

FIRST RECORD OF *Geoglossum fallax* (Geoglossaceae, Ascomycota) IN THE SOUTHERNMOST REGION OF THE STATE OF BAHIA, NORTHEASTERN BRAZIL

PRIMEIRO REGISTRO DE *Geoglossum fallax* (Geoglossaceae, Ascomycota) NA REGIÃO DO EXTREMO SUL DA BAHIA, NORDESTE DO BRASIL

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ABSTRACT: Informally known as black earth tongue, *Geoglossum fallax* has a large terrestrial dark brown or black ascoma. The species belongs to the Geoglossomycetes class of fungi, which includes the genera *Geoglossum*, *Sarcoleotia*, *Thuemenidium* and *Trichoglossum*. This study describes the first record of *G. fallax* in Bahia, northeastern Brazil, and presents the species' main identification features. The specimens were found growing on a lawn, in Campus X, Bahia State University (UNEB), municipality of Teixeira de Freitas, southernmost region of Bahia state. After gross inspection and microscopy, all specimens were identified based on the specialized literature. Slides and exsiccata of specimens were deposited in the Fungi Collection, Fungal Biology Laboratory, *Campus X*, UNEB. This is the first record of *G. fallax* in northeastern Brazil.

KEYWORDS: Fungi Taxonomy. Earth Tongues. Geoglossomycetes.

INTRODUCTION

The fungus *Geoglossum fallax* (E. J. Durand, *Annales Mycologici*, VI(5):1-36, 1908) belongs to the Ascomycota phylum, Geoglossomycetes class, Geoglossales order, Geoglossaceae family, and *Geoglossum* genus.

Geoglossomycetes is a relatively small class, and the fungus species it includes are commonly called black earth tongues. According to Hustad et al. (2013), Geoglossomycetes fungi are characterized by large, dark brown or black ascoma.

Kirk et al. (2008) and Schoch et al. (2009) classify the Geoglossales order in six genera and approximately 50 species. More specifically in Brazil, Pereira and Bezerra (2011) found that *Geoglossum*, *Trichoglossum* and *Microglossum* are the most common genera in the country. Ohenoja (1995) investigated Geoglossales and concluded that these saprobic fungi grow in lawns, pastures, prairies as well as along roads, rivers, and swamps.

Geoglossaceae includes terrestrial, stipitate, clavate or capitate, gymnocarpic black ascomycetes presenting inoperculate asci and generally septate, elliptical to cylindrical or clavate ascospores. When mature, in general these fungi are dark, resembling soot in aspect (ARAÚZO; IGLESIAS, 2014).

The members of the Geoglossaceae family normally are terrestrial, with apothecial ascoma. Measuring up to 10 cm in height, these fungi have cartilaginous, serous consistency and may have a stipe. Color of ascomas may vary between black,

black to violet, greenish, or yellowish (PEREIRA; BEZERRA, 2011).

Schoch et al. (2009) established that the Geoglossales order contains six genera (among which *Geoglossum*, *Sarcoleotia* and *Trichoglossum*), and that the Geoglossaceae family was previously placed in the Leotiomycetes class.

Currently, geoglossomycetes include the genera *Geoglossum*, *Sarcoleotia*, *Thuemenidium* and *Trichoglossum*, with 22, four, five, and 19 species each, respectively (KIRK et al., 2008).

This study describes the first record of *G. fallax* (Geoglossaceae, Ascomycota) in southern Bahia, northeastern Brazil, and discusses the main morphological characteristics that enabled its identification.

MATERIAL AND METHODS

All fungi identified as *G. fallax* were collected in the lawn of *Campus X*, Bahia State University (UNEB) (17°33.316' S; 39°44.600' W), municipality of Teixeira de Freitas, state of Bahia, Brazil (collected in July 2017).

After photographic record of specimens in their original habitat, 10 individuals were collected and immediately taken to the Fungal Biology Laboratory, *Campus X*, UNEB. All material was submitted to gross inspection and microscopic analysis, and species was determined based on identification keys (DURAND, 1908; GEESTERANUS, 1965; OHENOJA, 1995;

KUCERA; LIZON, 2012; ARAUZO; IGLESIAS, 2014; CANNON, 2016; RIDGE, 2016; SANCHEZ-IGLESIAS, 2017). Exsiccate of specimens and slides containing sections used in the microscopic analyses were deposited in the Fungi Collection, Fungal Biology Laboratory, *Campus X*, UNEB.

RESULTS AND DISCUSSION

The specialized literature describes *G. fallax* as a fungus species presenting dark, fleshy, firm, single 12 mm to 85 mm ascomata mildly spatuliform at the base; generally spatuliform 3 mm to 11 mm clavules containing the reproduction organ with one or two central, longitudinal grooves undifferentiated from stipes and between 3 mm and 11 mm in width; stipes varying between 1 mm and 3 mm in width; subcylindrical asci becoming clavate at the top, with eight ascospores and measuring 132 μm to 225 μm in length and 16 μm to 20 μm in width, translucent to black or light brown long, thin, slightly curved ascospores with slightly curved, rounded ends with three to 14 septa (though the

number of septa may vary between seven and 13) measuring 45 μm to 115 μm in length and 4 μm to 7 μm in width; translucent or light brown, cylindrical, thin, septate, clustered, 2 μm to 4 μm thick paraphyses containing a generally elliptical to clavate or piriform apical cell that may be curved at the apex, measuring between 5 μm and 12 μm (ARAUZO; IGLESIAS, 2014; CANNON, 2016; HUSTAD et al., 2013; KUCERA; LIZON, 2012; OHENOJA, 1995; SCHOCH et al., 2009).

All *G. fallax* specimens collected and identified in this study presented the following characteristics: single, typically black 25 mm to 55 mm tall ascoma with a narrow base that enlarges slightly at the top; spatuliform clavula measuring 3 mm to 10 mm across presenting a longitudinal groove; stipes varying between 2 cm and 5 cm in height and 2 mm in width; claviform asci containing eight long ascospores measuring 150 μm to 170 μm in length and 17 μm to 20 μm in width; light brown, mildly curved ascospores measuring 100 μm to 115 μm in length and 4 μm to 5 μm in width with eight to 13 septa (Figure 1).

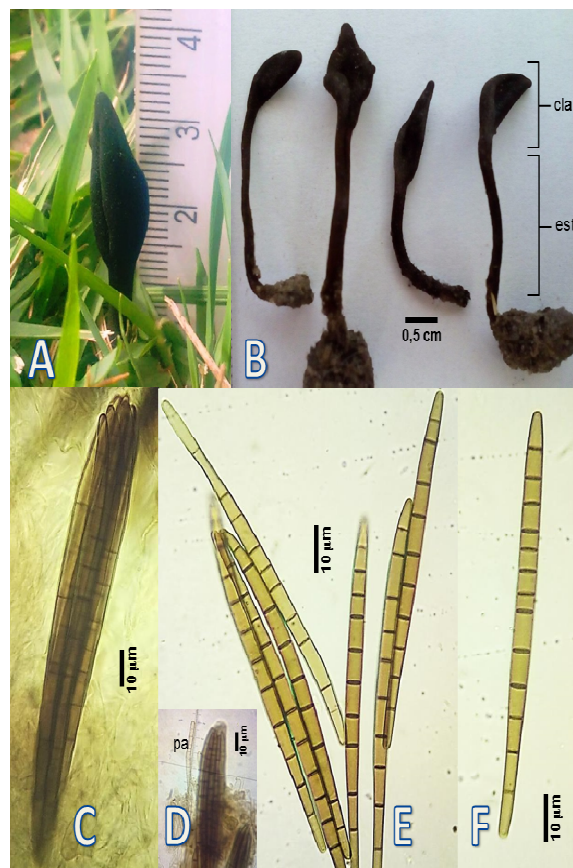


Figure 1. (A) *Geoglossum fallax* in its habitat. (B) Ascocarps: clavula (cla) and stipe (est). (C) Ascus. (D) Paraphysis (pa). (E) Ascospores with 9 to 11 septa. (F) Ascospore with 13 septa. (Microphotographs: 1,000X).

Until 2008, no records of Geoglossaceae fungi were made in northeastern Brazil; however, a survey carried out by Pereira and Bezerra (2011) revealed the occurrence of *Trichoglossum hirsutum* in Charles Darwin Ecological Unit and in João de Vasconcelos Sobrinho Ecopark, state of Pernambuco, for the first time.

Kucera and Lizon (2012) claim that it is virtually impossible to assess the abundance of geoglossaceous fungi, because fruiting bodies emerge sporadically. This means that every new specimen found should to be examined accurately, since it may shed new light on the taxonomy and ecology of these species.

The climate in the southernmost region of the state of Bahia, Brazil, is tropical humid or sub-humid with a short dry season whose consequences are offset by higher rainfall in the other seasons. August is the driest month, when rainfall stands at 58 mm, while November is the rainiest, with 136 mm. The hottest and coldest months are January and June, when temperatures reach 26.2°C and 22.0°C, respectively. Also, mean temperature in Teixeira de Freitas is 23.4°C, and mean rainfall is 1,099 mm (CLIMATE DATA, 2017). The most intense rains

fall in November to January, and temperature maximums are recorded in December (KOUSKY; CHU, 1978; RAO; HADA, 1990; TANAJURA; GENZ; ARAÚJO, 2010).

Importantly, the present study shows that *G. fallax* managed to grow in a region that would otherwise pose adverse conditions to fungi of the Geoglossaceae family. Ascocarps emerged during atypical climate settings in the region (July 2017), when higher rainfall and lower mean temperatures were recorded compared to the time series for July. For Arauzo and Iglesias (2014), temperate conditions may favor the growth of *G. fallax*, since it prefers low temperatures and high humidity, which are not the climatic conditions normally observed in the southernmost region of the state of Bahia.

All in all, the data obtained allow concluding that this is the first record of *G. fallax* in the southernmost region of the state of Bahia and in northeastern Brazil. Thus, this finding becomes important for studies of taxonomy and ecology of fungi Ascomycota, because studies of Atlantic Forest fungal in the southernmost of Bahia are rare.

RESUMO: Conhecido como “língua-da-terra”, o fungo *Geoglossum fallax* pertence à classe Geoglossomycetes e é tipicamente caracterizado por ascocarpo terrestre grande, escuro, variando de cor entre marrom-escuro a preto. Atualmente encontram-se incluídos na classe Geoglossomycetes os gêneros *Geoglossum*, *Sarcoleotia*, *Thuemenidium* e *Trichoglossum*. Os objetivos deste trabalho foram apresentar o primeiro registro da espécie *G. fallax* no extremo sul da Bahia, nordeste brasileiro, e descrever as principais características que permitiram sua identificação. Os espécimes foram encontrados em um gramado no *Campus X* da Universidade do Estado da Bahia (UNEB), município de Teixeira de Freitas. Todo o material foi analisado macro e microscopicamente e identificado com base na literatura especializada. Lâminas e exsiccatas dos espécimes foram depositadas na Micoteca do Laboratório de Biologia dos Fungos, *Campus X* da UNEB. A identificação de *G. fallax* confirma o primeiro registro desta espécie no extremo sul da Bahia e no nordeste do Brasil.

PALAVRAS-CHAVE: Taxonomia de fungos. Língua-da-terra. Geoglossomycetes.

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