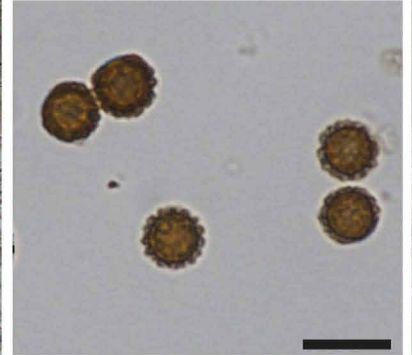
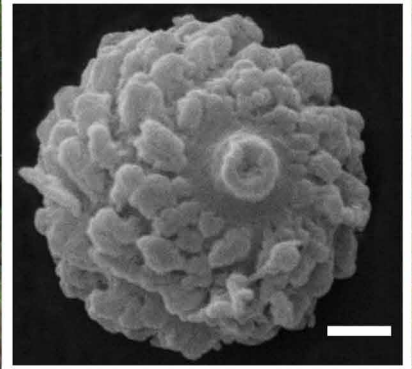
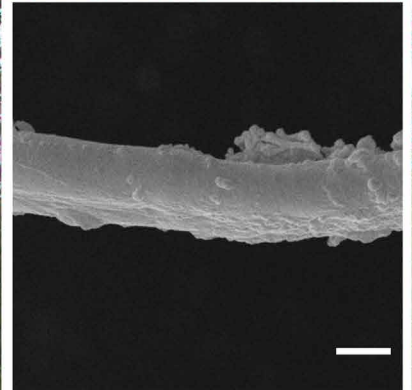


*Geastrum magnosporum*



Fungal Planet 731 – 13 July 2018

## *Geastrum magnosporum* J.O. Sousa, B.D.B. Silva, P. Marinho, M.P. Martín & Baseia, *sp. nov.*

**Etymology.** Referring to the size of basidiospores, being larger than the mean size in the genus *Geastrum*.

**Classification** — *Geastraceae*, *Geastrales*, *Agaricomycetes*.

**Unexpanded basidioma** hypogeous, orange white (5A2; Kernerup & Wanscher 1978), subglobose, 7 × 6 mm, surface papery to cottony, strongly encrusted with sand. **Expanded basidiomata**, arched, rarely saccate, 6–16 mm (including peristome) × 10–19 mm. **Exoperidium** splitting into 6–8 rays, arched, revolute, some involute, rolling up under endoperidial body, non-hygroscopic. **Mycelial layer** yellowish white (4A2), surface papery to cottony, strongly encrusted with sand and debris, persistent or peeling away in irregular patches, composed of yellowish, thin-walled (< 1 µm) hyphae, 2–2.5 µm diam, surface not encrusted, lumen not seen. **Fibrous layer** orange white (5A2), surface coriaceous, composed of hyaline, thick-walled hyphae (> 1 µm), surface encrusted, lumen seen. **Pseudoparenquimatous layer**, dark brown (7F4, 6F4), rimose, absent in some basidiomata, composed of brownish, thick-walled (> 1 µm) hyphae cells, subglobose, pyriform to ovoid, 30.5–63 × 27–46.5 µm. **Endoperidial body** orange grey (6B2), depressed-globose to subglobose, 3–5 × 6–9 mm, sessile, surface furfuraceous. **Apophysis** absent or inconspicuous. **Pedicel** absent or very short (up to 0.6 mm high). **Peristome** fibrillose, lacerate with age, non-delimited to weakly delimited, mammiform to flattened (< 1 mm high), lighter or concolorous with endoperidium. **Columella** circular, central, white (4A1). **Mature gleba** greyish brown (5F3). **Eucapillitium** brownish, thin-walled (< 1 µm diam), 2–5 µm diam, surface encrusted, warts absent, lumen seen, branch absent. **Basidia** clavate to pyriform, 19–24.5 × 8.8–6.3 µm, 2–3 sterigmata. **Basidiospores** brownish to yellowish in 5 % KOH, globose to subglobose, 6–8.5 µm ( $x = 6.8 \pm 0.7$ ,  $Q_m = 1.02$ ,  $n = 30$ ), densely verrucose, warts long (up to 1.3 µm high), truncate; apiculus reduced.

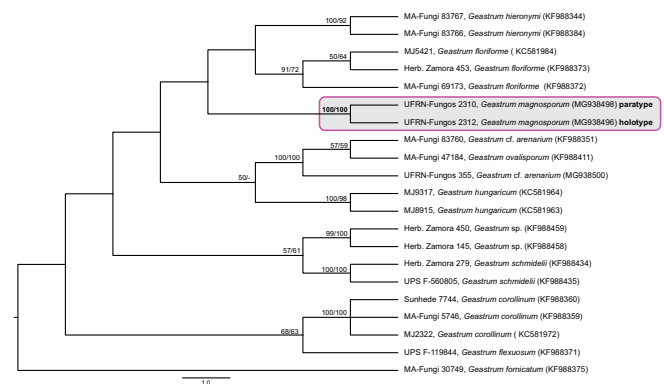
**Ecology & Distribution** — The specimens were found in the biome Atlantic Rainforest (Tropical & Subtropical Moist Broad-leaf Forests of Brazil – Pernambuco interior forests ecoregion) (Dinerstein et al. 2017), growing on sandy soil, without forest cover (exposed to sun), with gregarious or solitary habit.

**Typus.** BRAZIL, Paraíba, Mamanguape, Reserva Biológica Guaribas, S6°44'32.1" W35°08'25.8", on sandy soil, 26 June 2014, J.O. Sousa et al. (holotype UFRN-Fungos–2312, ITS and LSU sequences GenBank MG938496 and MG938497, MycoBank MB824254).

**Colour illustrations.** Brazil, Paraíba, Reserva Biológica Guaribas, SEMA II, open area of Atlantic rainforest where the type species was collected; expanded basidiomata *in situ* (UFRN–Fungos 2312, holotype); expanded basidiomata *ex situ* (UFRN–Fungos 2312, holotype); basidiospores under LM; basidiospores under SEM; eucapillitium under SEM. Scale bars = 2.5 mm (basidiomata *in situ*), 2 mm (basidiomata *ex situ*), 10 µm (basidiospores under LM), 1 µm (basidiospores and eucapillitium under SEM).

**Additional material examined.** BRAZIL, Paraíba, Mamanguape, Reserva Biológica Guaribas, 11 July 2013, J.O. Sousa et al., UFRN Fungos–2309; *ibid.*, 27 July 2012, B.D.B. Silva et al., paratype UFRN Fungos–2310, ITS and LSU sequences GenBank MG938498 and MG938499.

**Notes** — *Geastrum magnosporum* is morphologically close to *Geastrum floriforme*. However, *G. floriforme* has strongly hygroscopic rays, a sessile endoperidium and smaller basidiospores (up to 7 µm diam) (Sunhede 1989, Calonge 1998). Another similar species is *G. arenarium*, although, the latter differs in its well-delimited peristome, hygroscopic rays and smaller basidiospores (up to 4 µm diam) (Bates 2004). *Geastrum hieronymi* and *G. minimum* also resemble *G. magnosporum*, but these two species have a longer pedicel (up to 3 mm long) and smaller basidiospores (up to 5 µm and 6.5 µm, respectively) (Bates 2004, Kuhar et al. 2012). Other species with large basidiospores in the genus are *G. laevisporum* (up to 10 µm diam), *G. campestre* (up to 8 µm diam) and *G. platense* (up to 8 µm diam). *Geastrum laevisporum* is distinct due to its smooth basidiospores and hygroscopic rays; *G. campestre* in the plicate peristome and verrucose endoperidium; and *G. platense* in the larger basidiomata (up to 26 mm wide), hygroscopic rays and sessile endoperidium (Sunhede 1989, Soto & Wright 2000, Bates 2004, Sousa et al. 2015).



The first of three equally most parsimonious trees of the ITS nrDNA sequence alignment were obtained from a heuristic search. The analysis was conducted with PAUP v. 4.0b10 (Swofford 2003) with 10 000 bootstrap replicates. The new *Geastrum* species described here are marked with a coloured box. The accession numbers from EMBL/GenBank databases are indicated on the tree. Bootstrap support values greater than 50 % for Parsimony and Maximum-Likelihood (ML) are indicated on the branches. ML analysis was run with RAXML-HPC v. 8.2.10 (Stamatakis 2014) under a GTR model. *Geastrum fornicatum* was included as outgroup. CoreIDRAW® X8 software was used to edit the final tree.

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