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# *Blastocladia bonaerensis* (*Blastocladiales*, *Chytridiomycetes*), a new species from an Argentine channel

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**Abstract**—*Blastocladia bonaerensis* sp. nov. was found in water containing litter (floating dead twigs, roots and leaves) in an artificial eutrophic channel, in Buenos Aires province (Argentina). The species is described, illustrated, and compared with other species of the genus; it produces mainly a small columnar and branched basal cell, which develops on lobes expanded distally, characteristic obpyriform zoosporangia with a long neck.

**Key words**—*Chytridiomycota, Fungi*, systematics

## Introduction

The genus *Blastocladia* (*Blastocladiales*, *Chytridiomycetes*) was established by Reinsch (1878) to accommodate a single species, *B. pringsheimii;* it was included among the doubtful genera of *Saprolegniaceae* by Fischer (1892) and remained there until Petersen (1909) erected the order *Blastocladiales* with *Blastocladia* as the only genus. Since then many species have been added by various workers in the field (Sparrow 1960, Dasgupta & John 1989). Kirk et al. (2001) estimate the number of acceptable species with 13 species, but Index Fungorum presently lists 36 taxa (including 4 varieties + 1 excluded synonym, thus at most 31 species).

During a survey of zoosporic organisms occurring in polluted water and organic matter in Playa 66, an artificial channel near La Plata city, Partido de Berisso (Buenos Aires Province, Argentina), the authors found a species belonging to *Blastocladia* with distinctive features separating it from other species in the genus. It is here named *B. bonaerensis*.

*Blastocladia globosa* Kanouse and *B. pringsheimii* Reinsch were previously found in other polluted habitats at Partido de Chascomús (Steciow 1999) whereas *B. incrassata* Indoh, *B. sparrowii* Indoh, *B. tenuis* Kanouse and

*B. ramosa* Thaxt. were got at Partido de Ensenada, also located in Buenos Aires Province, Argentina (Steciow et al. 2001, Steciow & Elíades 2002).

## Material and Methods

Samples of surface water containing organic litter (from twigs and leaves of the local vegetation) were collected from the site named "Playa 66", located in Partido de Berisso (Buenos Aires Province, Argentina) and were brought to the laboratory in sterile flasks. They were subsequently divided into 2 subsamples; one was used for chemical analysis while the other was left untreated so that live organisms could be observed and identified. The collection site is a water course that receives substantial discharges of both domestic sewage (from La Plata city and surrounding areas) and industrial effluents. At its margins profuse macrophyte vegetation of *Scirpus californicus* is growing.

At the sampling time, the following water quality data were recorded: pH = 7; turbidity = 58 UTN; conductivity = 822 µS $cm^{-1}$; BOD = 82 mg $L^{-1}$; COD = 414 mg $L^{-1}$; P = 1.363 mg P $L^{-1}$; $NO_3^-$ = 12.51 mg N $L^{-1}$; $NO_2^-$ = 0.136 mg N $L^{-1}$; $NH_4^+$ = 1,865 (determined according to Mackereth et al. 1978). The high organic matter content classifies the channel as eutrophic.

*Blastocladiales* are known to grow saprotrophically on submerged fruits and twigs. The method for collection described by Sparrow (1960), Dasgupta & John (1988), and Khulbe (2001) was used. Samples were placed in sterile flasks containing distilled water; rose fruits were used as baits and incubated at room temperature (15-20°C).

The dried type specimen is deposited in the Mycological Herbarium of Spegazzini Institute in La Plata (LPS). Because the original material was scarce on rose fruits, the fungus could not be isolated on agar media.

Measurements and observations were made using an Olympus BX 40 microscope (Olympus Optical CO., LTD, Tokyo, Japan) equipped with phase contrast optics.

## Taxonomy

***Blastocladia bonaerensis*** Steciow & Marano, **sp. nov.** **Figs 1-11**

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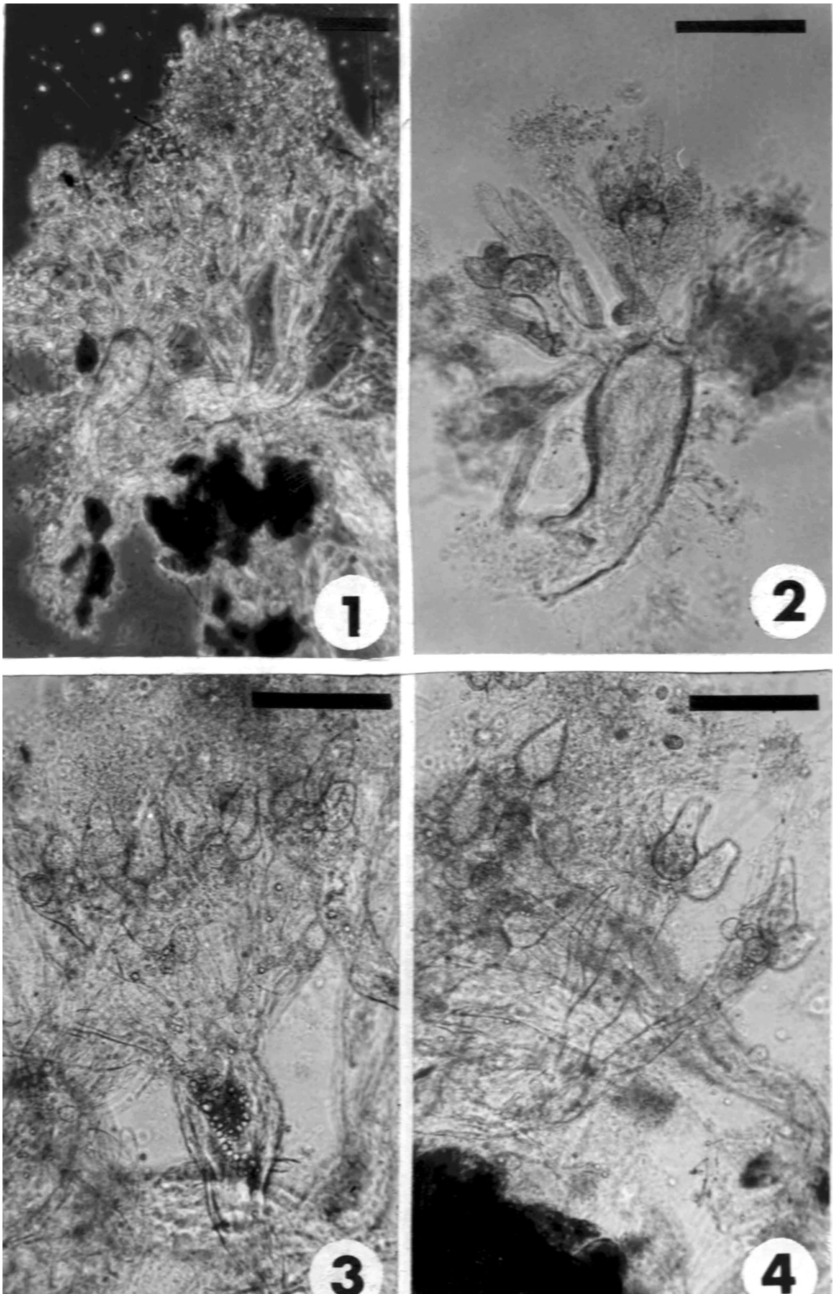
*Thalli cellula basilaris habitu et statura variabilis, saepe columnaris bene ramosa, (175-)225-320(-354) x 50-80 µm, pariete laevi vel rugosa tenui vel crassa, expansa ad apicem, simplici vel ramos cylindricos; rami usque ad 240-400 µm longi, ad apicem dichotomi vel in umbellis vel irregulariter dispositi. Pars basilaris valde ramose. Totus thallus 300-575 µm longus. Zoosporangia sessilia ad apicem ramorum vel super loborum dilatatorum*

**Figs. 1-4.** *Blastocladia bonaerensis*. **Fig. 1.** Aspect of the pustules on rose fruits. **Fig. 2.** Thallus columnar trunk with dichotomous branching with the zoosporangia of different size and shape, surmounted the swollen branches on the tips of the thallus. **Figs. 3-4.** Aspect of dense pustules with details of obpyriform sessile zoosporangia with a long neck, borne on the branches or lobes with setae. Scale bars, Fig. 1 = 100 µm; Figs. 2-4 = 50 µm.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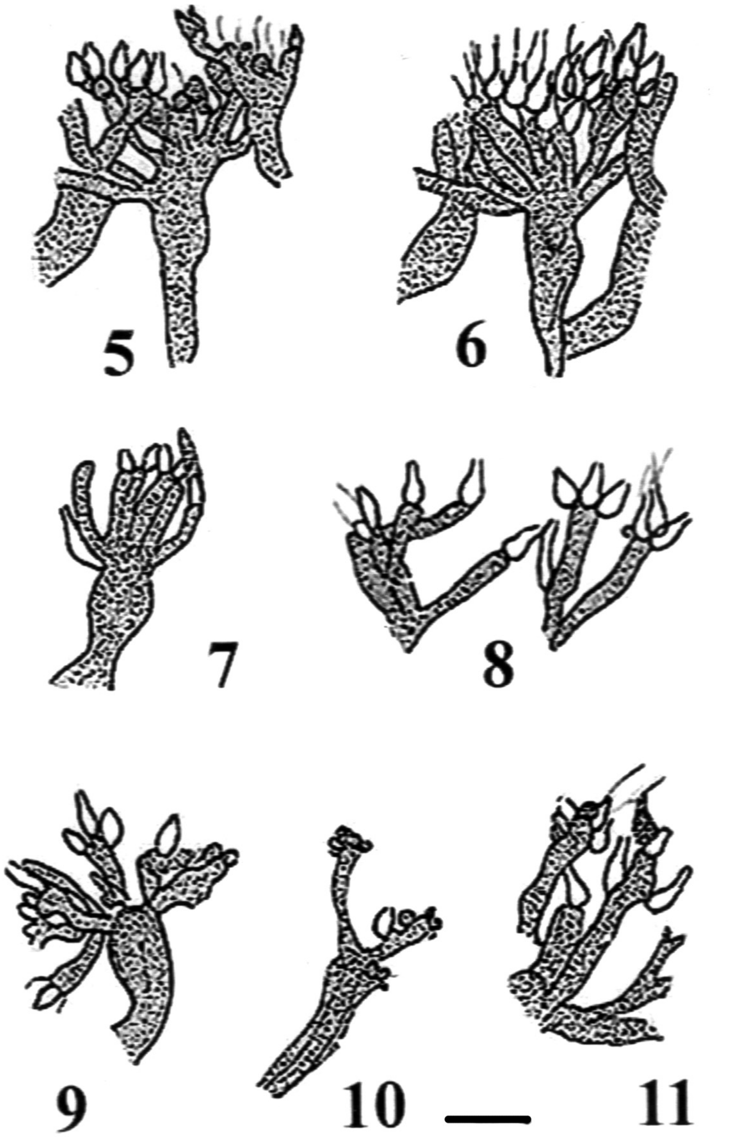

**Figs. 5-11.** *Blastocladia bonaerensis.* **Figs. 5-6.** Details of pustules with obpyriform zoosporangia with a long neck borne on dichotomously, umbellately, or irregularly arranged branches; setae present or scarse. **Figs. 7-11**. Young thalli. Scale bar = 50 µm.

*superficie portata, saepe obpyriformia interdum fusiformia vel cylindrica vel naviculata vel obovata, (25-)32-75 µm x 17-37 µm; zoosporae ovoideae vel sphaericae 6-9 µm x 3-6 µm. Sporangia vacua non decídua. Sporangia quiescentia non observata.*

Etymology: The name refers to the province (Buenos Aires) where this new species was found.

**Basal cell** variable in shape and size, generally columnar, sometimes clavate, often densely branched, (175-)225-320(-354) x 50-80 µm, **wall** smooth or rough, expanded distally and simple or giving rise to cylindrical, apically, dichotomously, umbellately, or irregularly arranged branches or broad lobes up to 240-400 x 80-160 µm; **setae** present or scarse, 2-6 µm wide; **holdfasts** richly branched, the **whole thallus** 300-575 µm long. **Zoosporangia** sessile, borne along the tips of the branches or over the surface of the swollen lobes, predominantly obpyriform with a prominent and characteristic apical beak, sometimes fusiform, cylindrical, naviculate and obovate, (25-)32-75 x 17-37 µm; **zoospores** ovoid and 6-9 x 5-6 µm, or spherical and 12-15 µm diam, emerging individually or in a columnar or pyriform group surrounded by an evanescent vesicle wall bearing an apical, persistent plug (the remains of the discharge papilla), empty sporangia not deciduous; **resting spores** not observed.

Saprotrophic; after 15-30 days appearing as small pustules on the surface of *Rosa* sp. fruits used as bait.

**Holotype: ARGENTINA. Buenos Aires Province**: Berisso, Channel 66 (artificial channel), in water with floating vegetable debris and organic pollution, June 2003, *Paula Hualde* (LPS N° 472171), dried material deposited at Spegazzini Institute.

## Discussion

Of the 31 described species, our new Argentine species appears similar in its habit to *Blastocladia pringsheimii*, *B. globosa*, *B. ramosa*, *B. sparrowii*, *B. fruticosa* S.N. Dasgupta & R. John, and *B. pileota* S.N. Dasgupta & R. John. Principal characters of these related species are detailed in Table 1. Among these species *B. bonaerensis* is unique because of their smooth or thick-walled, cylindrical or clavate basal cell, with dichotomously, umbellately, or irregularly arranged branches or swollen apices up to 400 µm. The whole thallus only reaches 575 µm in length. Setae can be present or scarce. The zoosporangia are characteristically sessile, obpyriform, with a prominent apical beak borne along the tips of the branches or over the surface of the swollen lobes; they can also be fusiform, cylindrical, naviculate and obovate. Resting spores are lacking.

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Table 1. Comparison of principal characters in species related to *B. bonaerensis*

| | *B. pringsheimii* | *B. globosa* | *B. ramosa* | *B. sparrowii* | *B. fruticosa* | ***B. pileota*** | ***B. bonaerensis*** |
|---|---|---|---|---|---|---|---|
| Thallus size (µm) | up to 2,000 | 120-400 | 260-1,000 | up to 620 | 150-250 | up to 460 | 300-575 |
| Basal cell size | 400-1,000 X 30-90 | 120-350 X 200 | up to 400 X 14-80 | 312-468 X 13-31 | 60-75 X 30-50 | 160-230 X 50-60 | (175-) 225-320/(-354) X 50-80 |
| Basal cell shape | cylindrical or clavate | globose or subglobose, with expanded distal portion | cylindrical | cylindrical with swollen distal portion | cylindrical | cylindrical | cylindrical or clavate |
| Basal cell branching | dichotomous, umbellate or irregularly with swollen apices | unbranched or with expanded lobes | dichotomously (2-several axes branched sympodial or irregularly) | lobed or not | dichotomously (2-several axes branched sympodial or irregularly) | dichotomously (3-4 axes branched dichotomously once or twice) | dichotomous, umbellate or irregularly |
| Zoosporangial shape | cylindrical or narrowly clavate, ellipsoidal, fusiform, long ovoid or siliquiform | cylindrical or broadly cylindrical | ovoid, with a narrow truncate base or broadly fusiform | cylindrical, with internal proliferation | pyriform or cylindrical | ovoid, pitcher-shaped with a neck ending | obpyriform, with a prominent beak; sometimes fusiform, cylindrical, naviculate & obovate |
| Zoosporangio size (µm) | 70-350 X 13-70 | 55-160 X 15-60 | 30-85 X 7-24 | 73-143 X 13-31 | 28-30 X 15-17 (pyrif.)/25-30 X 9-10 (cylind.) | 40-68 X 20-30 | (25-) 32- 75 X 17-37 |
| Resting spore shape | ellipsoidal, ovoidal or spherical | subspherical, ovoid or subpyriform | broadly ovoid, narrowly clavate or spatulate | lacking | spherical or ovoid | lacking | lacking |
| Resting spore size (µm) | 40-99 X 30-50 | 25-70 X 27-50 | 18-38 X 11-28 | | 15-25/20-22 X 17 | | |
| Setae | scarce or absent | scarce or absent | lacking | present, branched or not | lacking | lacking | scarce or absent |

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