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First record of *Brevilegnia longicaulis* Johnson (Saprolegniales) in Brazil

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Abstract.

During a survey of zoosporic organisms the authors found a species identified as *Brevilegnia longicaulis* Johnson. This is the first record of the species occurring in Brazil. In this article, we describe and illustrate *B. longicaulis* isolated from soil and water samples collected in the Mutum stream, municipality of Demerval Lobão, state of Piauí, Brazil.

Key words – oomycota **–** Piauí, taxonomy **–** zoosporic organism

Introduction

Knowledge of the occurrence and diversity of zoosporic organisms is very important for environment conservation. With the exception of the southeast region, studies of these organisms in Brazil are rare, especially for a country of continental size. Few studies have been conducted in the northeast region of the country (Rocha et al. 2001, 2010, 2014).

A study was undertaken to investigate the diversity of zoosporic organisms in the Mutum stream, in the municipality of Demerval Lobão, state of Piauí, Brazil. The studied area is in a good state of preservation. In this area, no study has as yet been conducted. The current study was carried out focusing on the importance of environment preservation and on knowledge of the biodiversity of zoosporic organisms.

Four water and four soil sites in the stream area were sampled every two months, from January to September 2014. The zoosporic organisms were isolated by the multiple baiting technique, utilizing cellulosic, keratinous, and chitinous substrates. At the investigated sites, four isolates of *Brevilegnia* were obtained, all belonging to the species *B. longicaulis*.

The genus *Brevilegnia* was established by Coker and Couch (Cocker 1927), and 10 species are currently recognized as belonging to this genus (Johnson et al. 2002). The type of antheridia, general morphology of the oogonia, the size of the oospores, and the manner of sporangial proliferation are regarded to be relatively stable in this genus (Johnson et al. 2002). The instability of some taxonomic characters (size and form of zoosporangia, the presence or absence of antheridia, the motility of zoospores, and the presence or absence of gemmae) tend to change according to culture conditions(Salvin 1942, Johnson 1950).

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The species *B. longicaulis* is fundamentally characterized by antheridial branches diclinous, oogonia spherical, and oogonial wall smooth (Sparrow 1960, Johnson et al. 2002).

The occurrence of *Brevilegnia* species in Brazil is represented by *B. diclina* J. V. Harv. in São Paulo (Rogers et al. 1970); *B. linearis* Coker in Amazonas (Johnson et al. 2002), Minas Gerais (Oliveira 2004 *apud* Milanez et al. 2007), Piauí (Trindade Junior & Rocha 2013), São Paulo (Pires-Zottarelli & Milanez 1993); *B. megasperma* J. V. Harv. in Pernambuco (Upadhyay 1967); *B. minutandra* Höhnk in Amazonas (Silva, 2002), and *B. subclavata* Couch in Pernambuco (Upadhyay 1967). According to the list of plants and fungi of Brazil *B. longicaulis* has not been recorded in the country (Stéciow et al. 2012, Pires-Zottarelli 2014). This is, therefore, a new record for this species in Brazil.

Material & Methods

The method for zoosporic organism isolation described by Milanez (1989) was used in this study. Soil and water samples were collected and taken to the laboratory. Water samples were placed in 9 cm diameter Petri dishes containing cellulosic baits (seeds of *Sorghum* sp., onion bulb cataphylls, corn husks, paper and cellophane). The soil samples were placed in Petri dishes and dissolved in sterilized distilled water before addition of the cellulose baits. Next, the Petri dishes were incubated at room temperature (25°C−32°C) for 5 days. After incubation, the baits were examined under a light microscope (Olympus BX-50, Japan) and, once the formation of hyphae was observed, they were transferred to Petri dishes with new baits.

Once purified, they were transferred to Petri dishes containing sterilized distilled water and sterilized *Sorghum* sp. seed halves, and incubated until the reproductive organs formed around them. Cultures were maintained at room temperature (25°C−30°C). The cultures were examined on a weekly basis under a light microscope to verify the production of zoosporangia, oogonia and oospores. After taxonomic identification, selected cultures were deposited in the fungi culture and zoosporic organism collection (abbreviated as ZFBR) of the Federal University of Piauí, Teresina, state of Piauí, Brazil.

Results

Taxonomy

Brevilegnia longicaulis Johnson Mycologia 42, 244 1950 Figs 1A-1G

Mycelium denser near substratum, hyphae slender, branched. Gemmae lacking. Zoosporangia clavate or cylindrical; straight or curved; usually terminal, renewed by distinctive sympodial or cymose branching; 85−392 × 18−48 µm. Zoospore discharge brevilegnoid, sometimes dictyucoid and then zoosporangia is usually partly disintegrated and disarticulating; occasionally germinating *in situ*. Encysted zoospore more or less angular, 6−10 µm diam. Oogonia abundant, lateral, occasionally terminal, rarely intercalary; spherical, subspherical or obpyriform, immature ones occasionally proliferating; 22−32 µm diam. Oogonia wall smooth, unpitted. Oogonial stalk straight, usually curved to sinuous, bent, irregular; unbranched, 30−158 µm long. Oosphere frequently maturing. Oospores eccentric, spherical; one per oogonia and usually not filling it; 20−28 µm diam. Antheridial branches usually associated with most oogonia, diclinous, slender, irregular or contorted, branched or unbranched, persisting. Antheridial cells simple; clavate or irregularly tubular, laterally appressed. Fertilization tube not observed.

Material examined − Brazil, Piauí, Demerval Lobão, village Mutum, 07 Aug 2014, JRS Rocha & MAM Macêdo, S5/1−A1/1, ZFBR 159, 05º21.955'S, 42º45.233'W.

Notes – This species easily forms asexual and sexual reproductive organs (Fig 1A-1G) on mycelia growing on *Sorgum* sp seeds in sterile distilled water.

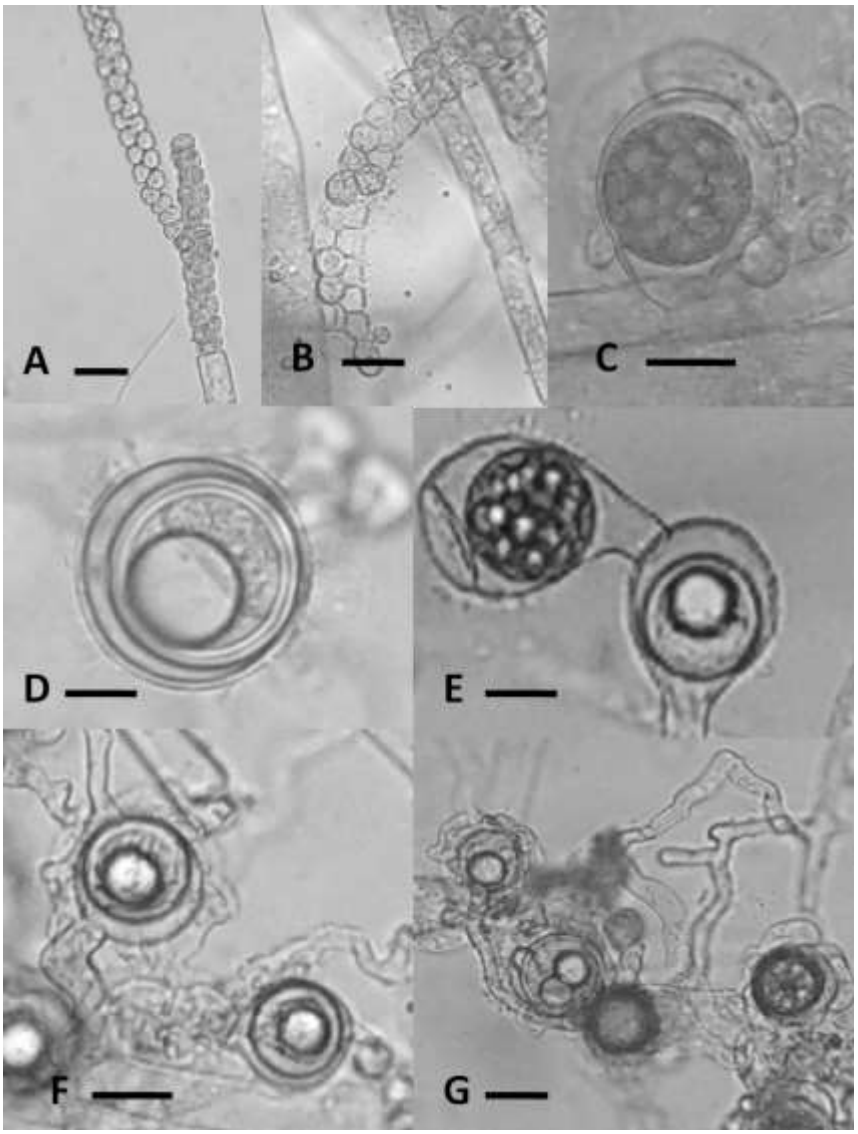

Fig. 1 − *Brevilegnia longicaulis* Johnson. A Zoosporangium brevilegnoid. B Zoosporangium dictyucoid and partly disintegrated and disarticulating. C Young oogonium with oosphere and antheridial branches diclinous; antheridial cells simple, tubular, and laterally appressed. D Oogonium spherical with wall smooth, unpitted; mature oospore, eccentric, spherical. E Oogonium proliferating. F Oogonia with antheridia diclinous. G Antheridial branches associated with most oogonia, diclinous, irregular, and branched. − Bars A, C, E, F, G = 25 µm; B, D = 15 µm.

The description was based on water cultures. The species described in this article can easily be distinguished from one another by the combination of characters such as the origin of antheridial branches and the shape of oogonia.

Brevilegnia longicaulis may be distinguished from *B. diclina* Harvey by the oogonial wall. In *B. diclina* the antheridial branches are diclinous, like *B. longicaulis*, but, the wall is irregular or sparingly papillate or otherwise ornamented (Harvey 1927), while in *B. longicaulis* the oogonial wall is smooth (Fig 1D). *B. linearis* Coker is separatede from *B. longicaulis* by the origin of antheridial branches predominantly androgynous (Fig 1F,G) (Coker 1927). In *B. megasperma* J.V. Harv. the antheridial branches are androgynous or monoclinous, different from those of *B. longicaulis* (Harvey 1930). The achlyoid zoosporangia and predominantly androgynous antheridial branches of *B.bispora* Couch readily distinguishes it from *B.longicaulis* (Couch 1927). Antheridial branch origin in *B.ensenadensis* Steciow is similar to that of *B.longicaulis*, particularly in the preponderance of diclinous branches. In the former, however, monoclinous and androgynous branches are produced, which does not occur in *B.longicaulis* (Stéciow 2003).

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