An emendation of *Phallus glutinolens*

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Abstract *Phallus glutinolens* was described from Brazil by Möller in 1895. A new collection of *P. glutinolens* from the Brazilian Atlantic Forest revealed that Möller's original description was based on young specimens. New information on morphology is provided for *P. glutinolens*, and an emendation of the species circumscription is presented. This article also presents a key to differentiate the known Brazilian members of the genus *Phallus*.

Introduction

In 1895, Möller published a mycological gem on the phalloid fungi of Brazil. Four new genera were described: *Protuberia*, *Blumenavia*, *Aporophallus* and *Itajahya*, as well

as eight new species: *Protuberia maracuja*, *Clathrus chrysomycelinus*, *Colus garciae*, *Blumenavia rhacodes*, *Aporophallus subtilis*, *Itajahya galericulata*, *Ithyphallus glutinolens* and *Dictyophora callichroa*.

Möller's most important fungal collections, including Brazilian specimens, were housed in the Botanical Museum Berlin-Dahlem (B), which, unfortunately, was destroyed during World War II (Fidalgo 1968). Hiepko (1987) asserted that all the material of Uredinales and imperfect fungi was saved, while the remainder of the herbarium of fungi was destroyed. However, some of Möller's collections are still kept in the Herbarium Biozentrum Klein-Flottbek (HBG), specially preserved in alcohol (Friederichsen 1977).

The genus *Phallus* is represented by a varying number of species, depending on the author. Thus, whereas Kreisel (1996) accepts 33 species, Calonge (2005) recognizes only 25. If we include the taxa proposed during the last 3 years: *Phallus formosanus* (Li et al. 2005), *P. maderensis* (Calonge et al. 2008), *P. luteus* (Kasuya 2008), and *P. calongei* (Moreno and Khalid 2009), the total figure is around 30 species.

Fungal taxonomic studies in Brazil have shown a rich gasteroid diversity (Baseia and Milanez 2002; Baseia et al. 2003; Baseia and Calonge 2005, 2006). To date, 12 *Phallus* species have been reported from Brazil, but 5 of these [*P. callichrous* (A. Möller) Lloyd, *P. campanulatus* Berk., *P. granuloso-denticulatus* Brown, *P. subtilis* (A. Möller) Lloyd and *P. moelleri* Lloyd] are doubtful species and 1 (*P. impudicus* L.: Pers.) may have been introduced by man.

Phallus glutinolens was originally described from Atlantic Forest of Santa Catarina (Möller 1895) and was rediscovered in 2007 in the same area. This new collection revealed that Möller's original description was based on

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young basidiomata and important morphological data about mature basidiomata are lacking. Therefore, the aim of this article is to present an emendation of *P. glutinolens* and to provide a detailed description with comments and illustrations of the species.

Materials and methods

Material collection was carried out during 2007 at the Hotel Plaza Caldas da Imperatriz Resort & Spa, Santo Amaro da Imperatriz, in the state of Santa Catarina. This site contains 140 ha of preserved area, owing to its proximity to the Parque Estadual da Serra do Tabuleiro, a 90,000-ha remnant of Atlantic Forest.

Basidiomata were examined and photographed in the field. Colours were coded according to Komerup and Wanscher (1978), with the letter “KW”, bracketed in the text and simultaneously described. The specimens are kept at the UFRN and FLOR herbaria.

Macroscopic characters were described on fresh and dry material. Light macroscopic (LM) observations were done following the traditional methods used in mycology.

Taxonomic description

Phallus glutinolens (A. Möller) O. Kuntze **emend.** Trierveiler-Pereira, Calonge & Baseia (Figs. 1, 2, 3, 4, 5, 6, 7 and 8)

≡ *Ithyphallus glutinolens* A. Möller, Bot. Mitt. Trop. 8: 100, 148 (1895)

Egg subglobose, 15–20 mm diam., brown (KW 4F4), with a whitish mycelial rhizomorph arising from the base. **Mature basidioma** 40–60 mm high, 50 mm in dry conditions. **Receptacle** cellular, globose when young and then campanulate with a perforate apex, 20 mm diam., covered by an olive-blackish **gleba** (KW 1F5), gelatinous, receptacle without gleba white, smooth. **Pseudostipe** cylindrical, spongy, with granular surface, whitish, 40–50×10–15 mm, attenuate at the apex; constituted by pseudoparenquimatic cells, 15–30×17–28 µm. **Ring** frequently present in young specimens. **Volva** subglobose, 20–25 mm diam., duplex with superficial layer dark yellow (KW 4C8), formed by pseudoparenchymatous cells, 18–45×15–40 µm; inner layer light yellow (KW 4A5), constituted by unbranched and septate threads, 4–5 µm diam.; disciform base with a central rhizomorph 20–30 mm long. **Basidia** not observed. **Spores** ellipsoid to cylindrical, 3.5–4.5×1.5–2 µm, greenish, hyaline, smooth. When fresh, the specimens have an aromatic, sweet smell, which changes to tarlike when dry.

Fig. 1–6 1. *Phallus glutinolens*. Young basidiome 2. *Phallus glutinolens*. Mature basidiome 3. *Phallus glutinolens*. Receptacle of a young basidiome 4. *Phallus glutinolens*. Receptacle of a mature basidiome 5. *Phallus glutinolens*. Discoid plate at the base of the volva 6. *Phallus glutinolens*. Basidiospores

Voucher material: Brazil, Santa Catarina, Santo Amaro da Imperatriz, Hotel Plaza Caldas da Imperatriz Resort & Spa, Pousada da Mata, Trilha da Estrada Velha, 450 m asl, growing in groups on soil, leg. L. Trierveiler-Pereira, Baltazar & Maccarini, 12.V.2007 (UFRN 834, FLOR 77079).

Discussion

Macro- and microscopic features of the young specimens examined agree with Möller’s original description (1895). Additional taxonomic features observed are: campanulate and perforate apex at maturity and disciform volva base.

Fig. 7 Young basidiome of *Phallus glutinolens* (scale bar=10 mm), photo by L. Trierveiler-Pereira

Calonge (2005) described the receptacle of *P. glutinolens* as having a granulose surface, due to a misinterpretation of Möller's original description. A later translation of the original German text has showed that the receptacle was smooth, like the examined specimens here. The disciform volva base, another very important characteristic for defining this taxon, was not mentioned by Möller (1985) or Calonge (2005).

Wright (1960) noticed that Argentinean specimens of *P. glutinolens* had a campanulate receptacle and larger basidiospores ($5.1\text{--}6.9 \times 2\text{--}3.1\text{ }\mu\text{m}$) and suggested that Möller's description may have been based on young basidiomata. However, the presence of such large basidiospores in the Argentinean material leads us to believe that the material is *P. macrosporus* Liu, Li & Du (Liu et al. 1980), whose spores are $7\text{--}7.6 \times 4\text{--}4.7\text{ }\mu\text{m}$, but in this case the volva is pink.

Two species relatively close to *P. glutinolens* share a number of morphological features: *P. yunnanensis* (M. Zang & R.H. Pertersen) Kreisel, which also shows a discoid base in the pseudostipe but lacks a volva (Kreisel 1996), and *P. ravenelli* Berk. & M.A. Curtis, which shows a white receptacle and pseudostipe, but a granulose receptacle surface (Berkeley 1873).

Key to *Phallus* species reported from Brazil (excluding doubtful species)

- 1 Receptacle surface wig-like after the gleba disappears, formed of lamellate plates, usually flattened on the top *P. galericulatus*
- 1* Receptacle surface smooth, rugulose or reticulate, never flattened 2
- 2 Basidioma very small, up to 1.5 cm high; growing on wood *P. pygmaeus*
- 2* Basidioma larger; growing on soil 3
- 3 Pseudostipe reddish, orange to pinkish *P. rubicundus*
- 3* Pseudostipe not pigmented 4
- 4 Receptacle globose to hemispherical when young; volva with a discoid plate at base *P. glutinolens*
- 4* Receptacle campanulate; volva without a discoid plate at base 5
- 5 Basidioma without indusium or with a rudimentary one *P. impudicus*
- 5* Basidioma with a well-developed indusium 6
- 6 Receptacle surface reticulate *P. indusiatus*

Fig. 8 Mature basidiome of *Phallus glutinolens* (scale bar=10 mm), photo by L. Trierveiler-Pereira

6* Receptacle surface granulose to rugulose *P. merulinus*

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