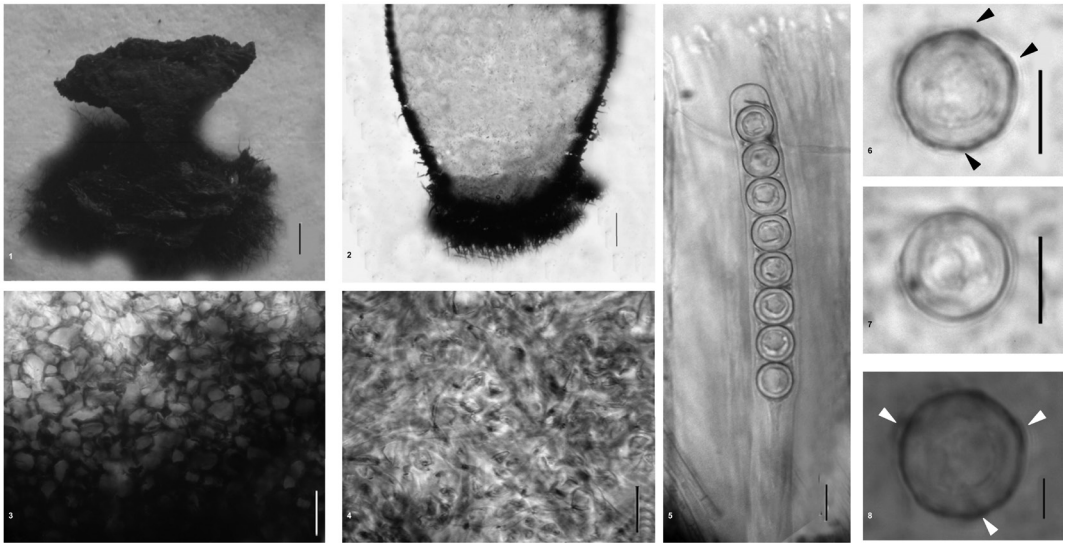
*Apothecium* dark brown when fresh or rehydrated, black when dry, 5-7 mm diam., 5-8 mm tall, gregarious, deep cup shaped, stipitated, with radiating black anchoring basal mycelium. *Disc* concave, brown to almost black, smooth. *Receptacle* dark brown, covered by short-brown hairs on the upper side and long brown hairs at the base. *Hairs* numerous, dark brown, thick-walled, septate, branched, cylindrical, sinuate, 200-600 µm × 8-10(-12) [$_x$9.5 $_m$15 $_s$1.6 $_n$19] µm at base, 60-130 µm × 6-8(-12) µm at flanks and margin. *Ectal excipulum textura angularis* to *textura globulosa*, 60-100 µm wide at base, 50-70 µm wide at the flanks and 30-50 µm wide at the margin; with brown thick-walled cells, 9-20(-24) [$_x$15 $_m$16 $_s$5.2 $_n$14] × (7-)8-13(-16) [$_x$10 $_m$8 $_s$3 $_n$14] µm, inner cells hyaline, outer cells dark-brown, the later ones giving rise to tomentum hyphae. *Medullary excipulum* hyaline to yellow, composed of *textura intricata* in a gelatinous matrix, 750 µm wide at the centre; 200 µm wide at the flanks and 120 µm wide at the margin; hyphae hyaline to yellow, 4-10 [$_x$6,5



**Figs. 1-6.** *Pseudoplectania ryvardenii*. 1. Dry apothecium; 2. Longitudinal section through an apothecium base; 3. Detail of cells of the ectal excipulum ; 4. Detail of hyphae of the medulary excipulum; 5. Ascus and paraphyses; 6. Ascospores. (Scale bars: 1 = 1 mm; 2-8 = 10 µm).

$_{m}5\ _{s}2{,}2\ _{n}22]$ µm diam., thin-walled. *Hymenium* yellow, 150-400 µm tall. *Asci* hyaline, long-cylindrical, narrowing below into a thin flexuous base, apex J$^{-}$, suboperculate, 8-spored, 250–314(–344) $[_{x}284\ _{m}270\ _{s}14.5\ _{n}9]$ × 11-14.5 $[_{x}12.5\ _{m}11\ _{s}1.7\ _{n}16]$ µm. *Ascospores* globose, hyaline, with one large central guttule, 10.5–13 $[_{x}11\ _{m}10.5\ _{s}1\ _{n}16]$ µm diam., thick-walled, with randomly scattered pustules seen only under Congo Red. *Paraphyses* hyaline, cylindrical, septate, straight, thin-walled, 2.4-3.2 µm diam. *Hymenial hairs* absent.

*Ecology & Distribution*: Gregarious, on decaying wood in a gallery forest dominated by *Dimorphandra macrostachya* Benth. Presently only known from the type locality.

## Discussion

To date, *Pseudoplectania* has not been reported from Venezuela (Iturriaga & Minter 2006). The genus *Pseudoplectania* currently comprises seven species: *Ps. ericae* Donadini, *Ps. kumaonensis* Sanwal, *Ps. melaena* (Fr.) Sacc., *Ps. nigrella* (Pers.) Fuckel, *Ps. sphagnophila*, *Ps. stygia* (Berk. & M.A. Curtis) Sacc. and *Ps. vogesiaca* Seaver. Among the genus *Plectania*, only one species has spherical spores: *Pl. carranzae* Calonge & M. Mata. Only *Pl. carranzae* and *Ps. nigrella* have been reported for the Neotropics.

*Pl. carranzae*, *Ps. sphagnophila, Ps. stygia* and *Ps. vogesiaca* have stipitate apothecia, the rest of species have substipitate or sessile apothecia (Figs. 1 & 2). Furthermore, all the species have very large apothecia as compared to *Ps. ryvardenii* (Table 1).

Paraphyses in *Ps. ryvardenii* are quite different from those of any of the other similar species: showing cylindrical, hyaline and straight paraphyses, while other species as *Pl. carranzae, Ps. nigrella, Ps. sphagnophila*, *Ps. stygia,* and *Ps. vogesiaca* have curved paraphyses with hooked apices. Paraphyses contents have been described as brown or black in *Ps. melaena*, *Ps. nigrella* and *Ps. sphagnophila*; 2 or 3 times branched at the apices in *Ps. ericae, Ps. melaena* and *Ps. nigrella*, or with agglutinated paraphyses in *Ps. kumaonensis* (Table 1).

*P. ryvardenii* is easily distinguished from all known species of the genus by the small size of its apothecia, up to 7 mm diam; cylindrical,

Table 1
Comparison of morphological characters among *Pseudoplectania* species

| Species | Apothecia | Paraphyses | Ascospores | Reference |
|---|---|---|---|---|
| *Pl. carranzae* | 5-20 mm diam., stipitated | Cylindrical, pale yellowish, curved at the apices, branched at times | 11 – 13 µm diam., smooth wall | Calonge & Mata (2002) |
| *Ps. ericae* | 1 cm diam., short stipitated | Cylindrical, hyaline , 2-3 branched | 11.5 – 12.5 µm diam., smooth wall, without guttules | Donadini (1987) |
| *Ps. kumaonensis* | 0.7 cm. diam., sessile to subsessile | Cylindrical, pale brownish, closely pressed and glued together by a gelatinous substance | 12 µm diam., smooth wall | Sanwal 1953 |
| *Ps. melaena* | Up to 1 cm. diam., sessile | Cylindrical, with black contents, 2-3 branched at the apex | 11 – 13 µm diam., smooth wall | Donadini (1987) |
| *Ps. nigrella* | 2 cm diam., sessile to substipitated | Cylindrical, branched, hooked apex, embedded in a olive-brown gelatinous material | 10-12 µm diam., smooth wall | Paden (1983) |
| *Ps. ryvardenii* | 5-7 mm diam, stipitate | Cylindrical, hyaline and straight at the apic es | 10.5–13 µm diam, with one large central guttule, with ramdomly scattered pustules | Present study |
| *Ps. sphagnophila* | 7-12 mm diam., stipitated | Cylindrical, hyaline, hooked apex, with black contents | 10-12 µm diam., smooth wall | Kreisel (1967) |
| *Ps. stygia* | 12 mm diam., stipitated | Cylindrical, hyaline, hooked apex | 10 µm diam., smooth wall | Saccardo (1869) |
| *Ps. vogesiaca* | 2-3 cm diam., stipitated | Cylindrical, brown and coiled or hooked at their apices | 10 µm diam., smooth wall, with one large guttule | Seaver (1913) |

hyaline paraphyses; and ornamented ascospores. This combination of characters does not exist in any of the already known descriptions of species belonging to the genus (Table 1).

Ornamented spores have not been reported in any other species of *Pseudoplectania.* However, Li and Kimbrough's (1995) ultrastructural studies show that walls of ascospores in *Pseudoplectania nigrella* are undulate and electron-dense dots are attached to the perisporic sac, outside their primary wall. These are not visible under light microscopy. It is possible that *Ps. ryvardenii* has large deposits of material than other species in the genus and consequently these can be observed under light microscopy.

Congo red is a very effective stain for showing ascospore wall ornamentations by it binding to the chitin of the cell-wall (Matsuoka et al. 1995). Thus, ornamentations seen under Congo Red and reported by us in this paper suggest that these are chitinous and might be part of the spore wall.

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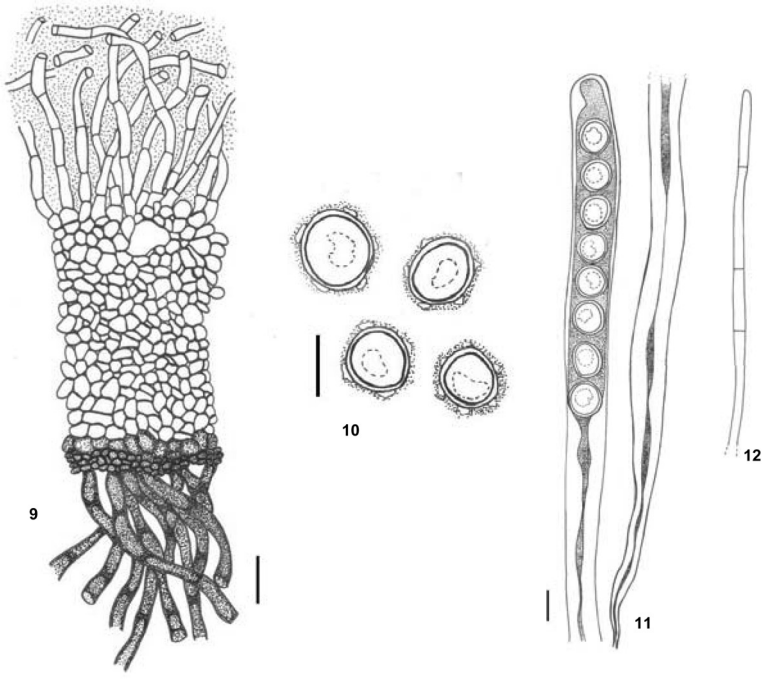


Figures. 9-12. 9. Longitudinal section of the ectal excipulum showing basal tomentum hyphae, ectal excipulum and gelatinized medulary excipulum; 10. Ascospores with ornamentations and gelatinous sheath; 11. Apical and basal parts of an ascus; 12. Paraphysis apex. (Scale bar = 10 µm).

## References

Calonge F.D., A. García, M. Sanz & J. Bastardo. 2003. *Plectania zugazeae* (Ascomycotina), especie nueva para la ciencia. *Bol. Soc. Micol. Madrid* 27: 17-20.

Calonge F.D. & M. Mata. 2002. *Plectania carranzae* sp. nov. (Ascomycotina), from Costa Rica. *Mycotaxon* 81: 237-241.

Donadini J.C. 1987. Étude des Sarcoscyphaceae ss. Le Gal (1). Sarcosomataceae et Sarcoscyphaceae ss. Korf. Le genre *Pseudoplectania* emend. nov. *P. ericae* sp.nov. (Pezizales). *Mycol.helv.* 2: 217-246.

Fuckel L. 1870. Symbolae mycologicae. Beiträge zur Kenntnis der rheinischen Pilze. *Jahrbücher des Nassauischen Vereins für Naturkunde* 23-24: 1-459.

Harrington F.A., D.H. Pfister, D. Potter & M.J. Donoghue. 1999. Phylogenetic Studies within the Pezizales. I. 18S rRNA Sequence Data and Classification. *Mycologia* 91: 41-50.

Hansen L. & Knudsen H. 2000. Nordic Macromycetes. Vol. 1, Ascomycetes. Nordsvamp, Copenhagen.

Iturriaga T. & D. Minter. 2006. Hongos de Venezuela. www.cybertruffle.org.uk/venefung [sitio internet, versión 1.00].

Iturriaga T. & R.P. Korf. 1990. A monograph of the discomycete genus Strossmayeria (Leotiaceae), with comments on it's anamorph Pseudospiropes (Dematiaceae). *Mycotaxon* 36: 383-454.

Korf R.P. 1957. Two bulgarioid genera: *Galiella* and *Plectania*. *Mycologia* 49: 107-111.

Korf R.P. 1970. Nomenclatural notes. VII. Family and tribe names in the Sarcoscyphineae (Discomycetes) and a new taxonomic disposition of the genera. *Taxon* 64: 937-994.

Korf R.P. 1972. Synoptic key to the genera of the Pezizales. *Mycologia* 64: 937-964.

Korf R.P. 1973. Discomycetes and Tuberales. In: Ainsworth G.C, Sparrow F.K, Sussman A.S. eds. *The Fungi, An Advanced Treatise 4A*. Academic Press. New York: 249-319.

Landvik, S., K. N. Egger & T. Schumacher. 1997. Towards a subordinal classification of the Pezizales (Ascomycota): phylogenetic analyses of SSU r DNA sequences. *Nordic J. Bot* 17: 403-418.

Li, L.T. & J. W. Kimbrough. 1995. Spore wall ontogeny in *Pseudoplectania nigrella* and *Plectania nannfeldtii* (Ascomycotina, Pezizales). *Can J. Botany* 73: 1761-1767.

Matsuoka, H., H.-C. Yang, T. Homma, Y. Nemoto, S. Yamada, O. Sumita, K. Takatori & H. Kurata. 1995. Use of Congo red as a microscopic fluorescence indicator of hyphal growth. *Appl. Microbiol Biotechnol* 43: 102-108.

Paden, J. W. 1983. Sarcosomataceae (Pezizales, Sarcoscyphineae). *Flora Neotropica Monograph* 37: 1-17.

Perry B.A., Hansen, K., Pfister, D.H. 2007. A phylogenetic overview of the family Pyronemataceae (Ascomycota, Pezizales). *Mycol. Res.* 111: 549-571.

Zhuang W.Y. & Z. Wang. 1998. Sarcosomataceous Discomycetes in China. *Mycotaxon* 67: 355-364.

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