Selenophoma eucalypti and Stigmina robbenensis spp. nov. from Eucalyptus leaves on Robben Island

P. W. CROUS1, C. L. LENNOX1 AND B. C. SUTTON2

1 Department of Plant Pathology, University of Stellenbosch, 7600 Stellenbosch, South Africa
2 International Mycological Institute, Bakewell Lane, Egham, Surrey TW20 9TY, U.K.

Collections of fungi associated with foliar lesions of Eucalyptus on Robben Island yielded two undescribed species, Selenophoma eucalypti and Stigmina robbenensis. Selenophoma eucalypti has also been collected in the forestry regions of the Cape and Transvaal Provinces. Stigmina robbenensis, however, is so far only known from the one collection.

Amongst a collection of foliar fungi of Eucalyptus made from Robben Island, two undescribed taxa were found. A species of Selenophoma Maire was consistently isolated from light brown, amphibigenous, irregular leaf spots, which were mainly situated along the leaf margins. Single-conidial isolates produced a yeast-like growth when cultured on 2% malt-extract agar (Biolab) (MEA). When these isolates were placed on carnation-leaf agar (Fisher et al., 1982; Crous, Phillips & Wingfield, 1992), however, they produced pycnidial conidiomata of the Selenophoma species which was originally isolated. A closer examination showed this fungus to produce a yeast-like synnann morph in culture. The Selenophoma species is also known from collections made in the Transvaal and Cape Provinces of South Africa. Two other fungi known from Eucalyptus resemble this species of Selenophoma. Kabatella delgeri M. Morelet (1968) is described with septate conidiophores having 1–4 conidiogenous loci per conidiogenous cell, 9.5–26.5 × 4–7.5 μm. Conidia are curved, cylindrical, 4–12 × 1.5–3 μm. The Selenophoma species is distinct in lacking septate conidiophores, having 1–2 loci per conidiogenous cell, and having larger conidia. Cryptosporium eucalypti Cooke & Harkn. (1881) is described from Eucalyptus twigs with fusoid, abruptly curved conidia 20 × 3–5 μm. An examination of the type (K 1286) revealed dark brown to black acervuli opening by irregular rupture. Conidia are hyaline, fusoid, strongly falcate, 10–20 × 1.5–2 μm in size, forming on inconspicuous conidiogenous cells. The occurrence on twigs, black acervuli, and narrow, strongly falcate conidia clearly distinguish it from the folicolous Selenophoma species. The collection from Eucalyptus is furthermore distinguished from the five species presently acknowledged in Selenophoma (Sutton, 1980) by having smaller conidia, and is therefore described as new.

Selenophoma eucalypti Crous, C. L. Lennox & B. Sutton sp. nov.

(Figs 1, 3, 5–9, 17)

Mycota foliorum amphibigenae, pallide brunneae ad brunneae, irregulara densum confluentes, praeipsue in marginibus foliorum, 6–30 mm diam. Mycelium immersum, ex hyphis septatis olivaceis laevibus ad 4 μm longis compositum. Conidiomata pycnidialia, amphibigena, praeipsue epigena, separata, subepidermala, ovoidea, cum laesiom concolorata, strato basali saepe atrobruneo, ex textura angulari parietum sarmosorum composita, ad 100 μm lata at 50 μm alta; ruptilia pariete superiore. Conidiophora nulla. Cellulae conidiogenae phialideae, locis 1–2, saepe parietibus crassis, ex strato interiore parietis conidiomatis compositos et in parte interiore terti conidiomatis dispositae, ampullaceae ad cylindraceae basim tumidae, ad apicem contractae, rectae vel parum flexae, hyalinae, laeves; collaris minuta, periclinalis incrassatae, 10–20 × 3.5–5 μm. Conidia holoblastica, asetata, hyalina, laeves, fusiformia, recta ad falcata, ad apicem acuta et basin subtruncata contracta, 8–15 × 2–3.5 μm.


Leaf spots amphibigenous, light brown to brown, irregular, becoming confluent, mainly situated along the leaf margins, 6–30 mm in diam. Mycelium immersed, consisting of septate, olivaceous, smooth hyphae up to 4 μm wide. Conidiomata pycnidial, amphibogenous, predominantly epigenous, separate, subepidermal, ovoid, concolorous with the lesion, basal layer

Figs 1, 2. Leaf symptoms. Fig. 1. Irregular lesions of Selenophoma eucalypti. Fig. 2. Distinct, circular lesions associated with Stigmina robbenensis.
often darker brown, consisting of 2–3 layers of thin-walled 
textura angularis, up to 100 μm wide × 50 μm high; dehiscence 
by irregular rupture of the upper wall. Conidiophores absent. 
Conidiogenous cells phialidic (sensu Sutton, 1980), with 1–2 
loci, often thick-walled, formed from the inner layer of the 
conidiomatal wall and situated in the lower third of the 
conidioma, ampulliform to cylindrical with a swollen base 
tapered towards the apex, straight or slightly bent, hyaline, 
smooth; collarettes and channel minute, periclinal thickening 
present, 10–20 × 3.5–5 μm. Conidia holoblastic, aseptate, 
hyaline, smooth, fusiform, straight to falcate, tapering to an 
acutely rounded apex and subtruncate base, 8–15 × 2–3.5 μm.

Specimens examined: South Africa: Transvaal, Pretoria, Fort 
Klapperkop, Eucalyptus sp., P. W. Crous, Apr. 1990, PREM 51727
(holotype), IMI 341609 (isotype), IMI 359556 (ex type culture); 
Cape Province, Stilbay, Eucalyptus sp., P. W. Crous, Aug. 1993, 
PREM 51728; Robben Island, Eucalyptus sp., C. L. Lennox, Sept. 
1993, PREM 51729.

Cultures are effuse, slimy, without aerial mycelium, and 
19° d Buff (Rayner, 1970) on MEA. Single-conidial isolates 
have a minimum temperature requirement 5–10 °C, a 
maximum 30–35°, and an optimum growth at 25°, with colonies 
reaching a radial growth of 9 mm after 10 d at 25° in 
the dark. Single-conidial isolates form a yeast-like synana-
morph, with older conidia giving rise to new conidia, the loci 
being phialidic, with clearly visible collarettes. Conidia of the 
yeast state are falcate to fusiform, or more ellipsoid with 
bluntly rounded ends, 8–15 × 2–7 μm. Several mature conidia 
were also observed to have become pigmented brown, verruculo-
se and thick-walled, resembling chlamydospores. A similar 
phenomenon was also reported in the genus by Sutton (1980).
The occurrence of yeast synanamorphs in mitosporic fungi is 
well known (Wang, 1979; Sutton, 1980), and the phenomenon 
of phialidic conidiogenous cells not unusual (von Arx, 1979).

Several of the leaves infected by Selenophoma eucalypti also 
had prominent lesions associated with a species of Stigmina 
Sacc. Presently there are four species of Stigmina known 
from Eucalyptus (Sutton & Pascoe, 1989). This collection has 
ellipsoid to cylindrical conidia which are 1–9 distoseptate, 
10–30 × 6–8 μm. It can easily be distinguished from S. 
transvallensis B. Sutton & Pascoe which has ellipsoid to fusiform, 
1-distoseptate conidia, 12–17.5 × 6–8 μm. The leaf symp-
toms of this collection resemble those of S. eucalypticola B. 
Sutton & Pascoe (1989). However, S. eucalypticola has ellipsoid 
to fusiform conidia which are 1–3 transversely distoseptate, 
and occasionally have a single longitudinal distoseptum. 
Furthermore, the conidiogenous cells of S. eucalypticola are 
ampulliform to doliform or cylindrical, and form up to four
Figs 5–9. Selenophoma eucalypti (bars = 10 μm). Fig. 5. Vertical section through a conidioma. Fig. 6. Falcate to fusiform conidia. Fig. 7. Budding conidium on MEA. Fig. 8. Primary conidium forming a secondary conidium enteroblastically, with clearly visible collarette. Fig. 9. Conidia of S. eucalypti and its yeast synanamorph on MEA. Figs 10, 11. Stigmina robbenensis. Fig. 10. Hyphae emerging through stomata, giving rise to conidiomata. Fig. 11. Vertical section through a conidioma with conidiogenous cells and conidia.
percurrent proliferations, whereas those of this collection are doliform to cylindrical, and only have up to two percurrent proliferations. The more cylindrical conidia of this species resemble those of *Stigmia eucalypti* Alcorn, but can be distinguished by being smaller, and having more septa than those of *S. eucalypti*, which are markedly verrucose and mainly 3-septate, 20–36 × 7.5–12 μm (Sutton & Pascoe, 1989). It is similar to *Stigmia inconspicua* B. Sutton & Pascoe (1989) in having conidia of comparable size but differs in being only 1–3 septate. The *Stigmia* species occurring on eucalypts on Robben Island is therefore described as new.

**Stigmia robbenensis** Crous, C. L. Lennox, & B. Sutton sp. nov. (Figs 2, 4, 10–16)

*Follicarinum muscalae* praecipue hypogena, saepe non per lamina externa, atrobrunneae, centro albo et margine chlorotico, Irregulare circularres, separatae, 2–5 mm diam. *Mycelium internum et exterum, hypheam septatum brunneum, glabrum ubi internarum, sublitet scoletarum ubi exterarum, ad 4 μm latum, stroma suprastomatatae producec 20–40 μm latum et 15–20 μm altum, cellulararum atrobrunnerarum pseudoparenchymatarum compositum. Conidiomata supra stomatibus, amphigene, praecipue hypogena, sporodochialia, brunnea, 40–70 μm lata, 20–30 μm alta. Conidiophora nulla vel cellulae sustinentis composita. Conidiogeenae cellulae sub-
stromata exoiertes, doliformes ad cylindraceae, discrete, verruculose, brunnea, proliferationibus ad duobus enteroblasticis, percurrentibus verrucosis, 5–10 × 5–7 μm. Conidia holoblastic, apicalia, solitaria, brunnea, 10–30 × 6–8 μm, verruculosa, 1–9 transverse distoseptata, ellipsoidae ad cylindraceae, apice obtuso et base truncata margine undulato.


Leaf spots predominantly hypogenous, frequently not extending through the lamina, dark brown, with a whitish centre and chlorotic margin, irregularly circular, separate, 2–5 mm diam. Mycelium internal and external, consisting of brown, septate hyphae that are smooth when internal, and finely roughened when external, up to 4 μm wide, giving rise to a suprastomal stroma 20–40 μm wide and 15–20 μm high, composed of dark brown pseudoparenchymous cells. Conidiomata situated over stomata, amphiogenous, predominantly hypogenous, sporodochial, brown, 40–70 μm wide, 20–30 μm high. Conidiophores absent or consisting of a supporting cell. Conidigenous cells arising from the stroma, doliform to cylindrical, discrete, verruculose, brown, with up to two enteroblastic, percurrent verrucose proliferations, 5–10 × 5–7 μm. Conidia holoblastic, apical, solitary, brown, 10–30 × 6–8 μm, verruculose, 1–9 transversely distoseptate, ellipsoidal to cylindrical, with an obtuse apex and truncate base with a marginal frill.

(Accepted 5 September 1994)

It is interesting to note that S. robbenensis has thus far only been found on eucalypts occurring on Robben Island, and has not been observed on any eucalypts near the coast in the Cape Province, or elsewhere in the commercial forestry plantations of South Africa. Although Koch’s postulates could be confirmed for Selencophoma eucalypti on 2-month-old E. grandis Hill ex Maid. seedlings, this could not be repeated for S. robbenensis as no cultures were obtained of the latter.

REFERENCES


