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## BRIEFREPORT

### Contribution to the knowledge of pathogenic fungi of spiders in Argentina. Southernmost record in the world

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Received 23 February 2016; accepted 29 October 2016

#### KEYWORDS

Spiders;  
Pathogens;  
Fungi;  
Biodiversity

#### PALABRAS CLAVE

Arañas;  
Patógenos;  
Hongos;  
Biodiversidad

**Abstract** The aim of this study was to identify entomopathogenic fungi infecting spiders (Araneae) in a protected area of Buenos Aires province, Argentina. The Araneae species identified was *Stenoterommata platensis*. The pathogens identified were *Lecanicillium aphanocladii* Zare & W. Gams, *Purpureocillium lilacinum* (Thom) Luangsa-ard, Houbraken, Hywel Jones & Samson and *Ophiocordyceps caloceroides* (Berk & M.A. Curtis). This study constitutes the southernmost records in the world and contributes to expanding the knowledge of the biodiversity of pathogenic fungi of spiders in Argentina.

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#### Aporte al conocimiento de los hongos patógenos de arañas en Argentina. El registro más austral del mundo

**Resumen** El objetivo de este estudio fue identificar hongos entomopatógenos de arañas en un área protegida de la provincia de Buenos Aires, Argentina. La especie de araña identificada fue *Stenoterommata platensis*. Los patógenos identificados fueron *Lecanicillium aphanocladii* Zare y W. Gams, *Purpureocillium lilacinum* (Thom) Luangsa-ard, Houbraken, Hywel Jones y Samson y *Ophiocordyceps caloceroides* (Berk y M.A. Curtis). Este estudio constituye el registro más austral del mundo y contribuye a ampliar el conocimiento de la biodiversidad de hongos patógenos de arañas en Argentina.

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<http://dx.doi.org/10.1016/j.ram.2016.10.007>

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Please cite this article in press as: Manfrino RG, et al. Contribution to the knowledge of pathogenic fungi of spiders in Argentina. Southernmost record in the world. Rev Argent Microbiol. 2017. <http://dx.doi.org/10.1016/j.ram.2016.10.007>

Entomopathogenic fungal species parasitizing spiders have been reported worldwide<sup>2,4,7,10,11</sup>. Commonly, the fungal genera recorded include *Akanthomyces*, *Cordyceps*, *Gibellula*, *Nomuraea*, *Ophiocordyceps* and *Torrubiella*. *Gibellula mainsii*, *G. brunnea* and *G. clavata* have been reported in South America<sup>9</sup>, whereas *Gibellula clavulifera* var. *major* has been recorded in Mexico<sup>6</sup>. However, no attempts have been made to identify the host spider species. In Argentina, the only record of fungal pathogens of spiders is *Nomuraea atypicola* infecting *Actinopus* spp.<sup>3</sup>. Thus, the aim of this study was to identify entomopathogenic fungi of Araneae in "El Destino", a protected area of Buenos Aires province, Argentina.

Araneae specimens were collected during 2012, 2013 and 2014 from the protected area known as "El Destino", located in Pearson (33°39'09"S and 60°53'25"W), Magdalena, Buenos Aires province, 3 km away from the Río de La Plata River. The environments are principally forests of *Celtis tala* Gillet ex Planchon (Ulmaceae), associated with *Jodina rombifolia* Hook et Arn. – (Santalaceae) *Acacia caven* (Mol.) Mol. (Leguminosae). These areas have soils containing sedimentary shells and are subject to seasonal flooding. Spiders were hand-collected individually mainly from under trees (leaf litter) and under stones close to vegetation, and from soil samples and holes, and deposited with fine forceps into small clean capped plastic tubes that were identified with the site, date, and collector's name. Fungi were recovered from freshly collected specimens using direct isolation techniques<sup>1,5</sup>. For this purpose, the spiders were collected with fine forceps sterilized by flame and their surface was superficially disinfected by submerging them first in ethanol 70° for 20–30 s and then washed in sterile distilled water. Mycelia or fungal spores were taken with a sterile needle or looper and inoculated into 60 mm sterilized Petri dishes. The culture medium used was Sabouraud dextrose agar (SDYA) + antibiotics (gentamicin + chloramphenicol) and SDYA with crystal violet and dodine. The dishes were then sealed with Parafilm® and cultures were incubated in an incubator in darkness at 25 °C for 2 weeks.

Microscopic and macroscopic descriptions were made from SDYA and from malt extract agar for *Lecanicillium aphanocladii* and *Purpureocillium lilacinum*, respectively. Mycelia were mounted in lactophenol/cotton blue (0.01%, w/v) and observed by phase contrast under an Olympus CH3 microscope. Fungal preparations were photographed using a Nikon Optiphot microscope equipped with differential interference contrast fitted with a Canon PowerShot A80 camera. The length and width of fungal structures (conidia, conidiogenous cells and mycelia) were measured to enable species identification. Fungal species were identified according to taxonomic keys and monographs in Samson et al.<sup>8</sup>, and Zare and Gams<sup>12</sup>.

The Araneae species identified was *Stenoterommata platensis* Holmberg 1881 (Mygalomorphae, Nemesiidae) and 13 specimens (nine females, two males and two juveniles) were collected.

Fungal identification and taxonomic observations:

*Lecanicillium aphanocladii* Zare & Gams Nova Hedwigia 73 (1–2): 27 (2001) (Fig. 1).

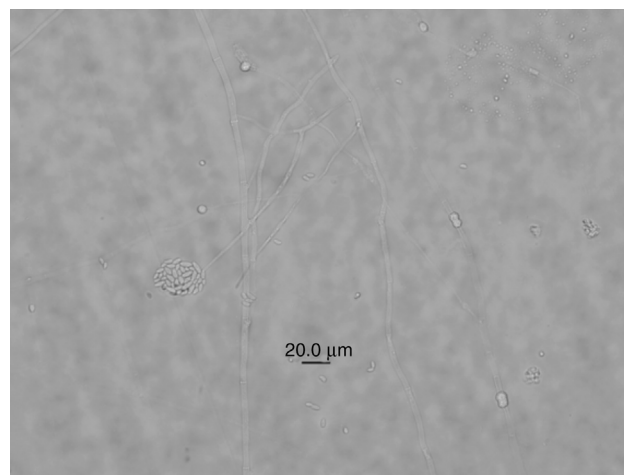


Figure 1 Conidia and phialides of *Lecanicillium aphanocladii*.

=Synonymy:

*Acremonium araneorum* Petch, Transactions of the British Mycological Society 16 (4): 242 (1931).

*Aphanocladium araneorum* (Petch) W. Gams, Cephalosporium-artige Schimmelpilze: 198 (1971).

Classification: Ascomycota, Pezizomycotina, Sordariomycetes, Hypocreomycetidae, Hypocreales, Cordycipitaceae.

Date: June 20, 2014.

Culture collection access number: CEP 556

Collector: Barneche, J.

Leg. & det.: López Lastra, C.C.

Description:

Macroscopic characterization: colonies growing up to 50 mm in diameter after 10 days at 25 °C. Color white cream to lightly orange and colony reverse white cream, mycelia sticky.

Microscopic characterization: conidiogenous cells 4.5–9 μm in length (average 48.5) × 2 μm in width. Globose to slightly ovoid conidia 4.03–5.72 μm in length (average 4.82 μm) × 1.90–3.09 μm (average 2.60 μm) in width.

*Purpureocillium lilacinum* (Thom) Luangsa-ard, Houbraaken, Hywel-Jones & Samson, FEMS Microbiology Letters 321: 144 (2011) (Fig. 2).

=Synonymy

*Penicillium lilacinum* Thom, Bull. Bur. Anim. Ind. U.S. Dep. Agric.: 73 (1910)

*Paecilomyces lilacinus* (Thom) Samson, Studies in Mycology 6: 58 (1974)

*Penicillium amethystinum* Wehmer

*Spicaria rubidopurpurea* Aoki, Bull. Imp. Seri cult. Exp. Sta. Japan: 419–441 (1941)

Classification: Ascomycota, Pezizomycotina, Sordariomycetes, Hypocreomycetidae, Hypocreales, Ophiocordycipitaceae.

Date: June 20, 2014.

Culture collection access number: CEP 555

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