

NOTA

Brief notes on three gasteroid fungi in the Andean Patagonia

Rugolo, Maximiliano; Francisco Kuhar

Centro de Investigación y Extensión Forestal Andino Patagónico (CIEFAP), C.C. 14, (9200) Esquel, Chubut, Argentina. Correspondig autor: franciscokuhar@gmail.com

► **Abstract** — Rugolo Maximiliano; Francisco Kuhar. 2014. "Brief notes on three gasteroid fungi in the Andean Patagonia". *Lilloa* 51 (1). In reviewing the entire collection of the genus *Gastrum* of the BAFC herbarium, two samples were found containing unidentified specimens from Patagonia, one from Los Alerces National Park (Argentina, Chubut) and the other one from Mallín Ahogado (Argentina, Río Negro). Both were determined as *Gastrum triplex*, resulting in the first record of the species in this region. In addition, the finding of a specimen of *Gastrum pectinatum* in Lago Puelo (Argentina, Chubut) and one of *Tulostoma brumale* in Esquel (Argentina, Chubut) are reported as the first records of those species in Patagonia. SEM images of spores are provided.

Keywords: *Gastrum*, *G. pectinatum*, *G. triplex*, *Tulostoma*, *T. brumale*.

► **Resumen** — Rugolo Maximiliano; Francisco Kuhar. 2014. "Breves notas sobre tres hongos gasteroides de la Patagonia Andina". *Lilloa* 51 (1). Durante la revisión de ejemplares del género *Gastrum* del herbario BAFC, se encontraron dos colecciones de Patagonia sin identificar, la primera proveniente del Parque Nacional Los Alerces (Argentina, Chubut), y la segunda de Mallín Ahogado (Argentina, Río Negro). Ambos fueron determinados como *Gastrum triplex*, resultando la primer cita de la especie para la región. Además el hallazgo de *Gastrum pectinatum* en Lago Puelo (Argentina, Chubut) y de *Tulostoma brumale* en Esquel (Argentina, Chubut) representan nuevos reportes de dichas especies para Patagonia.

Palabras clave: *Gastrum*, *G. pectinatum*, *G. triplex*, *Tulostoma*, *T. brumale*.

The Andean Patagonian weather is humid and cold, with snowfalls concentrated during the winter, and rain and frost throughout the year. Both deciduous and evergreen trees compose the region. Dominant tree species include *Nothofagus antarctica* (G. Forst.) Oerst., *N. pumilio* (Poepp. & Endl.) Krasser, and *Austrocedrus chilensis* (D. Don) Pic. Serm. & Bizzarri. The analyzed material was collected by M. Rajchenberg, F. Kuhar and M. Rugolo and deposited in the BAFC herbarium. Capillitrial threads and spores were mounted and observed under the light microscope (LM) and scanning electron microscope (SEM EDS INCA ENERGY, Oxford Instruments Scanning electron microscope with Field Emission Gun (FEG) Zeiss DSM 982 GEMINI secondary electrons detector in-lens). The keys used to identify our materials are those published by Wright (1987), Sun-

hede (1989), Soto and Wright (2000). The present work provides notes on new cites of gasteroid fungi in order to contribute to the knowledge of the Argentinean mycobiota. Since our materials agree with the cited descriptions, we briefly discuss only what concerns our findings.

TAXONOMY

Gastrum triplex Jungh. [as 'Geaster'], Tijdschr. Nat. Gesch. Physiol. 7: 287.1840.
Fig. 1A; 2A

Description.— Sunhede (1989)

Studied material.— ARGENTINA. Prov. Río Negro, Dpto. Bariloche, Mallín Ahogado, XI-1994, Mario Rajchenberg 51671 (BAFC); Prov. Chubut, Dpto. Futaleufú, Lago Krugger, XI-1993, Mario Rajchenberg 34915 (BAFC).

Note.— All basidiomes are devoid of the fleshy pseudoparenchymatous layer, which

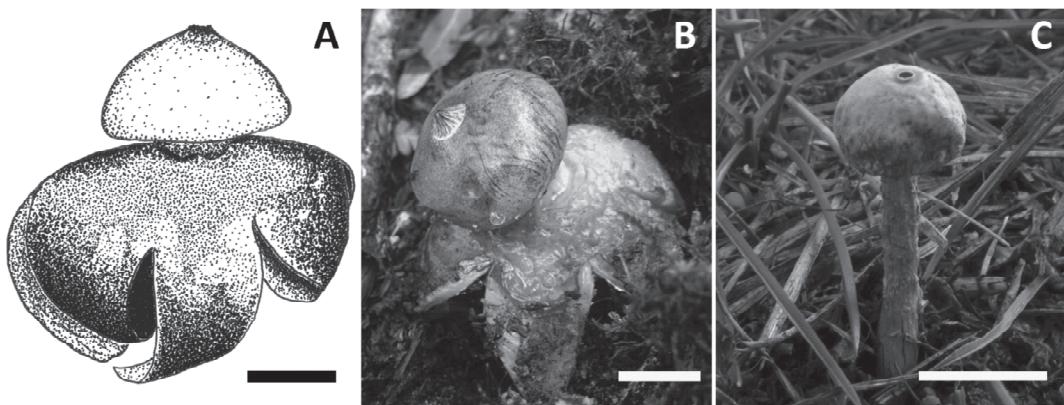


Fig. 1. A) *Geastrum triplex*, showing the remnants of the fleshy pseudoparenchymatous layer surrounding the base of the endoperidial body. B) *G. pectinatum*. C) *Tulostoma brumale*. Scale bar = 1 cm.

remains only as fragments of the characteristic collar surrounding the endoperidial body. Nevertheless the remaining features allow a precise determination following Sunhede (1989). Zamora *et al.* (2013) proposed the use of non-traditional characters such as macrochemical spot tests and rhizomorphal anatomy for a precise delimitation of this species, but this type of information is no longer available in our materials. This species has recently shown to be polyphyletic by Kasuya *et al.* (2012) by a molecular analysis which included Argentinean material collected in the central and northern Argentina. The results suggest that those collections (nested in the «clade 3») are more closely related to *G. triplex* sensu stricto than European specimens are. Molecular analyses of Patagonian material are needed

in order to verify their position. *G. triplex* has been recorded by Soto and Wright (2000) and Wright and Albertó (2006) in the province of Buenos Aires and by Hernandez Caf-fot *et al.* (2013) in the province of Córdoba. This is the first record of *G. triplex* in the Argentinean Patagonia.

Geastrum pectinatum Pers., Syn. meth.
fung. (Göttingen) 1: 132. 1801.
Fig. 1B; 2B

Description.— Sunhede (1989)

Studied material.— ARGENTINA. Prov. Chubut, Dpto. Cushamen, Lago Puelo, 42° 5' 36,798"S 71° 38' 1,9386"O, 150m, 19-X-2013, Maximiliano Rugolo 52328 (BAFC).

Note.— Sunhede (1989) indicates that in Northern Europe *G. pectinatum* can mainly

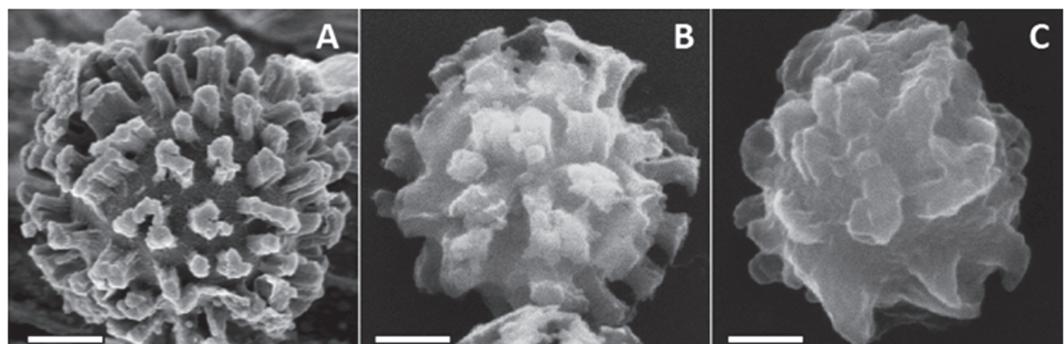


Fig. 2. SEM images of the spores. A) *Geastrum triplex*, B) *G. pectinatum*, C) *Tulostoma brumale*. Scale bar 1 µm.

be considered a «coniferous wood species», mostly growing under *Picea abies* (L.) H. Karst., *Pinus sylvestris* L. or *Juniperus communis* L. Our collection consists of one well-preserved mature basidiome found on *Austrocedrus chilensis* litter, although Soto and Wright (2000) reported some collections of this species growing under *Eucalyptus* spp. stands in the Province of Buenos Aires. This species has been also recorded in the province of Buenos Aires by Spegazzini in 1955, as *Geaster* sp. (Soto and Wright, 2000) and by Spegazzini (1927 as *Geaster striatus*), Dominguez de Toledo (1989, 1993) and Hernandez Caffot *et al.* (2013) in Córdoba. This is the first record of *G. pectinatum* in the Argentinean Patagonia.

Tulostoma brumale Pers., Neues Mag. Bot. 1: 86. 1794.
Fig. 1C; 2C

Description.— Wright (1987)

Studied material.— ARGENTINA. Prov. Chubut, Dpto. Futaleufú, Esquel, 42° 54' 25,9812"S 71° 18' 17,802"O, 563m, 30-VII-2013, Maximiliano Rugolo 52329 (BAFC).

Note.— This species may be somewhat difficult to separate from a «constellation whose species are sometimes very difficult to identify» (Wright, 1987). Although the exoperidium is quite washed away in our exemplars, the correlation of some characters allows a precise determination: the slightly elevated tubular mouth surrounded by a darkened peristome, the thick-walled capillitial threads abruptly swollen at the stirrup-looking septa, and the fructification time in winter, to which this species owes its name. The crystalline matter described by Wright (1987) as generally covering the capillitial threads was only observed in only one basidiome. SEM images of the spores undoubtedly confirm the identification. *T. brumale* has already been cited in the province of Buenos Aires by Wright (1987) who

regarded it as probably introduced from Europe. This would explain the fact that our finding in an urbanized area is the first record in the Argentinean Patagonia.

ACKNOWLEDGEMENTS

We thank Gustavo Guajardo for kindly proofreading our English manuscript. This work was supported by CONICET.

REFERENCES

- Domínguez de Toledo L. S. 1989. Contribución al conocimiento de los gasteromicetes del centro de Argentina. Doctoral Dissertation. Universidad Nacional de Córdoba.
- Domínguez de Toledo L. S. 1993. Gasteromycetes (Eumycota) del centro y oeste de la Argentina. Análisis crítico de los caracteres taxonómicos, clave de los géneros y orden *Podaxales*. Darwiniana 32 (1-4): 195-235.
- Hernández Caffot M. L., Robledo G., Domínguez L. S. 2013. Gasteroid mycobiota (Basidiomycota) from *Polylepis australis* woodlands of central Argentina. Mycotaxon 123: 491.
- Kasuya T., Hosaka K., Uno K., Kakishima M. 2012. Phylogenetic placement of *Gastrum melanocephalum* and polyphyly of *Gastrum triplex*. Mycoscience 53 (6): 411-426.
- Soto M., Wright J. E. 2000. Taxonomía del género *Gastrum* (Basidiomycetes, Lycoperdales) en la provincia de Buenos Aires, Argentina. Boletín Sociedad Argentina de Botánica 34: 185-202.
- Spegazzini C. 1927. Gasteromycetas Argentinas. Physis 8 (31): 421-435.
- Sunhede S. 1989. Geastraceae (Basidiomycotina) Morphology, ecology, and systematics with emphasis on the North European species. Synopsis Fungorum 1.
- Wright J. E. 1987. The Genus *Tulostoma* (Gasteromycetes) – A world monograph. J. Cramer, Berlin – Stuttgart, 338pp.
- Zamora J. C., Calonge F. J., Martín M. P. 2013. New sources of taxonomic information for earthstars (*Gastrum*, Geastraceae, Basidiomycota): phenoloxidases and rhizomorph crystals. Phytotaxa 132 (1): 1-20.