

# A PRELIMINARY CHECKLIST OF BOLETALES FROM BRAZIL AND NOTES ON BOLETALES SPECIMENS AT THE INSTITUTO DE BOTÂNICA (SP) HERBARIUM, SÃO PAULO, SP, BRAZIL<sup>#</sup>

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**(A preliminary checklist of Boletales from Brazil and notes on Boletales specimens at the Instituto de Botânica (SP) Herbarium, São Paulo, SP, Brazil)** – Using literature records, we list 70 species of Boletales previously collected in Brazil. Sixty percent of these collections were made either by Rick in Southern Brazil or by Singer in various localities in the country. Nine species are deposited only at herbaria abroad. Collections housed in São Paulo include specimens that have barely been studied, being some are in poor condition. A preliminary checklist of Boletales represented in São Paulo includes the genera *Boletinellus*, *Gyrodon*, *Gyroporus*, *Paxillus*, *Rhizopogon*, *Suillus*, and *Xerocomus*, with a total of 11 species. A new record, *Paxillus atrotomentosus*, is first cited for Brazil.

**Key words:** taxonomy, Basidiomycetes, boletes.

**(Listagem preliminar de Boletales do Brasil e notas sobre espécies de Boletales do Herbário do Instituto de Botânica, São Paulo, SP, Brasil)** – Através de registros da literatura, foram listadas 70 espécies de Boletales previamente coletadas no Brasil. Sessenta por cento das coletas foram feitas por Rick no Sul do Brasil ou por Singer em diversas localidades do país. Nove espécies estão depositadas apenas em herbários no exterior. As coleções depositadas em SP incluem espécimes que foram pouco estudados, e alguns estão em mau estado de conservação. Uma lista preliminar dos Boletales representados em SP inclui os gêneros *Boletinellus*, *Gyrodon*, *Gyroporus*, *Paxillus*, *Rhizopogon*, *Suillus*, e *Xerocomus*, com um total de 11 espécies. Um novo registro, *Paxillus atrotomentosus*, é citado pela primeira vez para o Brasil.

**Palavras-chave:** taxonomia, Basidiomycetes, boletos.

## INTRODUCTION

The Boletales are well known in Europe, North America, and several tropical regions, but only in the last decade have studies of South American Boletales been emphasized. Most of these studies have focused on the documentation of fungi from montane forests (HØILAND, 1987; HALLING & MUELLER, 1999; HALLING & MUELLER, 2002). Collections of macrofungi from Brazil are few. In southern Brazil, most Agaricales s.l. collections were made by Rick during the first half of the twentieth century (RICK, 1907, 1960). Singer made some collections in the Amazonian region in the 1980s (SINGER *et al.*, 1983) and reviewed some of the species collected by Rick, named Fungi Rickiani (SINGER, 1953). Recent publications on Boletales have added to the knowledge of this group in Brazil (SINGER & ARAUJO, 1986; OLIVEIRA, 1987; PUTZKE *et al.*, 1994; WATLING & MEIJER, 1997; GIACHINI *et al.*, 2000; BASEIA & MILANEZ, 2002), but much of the diversity presumably remains to be discovered.

The diversity of the Boletales in Brazil is very little known compared to other countries where this group has been more intensively studied. Costa Rica, Colombia, and Australia, for instance, are smaller in area but have a larger number of reported Boletales species than Brazil (HALLING, 1989; HALLING & FRANCO-MOLANO, 1996; HALLING & MUELLER, 2002; WATLING, 2001). Since many species of Boletales have Pantropical distributions, we hypothesize that additional species await discovery in Brazil and believe

that more collections are needed to improve the knowledge of macrofungal diversity in Brazil and South America as a whole. We present the following annotated checklist of Brazilian Boletales as a means of facilitating further systematic and biogeographic research on this important group of ectomycorrhizal fungi.

The taxonomic concept of the Boletales that we use in the present work is based on that presented in the 9<sup>th</sup> edition of AINSWORTH & BISBY'S DICTIONARY OF THE FUNGI (2001), which treats the Boletales as comprising 18 families.

## MATERIALS AND METHODS

This checklist was compiled from a literature review of articles citing species of Boletales from Brazil. Specimens deposited at the Instituto de Botânica herbarium (SP), São Paulo (HOLMGREN & KEUKEN, 2003), were observed to validate names previously published. Herbarium acronyms follow HOLMGREN & KEUKEN (2003).

## RESULTS

Seventy species, assigned to 20 genera in six families, are reported in the available literature. A list of these taxa is presented in alphabetical order by family, and their known distribution in Brazil is given. The literature cited includes the original publication as well as additional descriptions for the taxon. The herbaria where Brazilian

specimens are deposited are also cited.

Most Brazilian species are represented by material deposited in both Brazilian and foreign herbaria, with the exception of nine species that are only deposited outside of Brazil. Five type species collected by Rick are missing according to observations made by SINGER (1953). Further observations need to be made to confirm the status of the missing collections.

Except for *Gyroporus castaneus*, all taxa deposited at SP are collections from the state of São Paulo. The 11 taxa from SP consist of records that were identified by other mycologists. Two of these names, *Boletinellus exiguus* and *Boletinellus rompelii*, have been previously published (Bononi et al. 1981, Grandi et al. 1984) and are validated here. *Paxillus atrotomentosus* is cited for the first time from Brazil.

Notations and abbreviations:

◆ – taxon reported for the first time from Brazil.

❖ – validated names.

<sup>B</sup> – type locality in Brazil.

<sup>R</sup> – Fungi Rickiani.

<sup>nd</sup> – *nomen dubium*.

<sup>ni</sup> – *nomen invalidum*.

<sup>m</sup> – *misdetermination*.

Dist. – distribution in Brazil regions (states).

Herb. – herbaria in which Brazilian collections are deposited (\* after Herb. denotes a missing type specimen).

Lit. – literature source presenting description of the taxon.

#### Preliminary checklist of Boletales from Brazil

#### BOLETACEAE Chevall.

##### *Austroboletus* (Corner) Wolfe

*Austroboletus festivus* (Singer) Wolfe <sup>B</sup>

*Bibl. Mycol.* **69**: 92 (1980) [1979]

Dist.: Paraná, Pernambuco

Herb.: LIL, BAFC, E

Lit.: SINGER (1964), SINGER *et al.* (1983), WATLING & MEIJER (1997)

*Austroboletus graciliaffinis* Singer <sup>B</sup>

*Mycologia* **80**(1): 46 (1988)

Dist.: Amazônia

Herb.: INPA

Lit.: SINGER (1989)

*Austroboletus olivaceus* Singer <sup>B</sup>

*Beihefte zur Nova Hedwigia* **77**: 132 (1983)

Dist.: Amazônia

Herb.: INPA

Lit.: SINGER *et al.* (1983)

*Austroboletus rionegrensis* (Sing. & Araujo) Sing.

*Beihefte zur Nova Hedwigia* **77**: 129 (1983)

Dist.: Amazônia

Herb.: INPA

Lit.: SINGER (1978), SINGER *et al.* (1983)

##### *Boletellus* Murrill

*Boletellus ananas* var. *minor* Singer <sup>B</sup>

*Mycologia* **1**: 10 (1909)

Dist.: Amazônia

Herb.: INPA

Lit.: SINGER *et al.* (1983)

*Boletellus lepidospora* Gilb.

*Bull. Jard. Bot. Brux.* **21**: 295 (1951)

Dist.: Pernambuco

Herb.: JPB

Lit.: OLIVEIRA (1987)

*Boletellus pustulatus* (Beeli) Gilb.

*Bull. Soc. R. Bot. Belg.* **LVIII**: 9 (1926)

Dist.: Pernambuco

Herb.: JPB

Lit.: OLIVEIRA (1987)

##### *Boletus* Fr.

*Boletus cinnamomeus* Rick <sup>nd</sup>

*Egatea* **11**: 16 (1926)

Dist.: Rio Grande do Sul

Herb.: \*

Lit.: SINGER (1953), RICK (1926)

*Boletus olivaceus* Rick <sup>B, R</sup>

*Broteria* **23**: 167 (1937)

Dist.: Rio Grande do Sul

Herb.: FH, HH

Lit.: SINGER (1953), RICK (1937)

*Boletus panormitanus* Inzeng

Original description not found

Dist.: Rio Grande do Sul

Herb.: \*

Lit.: RICK (1960)

*Boletus spadiceus* Karst. *sensu* Rick <sup>m</sup>

original description not found

Dist.: Rio Grande do Sul

Herb.: \*

Lit.: SINGER (1953)

##### *Chalciporus* Bataille

*Chalciporus trinitensis* (Heinem.) Singer, Araujo & Ivory <sup>ni</sup>

*Beihefte zur Nova Hedwigia* **77**: 86 (1983)

Dist.: Amazônia

Herb.: INPA

Lit.: SINGER *et al.* (1983)

*Chalciporus piperatus* (Bull.: Fr.) Bataille  
*Bull. Soc. Hist. Nat. Doubs* **15**: 39 (1908)  
 Dist.: Santa Catarina, Paraná, Pernambuco  
 Herb.: JPB, E  
 Lit.: OLIVEIRA (1987), WATLING & MEIJER (1997)

### ***Fistulinella* Henn.**

*Fistulinella campinaranae* Singer var.  
*campinaranae*<sup>B</sup>  
*Persoonia* **9**: 436 (1978)  
 Dist.: Amazônia  
 Herb.: INPA  
 Lit.: SINGER (1978), SINGER *et al.* (1983)

*Fistulinella campinaranae* var. *scrobiculata* Singer<sup>B</sup>  
*Beihefte zur Nova Hedwigia* **77**: 148 (1983)  
 Dist.: Amazônia  
 Herb.: INPA  
 Lit.: SINGER *et al.* (1983)

*Fistulinella violaceipora* (Stev.) Singer  
*Trans. Br. Mycol. Soc.* **76**(1): 142 (1981)  
 Dist.: Pernambuco  
 Herb.: JPB  
 Lit.: OLIVEIRA (1987)

### ***Phylloporus* Quél.**

*Phylloporus flavipes* Rick<sup>B, R</sup>  
*Broteria* **23**: 168 (1937)  
 Dist.: Rio Grande do Sul  
 Herb.: PACA  
 Lit.: RICK (1960)

*Phylloporus foveolatus* (Berk) Rick  
 Original description not found  
 Dist.: Rio Grande do Sul  
 Herb.: \*  
 Lit.: RICK (1907)

*Phylloporus gymnocystis* Singer<sup>B</sup>  
*Fieldiana, Bot., N.S.* **21**: 124 (1989)  
 Dist.: Amazônia  
 Herb.: INPA  
 Lit.: SINGER (1989)

*Phylloporus manausensis* Singer<sup>B</sup>  
*Persoonia* **9**: 424 (1978)  
 Dist.: Amazônia  
 Herb.: INPA, F  
 Lit.: SINGER (1978), SINGER *et al.* (1983)

*Phylloporus pratensis* Rick<sup>B, R</sup>  
*Iheringia* **7**: 295 (1960)  
 Dist.: Rio Grande do Sul  
 Herb.: PACA

Lit.: RICK (1960)

*Phylloporus viridis* (Berk) Singer<sup>B</sup>  
*Nova Hedwigia* **7**: 123 (1964)  
 Dist.: Amazônia  
 Herb.: K  
 Lit.: SINGER & DIGILIO (1960), PEGLER (1997)

### ***Pulveroboletus* Murrill**

*Pulveroboletus duckeanus* Singer<sup>B</sup>  
*Beihefte zur Nova Hedwigia* **77**: 95 (1983)  
 Dist.: Amazônia  
 Herb.: INPA  
 Lit.: SINGER *et al.* (1983)

*Pulveroboletus roseamariae* Singer<sup>B</sup>  
*Nova Hedwigia* **77**: 99 (1983)  
 Dist.: Amazônia  
 Herb.: INPA  
 Lit.: SINGER *et al.* (1983)

### ***Strobilomyces* Berk.**

*Strobilomyces pauper* Singer<sup>B</sup>  
*Beihefte zur Nova Hedwigia* **77**: 126 (1983)  
 Dist.: Amazônia  
 Herb.: INPA  
 Lit.: SINGER *et al.* (1983)

### ***Tylopilus* Karst.**

*Tylopilus acutesquamosus* Singer<sup>B</sup>  
*Beihefte zur Nova Hedwigia* **77**: 117 (1983)  
 Dist.: Amazônia  
 Herb.: INPA  
 Lit.: SINGER *et al.* (1983)  
*Tylopilus arenarius* Singer<sup>B</sup>  
*Persoonia* **9**: 432 (1978)  
 Dist.: Amazônia  
 Herb.: INPA  
 Lit.: SINGER (1978), SINGER *et al.* (1983)

*Tylopilus potamogeton* Singer var. *potamogeton*<sup>B</sup>  
*Persoonia* **9**: 433 (1978)  
 Dist.: Amazônia  
 Herb.: INPA  
 Lit.: SINGER (1978), SINGER *et al.* (1983)

*Tylopilus potamogeton* var. *aquarius* Singer<sup>B</sup>  
*Beihefte zur Nova Hedwigia* **77**: 122 (1983)  
 Dist.: Amazônia  
 Herb.: INPA  
 Lit.: SINGER *et al.* (1983)

### ***Xerocomus* Quél.**

*Xerocomus amazonicus* Singer var. *amazonicus*<sup>B</sup>  
*Persoonia* **9**: 429 (1978)  
 Dist.: Amazônia

Herb.: INPA

Lit.: SINGER (1978), SINGER *et al.* (1983)

*Xerocomus amazonicus* var. *obscuratus* Singer & Araujo<sup>B, ni</sup>

*Beihefte zur Nova Hedwigia* 77: 78 (1983)

Dist.: Amazônia

Herb.: INPA

Lit.: SINGER *et al.* (1983)

*Xerocomus brasiliensis* Rick<sup>B, R</sup>

*Farlowia* ii: 298 (1945)

Dist.: Rio Grande do Sul, São Paulo

Herb.: FH, SP, PACA

Lit.: SINGER & DIGILIO (1957)

*Xerocomus campinaranae* Singer<sup>B</sup>

*Beihefte zur Nova Hedwigia* 77: 66 (1983)

Dist.: Amazônia

Herb.: INPA

Lit.: SINGER *et al.* (1983)

*Xerocomus chapinii* Singer<sup>B</sup>

*Beihefte zur Nova Hedwigia* 77: 74 (1983)

Dist.: Amazônia

Herb.: INPA

Lit.: SINGER *et al.* (1983)

*Xerocomus* cf. *coccolobae* Pegler

*Kew Bull.*, Addit. Ser. 9: 576 (1983)

Dist.: Paraná

Herb.: E

Lit.: WATLING & MEIJER (1997)

*Xerocomus globuliger* Singer<sup>B</sup>

*Nova Hedwigia* 68: 99 (1983)

Dist.: Amazônia

Herb.: INPA

Lit.: SINGER *et al.* (1983)

*Xerocomus hypoxanthus* Singer

*Farlowia* ii: 289 (1945)

Dist.: Rio de Janeiro, Pernambuco

Herb.: LIL, JPB

Lit.: SINGER & DIGILIO (1960), OLIVEIRA (1987)

*Xerocomus inundabilis* Singer<sup>B</sup>

*Beihefte zur Nova Hedwigia* 77: 70 (1983)

Dist.: Amazônia

Herb.: INPA

Lit.: SINGER *et al.* (1983)

*Xerocomus radicolica* Singer<sup>B</sup>

*Persoonia* 9: 430 (1978)

Dist.: Amazônia

Herb.: INPA

Lit.: SINGER (1978), SINGER *et al.* (1983)

*Xerocomus scrobiculatus* Singer<sup>B</sup>

*Beihefte zur Nova Hedwigia* 77: 81 (1983)

Dist.: Amazônia

Herb.: INPA

Lit.: SINGER *et al.* (1983)

#### BOLETINELLACEAE Binder & Bresinsky

##### *Boletinellus* Murrill

❖ *Boletinellus exiguus* (Singer & Digilio) Watling

*Edinburgh J. Bot.* 54(2): 243 (1997)

Dist.: Paraná, Rio Grande do Sul

Herb.: E, SP, HUNISC

Lit.: SINGER & DIGILIO (1960), WATLING & MEIJER (1997)

❖ *Boletinellus rompelii* (Pat. & Rick in Rick) Watling<sup>B</sup>

*Broteria* 6: 81 (1907)

Dist.: Paraná, Rio Grande do Sul, São Paulo

Herb.: LIL, FH, E, SP, HUNISC

Lit.: SINGER (1964), WATLING & MEIJER (1997)

##### *Phlebopus* (Heim) Singer

*Phlebopus beniensis* (Sing. & Digilio) Heinem. & Ramm.

*Mycotaxon* 15: 390 (1982)

Dist.: Paraná, Pernambuco

Herb.: BAFC, JPB, E

Lit.: SINGER (1964), OLIVEIRA (1987), WATLING & MEIJER (1997)

*Phlebopus brasiliensis* Singer<sup>B</sup>

*Beihefte zur Nova Hedwigia* 77: 43 (1983)

Dist.: Amazônia, Pernambuco

Herb.: LIL, BAFC, INPA

Lit.: SINGER *et al.* (1983)

*Phlebopus harleyi* Heinem. & Ramm.

*Mycotaxon* 15: 390 (1982)

Dist.: Pernambuco

Herb.: JPB, HUNISC, PACA

Lit.: HEINEMANN & RAMMELOO (1982), OLIVEIRA (1987)

*Phlebopus portentosus* (Berk. & Br.) Boedjin

*Sydowia* 5(3-6): 218 (1951)

Dist.: Pernambuco

Herb.: JPB

Lit.: OLIVEIRA (1987)

*Phlebopus tropicus* (Rick) Heinem. & Ramm.

*Mycotaxon* 15: 389 (1982)

Dist.: Rio Grande do Sul, Santa Catarina

Herb.: S, FH, HUNISC, PACA

Lit.: SINGER & DIGILIO (1957)

#### GYROPORACEAE Locq.

**Gyroporus** Quél.

*Gyroporus castaneus* (Bull. ex Fr.) Quél.  
*Enchiridion Fungorum*: 161 (1886)  
 Dist.: Rio Grande do Sul, Amazônia  
 Herb.: INPA, SP  
 Lit.: SINGER *et al.* (1983)

Lit.: SINGER (1961, 1964)

*Paxillus involutus* (Batsch) Fr.  
*Epicrisis Systematis Mycologici*: 317 (1838)  
 Dist.: Rio Grande do Sul  
 Herb.: PACA  
 Lit.: RICK (1961)

**PAXILLACEAE** Lotsy**Gyrodon** Opat.

*Gyrodon adisianus* Singer<sup>B</sup>  
*Fieldiana, Bot.*, N.S. **21**: 123 (1989)  
 Dist.: Amazônia  
 Herb.: F  
 Lit.: SINGER (1989)

*Gyrodon cupreus* Heinem.  
*Bull. Jard. Bot. Brux.* **30**: 22 (1960)  
 Dist.: São Paulo  
 Herb.: SP  
 Lit.: HEINEMANN (1960)

*Gyrodon proximus* Singer  
*Farlowia* **ii**: 244 (1945)  
 Dist.: Pernambuco  
 Herb.: JPB  
 Lit.: OLIVEIRA (1987)

*Paxillus panuoides* (Fr. ex Fr.) Fr.  
*Epicrisis Systematis Mycologici*: 318 (1838)  
 Dist.: Rio Grande do Sul, Paraná  
 Herb.: FH, E  
 Lit.: RICK (1961), SINGER (1964)

*Paxillus screlopus* Rick  
*Iheringia* **8**: 405 (1961)  
 Dist.: Rio Grande do Sul  
 Herb.: PACA  
 Lit.: RICK (1961)

**Phyllobolites** Singer

*Phyllobolites miniatus* (Rick) Singer<sup>R</sup>  
*Annals Mycol.* **40**: 59 (1942)  
 Dist.: Rio Grande do Sul, Amazônia  
 Herb.: INPA  
 Lit.: RICK 1961, SINGER *et al.* (1983)

**Neopaxillus** Singer

*Neopaxillus echinospermus* (Speg.) Singer<sup>B</sup>  
*Lilloa* **22**: 633 (1951)  
 Dist.: São Paulo, Paraná  
 Herb.: FH, LPS, E  
 Lit.: SINGER (1964), WATLING & MEIJER (1997)

**RHIZOPOGONACEAE** Gäum. & Dodge**Rhizopogon** Fr. & Nordholm

*Rhizopogon fuscorubens* Smith  
*Mem. N. Y. Bot. Garden* **14**: 120 (1966)  
 Dist.: Santa Catarina  
 Herb.: FLOR  
 Lit.: SMITH & ZELLER (1966)

**Paxillus** Fr.

*Paxillus alexandri* Fr.  
*Bull. Soc. Linn. Normandie*, sér. 2: 157 (1873)  
 Dist.: Rio Grande do Sul  
 Herb.: \*  
 Lit.: RICK (1961)

*Rhizopogon luteolus* Fr. & Nordholm  
*Symb. Gasteromyc.* **1**: 5 (1817)  
 Dist.: São Paulo  
 Herb.: SP  
 Lit.: SMITH & ZELLER (1966), BASEIA & MILANEZ (2002)

◆ *Paxillus atrotomentosus* (Batsch ex Fr.) Fr.  
*Epicrisis systematis mycologici*: 317 (1838) [1836]  
 Dist.: São Paulo  
 Herb.: SP  
 Lit.: FRIES (1821), PACIONI (1981)

*Rhizopogon nigrescens* Coker & Couch  
*Gasteromycetes of Eastern U.S. and Canada*: 30 (1928)  
 Dist.: Santa Catarina  
 Herb.: FLOR  
 Lit.: SMITH & ZELLER (1966)

**Material examined:** Brazil: São Paulo, Parque Estadual de Campos do Jordão, 29.Nov.1982, Guzmán & coll., SP 177733 (SP).

*Paxillus guttatus* Sing.<sup>B</sup>  
*Publ. Inst. Micol. Univ. Recife* **304**: 15 (1961)  
 Dist.: Pernambuco, Paraíba  
 Herb.: LIL

*Rhizopogon roseolus* Corda *sensu* Smith  
*Svensk Bot. Tidskr.* **1**(3): 282 (1909)  
 Dist.: São Paulo  
 Herb.: SP  
 Lit.: SMITH & ZELLER (1966), BASEIA & MILANEZ (2002)

*Rhizopogon rubescens* (Tul.) Tulasne

*G. Bot. Ital.* **2**(1): 58 (1844)  
 Dist.: Santa Catarina, São Paulo  
 Herb.: FLOR, SP  
 Lit.: SMITH & ZELLER (1966), BASEIA & MILANEZ (2002)

*Rhizopogon vulgaris* (Vitt.) Lange  
*Dansk Bot. Ark.* **16**: 56 (1956)  
 Dist.: Santa Catarina  
 Herb.: FLOR  
 Lit.: SMITH & ZELLER (1966)

*Rhizopogon zelleri* Smith  
*Mem. N. Y. Bot. Garden* **14**: 75 (1966)  
 Dist.: Santa Catarina  
 Herb.: FLOR  
 Lit.: SMITH & ZELLER (1966)

#### SUILLACEAE (Singer) Besl & Bresinsky

#### *Suillus* Gray

*Suillus cothurnatus* Singer  
*Farlowia* **ii**: 261 (1945)  
 Dist.: Paraná, Rio Grande do Sul  
 Herb.: E  
 Lit.: WATLING & MEIJER (1997)

*Suillus granulatus* (L.: Fr.) Kuntze  
*Lloydia* **7**: 32 (1944)  
 Dist.: São Paulo, Paraná, Rio Grande do Sul  
 Herb.: E, SP, HUNISC  
 Lit.: WATLING & MEIJER (1997)

*Suillus luteus* (L.: Fr.) S.F. Gray  
*Nat. Arr. Brit. Pl.* **1**: 646 (1821)  
 Dist.: Paraná, Rio Grande do Sul, São Paulo  
 Herb.: E, SP, HUNISC, ICN  
 Lit.: WATLING & MEIJER (1997)

*Suillus subaureus* (Peck) Snell  
*Lloydia* **vii**: 30 (1944)  
 Dist.: Rio Grande do Sul  
 Herb.: HUNISC  
 Lit.: PUTZKE *et al.* (1994)

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