



New records of *Pluteus* (Agaricales) from Paraná State, Brazil

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Dias RL, Cortez VG 2013 – New records of *Pluteus* (Agaricales) from Paraná State, Brazil. Mycosphere 4(5), 937–943, Doi 10.5943/mycosphere/4/5/6

Abstract

In a survey of the agarics from the western region of Paraná State, south Brazil, three new records are presented: *Pluteus argentinensis* is a new record from Brazil, while *P. cervinus* and *P. globiger* are new records from the State of Paraná. Descriptions and photos of both macro- and microscopic features are given, with a brief discussion on their taxonomy and distribution.

Key words – agaricoid fungi – mycobiota – Neotropical – pluteoid clade – taxonomy

Introduction

Pluteus Fr. is a large and widespread genus in *Pluteaceae* Kotl. & Pouzar, comprising ca. 300 species worldwide (Kirk et al. 2008). The pluteoid habit, free and pinkish lamellae with an inverse bilateral trama, stipe without volva and mostly exannulate, smooth and pinkish spores are some diagnostic features of the genus (Orton 1986, Singer 1986). Recent molecular phylogeny studies changed *Pluteus* taxonomy, with the inclusion of annulate species formerly included in *Chamaeota* (W.G. Sm.) Earle and re-evaluation of infra-generic classification (Minnis et al. 2006, Justo et al. 2010a,b).

In Brazil, about 70 *Pluteus* taxa and were reported from several States in the country (Menolli & Capelari 2008, Putzke & Wartchow 2008, Menolli et al. 2010). From the State of Paraná, Meijer (2008) reported 34 *Pluteus* species, including 10 unnamed taxa. During a macrofungal survey in the western region of Paraná State (Ferreira & Cortez 2012), specimens of *Pluteus* were collected and some are reported here. This investigation aimed to provide data for the knowledge of the mycobiota from southern Brazil, with particular reference to western region of Paraná State.

Materials & Methods

This study was undertaken at the São Camilo State Park (abbreviated onwards as PESC), a conservation unit placed in the municipality of Palotina, western region of the State of Paraná, in Southern Brazil (24°18' 00" - 24°19'30" S and 53°53'30" - 53°55'30" W). The area is a fragment of Seasonal Semideciduous Forest, in the Domain of the Atlantic Forest, and comprises an area of ca. 387 ha. (IAP 2006). Specimens were collected from March 2010 and June 2012 and are preserved at the mycological collection of Universidade Federal do Paraná, Campus Palotina (HCP). Macroscopic and microscopic examinations were performed according to Largent (1986) and Largent et al. (1977), respectively. Color names and codes follow Kornerup & Wanscher (1978). In basidiospores' descriptions, Q is the range of the length/width quotient for all measured basidiospores, Qm is the average of all Q values obtained, and n indicates the number of measured basidiospores.

Taxonomy

Pluteus argentinensis Singer, *Lloydia* 21: 230, 1959 ('1958')

Figs 1–6

Basidioma pluteoid, solitary, on woody litter, in the forest. Pileus 43 mm diam., convex, surface densely fibrillose to slightly squamulose, yellowish brown (5F8) on a grey (6B1) background, margin entire, non-striate; context 2 mm thick near stipe insertion to 1 mm near the pileus margin, yellowish white (4A2). Lamellae close, free, distant about 1 mm each other, <4.5 mm diam, greyish orange (5B3), margin entire and concolor with sides. Stipe 68 × 6 mm, central, inserted, subcylindrical, tapering from the base towards the apex, surface fibrillose, beige/greyish yellow (4C3), context fibrous, greyish yellow (4B3). Spore-print reddish grey (7B2).

Basidiospores 5.5–7.6 × 5.5–7.1 μm, Q= 0.9–1.2, Qm= 1.0, n=30, globose to subglobose, pale greenish to hyaline under KOH, smooth and little thickened walls, guttulate. Basidia 25–36 × 8–9 μm, subclavate to subventricose, tetrasporic. Cheilocystidia 42–83 × 12–22 μm, mostly ventricose to broadly sublageniform, hyaline, thin-walled. Pleurocystidia 62–91 × 11–24 μm, ventricose, hyaline, thin-walled. Hymenophoral trama divergent, composed of long and cylindrical hyphae, 4–27 μm diam., smooth and thin-walled. Pileipellis formed of filamentous and elongated hyphae, 41.5–93.9 × 8.4–16.4 μm, smooth and thin-walled, with a brownish intracellular pigment uniformly dissolved in the hyphae, the terminal elements usually with a attenuate apex, but not capitate or rostrate. Clamp connections absent.

Known distribution – Neotropical: México, Argentina and south Brazil (new record).

Material examined – Brazil, Paraná, Palotina, PESC, 19 Oct 2011, *R.L. Dias 27-4* (HCP).

Discussion – This species was described from Argentina, and later reported from Mexico (Rodríguez & Guzmán-Dávalos 1999). Materials collected at PESC fits very well with original description by Singer (1959), except for the presence of slightly larger pleurocystidia (34–68 × 14–25 μm) and a few smaller hyphae of pileipellis (91–127 × 16.5–18.7 μm), but we consider it in the variation of the species. Wright & Albertó (2002) present a description, photo and line drawings of their material from the region of Buenos Aires, however it is possibly misidentified because *P. argentinensis* is a non-clamped species and their figures show conspicuous clamp-connections in pileipellis hyphae and basidia base. *Pluteus argentinensis* is a new record from Brazil.

Pluteus cervinus (Schaeff.) P. Kumm., *Führ. Pilzk.*: 99, 1871

Figs 7–12

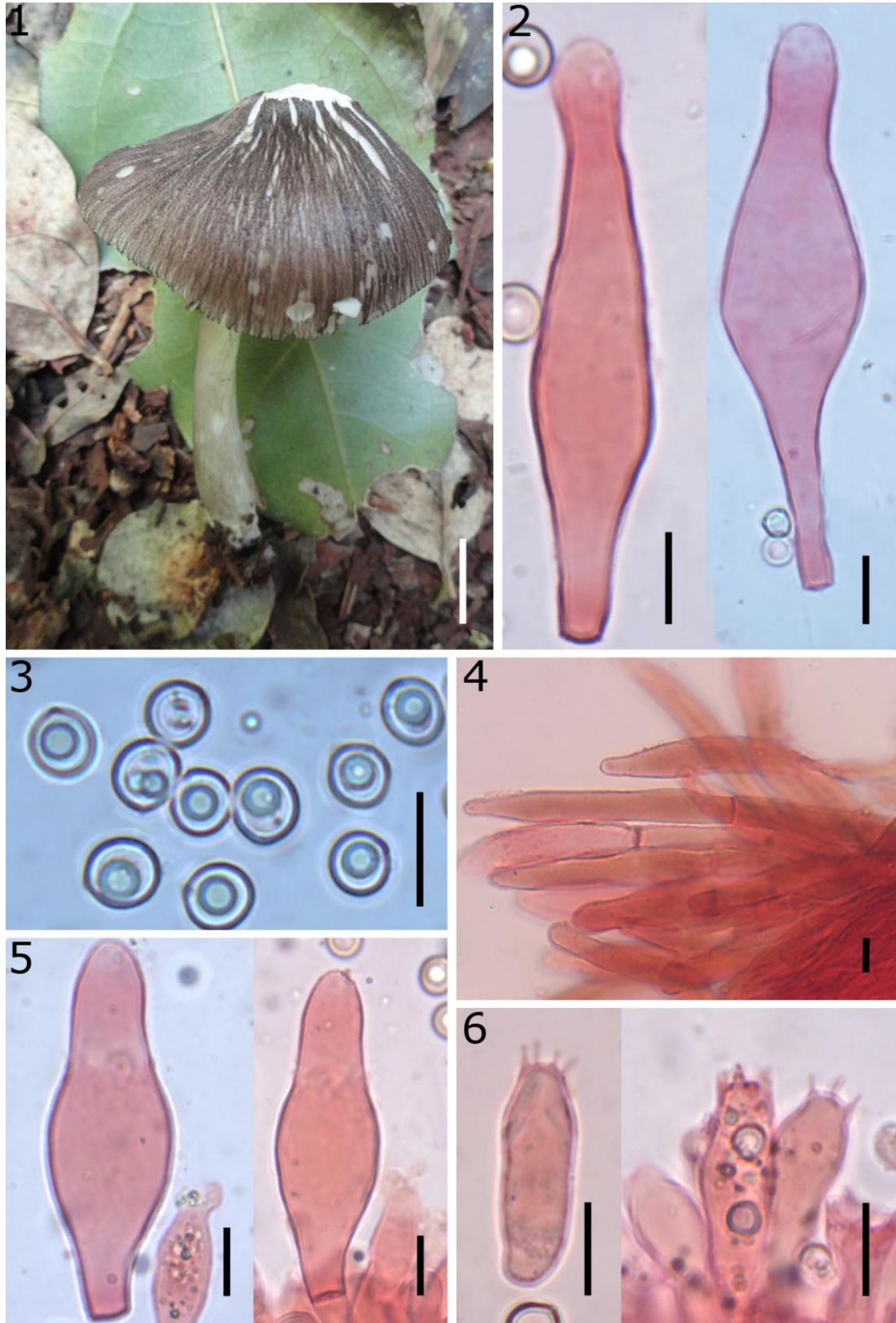
Basidiomata pluteoid, growing in pairs, on wood in decomposition. Pileus 80–110 mm diam., applanate to shallowly depressed but not umbilicate, yellowish brown (5E5), surface radially silky-fibrillose, dry; context fleshy, up to 6 mm thickness, brownish orange (5C6). Lamellae close, free, distant about 1 mm from each other, 6–10 mm, greyish orange (5B3), margin entire and concolor with sides. Stipe 95–105 × 7–9 mm, central, clavate, with basal mycelium, surface fibrillose, white (5A1), context fibrous, white (5A1) and 7–9 mm. Spore-print not seen.

Basidiospores 5–9 × 3–6 μm, Q= 1.2–1.8, Qm= 1.5, n=50, broadly elliptical to oblong or subglobose, smooth and thick-walled. Basidia 23–35 × 7–10.5 μm, ventricose to subclavate, tetrasporic. Cheilocystidia 25–47 × 11–17 μm, broadly clavate, hyaline, smooth and thin-walled. Pleurocystidia metuloidal, 45–95 × 11–23 μm, *Cervinus*-type, fusoid, with apical and occasionally one lateral horns 5–8 μm long, walls thick 1.8–2.9 μm, pale greenish under KOH, numerous in the sides of lamellae. Hymenophoral trama divergent, composed of filamentous, 2–16.2 μm diam., cylindrical, smooth and thin-walled. Pileipellis formed by prostrate, parallel hyphae, 5.5–7 μm, cylindrical, smooth and thin-walled, with a pale brown intracellular pigment. Clamp-connections absent.

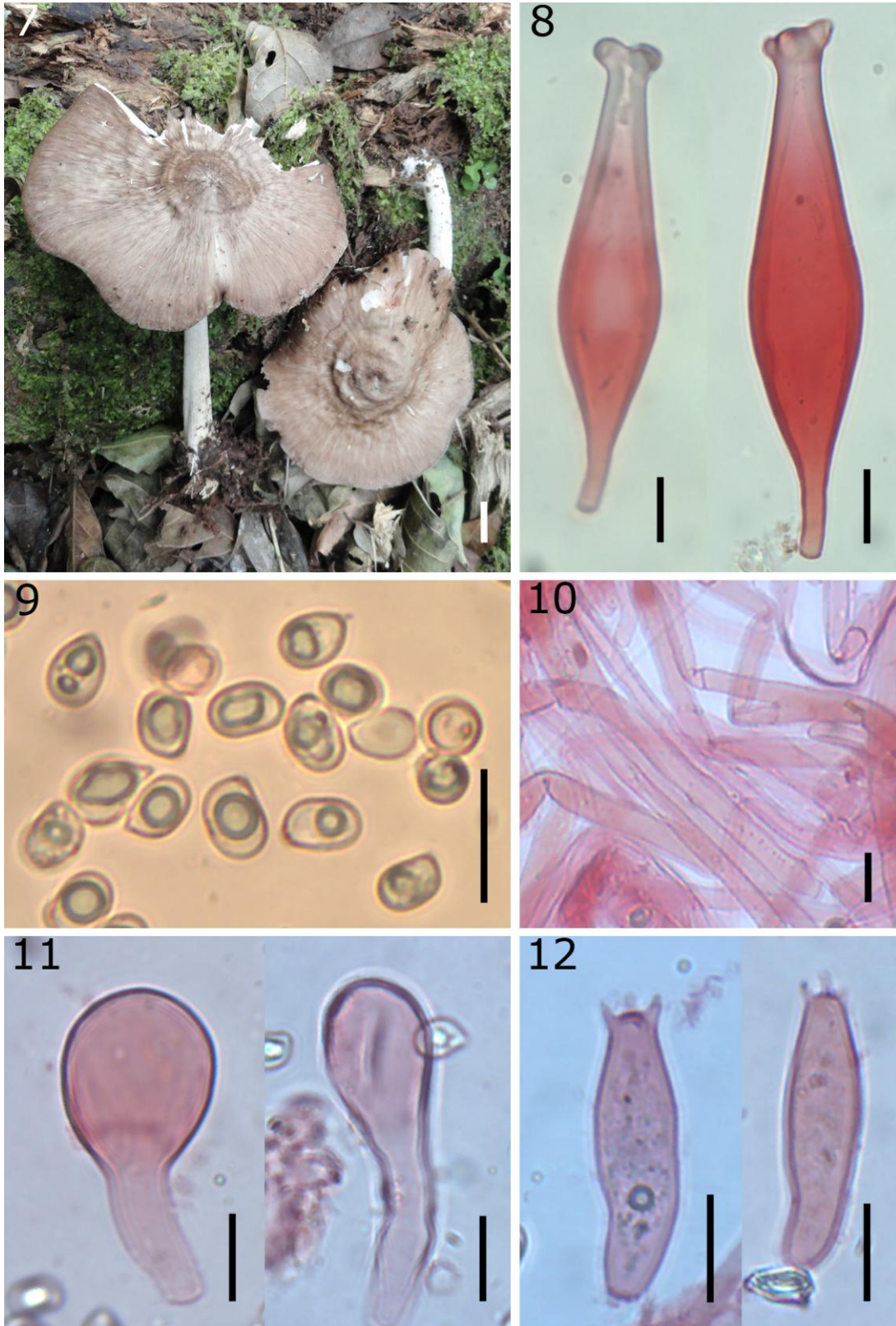
Known distribution – known from all continents.

Material examined – Brazil, Paraná, Palotina, PESC, 16 Sep 2011, *R.L. Dias 6-1* (HCP).

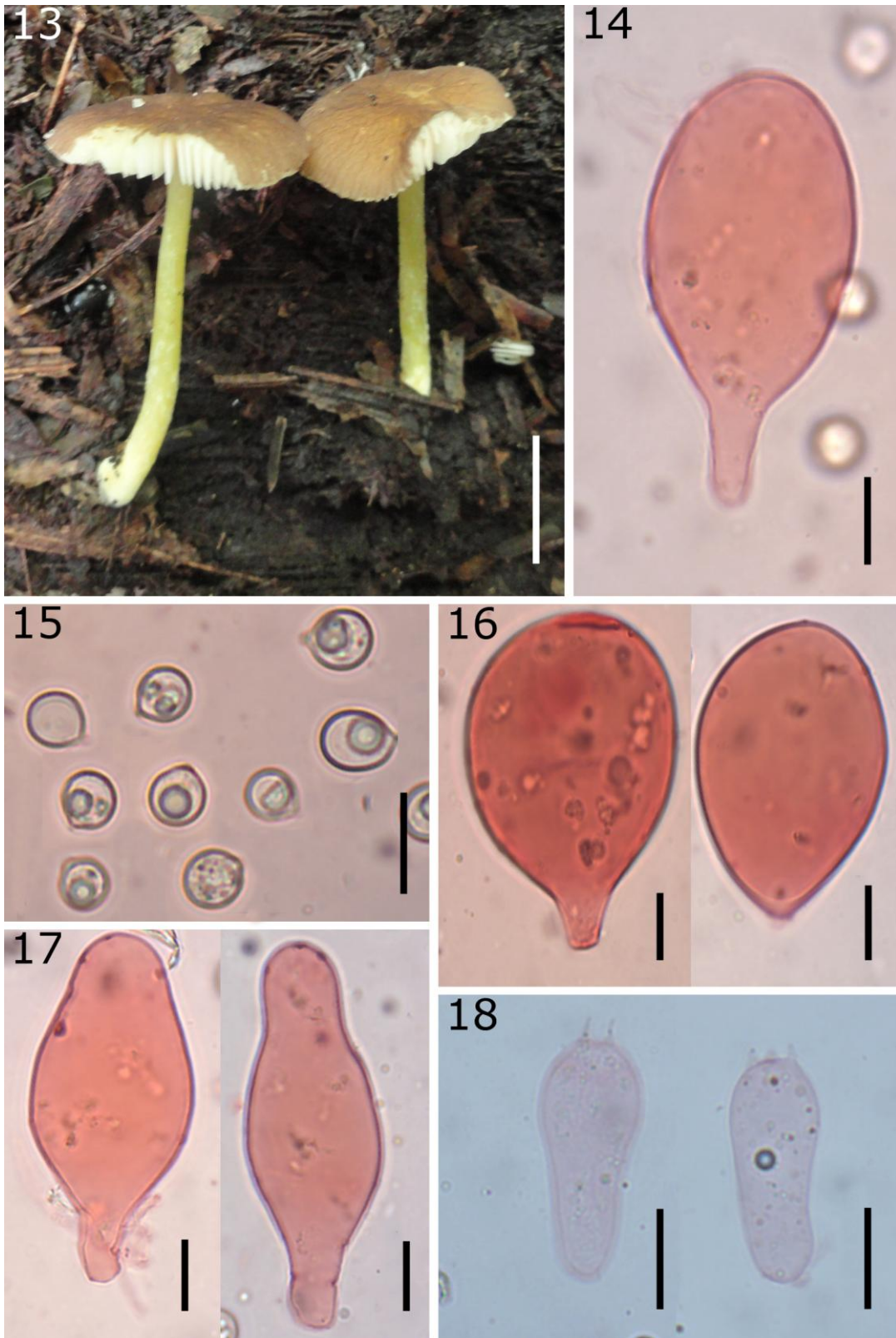
Discussion – This is the type species of the genus *Pluteus* and of Sect. *Pluteus* due to the filamentous pileipellis and presence of metuloidal cystidia (Singer 1986). This latter feature is one of the most important for identification of the species: the cystidia bears apical horns, although in some exceptional cases, they can bear one lateral horn, and are exclusively of *Cervinus*-type.



Figs 1–6 – *Pluteus argentinensis*. 1 Basidioma. 2 Pleurocystidia. 3 Basidiospores. 4 Pipelipellis. 5 Cheilocystidia. 6 Basidia. – Bars = 10 mm (1), 10 μ m (2–6).



Figs 7–12 – *Pluteus cervinus*. 7 Basidiomata. 8 Pleurocystidia (metuloids). 9 Basidiospores. 10 Pipelipellis. 11 Cheilocystidia. 12 Basidia. – Bars = 10 mm (7), 10 μ m (8–12).



Figs 13–18 – *Pluteus globiger*. 13 Basidiomata. 14 Cheilocystidia. 15 Basidiospores. 16 Pipelipellis. 17 Pleurocystidia. 18 Basidia. – Bars = 10 mm (13), 10 μ m (14–18).

The absence of clamp-connections is another diagnostic feature in the Sect. *Pluteus* (Singer 1959). Slightly larger cheilocystidia (30–60 × 10–24 µm) were described by Orton (1986), but the size of south Brazilian specimens agrees with those by Breitenbach & Kränzlin (1995) for the species. *Pluteus xylophilus* (Speg.) Singer is the closest species in subtropical Brazil, but differs from *P. cervinus* in the trimorphic pleurocystidia and dimorphic cheilocystidia (Menolli et al. 2010). *Pluteus cervinus* has been reported from all continents, although little recorded and known from Neotropical region, especially in South America. In Brazil, the only report of the species was from the State of São Paulo (Pegler 1997), since the record of *P. cervinus* by J. Rick from Rio Grande do Sul correspond to *P. xylophilus* (Menolli et al. 2010), and thus this is the first record from Paraná.

Pluteus globiger Singer, *Lilloa* 25: 266, 1952

Figs 13–18

Basidiomata pluteoid, growing in pairs on decayed wood. Pileus 21–22 mm diam., plano-convex, surface rugulose in the center, to moderately sulcate-striate towards the pileal margin, yellowish brown (5D5), context about 1 mm in all its extension, pale orange (5A3). Lamellae close, free, distant up to 1 mm from each other, subventricose, 4 mm diam., greyish orange (6B3), margin entire and concolor with sides. Stipe 30–37 × 2 mm, central, subcylindrical, slightly tapering from the base towards the apex, inserted base, surface delicately fibrillose, dull yellow (3B3) to greyish yellow (3C3), with a cartilaginous appearance, fistulous, context brownish orange (5C5). Spore print brownish orange (6C3).

Basidiospores 5–6 × 5–6 µm, Q= 1.0–1.2, Qm= 1.0, n=25, globose, guttulate, smooth and thin-walled, hyaline to pale greenish. Basidia 23–30 × 7–9 µm, broadly clavate, bearing four sterigmata 2–2.5 µm long. Cheilocystidia 30–53 × 11–27 µm, ventricose, hyaline to pale yellowish, smooth and thin-walled. Pleurocystidia 25–78 × 17–34 µm, ventricose to broadly lageniform, hyaline, smooth and thin-walled, numerous. Hymenophoral trama divergent, composed of cylindrical and filamentous hyphae, 3.3–14.4 µm diam., with smooth, hyaline and thin walls. Pileipellis cellular, composed of a layer of subglobose or mostly sphaeropedunculate elements, 35–61 × 27–53 µm, smooth and thin-walled, with a uniformly dissolved intracellular brown pigment. Clamp connections present.

Known distribution – Neotropical, from México to Argentina and Brazil.

Material examined – Brazil, Paraná, Palotina, PESC, 12 Sep 2011, *R.L. Dias 25-1* (HCP).

Discussion – Another species described from Argentina (Singer & Digilio 1952), characterized by the yellowish color of basidiomata, cellular structure of pileipellis with brownish pigments and globose basidiospores (Singer 1959). The cellular pileipellis indicates its placement in Sect. *Celluloderma*. *Pluteus globiger*, with an essentially Neotropical distribution (Rodríguez et al. 1997, Singer 1959), was only reported in Brazil from the State of Rio Grande do Sul (Wartchow et al. 2006) and now it is a new record from the State of Paraná.

Acknowledgements

We thank the CNPq (Brazil) for financial support to this project (Proc. 478373/2010-4) and student fellowship to RLD, and IAP for allowing fieldwork at PESC (Author. Scient. Res. 212-10).

References

- Breitenbach J, Kränzlin F. 1995 – Fungi from Switzerland. Vol. IV Agarics. 2nd part. Lucerne, Mykologia Lucerne.
- Ferreira AJ, Cortez VG. 2012 – Lepioid Agaricaceae (*Basidiomycota*) from São Camilo State Park, Paraná State, Brazil. *Mycosphere* 3, 962–976.
- IAP - Instituto Ambiental do Paraná. 2006 – Plano de Manejo do Parque Estadual de São Camilo. <http://www.uc.pr.gov.br/modules/conteudo/conteudo.php?conteudo=25>

- Justo A, Vizzini A, Minnis AM, Menolli Jr. N, Capelari M, Rodríguez O, Malysheva E, Contu M, Ghignone S, Hibbett DS. 2010a – Phylogeny of the *Pluteaceae* (*Agaricales*, *Basidiomycota*): Taxonomy and character evolution. *Fungal Biology* 115, 1–20.
- Justo A, Minnis AM, Ghignone S, Menolli Jr. N, Capelari M, Rodríguez O, Malysheva E, Contu M, Vizzini A. 2010b – Species recognition in *Pluteus* and *Volvopluteus* (*Pluteaceae*, *Agaricales*): morphology, geography and phylogeny. *Mycological Progress* 10, 453–479
- Kirk PM, Cannon PF, Winter DW, Stalpers JA. 2008 – Dictionary of the *Fungi*. 10th ed. Wallingford, CABI.
- Kornerup A, Wanscher JH. 1978 – Methuen Handbook of Colour. 3rd ed. London, Eyre Methuen.
- Largent DL, Johnson D, Watling R. 1977 – How to identify mushrooms to genus III: microscopic features. Eureka, Mad River.
- Largent DL. 1986 – How to identify mushrooms to genus I: macroscopic features. 3rd ed. Eureka, Mad River.
- Meijer AAR. 2008 – Notable Macrofungi from Brazil's Paraná Pine Forests. Colombo, EMBRAPA.
- Menolli N, Capelari M. 2008 – Notes on *Pluteus* (*Pluteaceae*, *Agaricales*) from Brazil including two new species and a new record. *Mycologia* 102, 697–707.
- Menolli N, Asai T, Capelari M. 2010 – Records and new species of *Pluteus* from Brazil based on morphological and molecular data, *Mycology* 1, 130–153.
- Minnis AM, Sundberg WJ, Methven AS, Sipes SD, Nickrent DL. 2006 – Annulate *Pluteus* species: a study of the genus *Chamaeota* in the United States. *Mycotaxon* 96, 31–39.
- Orton PD. 1986 – British Fungus Flora. Agarics and Boleti. 4: *Pluteaceae: Pluteus* and *Volvariella*. Edinburgh, Royal Botanic Garden.
- Pegler DN. 1997 – The agarics of São Paulo, Brazil. London, HMSO.
- Putzke J, Wartchow F. 2008 – Lista de espécies de *Pluteaceae* (*Agaricales*) que ocorrem no Brasil. *Biociências* 16, 110–113.
- Rodríguez O, Guzmán-Dávalos L. 1997 – New reports of the genus *Pluteus* (*Agaricales*) from Mexico. *Mycotaxon* 61, 473–480.
- Rodríguez O, Guzmán-Dávalos L. 1999 – Nuevos registros del género *Pluteus* (*Pluteaceae*) en México. *Documents Mycologiques* 114, 67–78.
- Singer R. & Digilio APL. 1952 – Pródromo de la Flora Agaricina Argentina. *Lilloa* 25, 5–461.
- Singer R. 1959 ('1958) – Monographs of South American *Basidiomycetes*, especially those from the east slope of the Andes and Brazil. 1. The genus *Pluteus* in South America. *Lloydia* 21, 195–299.
- Singer R. 1986 – The *Agaricales* in Modern Taxonomy. 4th ed. Königstein, Koeltz.
- Wartchow F, Cortez VG, Coelho G. 2006 – New records of *Pluteus* (*Pluteaceae*, *Agaricales*) from Brazil. *Mycotaxon* 96, 241–252.
- Wright JE, Albertó E. 2002 – Guía de Los Hongos de La Región Pampeana. I. Hongos con Laminillas. Buenos Aires, L.O.L.A.