

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

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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 Sao 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 9th 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.

^B – type locality in Brazil.

^R – Fungi Rickiani.

nd – *nomen dubium*.

ⁿⁱ – *nomen invalidum*.

^m – *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 ^B

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 ^B

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

Dist.: Amazônia

Herb.: INPA

Lit.: SINGER (1989)

Austroboletus olivaceus Singer ^B

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 ^B

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 nd

Egatea **11**: 16 (1926)

Dist.: Rio Grande do Sul

Herb.: *

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

Boletus olivaceus Rick ^{B,R}

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 ^m

original description not found

Dist.: Rio Grande do Sul

Herb.: *

Lit.: SINGER (1953)

Chalciporus Bataille

Chalciporus trinitensis (Heinem.) Singer, Araujo & Ivory ⁿⁱ

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^B
Persoonia **9**: 436 (1978)
 Dist.: Amazônia
 Herb.: INPA
 Lit.: SINGER (1978), SINGER *et al.* (1983)

Fistulinella campinaranae var. *scrobiculata* Singer^B
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* Qué.**

Phylloporus flavipes Rick^{B, R}
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^B
Fieldiana, Bot., N.S. **21**: 124 (1989)
 Dist.: Amazônia
 Herb.: INPA
 Lit.: SINGER (1989)

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

Phylloporus pratensis Rick^{B, R}
Iheringia **7**: 295 (1960)
 Dist.: Rio Grande do Sul
 Herb.: PACA

Lit.: RICK (1960)

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

***Pulveroboletus* Murrill**

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

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

***Strobilomyces* Berk.**

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

***Tylopilus* Karst.**

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

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

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

***Xerocomus* Qué.**

Xerocomus amazonicus Singer var. *amazonicus*^B
Persoonia **9**: 429 (1978)
 Dist.: Amazônia

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

Xerocomus amazonicus var. *obscuratus* Singer & Araujo^{B,ni}
Beihefte zur Nova Hedwigia **77**: 78 (1983)
Dist.: Amazônia
Herb.: INPA
Lit.: SINGER *et al.* (1983)

Xerocomus brasiliensis Rick^{B,R}
Farlowia **ii**: 298 (1945)
Dist.: Rio Grande do Sul, São Paulo
Herb.: FH, SP, PACA
Lit.: SINGER & DIGILIO (1957)

Xerocomus campinaranae Singer^B
Beihefte zur Nova Hedwigia **77**: 66 (1983)
Dist.: Amazônia
Herb.: INPA
Lit.: SINGER *et al.* (1983)

Xerocomus chapinii Singer^B
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^B
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^B
Beihefte zur Nova Hedwigia **77**: 70 (1983)
Dist.: Amazônia
Herb.: INPA
Lit.: SINGER *et al.* (1983)

Xerocomus radicolica Singer^B
Persoonia **9**: 430 (1978)
Dist.: Amazônia
Herb.: INPA
Lit.: SINGER (1978), SINGER *et al.* (1983)

Xerocomus scrobiculatus Singer^B
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^B
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^B
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 Quéf.

Gyroporus castaneus (Bull. ex Fr.) Quéf.
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^B
Fieldiana, Bot., N.S. **21**: 123 (1989)
 Dist.: Amazônia
 Herb.: F
 Lit.: SINGER (1989)

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)

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

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

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

Phyllobolites Singer

Phyllobolites miniatus (Rick) Singer^R
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^B
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.^B
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 **viii**: 30 (1944)
Dist.: Rio Grande do Sul
Herb.: HUNISC
Lit.: PUTZKE *et al.* (1994)

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