

Dematiaceous hyphomycetes from South Africa. I. Some phragmosporous, holoblastic and tretic species

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Nine phaeophragmosporous hyphomycetes, seven holoblastic and two tretic, are recorded from dead wood or leaf litter collected in South Africa. Descriptions and illustrations of the taxa are provided.

Nege feofragmosporiese hifomisete, sewe holoblasties en twee treties, wat op dooie hout of blaarafval in Suid Afrika versamel is, word aangemeld. Beskrywings en illustrasies van hierdie taksons word voorsien.

Keywords: Decorticated wood, hyphomycetes, leaf litter

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Introduction

Forests exhibit the highest sustained nutrient recycling productivity among natural terrestrial ecosystems and fungi play a vital role in the process as primary utilizers. Both fungi and bacteria compete for organic matter available to them and, as the different constituents of forest litter are decomposed and utilized, a succession of microfungi is involved. Although the quantitative roles of different types of fungi in decomposing various substrates is largely undocumented, information on the effectiveness of microfungi in decomposing such substances as cellulose, xylan, lignin and pectin has increased in recent years. The substantial amount of organic matter that must be continuously recycled in a deciduous forest makes the activity of microfungi essential to energy flow in such a system. Woody and leafy substrates are converted into biomass available for use by the microfauna that populate the forest floor. The discovery of large and diverse populations of taxa indicates the importance of this group of organisms in the forest ecosystem.

This is the first in a series of papers reporting collections of lignicolous and foliicolous hyphomycetes made in southern Africa. In previous publications by the authors, five new genera and eleven new species have been described (Morgan-Jones & Sinclair 1980a, b, 1983; Sinclair & Eicker 1981, 1985; Morgan-Jones *et al.* 1983, 1987a, b; Sinclair *et al.* 1983, 1987). These collections of microfungi have been made from various areas throughout southern Africa, including the NE Transvaal, central Orange Free State, eastern Cape and Transkei. At all locations, similar habitats were sought, being comprised of mountainous montane and submontane forests in moist and sheltered kloofs. The Mariepskop Forest Reserve in the district of Pilgrim's Rest along the NE Transvaal Drakensburg Mountain Escarpment is a particularly fertile site from where a great portion of the collections for these studies were made. Situated at 30° 52' E and 24° 30' S, the altitude is approximately 1 900 m above sea level, mean annual rainfall in this area is 1 369 mm with December, January and February being the wet months. Mist frequently shrouds the high mountain area and is an

important source of moisture for bryophytes and a great number of epiphytes growing at Mariepskop (van der Schijff & Schoonraad 1971) and should be considered an equally important factor in the prolific growth of microfungi at this location. It is hoped that these reports will help to define the unique and complex nature of the indigenous forests of southern Africa and serve to promote their preservation in the face of economic development that would change these irreplaceable environments forever.

Unless otherwise noted, most of these collections attest new records for southern Africa (Doidge 1950). Some have not previously been reported to occur on the African continent.

Descriptions

Curvularia intermedia Boedijn, Bull. Jard. Bot. Buitenz. III, 13: 126, 1933 (Figure 1). [*Curvularia* state of *Cochliobolus intermedius* Nelson, Mycologia 52: 776, 1960].

Colonies effuse, greyish to olivaceous-brown, thin, cottony. Mycelium immersed in the substratum, composed of branched, septate, smooth or minutely verruculose, subhyaline to pale brown, 3–5 µm wide hyphae. Rudimentary stromata composed of thicker-walled, 2–5 × 3–4 µm cells sometimes present. Conidiophores macronematous, mononematous, solitary, arising terminally or laterally from the hyphae, straight or slightly flexuous, frequently somewhat geniculate towards the apex, smooth, septate, thick-walled, mid-brown to brown, paler distally, up to 350 µm long, 6–7 µm wide; up to 17 µm wide at a bulbous, thicker-walled base. Conidiogenous cells monotretic or, more often, polytretic, integrated, terminal or intercalary, indeterminate, sympodial, cylindrical, often with node-like swellings. Conidia solitary, often borne in clusters at the apex of the conidiophore and at the nodes, straight or slightly curved on one side, broadly fusiform to ellipsoidal, smooth, 3-septate, central septum more or less median at the broadest point of the conidium, middle cells brown, end cells subhyaline to pale brown, 32–50 × 19–24 µm.

On unidentified dead leaf, Mariepskop, NE Transvaal,

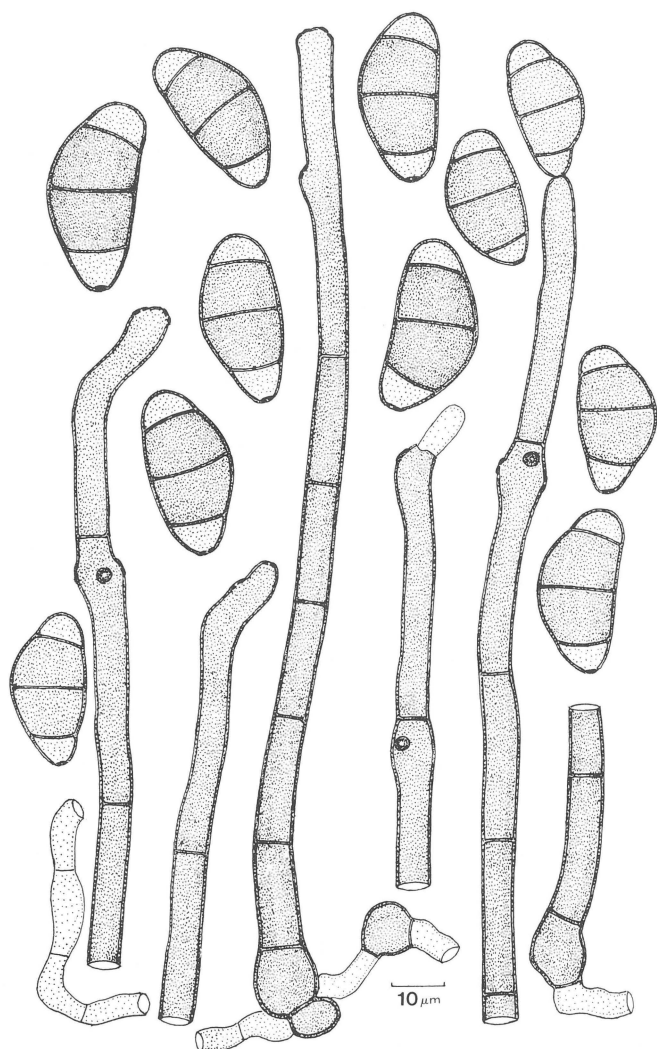


Figure 1 *Curvularia intermedia*.

South Africa, December 1981, R.C. Sinclair, AUAM 2553 (Auburn University Mycological Herbarium).

Curvularia intermedia was isolated in South Africa by G.R. Bates from surface washings of *Citrus sinensis* (L.) Osbeck during the 1930's (Doidge 1950). Another collection of it [from *Lolium multiflorum* seed, Howick, Natal, South Africa, May, 1979, N. Labuschagne, PREM 45535 (National Collection of Fungi, Pretoria)] is deposited in the herbarium of the National Collection of Fungi. It has been recorded predominantly from graminaceous hosts and is known to occur on corn (*Zea mays* L.), rice (*Oryza sativa* L.) and wheat (*Triticum aestivum* L.) in tropical and subtropical regions.

The conidial size range of the collection described above slightly exceeds that normally found in this species [27–40 × 13–20 μm (Ellis 1966), 30–41 × 15–21 μm (Matsushima 1975)].

***Dendryphiopsis atra* (Corda) Hughes, Can. J. Bot. 31: 655, 1953 (Figure 2).**

≡ *Dendryphon atrum* Corda, Icon, Fung. 4: 33, 1840.

[*Dendryphiopsis* state of *Amphisphaeria incrustans* Ell. & Everh., N. Am. Pyrenom.: 201, 1892.]

[For additional synonymy, see Hughes (1958).]

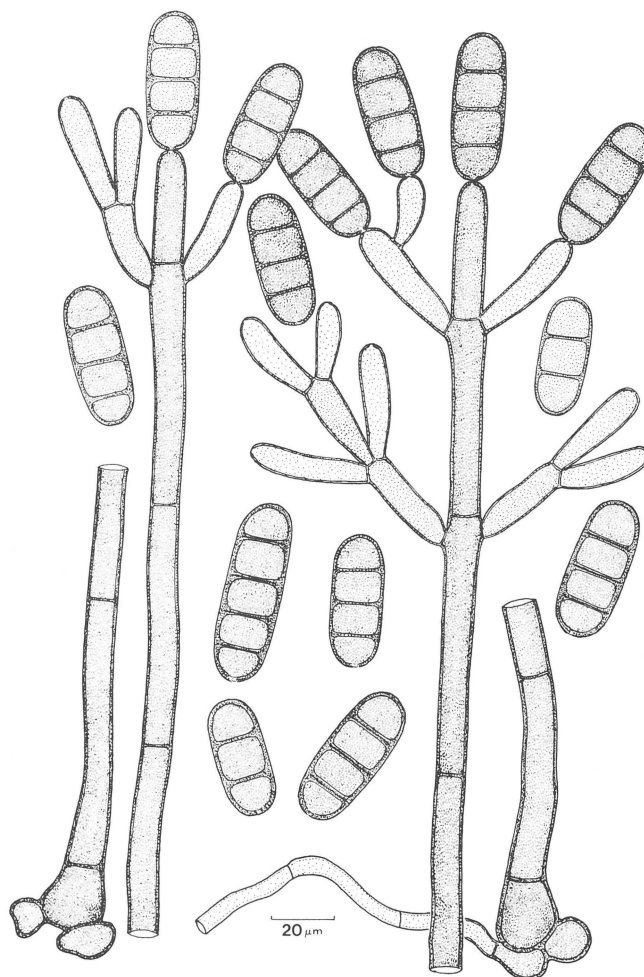


Figure 2 *Dendryphiopsis atra*.

Colonies effuse, black, hairy. Mycelium immersed in the substratum, composed of branched, septate, pale brown to brown, smooth, 4–6 μm wide hyphae. Conidiophores macronematous, mononematous, solitary, erect, straight or slightly flexuous, branched towards the apex, brown to dark brown, thick-walled, septate, cylindrical, smooth. Stipe up to 440 μm long, 8–10 μm wide, slightly narrower towards the apex. Branches paler than stipe, non- or 1-septate, cylindrical, 24–35 × 6–8 μm. Conidiogenous cells monotretic, integrated and terminal on stipe and branches or discrete, determinate. Conidia solitary, dry acrogenous, simple, cylindrical or somewhat obclavate, obtuse at each end, pale to mid-brown, thick-walled, smooth, 2- to 5-septate (usually 3 to 4), 45–65 × 16–20 μm.

On decorticated wood, Serala State Forest, near Tzaneen, NE Transvaal, South Africa, April 1986, A. Eicker, PREM 48915.

Another collection of this fungus was made on dead wood, Mbotyi, Transkei, December 1982; R.C. Sinclair, AUAM 2549. This has slightly larger spores, ranging to 70 μm long and 30 μm wide. It was collected previously in South Africa by Talbot (1956) [on fallen *Populus deltoides* Marsh., 'Goedehoop', Piet Retief District, April 1954, PREM 40993].

This species, which is not uncommon on wood and probably has a cosmopolitan distribution, has variably sized conidia. Ellis (1971) gives measurements of 40–80 × 12–25

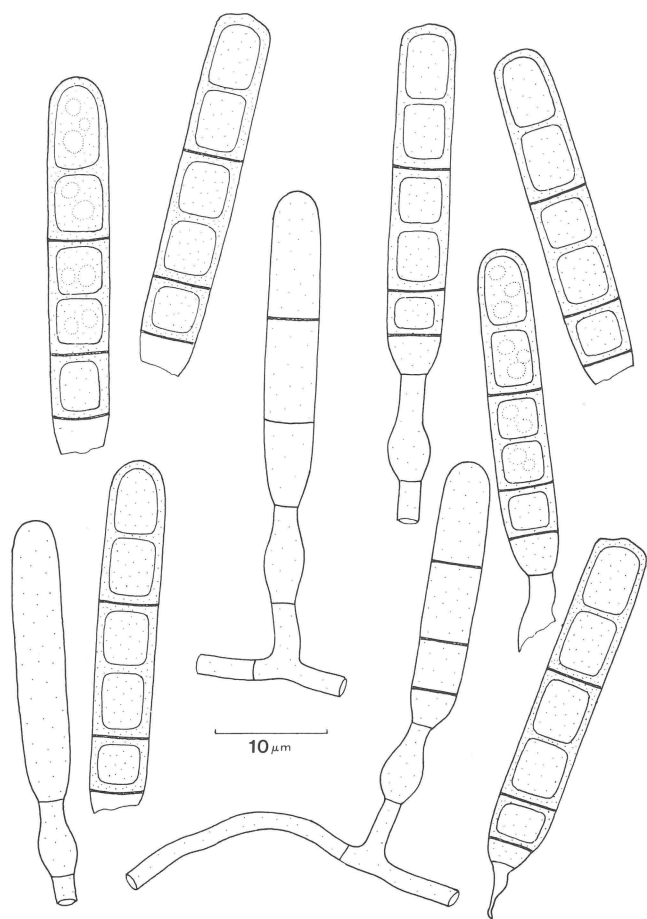


Figure 3 *Henicospora coronata*.

μm , whereas Matsushima (1971, 1975) reported collections from the Solomon Islands and Japan to have conidia $28\text{--}72 \times 13\text{--}17 \mu\text{m}$ and $35\text{--}65 \times 13\text{--}20 \mu\text{m}$ in size respectively.

Henicospora coronata Kirk & Sutton, Trans. Br. mycol. Soc. 75: 249, 1980 (Figure 3).

Colonies effuse, thin and inconspicuous, hairy. Mycelium partly superficial, partly immersed in the substratum, composed of branched, septate, smooth, hyaline, $1\text{--}2.5 \mu\text{m}$ wide hyphae. Conidiophores semi-macronematous, mononematous, arising terminally or laterally from the hyphae, simple, erect, straight, smooth, 1- to 2-septate, hyaline, $10\text{--}15 \times 2\text{--}2.5 \mu\text{m}$. Conidiogenous cells holoblastic, monoblastic, terminal, determinate, discrete, apex cylindrical, base narrowly obpyriform, $2\text{--}3 \mu\text{m}$ widening to $3\text{--}4 \mu\text{m}$ at the widest part. Conidia acrogenous, solitary, dry, smooth, cylindrical, guttulate, 3-euseptate, 5-distoseptate, septation progressive, lumina of upper five cells reduced, pale olivaceous-brown, $244\text{--}27 \times 4\text{--}5 \mu\text{m}$, slightly wider at a coronate apex. Conidium initials at first divided by three conspicuously thickened, unevenly placed euseptate; two in the lower third and one delimiting the upper third. The upper two cells each becomes subsequently subdivided by a distoseptum and the upper eusepta are each incorporated into an additional distoseptum. The lumen of the basal cell, delimited from the remainder of the conidium by the lower euseptum, remains unchanged. Conidium detachment

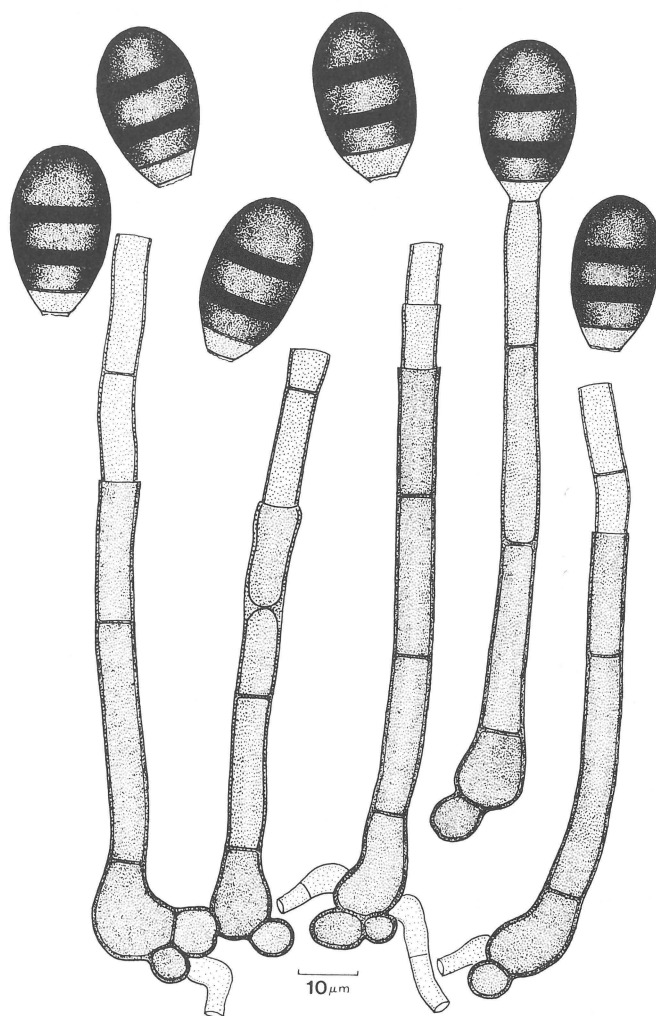


Figure 4 *Melanocephala triseptata*.

rhexolytic, by a fracture in the periclinal wall above or below the basal septum.

On dead unidentified leaf, Lusthof Farm, Geelhoutboom District, George, (Cape Province, South Africa, January 1983, R.C. Sinclair, AUAM 2558).

This fungus has been collected previously in Hawaii, U.S.A., Queensland, Australia, Trinidad and western Samoa (Kirk & Sutton 1980). The conidiophores of the South African specimen are somewhat shorter than those reported for the others and conidia are not always distinctly coronate at the apex.

Melanocephala triseptata (Shearer, Crane & Miller) Hughes, N.Z. J Bot. 17: 171, 1979 (Figure 4).

\equiv *Endophragmiella triseptata* Shearer, Crane & Miller, Mycologia 68: 184, 1976.

Colonies broadly effuse, black, hairy. Mycelium mostly immersed in the substratum, composed of branched, cylindrical, smooth, septate, subhyaline to pale brown, $2\text{--}3.5 \mu\text{m}$ wide hyphae. Conidiophores macronematous, mononematous, solitary or in a loose fascicle of a few, erect, simple, straight or very slightly flexuous, septate, smooth, proliferating percurrently a number of times, mid-brown, becoming paler towards the apex, especially following

proliferation, slightly bulbous at the extreme base, up to 150 μm long, 5–6 μm wide, swollen to 7–9.5 μm wide at the base. Conidiogenous cells monoblastic, integrated, terminal, cylindrical, frequently broadened slightly distally. Conidia broadly ellipsoidal or obovoid, brown to dark brown, 3-septate, with broad, dark brown to black bands masking the upper two septa, smooth, obtuse at the apex, truncate at the base, seceding rhexolytically, bearing a very narrow basal frill, 23–31 \times 13–18 μm , 5–6 μm wide at the base.

On dead decorticated wood, Debengeni Forest Reserve, Magoebaskloof, NE Transvaal, South Africa, August 17, 1979, R.C. Sinclair, AUAM 3375.

***Monotosporella setosa* (Berk. & Curt.) Hughes var. *macrospora* Hughes**, N.Z. J Bot. 16: 338, 1978 (Figure 5).

Colonies effuse, dark brown to black, hairy. Mycelium immersed in the substratum, composed of branched, septate, smooth or roughened, 3–6 μm wide hyphae. Conidiophores macronematous, mononematous, erect, straight or slightly flexuous, simple, cylindrical, septate, thick-walled up to 2 μm , smooth, dark brown, paler and thinner-walled towards the apex, 60–390 μm long, 6–10 μm wide, up to 12 μm at the swollen base, with up to 6 successive percurrent proliferations. Conidiogenous cells holoblastic, monoblastic,

integrated, terminal, cylindrical, proliferating percurrently. Conidia solitary, dry, acrogenous, obovoid to obpyriform, 2-septate; lower two cells short, pale to mid-brown, distal cell brown to black; 40–52 \times 30–36 μm .

On decorticated wood, Mariepskop, NE Transvaal, South Africa, September 1984, R.C. Sinclair, AUAM 2550.

Variety *macrospora* was described from a single collection made in New Zealand (Hughes 1978) and was said to differ from var. *setosa* by having shorter conidiophores and larger conidia. Some conidiophores in the South African collection are appreciably longer than those in the New Zealand material, but the conidia are similarly sized.

***Sporidesmiella hyalosperma* (Corda) Kirk var. *hyalosperma* Trans. Br. mycol. Soc. 79: 481, 1982 (Figure 6).**

\equiv *Helminthosporium hyalospermum* Corda, Icon. Fung. 1: 13, 1837.

[For additional synonymy, see Kirk (1982)].

Colonies effuse, brown to dark brown, sometimes sparse, hairy. Mycelium partly superficial, mostly immersed in the substratum, composed of branched, septate, smooth, subhyaline to pale grayish-brown, 2–3.5 μm wide hyphae. Conidiophores macronematous, mononematous, solitary, simple, straight or slightly flexuous, smooth, septate, golden

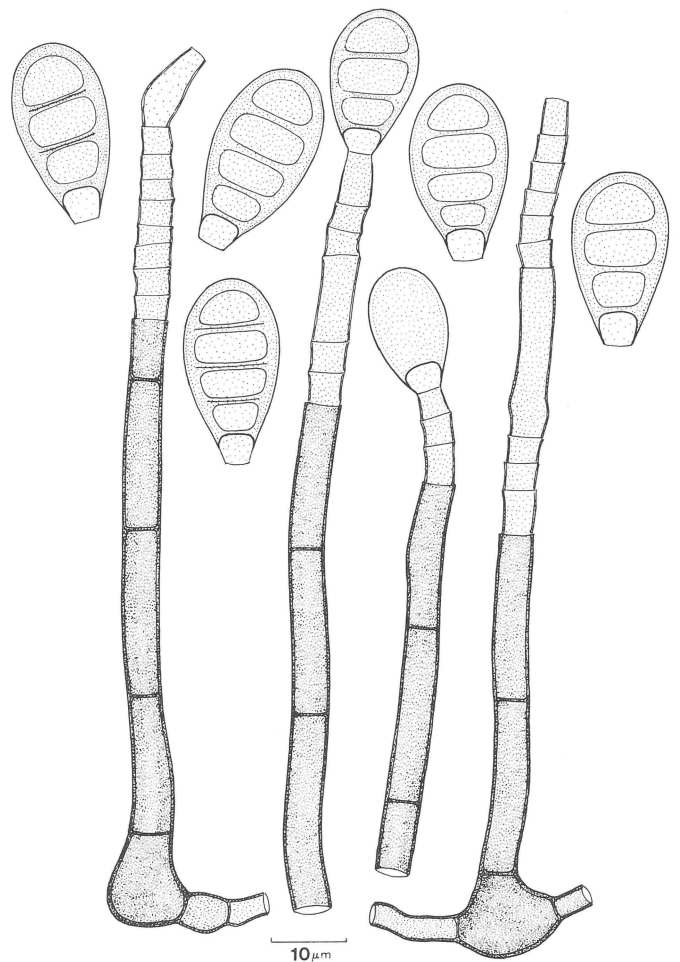
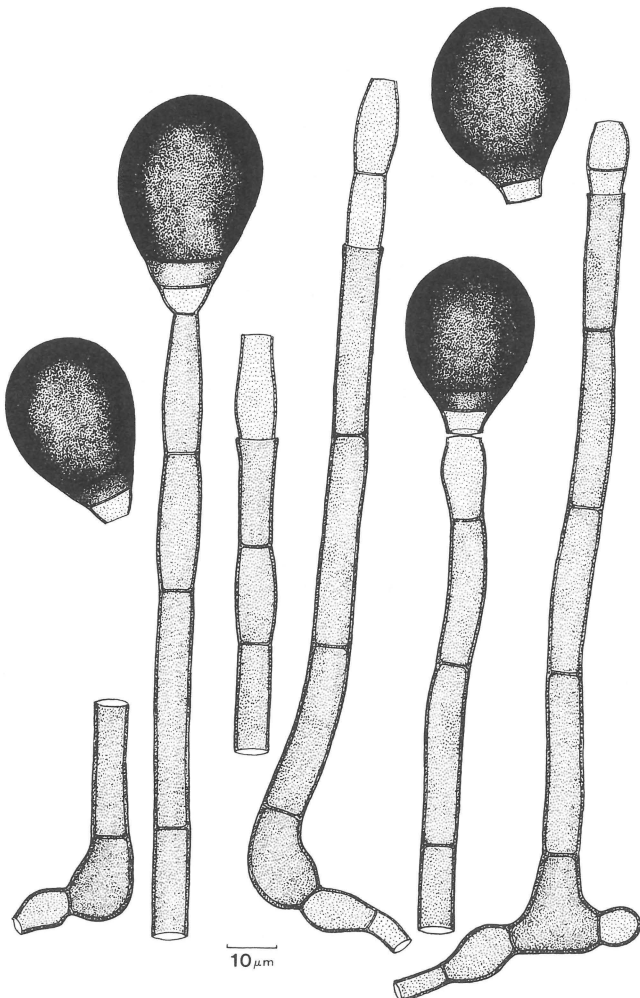


Figure 5 *Monotosporella setosa* var. *macrospora*.

Figure 6 *Sporidesmiella hyalosperma* var. *hyalosperma*.

brown to brown, paler towards the apex, initially 90–145 μm long, extending up to 230 μm , 5–6 μm wide, proliferating percurrently, 3 μm wide at the apex, up to 12 μm wide at the swollen base. Conidiogenous cells holoblastic, monoblastic, integrated, terminal, cylindrical, percurrent. Conidia acrogenous, simple, dry, broadly clavate to obovoid, 3- to 4-distoseptate, pale golden-brown to pale olivaceous-brown, septum delimiting basal cell convex and dark, 27–30 μm \times 9–12 μm , 2–3 μm wide at the truncate base.

On dead wood, Dullstroom District, Transvaal, South Africa, April 1983, H.M. Smith, AUAM 2551.

A second collection of this fungus from the same date and locality (PREM 48917) has longer conidia (29–33 μm). It appears to be common in the United Kingdom and has been recorded from Germany, Ireland, Maryland, U.S.A., and Sri Lanka (Kirk 1982).

Sporidesmium adscendens Berkeley, Ann. Nat. Hist., 4: 291, 1840 (Figure 7).

\equiv Clasterosporium adscendens (Berk.) Sacc., Syll. Fung. 4: 394, 1886.

Colonies effuse, dark brown to black, thin, hairy. Mycelium mostly immersed in the substratum, composed of branched, septate, smooth, pale brown to subhyaline, 2.5–3 μm wide hyphae; sometimes giving rise to superficial, thick-walled, subglobose, dark brown, stromatic cells. Conidiophores macronematous, mononematous, solitary or in groups of up to 5, formed terminally or laterally on the hyphae or arising from stromatic cells, simple, erect or suberect, straight or slightly flexuous, cylindrical, smooth, septate, mid- to dark brown, slightly paler towards the apex, thick-walled, 27–110 μm long, 9–11 μm wide. Conidiogenous cells holoblastic, monoblastic, integrated, terminal, determinate or percurrent. Conidia solitary, dry, acrogenous, simple, straight or slightly flexuous, long obclavate, truncate at the base, with numerous dark brown distosepta 7.5 to 8 μm apart, smooth-walled, mid- to dark brown, apical cells slightly paler, 150–285 \times 19–21 μm wide at the broadest part, tapering to 9–11 μm near the obtuse apex, 7–10 μm wide at the base.

On dead wood, Debengeni Forest Reserve, NE Transvaal, South Africa, August, 1979, R.C. Sinclair, AUAM 3374.

Sporidesmium altum (Preuss) M.B. Ellis, Mycol. Pap. 70: 46, 1958 (Figure 8).

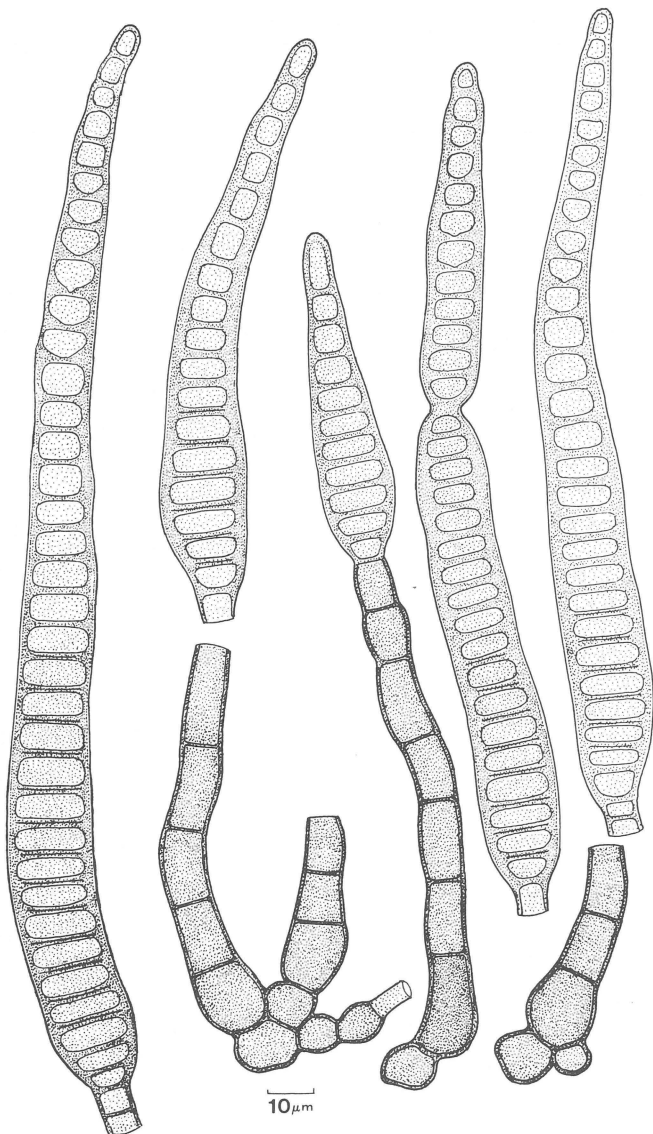


Figure 7 *Sporidesmium adscendens*.

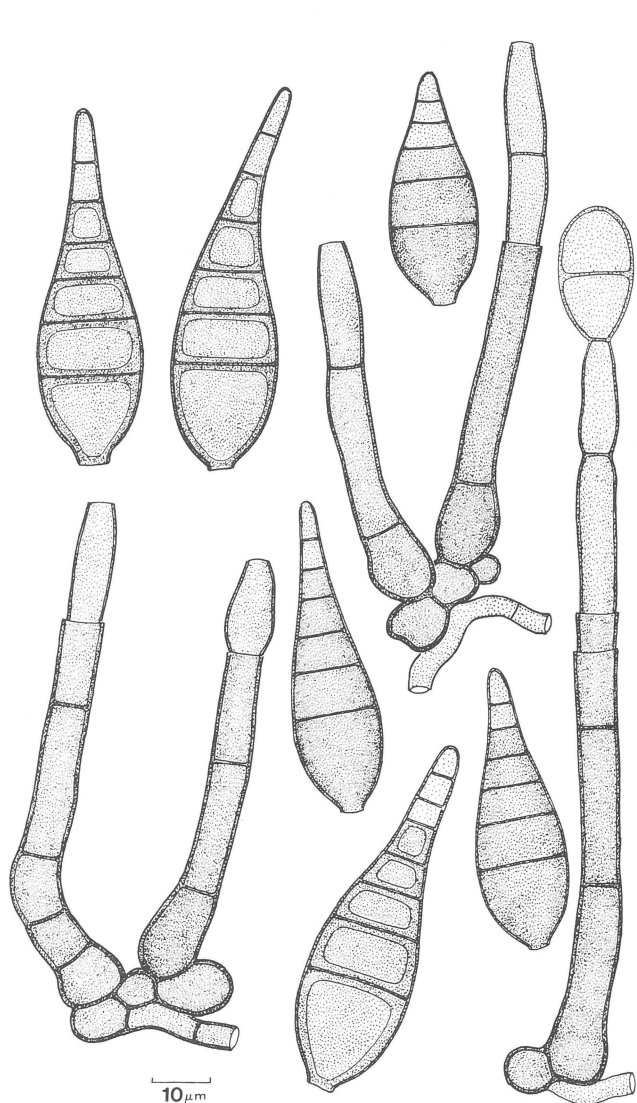


Figure 8 *Sporidesmium altum*.

≡ *Helminthosporium altum* Preuss, Sturm's Deutschlands Flora, Band 6: 33, 1848.

[For additional synonymy, see Ellis (1958)].

Colonies effuse, dark brown to black, thin, hairy. Mycelium mostly immersed in the substratum, composed of branched, septate, smooth, subhyaline to mid-brown, 1.55–4 µm wide hyphae. Conidiophores macronematous, mononematous, arising terminally and laterally on the hyphae or from dark brown, somewhat swollen cells, singly or in groups of 2–5, simple, erect, straight or slightly flexuous, cylindrical, smooth, septate, dark brown, paler towards the apex, up to 1.5 µm thick-walled, with up to 4 percurrent proliferations, 60–245 µm long, 6–7.5 µm wide narrowing to 5–6 µm at the extreme apex. Conidiogenous cells holoblastic, monoblastic, integrated, terminal, determinate or percurrent. Conidia solitary, dry, acrogenous, simple, straight or slightly curved, conical to obpyriform, truncate at the base, smooth, 7- to 9-septate, older ones appearing distoseptate, basal cell larger, mid- to dark brown, apical cells subhyaline to pale brown, seceding schizolytically, 41–60 µm × 15–22 µm

wide at the broadest part, 5–6 µm wide at the base.

On decorticated wood, Debengeni Forest Reserve, NE Transvaal, South Africa, August 1979, R.C. Sinclair, AUAM 2386.

The South African collection has conidiophores that are somewhat shorter than is normal.

***Sporidesmium folliculatum* (Corda) Mason & Hughes, Hughes, Can. J. Bot. 31: 609 (Figure 9).**

≡ *Helminthosporium folliculatum* Corda, Icon. Fung. 1: 12, 1837.

[For additional synonymy, see Ellis (1958)].

Colonies effuse, dark brown to black, hairy. Mycelium mostly immersed in the substratum, composed of branched, septate, smooth, pale brown to subhyaline, 1.5–4 µm wide hyphae. Superficial hyphal cells frequently slightly thicker-walled, swollen, subglobose to oblong, 4–5 µm in diameter. Conidiophores macronematous, mononematous, solitary or in interconnecting groups, terminal or lateral on the hyphae, simple, erect, straight or slightly flexuous, cylindrical, smooth, thick-walled, 0- to 2-septate, sometimes with one percurrent proliferation, 29–63 µm long, 5–6.5 µm wide, 2.5–3.5 µm wide at the apex. Conidiogenous cells holoblastic, monoblastic, integrated, terminal, determinate or percurrent. Conidia solitary, dry, acrogenous, simple, straight or slightly curved, mostly cylindrical, occasionally narrowly obclavate or subfusiform, broadly rounded at the apex, pale brown when young, darker reddish-brown when mature, darker toward the extreme base, smooth, 6–11 distoseptate, septa dark brown and 4–9 µm apart, 44–80 × 8–10 µm wide at the broadest part, truncate at the 2–2.5 µm wide base.

On dead wood, near Debengeni Waterfall, Debengeni Forest Reserve, NE Transvaal, South Africa, August 1979, R.C. Sinclair, AUAM 3372.

Acknowledgements

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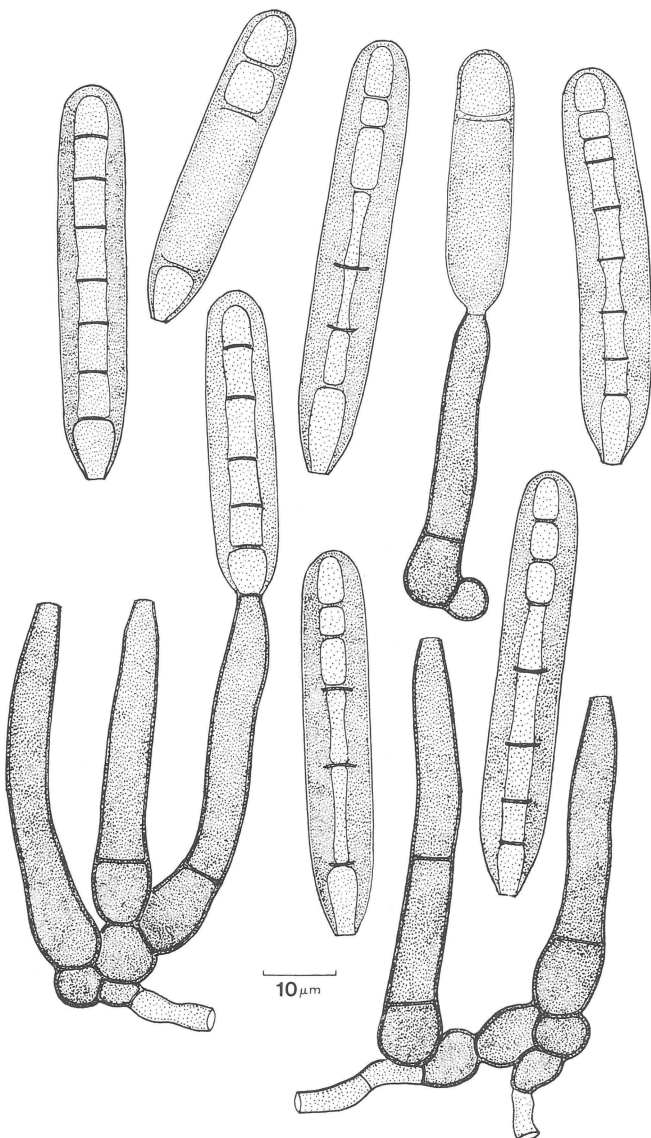


Figure 9 *Sporidesmium folliculatum*.

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