A provisional name for a taxon of *Phanerochaete* from South Africa

[1]T. H. de Koker, [2]H. Burdsall Jnr. & [3]B. J. H. Janse

[1]Department of Microbiology, University of Stellenbosch, Stellenbosch, South Africa
[2]Forest Mycology Center, USDA Forest Products Laboratory, Madison, WI, United States of America
[3]Mondi Forests , P.O. Box 39, Pietermaritzburg, 3200, South Africa

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Phanerochaete "pseudomagnoliae" nom. prov. isolated from decayed wood, collected in Stellenbosch, South Africa, is described and illustrated. From fruiting in culture it differs from previously described species of the genus *Phanerochaete* in that the basidiospores are smaller and it does not produce many chlamydospores on Malt Extract Agar but only on xylose containing liquid media. *Phanerochaete "pseudomagnoliae"* is compared with other similar species in *Phanerochaete*. Preliminary biochemical characterization of the strain is included.

Keywords: White-rot fungi, basidiomycetes, ligninolytic fungi, *Phanerochaete*, taxonomy.

The discovery of lignin peroxidases (LiP) and manganese dependent peroxidases (MnP) in *Phanerochaete chrysosporium* Burds. initiated interest in this species and similar white-rot decay fungi. The LiP and MnP enzymes enable these fungi to remove lignin from wood. Therefore, white-rot fungi have potential biotechnological applications in the pulp and paper industry (Akhtar & al., 1997), in bioremediation (Hammel, 1992), as well as in bioconversion of feeds (Eriksson & al., 1990). To date, research on understanding lignin degradation within the genus *Phanerochaete* Karst. focuses on selected strains of *P. chrysosporium* and *P. sordida* (Karst.) Erikss. et Ryv. (for reviews see Eriksson & al., 1990; Cullen & Kersten, 1996). However, there is a continual search for fungal strains with more selective and alternatively regulated lignin degradation (de Koker & al., 1998).

The genus *Phanerochaete* is heterogeneous, and based on classic taxonomic methodologies, Burdsall (1985) recognized 46 species. We have previously characterized the ligninolytic enzymes of a South African strain of *Phanerochaete*; designated PP25 (de Koker & al., 1998). Unfortunately, we have not found basidiomes of this species in

nature that would allow this fungus to be described adequately. In culture, however, the fruiting is strongly reminiscent of *Phanerochaete* species. Because of this, we refrain from describing it as a new species despite the molecular evidence (ITS sequences) supporting its uniqueness within the genus *Phanerochaete* (data not shown). Thus we describe the fruiting in culture and provide a provisional name *Phanerochaete "pseudomagnoliae"* nom prov. that can be used in literature referring to the species. Future collecting is planned in the area where the culture was isolated in order to finalize the delimitation of this species. In this study we present the description and preliminary biochemical characterization of strain PP25.

Materials and methods

Strain PP25 was isolated from decaying *Eucalyptus* wood collected in Stellenbosch, Western Cape, South Africa as described by de Koker & al. (1998). Strain PP25 was deposited at the Center for Forest Mycology Research (CFMR), Forest Products Laboratory, U.S.D.A. F.S., Madison, Wi 53705. *Phanerochaete chrysosporium* BKM-F-1767, *P. magnoliae* HHB 9829-Sp and *P. sordida* 97015P were obtained from the Forest Products Laboratory, U.S.D.A. F.S., Madison, Wi 53705. All strains were maintained on 1.5% (w/v) malt extract agar (MEA).

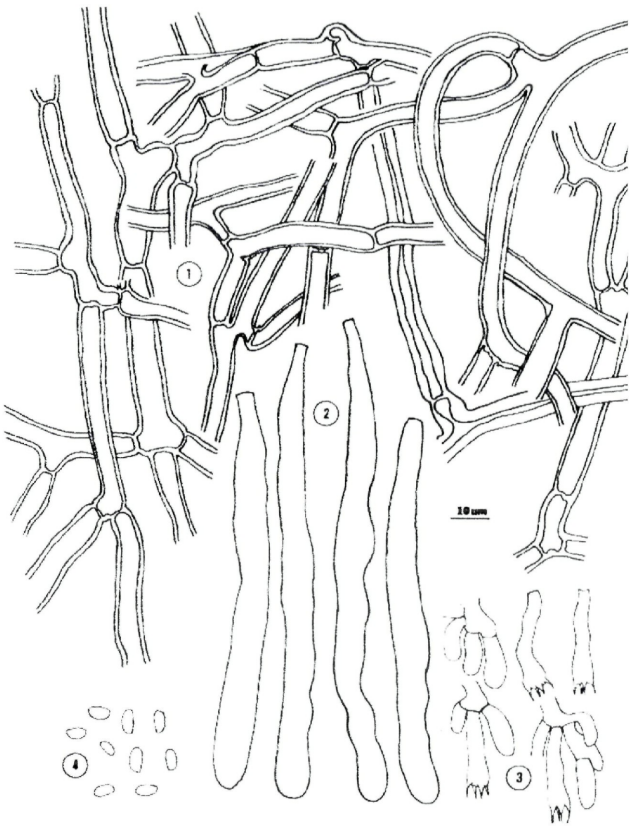
Chlamydospores of strain PP25 were produced at 37 °C in shallow defined liquid media (Kersten & Kirk, 1987) with xylose as carbon source. All tests to determine the species code were done as described by Stalpers (1978).

Growth rates (change in diam/day) at 37 °C were compared for *P. chrysosporium* BKM-F-1767, *P. sordida* 97015P and strain PP25 on malt extract agar (1.5% w/v), and dimethylsuccinic acid (DMS) medium (de Koker & al., 1998) containing 1% (w/v) glucose, xylose, galactose, cellobiose, mannose or asparagine. Ligninolytic potential was rated on high nitrogen DMS media supplemented with 0.2% Poly R-478 (de Koker & al., 1998).

Results

Phanerochaete "pseudomagnoliae" T. H. de Koker, Burds. & B. J. H. Janse, sp. nom. prov. – Figs. 1–4.

Etymology. – "*pseudomagnoliae*" in reference to characteristics similar to *P. magnoliae*.



Figs. 1–4. Line drawings of microscopic characters of *Phanerochaete "pseudo-magnoliae"*. – Fig. 1. Subicular hyphae. – Fig. 2. Cystidia. – Fig. 3. Basidia. – Fig. 4. Basidiospores. – Bar: 10 µm.

Colonies on MEA: Growth rate at 37 °C >70mm in 2 days. – Subiculum thin, white to cream-colored, advancing zone appressed, even; odor insignificant. Distance between marginal hyphae variable. – Aerial mycelia floccose. – Basidiome forming in small localized effused patches at edge of Petri dish at irregular in-

tervals, up to 1 cm diam; fertile area hydnaceous with some processes flattened, creamy tan to tan, spines up to 2 mm long, 0.5 mm diam. – Subicular hyphae in lower subiculum 5.0–7.5 µm diam, hyaline, slightly thickened walls or walls up to 1–2 µm thick, simple septate at irregular distances but often associated with a branch, branching usually at nearly right angles, H-branching not rare; in upper subiculum hyphae 3–5 µm diam, hyaline, simple septate, thin-walled, more or less regularly branched, H-branching not rare, other branching usually at nearly right angles. – Subhymenium composed of hyphae 2.5–3.5 µm diam, hyaline, thin-walled, with frequent simple septa, frequently branched, giving rise to hymenial elements in a candelabra-like arrangement. – Cystidia cylindrical with an obtuse apex, 60–120 × 5–7 µm, hyaline, smooth, walls thin at apex, then thickening gradually towards base, terminating with a single septum at the base, protruding up to 30 µm beyond hymenium, arising from subhymenium. – Basidia 19–22 µm long, 4.5–5.5 µm diam at widest point at the base of sterigmata, hyaline, clavate with a constriction about 5 µm below the apex, 4 sterigmate, thin walled, simple septate at base. – Basidiospores nearly ellipsoid, but adaxially flattened, 4–6 × 2–3 µm, hyaline, thin-walled, smooth, not changing color in Melzer's reagent. – Chlamydospores when grown at 37 °C on xylose, as shallow liquid cultures.

Culture examined. – South Africa, Stellenbosch, rotted wood, T. H. de Koker, PP25.

Discussion

In accordance with the classification key of Burdsall (1985) the proposed species *Phanerochaete "pseudomagnoliae"* can be classified under the genus *Phanerochaete* subgen. *Phanerochaete* because it possesses cystidia arising from the subhymenium and not directly from the substrate or subiculum.

Phanerochaete "pseudomagnoliae" possesses micromorphology characteristics similar to *P. chrysosporium, P. magnoliae* (Berk. et Curt.) Burds. and *P. sordida* (Tab. 1). However, the basidiospores are smaller (4–6 × 2–3 µm) than in *P. chrysosporium* (5.5–7.5 × 3–3.5 µm) and *P. magnoliae* (5.5–7 × 2.5–3 µm). Furthermore, unlike *P. chrysosporium* and *P. sordida,* few chlamydospores are formed on MEA by *P. "pseudomagnoliae"* and *P. magnoliae* (Tab. 1). On DMS media containing xylose as carbon source, *P. "pseudomagnoliae"* does form conidiospores.

Species code according to system of Stalpers (1978): (1), 3, 5, 13, (14), 19, 30, 31, 37, (48), 50, 54, 72, (85). All the tests for oxidative enzymes, viz. laccase and peroxidase (Stalpers, 1978), rate of deco-

Tab. 1. – Comparison of *Phanerochaete "pseudomagnoliae"* nom. prov. with other similar species (Burdsall, 1985).

Species	Basidiospores	Cystidia	Chlamydospores	High nitrogen Poly R-478
P. "pseudomagnoliae"	4–6 × 2–3 µm	Smooth 60–120 × 5–7 µm Protrude up to 30 µm	MEA (+)* Xylose media ++	2**
P. chrysosporium	5.5–7.5 × 3–3.5 µm	Smooth 60–150 × 6.5–7 µm Protrude up to 70 µm	MEA +++ Xylose media +++	4
P. magnoliae	5.5–7 × 2.5–3 µm	Smooth 50–100 × 5.5–7 µm Protrude up to 30 µm	MEA + Xylose media +	No reaction
P. sordida	5–7.5 × 2.5–3.5 µm	Incrusted or smooth 60–120 × 6–8 µm Protrude up to 30 µm	MEA +++ Xylose media +	4

* Number of conidiospores formed; (+) very few, + few, ++ average, +++ abundant.
** Day on which decolorization started.

loration of Poly R-478 media with high nitrogen content (Tab. 1) as well as results of de Koker & al. (1998) indicate that, in contrast to other wild *Phanerochaete* species, strain PP25 does not require low nitrogen conditions for the production of ligninolytic enzymes. The growth rates for *P. chrysosporium* BKM-F-1767, *P. sordida* and *P. "pseudomagnoliae"* on MEA and DMS media containing glucose, xylose, mannose, celliobiose and asparagine as carbon sources were similar. However, on galactose media *P. "pseudomagnoliae"* and *P. sordida* have slower growth rates than *P. chrysosporium*.

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