



First record of *Pythiopsis cymosa* de Bary (Saprolegniales: Oomycota) from freshwater fish in Brazil

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(With 1 figure)

Once observed that oomycetes could cause diseases in fish, the term “saprolegniosis” was employed for these diseases, thus Saprolegniosis reports do not necessarily include only organisms belonging to the order Saprolegniales. Organisms of other orders may also cause diseases in fishes and other aquatic animals. These organisms can generally live as saprophytes, colonizing various types of substrates such as animal or vegetable remains (Johnson et al., 2002). This parasitism affects the fish and is known as “fish mold” and “fish mildew.” The parasite hyphae grow in clumps on the fish skin which is why the term “cotton wool” is given to this disease.

Study with these organisms conducted in ornamental fish farm in Teresina, Piauí, showed the occurrence of *Pythiopsis cymosa* de Bary isolated from skin lesions of the ornamental Silver Hatchetfish (*Gasteropelecus sternicla* Linnaeus, 1758), forming proliferation of hyphae in lesions with the characteristic appearance of “cotton wool”.

Currently, four species are recognized as belonging to the *Pythiopsis* (Johnson et al., 2002). The species of *Pythiopsis* occurring in Brazil are *P. humphreyana* Coker in the state of Amazonas and Minas Gerais; *P. irregularis* R. L. Seym. in the state of Amazonas; and *P. papilliformis* R. L. Seym. in the state of Amazonas (Johnson et al., 2002; Milanez et al., 2007). On analyzing and reviewing the relevant literature, no report was found on the occurrence of *P. cymosa* in Brazil (Milanez et al., 2007; Steciow et al., 2012; Maia and Carvalho, 2015).

The studies were conducted in ornamental fish farm in Teresina, state of Piauí, Brazil, from May to August 2006, (50° 65' 3.92" S, 42° 83' 36.76" W). Dead fish with disease symptoms were collected from farm, packed in plastic bags, placed in coolers and taken to the laboratory of Zoosporic Organisms of the Federal University of Piauí. Initially, the skin lesions of infected fish were scraped with the aid of a sterilized scalpel. Slides were prepared with the collected material and examined under a microscope for an initial analysis of the pathogen. The oomycete observed was identified as *P. cymosa* using Johnson et al. (2005) key

to species. After taxonomic identification, cultures were deposited in the collection of cultures of the Laboratory of Zoosporic Organism of the Federal University of Piauí, access ZFBR 110.

P. cymosa isolates showed mycelium moderately branched, with hyphae slender. Zoosporangia globose, clavate, cylindrical, sometimes lobed or branched; renewed cymosely, simpodially or in basipetalous succession; 45-121 × 30-40 μm diam. Zoospore pyriform on emergence; discharge and behavior of primary zoospores saprolegnoid; primary zoospore cists 8-10 μm diam. Gemmae abundant; globose, subglobose, pyriform, cylindrical; terminal or intercalary; single or catenulate. Oogonia generally terminal, occasionally lateral or intercalary; spherical, obpyriform, occasionally angular or irregular; 18-30 μm diam. Oogonial wall unpitted, smooth, occasionally with 1-2 broad, blunt, inconspicuous protrusions. Oogonial stalk short, straight or irregular; unbranched. Oospores subeccentric; spherical or oval; 1(-3) per oogonium; 14-26 μm diam.; germination not observed. Antheridial branches usually present, monoclinal on terminal oogonia, androgynous on lateral ones or infrequently monoclinal, rarely declinal; short, slender; unbranched. Antheridial cells short, clavate, curved or bent, occasionally to frequently hypogynous or hemihypogynous; apically or laterally appressed.

P. cymosa can be easily distinguished from *P. humphreyana* by the smaller oogonia and sometimes by having few projections (Figure 1d) and the presence of basal antheridia (Figure 1c) (Coker, 1923). *P. cymosa* is less ornate and differs from *P. irregularis* by generally irregular and predominantly ornate oogonia, and from *P. papilliformis* by the always conspicuously ornate oogonia. The description of the isolate of *P. cymosa* obtained in this study agrees with the original description of the taxon and displays morphological characteristics reported by Coker (1923) (Figure 1a-f). Spencer et al. (2002) consider *Pythiopsis* monotypic consisting of only one subeccentric species, *P. cymosa*. Most of *P. cymosa* oospores are spherical and

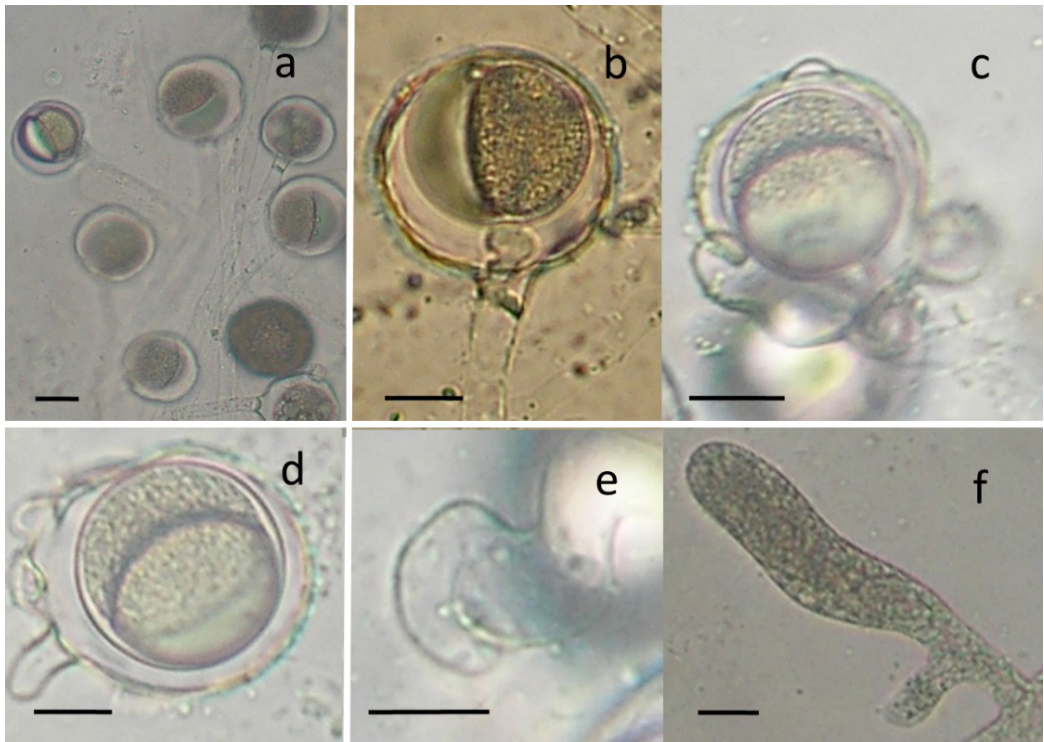


Figure 1. *Pythiopsis cymosa* de Bary. (a) Aspect general of the oogonia and hyphae; (b) Oogonium with subeccentric oospore; (c) Oogonium with subeccentric oospore. Antheridium hemihypogynous with antheridial cell short and lobed; (d) Oogonium with subeccentric oospore. Oogonial wall with blunt protrusion; (e) Antheridial cell short, curved and apically appressed; (f) Gemmae irregular. Scale Bars = 15 µm.

the wall is smooth, and each oogonium almost always contains only one subeccentric oospore (Figure 1a-d). The antheridial branches are commonly formed directly below the oogonia, and are strictly androgynous or are hypogynous. Johnson et al. (2002) adopted the term hemihypogynous by modifying the term semyhypogynous used by Nolan and Lewis (1974) for this hypogynous configuration of the antheridia of *Pythiopsis*. In this case, the hemihypogynal cell is usually lobed. This type of antheridium was observed in the isolates obtained in our studies (Figure 1c). Although Pickering and Willoughby (1977) and Willoughby (1978) reported the discovery of an unidentified species of *Pythiopsis* obtained in fish, there was no information on their pathogenicity. In this study, the isolate was obtained from fish injuries with a symptom of disease, but it was not possible to perform pathogenicity testing. This is the first record of the *P. cymosa* parasitizing freshwater fish also recording Brazil as new locality for geographic distribution.

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