



Geastrum hirsutum or *G. trichiferum* (Basidiomycota, Geastraceae): which name do use?

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Abstract

Geastrum hirsutum was described in 2006 and synonymized with *G. trichiferum* in 2012. Reevaluating the nomenclature and the typification of the two *Geastrum* species, it was found that *G. trichiferum* cannot be used since its basionym *Geaster trichifer* is a *nomen nudum* as it was published without description or reference to a previous effectively published description. Attempting to validate the name *G. trichifer*, a lectotypification was made in 2012, which does not resolve *G. trichifer*'s situation, since *G. hirsutum* has publication date priority over the lectotypification. As a *nomen nudum*, *Geastrum trichiferum* becomes unavailable and can no longer be used, since it was not validly published.

Key words – earthstars – gasteromycetes – nomenclature – taxonomy – typus

Introduction

Geastrum Persoon has been somewhat well studied in Brazil during recent years (Baseia et al. 2006, Baseia & Calonge 2006, Leite et al. 2007, 2011, Cortez et al. 2008, Fazolino et al. 2008, Trierveiler–Pereira et al. 2011, Silva et al. 2011, 2013, Cabral et al. 2014a, 2014b, Sousa et al. 2014a, 2014b, 2014c). Moreover, some species need to be revised although some current herbarium exsiccatae are not kept in suitable storage conditions to be studied. For *Geastrum*, it is imperative that collection specimen has mature basidiomata, and that the essential identification characters are easily visible such as form and delimitation of the peristome, mycelial layer and presence of gleba for analysis of the basidiospores and capillitium (Zamora et al. 2014).

Geastrum hirsutum Baseia & Calonge was protologued in 2006, characterized by the development of the subiculum, exoperidium with hairy mycelial layer, hairs 1.5–3 mm tall, delimited peristome, small basidiospores (2.5–3 µm) and as inhabitants of wood, termite mounds and leaf–litter (Baseia & Calonge 2006). In 2012, the species was synonymized with *Geastrum trichiferum* Rick due to similar characteristics (Trierveiler–Pereira & Silveira 2012).

Historical of the designations of *Geaster trichifer*

Lloyd (1907) used the name *Geaster trichifer* Rick for the first time together with an illustration of its basidiome and its comparison with *G. mirabilis* Mont., considering that *G. trichifer* exoperidium is more strigose than that of *G. mirabilis*. In his analysis, Lloyd (1907) also alleged that *G. trichifer* was similar to *G. lignicola* Berk. Lloyd (1907) did not include a description or a good picture of *G. trichifer*.

Saccardo & Trotter (1912) cited *G. mirabilis* with two varieties, *G. mirabilis* var. *subiculosus* (Cooke & Masee) Lloyd and *G. mirabilis* var. *trichifer* (Rick) Sacc. & Trotter, differing them by the larger and clearer basidiomata in *G. mirabilis* var. *subiculosus*, and the strongly strigose exoperidium in *G. mirabilis* var. *trichifer*. Gibbs (1916) also considered *G. mirabilis* var. *trichifer*, whereas Lloyd (1918), Coker & Couch (1928) and Dennis (1953) considered the two varieties to be separate species, differentiating *G. mirabilis* from *G. trichifer* by using the same characteristics cited by Lloyd (1907), however, adding the color and the size of the exoperidium hairs, as well as the diameter of basidiospores (3–3.6 µm).

Rick (1928), in a mycological summary for the State of Rio Grande do Sul, southern Brazil, listed the new taxa that were examined and included the location of the type–species and the journal in which they were published. In this list, it was indicated that Lloyd (1907) was the first to publish *G. trichifer*, thus agreeing with Lloyd (1925). Later on, *G. trichifer* was again mentioned for the same location (Rick 1930, 1961).

Ponce de Leon (1968), in a review of the family Geastraceae, included *G. trichifer* and *G. mirabilis* in the synonymy of *Geastrum schweinitzii* (Berk. & M.A. Curtis) Zeller. Trierveiler–Pereira & Silveira (2012) lectotypified *Geaster trichifer* in *Geastrum trichiferum* and synonymized *G. hirsutum* with *G. trichiferum*, concluding that both presented the same morphological characteristics.

Results and discussion

The original publication of *Geaster trichifer* (= *Geastrum trichiferum*) in Lloyd (1907) did not include a description, nor designated the type or any indication that the referred species was new. According to the Melbourne Code, in the Art. 38.7 and 38.9 (McNeill et al. 2012), prior to 1st January 1908 a name is valid if there is an illustration with analysis that helps in the identification of the species. Based on this information, *G. trichifer* should be considered a *nomen nudum*, since the original illustration does not provide sufficient information for its perfect and unequivocal identification.

In the first publication of this species, only illustrations (p. 314, fig. 147 and 148) complemented by a succinct comment are presented, mentioning that the species exhibits a strongly strigose exoperidium. In the legend of the figures, the species is only identified as *Geaster* sp., and throughout the comments it was reported that the species was named *G. trichifer* by Rick. In accordance to the taxonomical studies on the genus *Geastrum*, the strongly strigose exoperidium alone does not enable the specimen to be identified at the species level, considering that other species in the genus do show this characteristic, as *Geastrum albonigrum* Calonge & M. Mata (Calonge & Mata 2004) and *G. inpaense* T.S. Cabral, B.D.B. Silva & I.G. Baseia (Cabral et al. 2014a).

A lectotypification was recently made by Trierveiler–Pereira & Silveira (2012) in an attempt to maintain the name '*G. trichiferum*'. *Geastrum trichiferum*'s situation was, however, not decided, since *G. hirsutum* has priority over the lectotypification carried out, due to the publication date. Therefore, it is our conclusion that *G. trichifer* is a *nomen nudum* and consequently unavailable, *i.e.* no longer able to be used since it was never published and the lectotypification carried out in 2012 has no effect. To date, *G. hirsutum* is the only name to be considered.

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