

A NEW SPECIES OF *GEASTRUM* FROM COSTA RICA AND MEXICO

by

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Summary. CALONGE, F.D. & M. MATA (2004). A new species of *Geastrum* from Costa Rica and Mexico. *Bol. Soc. Micol. Madrid* 28: 331-335.

A new species of *Geastrum* is described here, characterized by showing a spiny ephemeral mycelial layer, a white fibrous layer and a black pseudoparenchymatous layer. A persistent rhizomorph together with a black endoperidium are the main characters present in this taxon.

Key words: *Geastrum*, *Gasteromycetes*, taxonomy, ecology, chorology, Costa Rica, Mexico.

Resumen. CALONGE, F. D. & M. MATA (2004). Una especie nueva de *Geastrum* encontrada en Costa Rica y México. *Bol. Soc. Micol. Madrid* 28: 331-335.

Se describe una especie nueva de *Geastrum*, que se separa y diferencia de las demás conocidas por presentar exoperidio con capa micelial de pelos espinosos erectos, capa fibrosa blanca y capa pseudoparenquimática negra; así como rizomorfo persistente y endoperidio negro.

Palabras clave: *Geastrum*, *Gasteromycetes*, taxonomía, ecología, corología, Costa Rica, México.

INTRODUCTION

According to Ainsworth & Bisby's Dictionary of Fungi (HAWKSWORTH & *al.*, 1995), the genus *Geastrum* includes about 50 species, widespread all over the world.

Several have been the contributions towards a better understanding of the genus. The most comprehensive one is that by PONCE DE LEON (1968) as the sole world monograph. There are several of regional treatment; such as BOIFFARD (1976) for the French Atlantic littoral, SUNHEDE

(1989) for Northern Europe, DÖRFELT (1985) for Central Europe, and CALONGE (1998) for the Iberian Peninsula. Some new species have been recently added, e.g. *G. ovalisporum* (CALONGE & *al.*, 2000), from Bolivia.

During visits to Costa Rica and Mexico in 2001, the senior author had the opportunity to observe many collections of different species of *Geastrum*, among which the taxon presented in this article did not match any of the already described taxa.

MATERIAL AND METHODS

The material studied belongs to the herbaria of the Instituto Nacional de Biodiversidad (INB), Costa Rica, and Instituto de Ecología de Xalapa (XAL), Mexico.

Microscopic observations and measurements were done in distilled water after a short 5 % KOH pretreatment. The ultramicroscopy was carried out coating samples of gleba with gold in a Balzers SCD 004 sputter coater, using a JEOL, JSM-T33A scanning electron microscope.

DESCRIPTION

Geastrum albonigrum Calonge & M. Mata sp. nov.

Etymology: *albonigrum*, having a white fibrous

layer and a black pseudoparenchymatous layer and endoperidium.

Diagnosis: *Exoperidium* non hygroscopicum, 25-40 mm latum, duabus circiter partibus apicalibus in 5-7 radios inequalis acutus fissilis. Stratum mixchale trichomatosum fugacibus, cremens, stratum fibrosum papyraceum, albidum, stratum pseudoparenchymaticum fusco-nigrum, laeve. Endoperidium 12-15 mm latum, sessilis, pubescentis, fusco-nigrum, cum peristomium fibrillosum non circum-delimitatum. Sporae sphaericae, 3-5 µm diam., verrucosae fusco-nigrae. Capillitium fuscum, 2-8 µm diam., sine lumen, cum extremi ramosi et acuti. **Holotypus:** Costa Rica, Guanacaste Conservation Area, Palo Verde National Park, El Pizote, on soil with plant debris, 27-IX-2003, leg. J. López 4869 (INB 3758538). **Isotypus:** Ma-Fungi 59260

Specimens examined: COSTA RICA: PUNTARENAS: Osa Conservation Area, Piedras Blancas National Park, Rio Bonito Station, Quebrada Trail, growing on plant debris, 19-X-2001, E. Fletes 2941 (INB 3469065). Corcovado National Park, San Pedrillo Station, on sandy soil in a pathway along the river San Pedrillo, 3-IX-2002, E. Fletes 4180 (INB 3558259). GUANACASTE: Tempisque Conservation Area,



Fig. 1.- *Geastrum albonigrum*. Several basidiomata, from Costa Rica, showing the black and white colour. J. López 4869 (INB 3758538). Holotypus



Fig. 2 - *Geastrum albougrum*. Four basidiomata from Mexico, showing similar features. G. Guzmán 30743 (XAL).

Palo Verde National Park, La Venada Trail, on soil with plant debris, 25-IX-2003, I. López 4852 (INB 3758520). El Pizote Trail, on soil with plant debris, 27-IX-2003, I. López 4869 (INB 3758538) **MEXICO:** CHIAPAS: Tapachula, under coffee trees, 3-X-1993, G. Guzmán 30743 (XAL).

Basidiomata globose before maturity, 10-15 mm diameter, showing a spiny surface (fig. 1), which disintegrates after opening. They can reach up to 40 mm diameter, showing nonhygroscopic rays and a well-developed white rhizomorph up to 20 mm long (figs. 1-2). Exoperidium splitting to the middle into 5-7, mostly 5-6, rays of varying shape, recurving or not under the exoperidial disc (figs. 1-2). Mycelial layer ephemeral with a brownish spiny surface. Each spine is made of hair aggregates up to 1500 μm high with pointed ends. The hairs are aseptate, 2-4 μm diameter and about 1 μm cell wall thickness. Fibrous layer white (figs.

1-2), papyraceous, from which a persistent, filiform, whitish, rhizomorph initiates. Pseudoparenchymatous layer dark brownish to black, with transverse cracks (fig. 1). Endoperidium globose, but often appears flattened, 12-15 mm diameter, sessile, pubescent, chocolate blackish, with a fibrillose, mammiform, non delimited peristome. Apophysis absent. Mature gleba black, with capillitium up to 8 μm diameter, fuscous with branched attenuated ends. Spores spherical, black in mass, 3-5 μm diameter, ornamentation included, which is made of cylindrical warts 0.6-1 μm long, fused in crests sometimes (figs. 3-4). **Holotype:** Costa Rica, Guanacaste, Tempisque Conservation Area, Palo Verde National Park, El Pizote, in soil with plant debris, 27-IX-2003, leg. I. López 4869 (INB 3758538). **Isotype:** MA-Fungi 59260.

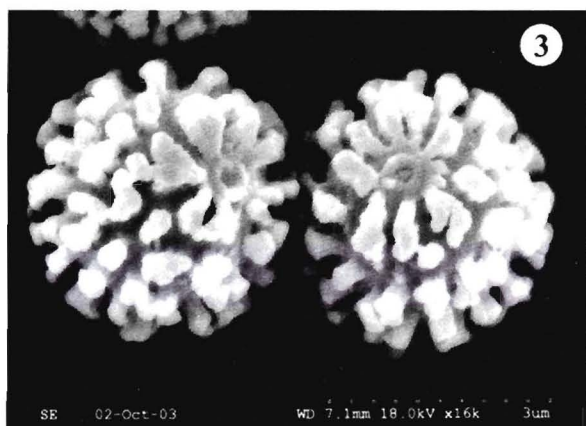


Fig. 3.- Spores of *Geastrum albonigrum*, showing cylindric spines, both isolated and fused in crests. E. Fletes 2941 (INB 3469065).

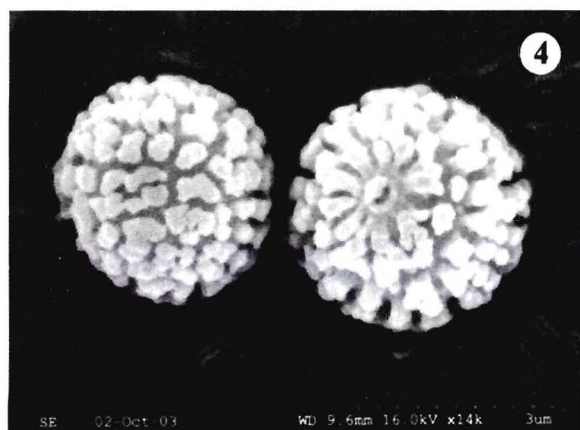


Fig. 4.- Spores of *Geastrum albonigrum* with the same type of ornamentation. G. Guzmán 30743 (XAL).

DISCUSSION

Two species show some resemblance to *G. albonigrum*; one is *G. coronatum* Pers., having stalked endoperidium and a well-developed apophysis, exoperidium subhygroscopic (SUNHEDE, 1989) or not (CALONGE, 1998), always lacking a rhizomorph and the contrasting white fibrous and black pseudoparenchymatous layers. All these features separate well this species from *G. albonigrum*. The other close species is *G. lloydianum* (Rick) P. Ponce de León, with a blackish subpedicellate or sessile endoperidium, with sulcate peristome and exoperidium lacking of any rhizomorph (PONCE DE LEON, 1968), characters which distinguish well this taxon from *G. albonigrum*.

On the other hand, the new species published after PONCE DE LEON's (1968) monograph are quite different. Thus, LAZO (1972) proposed *G. jurei* from Chile as a new taxon, which shows a basidioma rather alike to *G. fornicatum* (Huds.) Hook., with a fornicate exoperidium, pseudostipitate endoperidium and fimbriate peristome. PILAT (1972) described *G. deylli* from Mongolia, which is hygroscopic, shows a white endoperidium and resembles very much *G. floriforme* Vittad. *Geastrum huneckii* Dörfelt, also found in Mongolia (DÖRFELT, 1981), shows quite different features, such as a hygroscopic exoperidium made of

four rays, white endoperidium showing a well-delimited peristome and bigger spores, 5.5-6.5 μm diameter. In 1983 DÖRFELT & MÜLLER-URI proposed *G. pedicellatum*, which shows a doubtful identity, according to SUNHEDE (1989). Finally, CALONGE & *al.* (2000) have described *G. ovalisporum* Calonge & Moreno-Arr., from Bolivia, which has oval spores as the main distinctive character.

Thus, *G. albonigrum* ensembles a combination of characters, such as exoperidium with a spiny, ephemeral mycelial layer, white fibrous layer from which a persistent rhizomorph initiates, and blackish pseudoparenchymatous layer, together with a sessile black endoperidium, showing fibrillose non delimited peristome, that give enough strength to propose it as a new species.

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NEW SPECIES OF *GEASTRUM*

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