

## New and interesting records of South African fungi. XI. *Eucalyptus* leaf fungi

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Ten species of fungi from *Eucalyptus* leaves are described and illustrated. With the exception of *Coniella castaneicola* (Ellis & Everhart) Sutton, nine species are shown to be new records for South Africa. These include *Anungitea globosa* Sutton & Hodges, *Mapletonia falcata* Sutton, *Microsphaeropsis callista* (H. Sydow) Sutton, *M. globulosa* (Camara) Sutton, *Minimidochium setosum* Sutton, *Polyscytalum gracilisporem* (Matsushima) Sutton & Hodges, *Propolis emarginata* (Cooke & Masee) Sherwood, *Semifissispora elongata* Swart and *Tracylla aristata* (Cooke) Tassi.

Tien verskillende swamme vanaf *Eucalyptus*-blare word beskryf en geïllustreer. Met die uitsondering van *Coniella castaneicola* (Ellis & Everhart) Sutton wat reeds gerapporteer is, is nege nuwe rekords vir Suid-Afrika gevind: *Anungitea globosa* Sutton & Hodges, *Mapletonia falcata* Sutton, *Microsphaeropsis callista* (H. Sydow) Sutton, *M. globulosa* (Camara) Sutton, *Minimidochium setosum* Sutton, *Polyscytalum gracilisporem* (Matsushima) Sutton & Hodges, *Propolis emarginata* (Cooke & Masee) Sherwood, *Semifissispora elongata* Swart en *Tracylla aristata* (Cooke) Tassi.

**Keywords:** Follicolous *Eucalyptus* fungi, new records, South Africa.

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### Introduction

*Eucalyptus* spp. are known to be hosts to a number of different leaf fungi (Crous *et al.* 1989a), many of which have recently been recorded from South Africa (Crous *et al.* 1988; 1989b; 1990; Crous 1991; Crous *et al.* 1991). The present study discusses the morphology of ten species collected from *Eucalyptus* leaves, nine of them being new records for the country.

1. *Anungitea globosa* Sutton & Hodges, Nova Hedwigia 29: 594 (1978) Figures 1 & 2.

Mycelium immersed and superficial. Hyphae dark brown, septate, frequently branched, cells up to 12 µm long, 6 µm in diam., forming rounded, thick-walled chlamydospores. Conidiophores macronematous, mononematous, unbranched, erect, medium brown at base, becoming hyaline towards apex, cylindrical, 2 – 8-septate, up to 70 µm long, 3 µm in diam. Conidiogenous cells polyblastic, integrated, terminal or intercalary, up to 24 µm long, apex globose, 4 – 6 µm in diam., with several short, protruding cicatricized denticles up to 1 µm in diam. Sterile setae present, forming from superficial mycelium or apices of conidiogenous cells, medium brown, with 4 – 15 septa, up to 200 µm long, 3 – 4 µm in diam., tapering from the terminal three cells to form light brown, acutely rounded apices. Conidia dry, formed in unbranched acropetal chains, cylindrical, 1-septate, hyaline, with truncate, slightly rounded ends, 10.0 – 15.0 × 2.0 – 2.5 µm.

Other collections of *A. globosa* have been made from various *Eucalyptus* spp. in Hawaii and New Zealand (Sutton & Hodges 1978).

Western Cape, Stellenbosch, Stellenbosch Mountain, *Eucalyptus* leaf litter, P.W. Crous, Sept. 1990, PREM 51099.

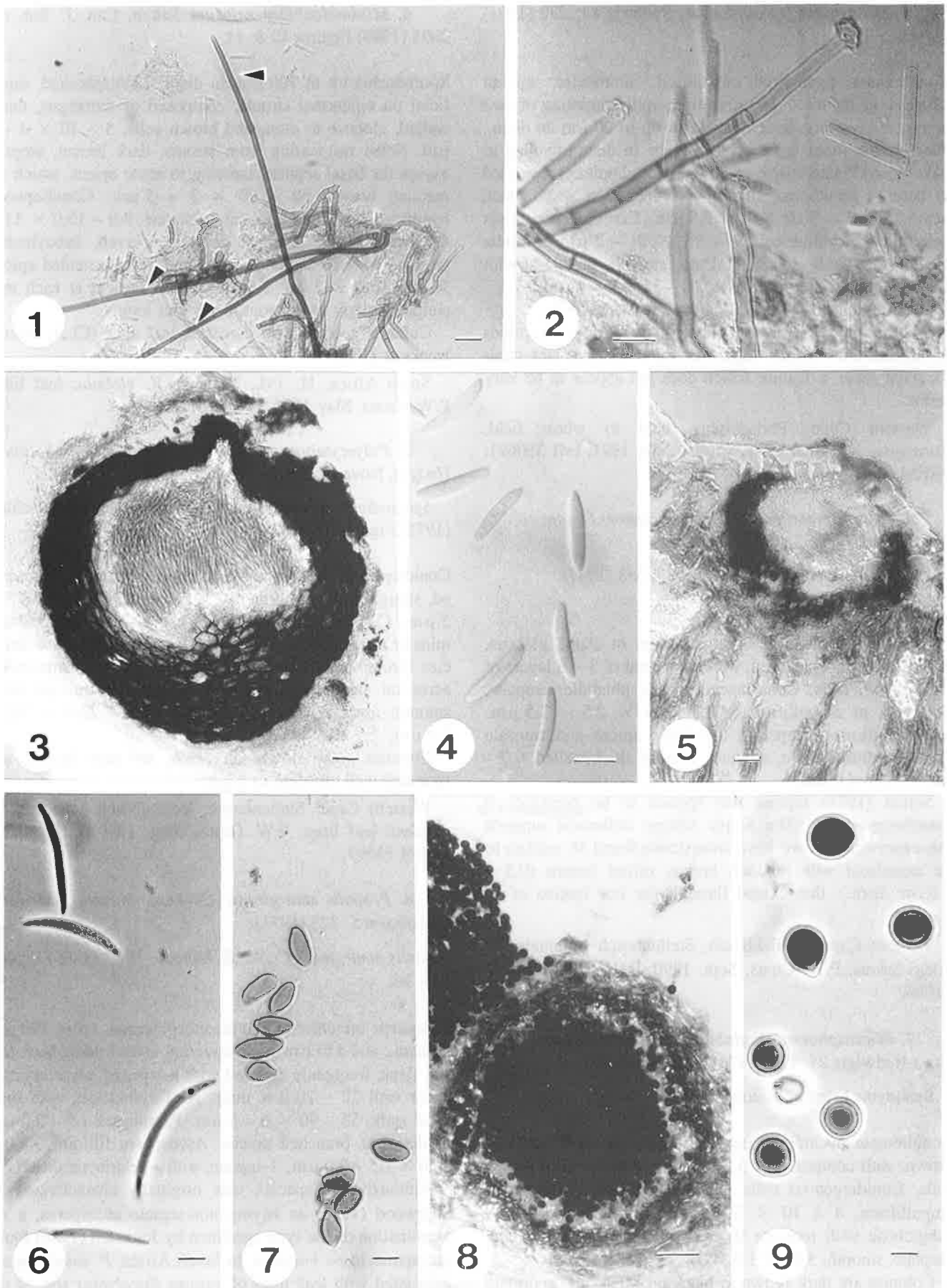
2. *Coniella castaneicola* (Ellis & Everhart) Sutton, in Sutton (1980) Figures 3 & 4.

Conidiomata pycnidoid, immersed, napiform, up to 230 µm in diam. *in vitro*, unilocular, with single, circular, central ostiole, up to 25 mm in diam; wall consisting of 4 – 6 layers of dark brown cells, *textura angularis*. Conidiophores up to 30 µm high, hyaline, septate, branched, ending in 2 – 3 phialides. Conidiogenous cells hyaline, phialidic, 7.0 – 13.0 × 2.5 – 3.0 µm. Conidia navicular, with obtuse apices, blunt, truncate bases, slightly curved, aseptate, hyaline to light brown, 13.0 – 25.0 × 2.5 – 3.5 µm.

Cultures sporulate profusely within 4 weeks on 2% malt extract agar (MEA).

*C. castaneicola* was recently reported from South Africa by Roux & Van Warmelo (1990). Although it is frequently associated with leaf spots, its pathogenicity remains to be confirmed. Another species of this genus, *Coniella fragariae* (Oud.) Sutton, is recognized as a serious pathogen of *Eucalyptus* leaves in India and Brazil (Sharma *et al.* 1985; Ferreira 1989). Although this pathogen occurs in South Africa (Sutton 1980), it has not been associated with leaf disease of *Eucalyptus* locally. In the present study, however, *C. fragariae* has been found on leaves of *Heteropyxis natalensis* Harvey, which like *Eucalyptus*, belongs to the Myrtaceae.

Eastern Transvaal, Barberton, *E. nitens* leaf litter, P.W. Crous, 11 May 1990, PREM 51098; Northern Transvaal, Tzaneen, leaves of *E. globulus* seedlings, P.W. Crous, 27 March 1991, PREM 51101.



**Figures 1 – 9** 1. Hyphae with sterile setae (arrowed) of *Anungitea globosa*. 2. Conidia and a mononematous conidiophore with polyblastic conidiogenous cells of *A. globosa*. 3. Vertical section through a pycnidium of *Coniella castaneicola* on MEA. 4. Navicular conidia of *C. castaneicola*. 5. Vertical section through a pycnidium of *Mapletonia falcata*. 6. Falcate conidia of *M. falcata*. 7. Ellipsoid conidia of *Microsphaeropsis callista*. 8. Vertical section through a pycnidium of *Microsphaeropsis globulosa*. 9. Globose to sub-globose conidia of *M. globulosa*. Scale bars: 10  $\mu\text{m}$ .

**3. *Mapletonia falcata* Sutton**, Sydowia 43: 272 (1991) Figures 5 & 6.

Conidiomata pycnidoid, immersed, unilocular, up to 220  $\mu\text{m}$  in diam.  $\times$  180  $\mu\text{m}$  high; wall consisting of two layers, *textura angularis*, outer layer up to 20  $\mu\text{m}$  in diam., dark brown, inner layer up to 10  $\mu\text{m}$  in diam., hyaline to pale brown. Setae sparse or absent. Conidiophores restricted to base of conidioma, simple or branched, 1 – 2-septate, hyaline, 10.0 – 30.0  $\times$  2 – 3.5  $\mu\text{m}$ . Conidiogenous cells determinate, cylindrical, 8 – 15  $\times$  2 – 3  $\mu\text{m}$ . Conidia hyaline, medianly septate, falcate, smooth, guttulate, with acute apices and truncate bases, 18 – 32  $\times$  2 – 4  $\mu\text{m}$ .

Colonies sporulate on MEA after 2 weeks at 25°C.

*M. falcata* has been collected at various locations throughout the Western Cape. Several collections lack conidiomatal setae, a feature which does not appear to be very stable.

Western Cape, Philadelphia, next to wheat field, *Eucalyptus* leaf litter, P.W. Crous, Sept. 1991, IMI 350691, PREM 51100.

**4. *Microsphaeropsis callista* (H. Sydow) Sutton**, Mycol. Pap. 123: 35 (1971).

*Coniothyrium callista* H. Sydow: 35: 358 (1937) Figure 7.

Conidiomata pycnidoid, up to 200  $\mu\text{m}$  in diam., globose, dark brown, subepidermal; wall composed of 3 – 6 layers of dark brown cells. Conidiogenous cells phialidic, aseptate, doliform to ampulliform, 4.0 – 9.0  $\times$  2.5 – 3.5  $\mu\text{m}$ . Conidia ellipsoid, tapering to obtuse apices and truncate bases, medium brown, aseptate, smooth, thick-walled, 6.0 – 8.0  $\times$  3.5 – 4.0  $\mu\text{m}$ .

Sutton (1971) reports this species to be parasitic on *Eucalyptus* leaves. The South African collection supports this observation as we have consistently found *M. callista* to be associated with medium brown, raised lesions (0.5 – 1.0 cm diam.), that extend through the leaf lamina of *E. nitens*.

Western Cape, Stellenbosch, Stellenbosch Mountain, *E. nitens* leaves, P.W. Crous, Sept. 1990, IMI 343156, PREM 51096.

**5. *Microsphaeropsis globulosa* (Camara) Sutton**, Nova Hedwigia 25: 170 (1974) Figures 8 & 9.

Synonyms listed in Sutton (1974).

Conidiomata pycnidoid, up to 150  $\mu\text{m}$  *in vitro*, globose, brown; wall composed of 3 – 6 layers of thin-walled brown cells. Conidiogenous cells phialidic, hyaline, doliform to ampulliform, 4 – 10  $\times$  3 – 4  $\mu\text{m}$ . Conidia globose to subglobose with truncate bases, dark brown, thick-walled, aseptate, smooth, 5.0 – 7.5  $\times$  5.0 – 7.0  $\mu\text{m}$ .

Colonies are dark brown to black on MEA, and sporulate profusely within 2 weeks at 25°C.

Sutton (1971) reports *M. globulosa* to be saprophytic, which is consistent with our observations.

Eastern Transvaal, Belfast, *E. nitens* leaf litter, P.W. Crous, 16 July 1990, IMI 341611, PREM 51103.

**6. *Minimidochium setosum* Sutton**, Can. J. Bot. 47: 2095 (1969) Figures 10 & 11.

Sporodochia up to 100  $\mu\text{m}$  in diam., hemispherical, superficial on epidermal stroma, composed of numerous, thick-walled, globose to elongated brown cells, 5 – 10  $\times$  4 – 5  $\mu\text{m}$ . Setae originating from stroma, dark brown, aseptate except for basal septum, tapering to acute apices, which are medium brown, 50 – 80  $\times$  3 – 5  $\mu\text{m}$ . Conidiophores hyaline, phialidic, cylindrical to clavate, 8.0 – 15.0  $\times$  3.0 – 4.5  $\mu\text{m}$ . Conidia hyaline, aseptate, curved, subcylindrical, tapering towards flattened bases and acute, rounded apices, 10.0 – 15.0  $\times$  2.0 – 2.5  $\mu\text{m}$ ; setula present at each end, simple, straight or flexuous, 3 – 8  $\mu\text{m}$  long.

Cultures sporulate on carnation-leaf agar (CLA) after 2 weeks at 25°C.

South Africa, N. Tv1., Tzaneen, *E. globulus* leaf litter, P.W. Crous, May 1991, PREM 51102.

**7. *Polyscytalum gracilisporum* (Matsushima) Sutton & Hodges**, Nova Hedwigia 28: 488 (1976).

*Symptodiella gracilispora* Matsushima, in Matsushima (1975) Figures 12 & 13.

Conidiophores macronematous, mononematous, unbranched, straight, medium brown, 2 – 6-septate, 40 – 100  $\times$  3 – 5  $\mu\text{m}$ . Conidiogenous cells pale brown, polyblastic, determinate, integrated, up to 25  $\mu\text{m}$  long, with flattened denticles throughout. Conidia initially developing in unbranched acropetal chains, cylindrical, hyaline, with truncate ends, smooth, aseptate, rarely 1-septate, 18.0 – 20.0  $\times$  2.0 – 2.5  $\mu\text{m}$ .

Colonies grow slowly on MEA, are dark brown, and sporulate well on MEA or CLA.

Western Cape, Stellenbosch, Stellenbosch Mountain, *E. maidenii* leaf litter, P.W. Crous, Sept. 1990, IMI 343155, PREM 51097.

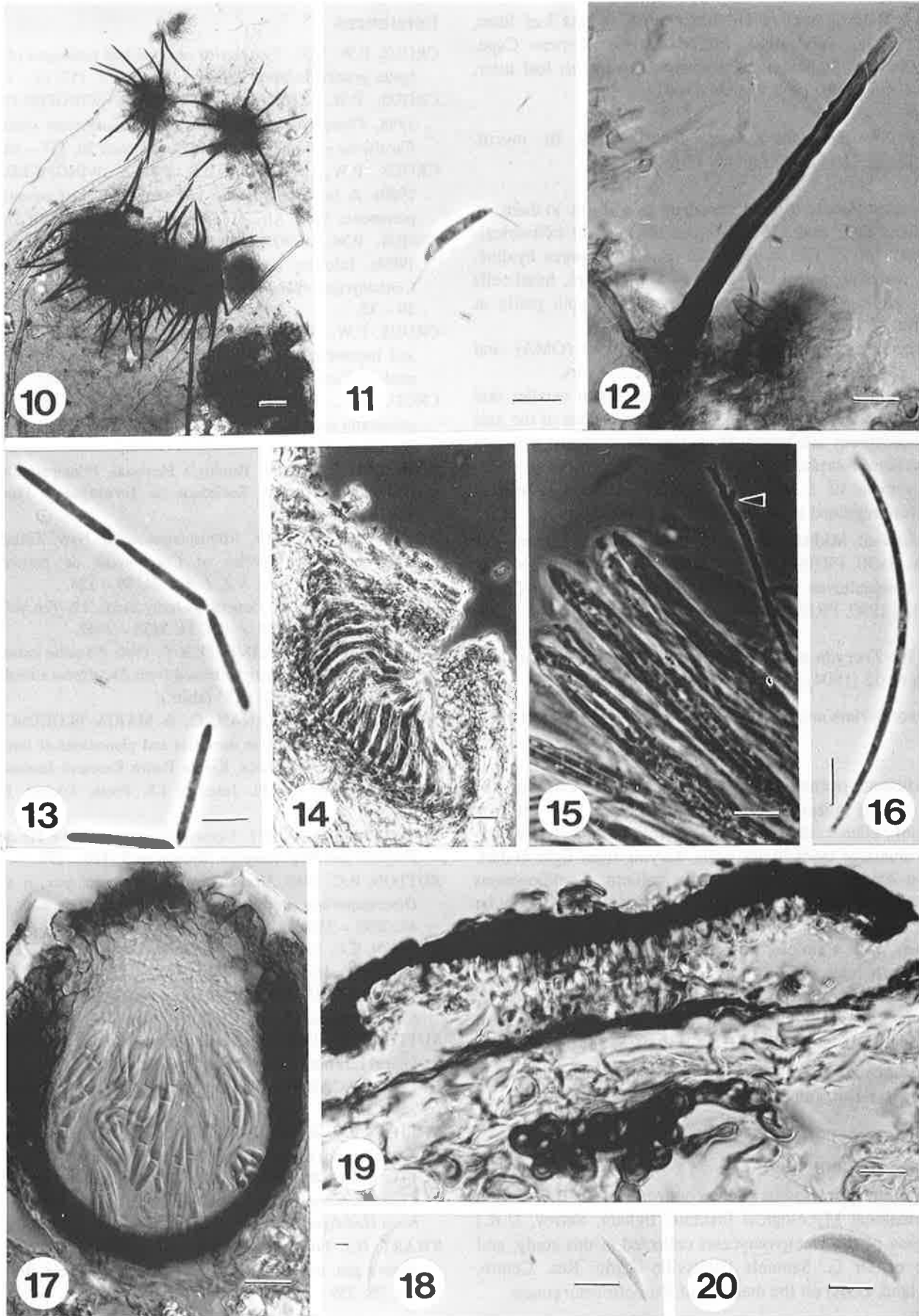
**8. *Propolis emarginata* (Cooke & Masee) Sherwood**, Mycotaxon 5: 323 (1977).

*Stictis emarginata* Cooke & Masee, 18: 7 (1889) Figures 14 – 16.

Ascocarps orbicular to round, subepidermal, up to 190  $\mu\text{m}$  in diam., and 150  $\mu\text{m}$  high; covering layer folding back in 3 – 4 flaps, frequently covered with a layer of white crystals; lower wall 12 – 20  $\mu\text{m}$  thick. Asci cylindrical, with short basal stalk, 55 – 90  $\times$  6 – 8  $\mu\text{m}$ . Paraphyses 1.5 – 2.0  $\mu\text{m}$  in diam. at branched apices. Ascospores filiform, 48.0 – 80.0  $\times$  1.5 – 2.0  $\mu\text{m}$ , 1-septate, with a gelatinous sheath.

Although this species was originally characterized by Sherwood (1977) as having non-septate ascospores, a re-examination of the type specimen by Johnston (1986) found ascospores to be 1-septate. In South Africa, *P. emarginata* is associated with leaf litter of various *Eucalyptus* spp. in the Cape and Transvaal Provinces. It has also recently been collected from leaves of *Syzygium cordatum* Hochst. in the Natal Province.

Eastern Transvaal, Barberton, Sapeko tea plantation, *Eucalyptus* leaf litter, P.W. Crous, 11 May 1990, PREM



Figures 10 – 20 10. Sporodochia of *Minimidochium setosum* on CLA. 11. Setulate conidium of *M. setosum*. 12. Mononematous conidiophore with polyblastic conidiogenous cells of *Polyscytalum gracilisporum*. 13. A conidial chain of *P. gracilisporum*. 14. Vertical section through a subepidermal ascocarp of *Propolis emarginata*. 15. Cylindrical asci and paraphyses with branched apices (arrowed) of *P. emarginata*. 16. Median-septate ascospore of *P. emarginata*. 17. Subglobose ascocarp of *Semifissispora elongata*. 18. Median-septate, bent ascospores of *S. elongata*. 19. Vertical section through a pycnothyrium of *Tracylla aristata*. 20. Navicular, setulate conidium of *T. aristata*. Scale bars: 10  $\mu$ m.

51093; Belfast, next to N4 highway, *E. nitens* leaf litter, P.W. Crous, July 1990, PREM 51095; Western Cape, Stellenbosch, Stellenbosch Mountain, *Eucalyptus* leaf litter, P.W. Crous, Feb. 1992, PREM 51091.

**9. *Semifissispora elongata* Swart**, Trans. Br. mycol. Soc. 78(2): 260 (1982) Figures 17 & 18.

Ascocarps globose to subglobose, up to 240  $\mu\text{m}$  in diam.  $\times$  220  $\mu\text{m}$  high; wall 15 – 20  $\mu\text{m}$  thick. Asci cylindrical-clavate, 150 – 170  $\times$  20 – 25  $\mu\text{m}$ . Ascospores hyaline, bent, 1-septate, apical cells 25 – 29  $\times$  6 – 7  $\mu\text{m}$ , basal cells 21 – 25  $\times$  7 – 8  $\mu\text{m}$ , mature ascospores split partly at septum.

Ascospores inoculated onto oatmeal agar (OMA) and MEA readily produce ascocarps within 2 – 3 wks.

The dimensions of the ascocarps are much smaller than those given by Swart (1982), but the dimensions of the asci and ascospores are larger. However, the ascocarp structure and general morphology of the asci and ascospores are similar to those of *S. elongata*, and the variation in size is therefore regarded as acceptable within this taxon.

Transvaal, Middelburg, *Eucalyptus* leaf litter, E.J. van der Linde, 1990, PREM 50959; Orange Free State, Bloemfontein, Langenhoven Park, *Eucalyptus* leaf litter, P.W. Crous, 28 May 1990, PREM 51092.

**10. *Tracylla aristata* (Cooke) Tassi**, Boll. R. Orto Bot. Siena 6: 62 (1904).

*Leptothyrium aristatum* Cooke, 20: 6 (1892) Figures 19 & 20.

Conidiomata pycnothyrioid, scattered to gregarious, superficial, circular to irregular, dark brown to black, 70 – 180  $\mu\text{m}$  in diam., connected to immersed mycelium in host by a central column of isodiametric cells, varying from light to dark brown towards the centre of the column. Conidiogenous cells phialidic, hyaline, cuboid, 4 – 6  $\times$  3 – 4  $\mu\text{m}$ . Conidia hyaline, unicellular, navicular to lunate, 12.0 – 16.0  $\times$  2.0 – 2.5  $\mu\text{m}$ , with a simple, filiform, flexuous apical appendage, 5 – 10  $\mu\text{m}$  long.

Cultures sporulate on MEA after 2 weeks at 25°C.

*T. aristata* is known from other collections made in Australia and New Zealand (Nag Raj 1975; Sutton 1991).

Eastern Transvaal, Barberton, Sapeko tea plantation, *Eucalyptus* leaf litter, P.W. Crous, 11 May 1990, PREM 51094.

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