Chapter 3

Mycosphaerella species causing leaf disease in South African *Eucalyptus* plantations

ABSTRACT

Commercial *Eucalyptus* plantations provide an important source of hardwood for several industries worldwide. Several species of *Mycosphaerella* are associated with a destructive *Eucalyptus* leaf disease known as Mycosphaerella leaf disease (MLD). During 2000, a survey was undertaken in several commercial *Eucalyptus* growing areas of South Africa to determine the identity of the *Mycosphaerella* spp. contributing to outbreaks of MLD. Symptomatic leaf samples were collected from three major *Eucalyptus* growing areas and the *Mycosphaerella* spp. were isolated. Isolates were identified using ascospore germination patterns and sequence data from the ribosomal DNA operon. Six species, namely; *M. ellipsoidea*, *M. irregulariramosa*, *M. juvenis*, *M. lateralis*, *M. marksii*, *M. nubilosa* as well as an undescribed species of *Mycosphaerella* were identified. *Mycosphaerella nubilosa* was most commonly isolated, particularly on *E. nitens* and appears to be a dominant species contributing to MLD. Data obtained in this study show that MLD is caused by a complex of species contributing to disease outbreaks in South Africa.

INTRODUCTION

Eucalyptus L'Heritier is a large genus in the Myrtaceae, that includes approximately 700 species (Potts & Pederick 2000). Most of these species are native to Australia and Papua New Guinea, where they occur in large natural forests (Poynton 1979). *Eucalyptus* spp. are grown commercially in intensively managed plantations in both the Northern and Southern Hemispheres. In South Africa, *Eucalyptus* spp. comprise 47 percent of the total 1.5 million ha of commercial plantations (Edwards 2000). These trees are now amongst a small number of favoured forestry species throughout the world. As such, they rival *Pinus* spp. in their use as a commercial forestry resource. *Eucalyptus* spp. are, however, susceptible to many pathogens that threaten plantations (Wingfield *et al.* 1995, Wingfield 1999). Species of *Mycosphaerella* Johanson are regarded to be some of the most important *Eucalyptus* leaf pathogens.

The genus *Mycosphaerella* is large and includes approximately 2000 species (Corlett 1991, 1995, Aptroot *et al.* 1999). Species of *Mycosphaerella* include both saprophytes and parasites that infect woody and herbaceous hosts and generally cause leaf diseases (Arx 1983). Several species of *Mycosphaerella* are associated with Mycosphaerella leaf disease (MLD) of *Eucalyptus* spp. in many countries where these trees are grown as a commercial hardwood resource (Crous 1998, Carnegie 2000).

Symptoms associated with MLD are variable and can differ depending on the *Mycosphaerella* spp. involved. The primary symptoms are leaf spots that reduce the photosynthetic capacity of leaves and result in defoliation (Beresford 1978, Ganapathi 1979). In cases of severe infection, the disease can spread to young shoots and branches, where cankers are formed, resulting in gum exudation and eventual twig die-back (Dick 1982, Dick & Gadgil 1983). This symptom leads to the formation of multi-stemmed trees, which are unsuitable for milling (Beresford 1978). Trees often become physiologically stressed and stunted, resulting in reduced growth, infection by secondary pathogens, and increased silvicultural costs.

The taxonomy and identification of *Mycosphaerella* spp. is complicated and beset with problems. Traditionally, host affiliations have been the primary factor considered for identification. This approach has, however, been recognized as unreliable (Corlett 1991, Aptroot & Lucking 2001). Recently, cultural characteristics and anamorph-teleomorph connections have received attention in the classification of *Mycosphaerella* spp., and today 23 anamorph genera, within the coelomycetes and hyphomycetes, are accepted as *Mycosphaerella* anamorphs (Arx 1983, Crous 1998, Crous *et al.* 2000). Ascospore germination patterns have also provided useful taxonomic characters (Park & Keane 1982a, Crous 1998). More recently DNA sequence data have contributed substantially to the identification of *Mycosphaerella* spp. occurring on *Eucalyptus* spp and other hosts (Crous *et al.* 1999, 2001).

Several *Mycosphaerella* spp. are readily isolated from diseased *Eucalyptus* leaves in South Africa (Crous 1998). During initial studies of MLD in this country, the disease was attributed to *M. molleriana* (Thüm.) Lindau (Doidge 1950). Subsequent studies, particularly on *E. nitens* (Deane et Maiden) Maiden, suggested that *M. nubilosa* was the only *Mycosphaerella* spp. causing MLD in South Africa (Purnell & Lundquist 1986, Crous *et al.* 1989). More recently, several new species of *Mycosphaerella* were identified on *Eucalyptus* spp., including *M. africana* Crous & M.J. Wingf., *M. crystallina* Crous & M.J. Wingf., *M. ellipsoidea* Crous & M.J. Wingf and *M. juvenis* Crous & M.J. Wingf. (Crous & Wingfield 1996, Crous 1998). The impact, relative occurrence and importance of these *Mycosphaerella* spp. on commercial forestry in South Africa, however, remains unclear.

The aim of this study was to consider the occurrence of *Mycosphaerella* spp. on *Eucalyptus* spp., specifically in commercial plantations experiencing outbreaks of MLD. To achieve this goal, surveys were conducted and samples collected from plantations in three major *Eucalyptus* growing areas of South Africa. *Mycosphaerella* spp. were recovered from diseased leaves and identified based on ascospore germination patterns, leaf symptoms, cultural characteristics and sequence data from the Internal Transcribed Spacer (ITS) region of the rDNA operon.

MATERIALS AND METHODS

Sample collection

Samples of diseased *Eucalyptus* leaves were collected from various plantations in three major *Eucalyptus* growing areas of South Africa. The plantations were selected based on advice received from foresters and occurred in the KwaZulu-Natal Midlands, Tzaneen in the Northern Province and Umtata in the Eastern Cape Province. From KwaZulu-Natal, diseased leaves were collected from two plantations. These were Clairemont (latitude 29°40'', longitude 29°45'') near Bulwer and the Enon plantation (latitude 29°49'', longitude 30°13'') near Richmond. A total of 126 trees were sampled (65 trees from Clairemont, 61 trees from Enon) from these two plantations with ten leaves collected from each diseased tree. These samples were collected from several different *Eucalyptus* spp. including *E. nitens*, *E. bicostata* Maiden, Blakely et Simmonds, *E. macarthurii* Deane et Maiden, *E. smithii* R. T. Baker, *E. dunnii* Maiden, *E. grandis* Hill ex Maiden and one clone of *E. grandis* × *E. nitens*.

Samples from Tzaneen were collected from a plantation belonging to Northern Timbers (latitude 23°40''–23°58'', longitude 30°–30°15''). A total of 33 trees were sampled and ten leaves were collected from each diseased tree. The *Eucalyptus* spp. sampled included *E. grandis* and *E. grandis* × *camaldulensis*. Samples were also collected from 10 trees in Umtata (Eastern Cape Province), these were all from naturally regenerated *E. grandis* trees, where ten leaves were collected from each tree. In all cases, diseased leaves were placed in brown paper bags after collection and transported to the laboratory, where *Mycosphaerella* isolations were conducted within three days.

Isolation procedures and isolates examined

Leaves displaying a wide array of different lesions were chosen for isolations. The number of leaves used from each sample varied from two to five, depending on the number and types of lesions present on leaves. An effort was made to isolate from as many different lesion types as possible, even though there was no particular symptom that was obviously dominant. One to three lesions per leaf were excised and used for isolations. Excised lesions were placed in water for approximately two hours after which they were placed on double sided adhesive tape and adhered to the insides of Petri dish lids over 2% malt extract agar (MEA) (wt/v) (Biolab, South Africa), with the pseudothecia facing the agar surface (Crous 1998). Petri dishes were incubated in the dark for 24 hours to allow for ascospore release and germination on MEA. Following incubation, individual germinating ascospores were subcultured onto 2% MEA and incubated at 25°C in the dark.

Once colonies had formed, they were incubated at 25°C under continuous cool white light in an incubator. Germinating ascospores were also sub-cultured onto Carnation Leaf Agar (CLA) [1% water agar (wt/v) (Biolab, South Africa) with sterilized carnation leaves placed onto medium] and incubated at 25°C under continuous near-ultra-violet light (nuv, 250 nm) to promote the production of any asexual states. All cultures retained from this study are maintained in the culture collection of the Forestry and Agricultural Biotechnology Institute (FABI), University of Pretoria, South Africa (Table 1).

Symptoms and morphology of Mycosphaerella spp.

All *Mycosphaerella* isolates obtained from *Eucalyptus* spp. in this study were considered in terms of lesion characteristics, ascospore germination patterns and cultural characteristics. Lesions were characterized based on colour, shape, and ascomatal position.

After ascospore discharge from pseudothecia onto MEA, germinating ascospores were transferred to microscope slides and mounted in lactophenol for microscopic examination. Ascospores were evaluated based on characteristics known to be taxonomically relevant for *Mycosphaerella* spp. (Park & Keane 1982a, Crous 1998). From these criteria, the ascospore germination patterns were grouped as outlined by Crous (1998). Characteristics were compared with those for other *Mycosphaerella* spp. described from *Eucalyptus* spp. (Crous 1998).

Following isolation, cultures of *Mycosphaerella* spp. were grouped according to cultural colour (Rayner 1970) and morphology. *Mycosphaerella* cultures were also cultured onto CLA in an attempt to induce anamorph formation (Crous 1998). Two to four representative isolates grouped according to morphology, culture characteristics and ascospore germination patterns, were chosen for DNA sequencing (Table 1). The sequences of these isolates were compared to those from other *Mycosphaerella* spp. known to cause MLD on *Eucalyptus* spp. (Crous *et al.* 2001) (Table 1).

DNA Isolation

Following growth of axenic cultures, mycelium was scraped directly from agar plates and used for DNA isolation. Harvested mycelium was dried under vacuum and lypholized with liquid nitrogen. DNA was isolated using the method of Raeder & Broda (1985) with minor variations. The 1:1 phenol:chloroform purification step was repeated until the interphase between the two aqueous phases was clean of any cellular debris. Nucleic acids were precipitated by the addition of 10% 3M NaAc and 2 volumes of absolute ethanol and incubated at -20°C for 2 hours. DNA was further purified by washing with 70% ethanol and dried under vacuum, after which the resulting DNA pellet was resuspended in 50 μl SABAX water. RnaseA (10.0 μg/μl) was added to the DNA samples, and incubated at 37°C for three to four hours to digest any residual protein or RNA. DNA was visualized on a 1% agarose gel (wt/v) (Boehringer Mannheim, Germany) stained with ethidium bromide and viewed under an ultra-violet light. DNA was quantified for all samples with a Beckman DU Series 60 Spectrophotometer (Beckman, Germany).

PCR Amplification and Purification

Isolated DNA (50–90 ng) was used as a template for the Polymerase Chain Reaction (PCR). The Internal Transcribed Spacer (ITS) region of the rDNA operon, was targeted for amplification using primers ITS 1 (5'- TCC GTA GGT GAA CCT GCG G –3') and LR1 (5'- GGT TGG TTT CTT TTC CT –3') (White *et al.* 1990). The ITS 1 and ITS 2 regions including the 5.8S gene were amplified. DNA was amplified in a

50 µl reaction volume containing PCR buffer (10 mM Tris-HCL, 1.5 mM $MgCl_2$, 50 mM KCl, pH 8.3) (Roche Diagnostics, South Africa), 2.5 mM of each dNTP (dATP, dTTP, dCTP and dGTP) (Roche Diagnostics, South Africa), 0.2 µM of primers ITS1 and LR1 (MWG Biotech, Germany) and 2.5 U Taq DNA polymerase (Roche Diagnostics, South Africa). SABAX water was used to achieve the total volume of 50 µl.

PCR reactions were carried out using an Eppendorf Mastercycler gradient PCR machine (Eppendorf Scientific, Germany). PCR reaction conditions included an initial denaturation temperature of 96°C for 2 min. Following initial denaturation, 40 cycles of template denaturation for 30 s at 94°C, primer annealing for 30 s at 53°C and chain elongation for 2 min at 75°C were carried out with a final elongation at 75°C for 7 min. A negative control using water and no template DNA and a positive control containing DNA of a *Mycosphaerella* sp., was used for each reaction. PCR products were visualized in 2% agarose gels stained with ethidium bromide and viewed under ultra-violet light. Sizes of PCR products were determined against a 100 bp molecular weight marker XIV (Roche Diagnostics, South Africa). PCR products were purified using the High Pure PCR product purification kit (Roche Diagnostics, South Africa). After PCR purification, concentrations of purified PCR products were determined by running products on a 2% agarose gel stained with ethidium bromide, together with a 100 bp molecular weight marker XIV and viewed under ultra-violet light.

DNA sequencing and data analysis

Purified PCR products were used as template DNA for sequencing reactions on an ABI PRISM™ 377 Automated DNA sequencer (Perkin Elmer, Norwalk, CON). The ABI Prism Big Dye Terminator Cycle sequencing reaction kit (Perkin Elmer Biosystems, USA) was used for the sequencing reactions. Sequencing reactions were conducted with the same primers used for the PCR reaction, however, two internal primers ITS3 (5'- GCA TCG ATG AAG AAC GCA GC –3') and ITS2 (5'- GCT GCG TTC TTC ATC GAT GC –3') (White *et al.* 1990) were used as well to completely sequence both DNA strands of the ITS region.

Sequences were analyzed using Sequence Navigator version 1.0.1 (Perkin-Elmer, Applied Biosystems, Foster City, CA). Sequence alignments were done using the Clustal function of Sequence Navigator and gaps were inserted manually where necessary. Phylogenetic analysis of aligned sequences was conducted using PAUP (Phylogenetic Analysis Using Parsimony) version 4.0b1 (Swofford 1998). The Heuristic search function was used to generate the most parsimonious trees. Starting trees for the analyses were obtained by stepwise addition, with the MULPAR function effective. Tree Bisection Reconnection (TBR) was used as the swapping algorithm with maximum parsimony as an optimal criterion. All characters in the analysis were of equal weight. Branch support was evaluated by performing a Bootstrap search of 1000 replicates on the aligned sequences. Published sequences of *Mycosphaerella* spp. from *Eucalyptus* spp. were obtained from Genebank and compared to those sequences obtained for the *Mycosphaerella* spp. isolated in this study. Following the analysis all resulting trees were rooted to an outgroup. The taxon chosen for this purpose was *Ramulispora anguoides* (Nirenberg) Crous, which resides in the genus *Tapesia* and has been shown to be an appropriate outgroup for *Mycosphaerella* spp.(Crous *et al.* 2001).

RESULTS

Isolation procedures and isolates examined

Mycosphaerella ascospores were obtained from most, but not all lesions. Isolates of *Mycosphaerella* were, however, recovered from a wide variety of *Eucalyptus* spp. and all of the three areas sampled. A total of 382 isolates of *Mycosphaerella* were recovered, namely 257 from the Clairemont and Enon plantations (KwaZulu-Natal Midlands), 71 from Tzaneen (Northern Province) and 54 from Umtata (Eastern Cape Province). These isolates could be separated into 7 groups based on lesion type, cultural morphology and ascospore germination patterns. Based on symptoms, cultural characteristics and germination patterns, five species of *Mycosphaerella* were identified from the KwaZulu-Natal Midlands. These included *M. ellipsoidea* Crous & M. J. Wingf., *M. juvenis*, *M. lateralis* Crous & M.J. Wingf., *M. marksii* and *M. nubilosa*. Four species were identified from Tzaneen, namely *M. irregulariramosa*

Crous & M.J. Wingf., *M. lateralis* and *M. marksii* and an apparently undescribed *Mycosphaerella* species. Two species, *M. nubilosa* and *M. juvenis*, emerged from samples originating in Umtata in the Eastern Cape.

Symptoms and Morphology

Mycosphaerella ellipsoidea

Mycosphaerella ellipsoidea was isolated only from the KwaZulu-Natal Midlands. In total, six cultures of *M. ellipsoidea* were collected from two *E. nitens* trees (Enon plantation). Lesions were present on both leaf surfaces (amphigenous) and lesions were circular to sub-circular in shape with raised borders and a medium brown to dark brown colour (Figure 1B, Figure 2F). Pseudothecia were black, amphigenous and single. Ascospores showed a typical Type I ascospore germination pattern (Figure 3F) (Crous 1998). Ascospores germinated from both poles, producing parallel germ tubes with lateral projections (Crous 1998). Colonies of *M. ellipsoidea* had even to uneven margins. Colonies did not sector but did exhibit folding into the medium. Aerial mycelium was moderate to profuse with white fluffy patches. Colonies were olivaceous black 27''''m (reverse) (Figure 4B). Incubation of this species on CLA resulted in the production of an asexual state that was identified as *Uwebraunia ellipsoidea* Crous & M. J. Wingf.

Mycosphaerella irregulariramosa

Eight isolates of *M. irregulariramosa* were collected from juvenile leaves on six *E. grandis* trees from Tzaneen (Northern Timbers plantation). Lesions of this species were amphigenous, light brown, with a dark brown border (Figure 1F). Lesions were circular to irregular in shape, and varied in size from 2–25 mm (Figure 2B). Pseudothecia were black, amphigenous, single, and evenly dispersed. Ascospores showed a Type I germination pattern and germinated from both poles producing parallel germ tubes (Figure 3B) (Crous 1998). Lateral, secondary germ tubes were also produced from the original ascospore. Colonies had regular to irregular margins, but were predominantly irregular. Although colonies were unsectored, they did fold into the agar medium after prolonged incubation. Aerial mycelium was sparse. Colonies were iron grey 23'''''i (surface) and olivaceous black 27''''m to greenish black 33'''''k (reverse) (Figure 4F). *Pseudocercospora irregulariramosa* Crous & M. J. Wingf., the anamorph of *M. irregulariramosa* was readily produced on CLA medium.

Mycosphaerella juvenis

Mycosphaerella juvenis was isolated from KwaZulu-Natal and from Umtata. A total of twelve cultures of *M. juvenis* were collected from KwaZulu-Natal on hosts such as, *E. nitens* (Clairemont plantation), *E. grandis* (Enon plantation), *E. smithii* (Enon plantation), *E. dunni* (Enon plantation) and *E. grandis* × *E. nitens* (Enon plantation). Four cultures of *M. juvenis* were collected from three naturally regenerated *E. grandis* trees near Umtata.

Lesions of *M. juvenis* were amphigenous, varying in shape from circular to irregular, with some lesions coalescing to form larger spreading lesions (Figure 1C). Lesions were light brown on the abaxial surface and a darker brown on the adaxial surface. Lesions were often surrounded by raised dark borders, particularly on the adaxial leaf surface (Figure 2C). Pseudothecia of *M. juvenis* occurred only on the abaxial leaf surface (hypophyllous). Pseudothecia were single, black and numerous. Ascospore germination showed a typical Type F germination pattern (Crous 1998). Ascospores germinated from both poles and produced germ tubes that grew parallel to the long axis of the spores. Upon germination, the ascospores became constricted at the median septum and the spores became prominently swollen (Figure 3C). Colonies of *M. juvenis* had even margins and produced erect hyphal tufts. Aerial mycelium was moderate to profuse. Colonies were olivaceous black 29''''m to olivaceous grey 25'''''i (surface) and olivaceous black 27''''m to greenish black 31'''''k (reverse) (Figure 4C). *Uwebraunia juvenis* Crous & M. J. Wingf., the anamorph of *M. juvenis* was produced in culture on CLA.

Mycosphaerella lateralis

Mycosphaerella lateralis was collected from KwaZulu-Natal and Tzaneen. From KwaZulu-Natal, two isolates of *M. lateralis* were obtained from one *E. nitens* tree (Clairemont plantation). Thirteen isolates of *M. lateralis* were collected from thirteen *E. grandis* trees in Tzaneen (Northern timbers plantation).

Leaf spots were amphigenous, grey to dark brown in colour with raised borders (Figure 1D). Lesions were the same colour on the reverse side (abaxial) of the leaf and were circular to sub-circular in shape (Figure 2D). Smaller lesions often coalesced to form larger lesions of a more irregular shape. Pseudothecia were black, predominantly epiphyllous, and sparse. Ascospores of *M. lateralis* germinated from both poles and produced germination tubes that grew roughly parallel to the long axis of the spore (Type I) (Figure 3D). Ascospores showed a constriction at the septum upon germination. After a longer period of ascospore germination, lateral branches were produced from the primary germ tube (Crous 1998). Cultures of *M. lateralis* had irregular margins and sparse to medium aerial mycelium. Colonies were not sectored but did show some folding into the agar medium. Colonies were olivaceous 21''m to 23'''''i (surface) and grey olivaceous 23'''i (reverse) (Figure 4D). The anamorph of *M. lateralis*, *Uwebraunia lateralis* Crous & M. J. Wingf., was readily produced on CLA after one to two weeks of incubation under near-ultra-violet light.

Mycosphaerella marksii

Mycosphaerella marksii was collected from the KwaZulu-Natal midlands and Tzaneen areas. A total of twelve isolates of *M. marksii* were isolated from one tree each of *E. grandis*, *E. bicostata* and *E. smithii* (Enon plantation). Five isolates were obtained from Tzaneen from five *E. grandis* trees (Northern timbers plantation).

Leaf spots extended through the leaf lamina and were visible on both the abaxial and adaxial leaf surfaces (Figure 1E). Lesions were light to dark brown in colour with a raised brown border. A faint red margin could be observed around the majority of lesions (Figure 2E). Pseudothecia of *M. marksii* were located predominantly on the adaxial leaf surface (epiphyllous). Ascospores showed a typical Type B germination pattern, germinating from both poles with long germ tubes growing parallel to the long axis of the spores. Ascospores did not constrict or swell upon germination (Figure 3E) (Crous 1998). This species was characterized by colonies with smooth or uneven edges and folding into the agar medium to form sectors with sparse aerial mycelium. Colonies were raised above the agar with a roughly concentric colony morphology. Colonies were pale olivaceous grey 23'''''f to olivaceous grey 22'''''i (surface) and olivaceous black 27''''m (reverse) (Figure 4E). Incubation of isolates of *M. marksii* on CLA did not result in the formation of any anamorph. However, ascomata were readily produced in culture.

Mycosphaerella nubilosa

Mycosphaerella nubilosa was collected from KwaZulu-Natal and Umtata. *M. nubilosa* was the dominant fungus in both these regions. From KwaZulu-Natal, a total of 232 isolates were obtained from four *Eucalyptus* species, 47 *E. nitens* trees (Clairemont plantation), two *E. bicostata* trees (Enon plantation), two *E. dunnii* trees (Enon plantation) and five trees representing a *E. grandis* × *nitens* clone (Enon plantation). From Umtata, a total of 50 *M. nubilosa* cultures were collected from 10 naturally regenerated *E. grandis* trees.

Lesions of *M. nubilosa* varied in size from small spots to large blotches across the leaf surface (Figure 1A). Lesions were round to irregular in shape and frequently coalesced with other lesions to form larger blotches. Lesions were amphigenous, light to pale brown in colour and had a raised brown to light brown margins (Figure 2A). Pseudothecia of *M. nubilosa* were amphigenous, but predominantly hypophyllous. Ascospores of *M. nubilosa* showed typical Type C ascospore germination patterns (Crous 1998). Ascospores germinated from both poles and produced germ tubes that grew roughly parallel to the long axis of the spore. No lateral branches were produced and the ascospores showed a slight constriction at the median septum (Figure 3A). Cultures of *M. nubilosa* had regular to irregular margins with little aerial mycelium. Cultures were initially pale olivaceous grey 23'''''f becoming dark olivaceous grey 23'''''i (surface) (Figure 4A) (Crous 1998). No anamorph was produced in culture.

Mycosphaerella sp.

An apparently unidentified species of *Mycosphaerella* was collected from 43 *E. grandis* trees in Tzaneen (Northern timbers plantation). This species was dominant in Tzaneen and was represented by a total of 45 isolates. This fungus was not found in other forestry areas surveyed. Based on all key morphological characteristics used to identify *Mycosphaerella* spp. from *Eucalyptus*, it was concluded that this fungus represented a new taxon. It is thus described as follows:

> The description of this fungal species does not represent a formal mycological description and is only described here for thesis purposes. This description should not be cited. A formal mycological description of this fungus will be published at a later date in a recognized mycological journal.

Species description

Mycosphaerella fori sp. nov. Fig.6 A-E, 7A-E.

Anamorph. ***Pseudocercospora fori*** sp. nov.

Leaf spots amphigenous, subcircular to irregular, 2–30 mm diam., becoming confluent along leaf margins, grey, surrounded by a dark brown outer zone, and a thin red-purple border, confluent with the leaf surface; abaxial surface medium brown with a dark brown outer zone. Pseudothecia predominantly epiphyllous, single, black, immersed becoming erumpent, globose, 50–100 µm diam.; apical ostiole 5–10 µm diam.; wall of 2–3 layers of medium brown textura angularis. Asci aparaphysate, fasciculate, bitunicate, subsessile, subcylindrical to narrowly obclavate, straight or slightly incurved, 8-spored, 35–55 x 6–10 µm. Ascospores 3- to multiseriate, overlapping, hyaline, guttulate, thick-walled, straight to slightly curved, narrowly ellipsoid with subobtuse apices, medianly 1-septate, widest at unconstricted septum, tapering equally toward both ends, (12–)14–16(–20) x 3(–3.5) µm in vivo, 11–14 x 2.5–3.5 µm in vitro. Mycelium immersed and superficial, of smooth, branched, septate, pale brown hyphae, 3–4µm diam. Caespituli fasiculate, predominantly epiphyllous, medium brown on leaves, up to 150 µm wide and 90 µm high.

Conidiophores occurring singly on secondary mycelium as lateral projections, or arranged in fascicles; fascicles arising from the upper cells of a medium brown stroma up to 60 µm wide and 50 µm high; conidiophores smooth, unbranched or rarely branched below, 1–3-septate, subcylindrical, straight to geniculate-sinuous, pale brown, 20–60 x 2.5–4 µm. Conidiogenous cells terminal, subcylindrical, straight or with several geniculations, pale brown, monoblastic or polyblastic, sympodial, or proliferating 1–3 times percurrently near the apex, 15–30 x 2.5–3.5 µm, with truncate apices; conidial scars unthickened. Conidia solitary, subcylindrical, pale brown, smooth, variously curved, apex subobtuse, base truncate, (50–)70–90(–100) x 2–3(–3.5) µm, indistinctly 1–3-septate; hilum unthickened, 1.5–2 µm wide.

HOLOTYPE. SOUTH AFRICA. NORTHERN PROVINCE: Tzaneen, on leaves of *E. grandis* 2000, G.C. Hunter (PREM 57305, teleomorph; PREM 57306, anamorph), cultures ex type CMW 9095.

Etymology. Raper (1987), states that Tzaneen is a North Sotho term indicating "where the people used to meet" or "in a basket". The epithet, is therefore to be translated " of the forum", or by extension "of Tzaneen".

Ascospore germination on MEA after 24 h. Type C. Ascospores do not darken on MEA, and germinate from both ends, with germ tubes parallel to long axis of spore, and with no visible distortion thereof. Some constriction occurs at the original ascospore septum, with ascospores becoming 3–4 µm diam.

Cultures. Colonies 35–39 mm diam on MEA after 1 month at 25°C. Colonies olivaceous, 21''k (reverse) and smoke grey, 21''''f to grey olivaceous, 21''''i (surface) (Rayner 1970). Colony centre smoke grey, while colony border is grey olivaceous. Aerial mycelium profuse. Margins regular and smooth. Colony surface not sectored and no folding occurs. Only the anamorph, *P. fori* is observed in culture.

Cardinal Temperatures. Min. above 5°C, opt. 20–25°C, max. below 35°C.

Host. *Eucalyptus grandis* Hill ex Maiden

Distribution. Tzaneen, Northern Province, South Africa.

Notes: *Mycosphaerella fori* is most similar to *M. gracilis* Crous & Alfenas, but can be distinguished by its ascospore germination pattern, where ascospores remain unconstricted in *M. gracilis* (type B). Furthermore, conidia of *Pseudocercospora fori* taper towards their apices, whereas conidia of *P. gracilis* Crous & Alfenas are cylindrical.

PCR amplification and sequence data analysis

Amplification of the ITS region of the rDNA operon resulted in amplification products of approximately 600bp for all isolates. Sequence and parsimony analysis of representative isolates combined with published sequences of *Mycosphaerella* spp. on *Eucalyptus* spp. produced four most parsimonious trees with a length of 1562 steps (CI = 0.5038, RI = 0.7879, HI = 0.4962) using the heuristic search option. Of the 657 characters that were analyzed; 257 of these were constant, 106 were parsimony-uninformative and 295 were parsimony-informative. A bootstrap search of 1000 replicates produced a tree of the same topology as the most parsimonious tree (Figure 5). The total data set could be resolved into two major clades. The first clade comprised a larger monophyletic *Mycosphaerella* clade and the second clade was represented by species producing a *Dissoconium* de Hoog, van Oorschot & Hijwegen anamorph. Within the larger *Mycosphaerella* clade, several anamorph genera, associated with those *Mycosphaerella* spp. occurring on *Eucalyptus* were represented. These included *Stenella* Syd., *Pseudocercospora* Speg., *Cercostigmina* U. Braun, *Sonderhenia* H. Swart & J. Walker, *Uwebraunia* Crous & M. J Wingf., *Phaeophleospora* Rangel, *Mycovellosiella* Rangel and *Colletogloeopsis* Crous & M. J. Wingf.

Based on isolations made from South African *Eucalyptus* leaves, six previously recognized species and one new species of *Mycosphaerella* could be identified from the sequence data. These taxa correlated with those identified based on morphology. Thus, sequence data clearly separated *M. marksii*, *M. irregulariramosa*, *M. ellipsoidea*, *M. juvenis*, *M. nubilosa*, *M. lateralis* and *M. fori*. Four of the species isolated during this survey, *M. marksii*, *M. irregulariramosa*, *M. ellipsoidea* and *M. lateralis* were supported with a 100% bootstrap support, and showed no base differences when compared with their respective reference isolates. *Mycosphaerella nubilosa* isolates were also supported with a strong bootstrap support and had four base differences when compared with the reference isolate of *M. nubilosa* (CMW 3282) originally collected from Australia. Isolates of *M. juvenis* grouped within the *Uwebraunia* sub-clade, together with two reference isolates of *M. juvenis* (CMW 4936 & CMW4937) from South Africa, and showed eight base pair differences when compared with the reference strains. Isolates of *M. lateralis* grouped outside of the larger *Mycosphaerella* clade within a smaller, well supported second clade, together with reference isolates from South Africa (CMW 5164) and Zambia (CMW 4935). This smaller clade is represented by species with a *Dissoconium* anamorph, of which *M. lateralis* is the only *Mycosphaerella* species associated with this anamorph genus (Crous *et al*. 1999).

Isolates CMW 9094 & CMW 9095, representing *M. fori* from Tzaneen, grouped in a clade comprising *Pseudocercospora* species from *Eucalyptus* and *Syzygium*. These isolates grouped close to *Pseudocercospora eucalyptorum* Crous, M. J. Wingf., Marasas & B. Sutton isolates, which is known to occur on *Eucalyptus* leaves in South Africa. They were, however, distinct from this species, grouping within their own clade with high bootstrap support (99%).

DISCUSSION

Results from this study have provided substantial clarification to our understanding of the occurrence of *Mycosphaerella* spp. in commercial *Eucalyptus* plantations in South Africa. While a relatively large number of species of *Mycosphaerella* have previously been reported from South Africa (Crous & Wingfield 1996, Crous 1998), there has been very little information available regarding their relative importance and distribution. The focus of the present study was to include the most important *Eucalyptus* spp. in South Africa and to concentrate collections in plantations where leaf spot problems were being experienced. As a result, we were able to detect 6 of the total number of species previously reported on *Eucalyptus* in South Africa, and a previously undescribed new species was also collected.

It is clear from this study that one species, *M. nubilosa*, is dominant in disease outbreaks throughout the sampled areas, particularly KwaZulu-Natal and Umtata. *Mycosphaerella nubilosa* is one of the main pathogens responsible for MLD in Australia and New Zealand (Park & Keane 1982a, b, Dick & Gadgil 1983). It is now clear that it is also an important pathogen in South Africa, where it causes severe leaf spotting and defoliation of young *Eucalyptus* trees, especially *E. nitens*. This species was, however, also isolated from other *Eucalyptus* spp. including *E. bicostata*, *E. dunni* and *E. grandis*. Among these species, *E. grandis* and *E. dunni* are particularly important in South Africa, but *M. nubilosa* does not appear to cause severe damage on these species.

Mycosphaerella marksii was first identified from Victoria in Australia where it was infecting both adult and juvenile leaves of several *Eucalyptus* spp. (Carnegie & Keane 1994). Previous surveys of *Eucalyptus* spp. in South Africa showed that *M. marksii* was present in the Western Cape, KwaZulu-Natal and Gauteng Provinces (Crous & Wingfield 1996). Results of the present study have expanded our knowledge of the geographic distribution of this fungus to now include the Northern Province. The known host range of *M. marksii* includes *E. botryoides* Smith, *E. fraxinoides* Deane et Maiden, *E. globulus* Labill., *E. grandis*, *E. nitens*, *E. quadrangulata* Deane et Maiden and *E. saligna* Smith (Crous 1998). During this study, *M. marksii* was also found on *E. bicostata* and *E. smithii*, the latter of which is an important plantation species. However, the low number of isolates of *M. marksii* collected suggests that this fungus is not a major contributor to MLD outbreaks.

In this study, *M. lateralis* was found on diseased leaves of *E. nitens* and *E. grandis* leaves from KwaZulu-Natal and Tzaneen. This identification is not surprising as the fungus was previously known to occur in these areas (Crous & Wingfield 1996). However, our results have expanded the known host range of this fungus to include *E. grandis*. Other than in South Africa, *M. lateralis* is known to occur in Zambia, and has recently been found in Queensland, Australia (Crous 1998, Maxwell *et al.* 1999).

Mycosphaerella juvenis was previously considered as the most important species contributing to outbreaks of MLB in South Africa (Crous & Wingfield 1996, Crous

1998). It was thus surprising that this fungus was encountered relatively infrequently in the present study. The reason for the apparent change in status of this fungus is not clear. It is possible that species of *Mycosphaerella* causing leaf disease differ in their distributions and occurrence in different years and this matter deserves further study. From the samples studied in the present study it is clear that *M. nubilosa* is now dominant. This finding has emerged from a study that included considerably more material from a wider geographical area than has ever previously been sampled. Unlike *M. nubilosa*, *M. juvenis* has never been found in Australia, and it is thus difficult to assess its relative importance. However, due to its perceived importance in South Africa, *M. juvenis* is considered an important quarantine pathogen in Australia.

Mycosphaerella ellipsoidea is a relatively newly described *Mycosphaerella* species that has previously been known only from the Western Cape Province of South Africa (Crous & Wingfield 1996). In this study, *M. ellipsoidea* was collected from KwaZulu-Natal from leaves of *E. nitens*, although its incidence was low. Its appearance, for the first time in a commercially important forestry area deserves consideration. In this study, *M. irregulariramosa* was isolated from leaves of *E. grandis* from Tzaneen. Although this fungus has previously been reported from Tzaneen, this is the first report of its occurrence on *E. grandis*. Only 8 isolates of this species were recovered in this study, and relative to other species, this was the least common in the area.

The identification of a new species of *Mycosphaerella* was surprising. This is because extensive collections have been made in the past, resulting in the unusual situation that the largest number of *Mycosphaerella* spp. from *Eucalyptus* are known in South Africa. *Mycosphaerella fori* appears to be the most important species responsible for leaf spot in the Tzaneen area. It was found on the most important *Eucalyptus* sp. grown in South Africa, and there is concern that it might spread to other areas in the future.

A large number of *Mycosphaerella* spp. have been reported on *Eucalyptus* spp. from South Africa. These include, *M. africana*, *M. ellipsoidea*, *M. endophytica*, *M. irregulariramosa*, *M. juvenis*, *M. lateralis*, *M. marksii*, *M. crystallina* and *M. nubilosa* (Crous 1998). Six of these species were collected during the present study. The three species not collected were, *M. africana*, *M. endophytica* and *M. crystallina*. *M. africana* and *M. endophytica* were originally identified from Stellenbosch in the Western Cape Province (Crous 1998), which is outside the commercial *Eucalyptus* growing area. These fungi have either been geographically isolated, or they are marginally important. The other species not collected was *M. crystallina*, that is known to occur in the KwaZulu-Natal province on leaves of *E. bicostata* and *E. grandis* × *camaldulensis* (Crous & Wingfield 1996). The absence of this species in this study suggests that it is probably not an important pathogen in commercial plantations.

Determining the relative importance of *Mycosphaerella* spp. causing MLD on *Eucalyptus* is difficult. This is due to the fact that many species are associated with the disease and that it is extremely difficult to identify them. Although results of this study have shown that it is possible to define species based on morphology, these characters are variable. Generally identifications made in the absence of DNA sequence data are viewed with some circumscription. Clearly, it is impossible to obtain DNA sequences for the large number of isolates that emerge from extensive surveys. Rapid DNA-based procedures for the identification of *Mycosphaerella* spp. on *Eucalyptus* are thus needed. These would not only facilitate efforts to improve disease management but they would be extremely valuable in the application of more stringent and meaningful quarantine.

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Table 1. Isolates included in sequence analysis of *Mycosphaerella* species.

Isolate No.	Teleomorph (Mycosphaerella)	Anamorph	GENBANK Accession No.	Origin
CMW 4945[1]	*M. africana*	Unknown	AF309602	*Eucalyptus*, South Africa
CMW 4944[1]	*M. colombiensis*	*Pseudocercospora colombiensis*	AF309612	*Eucalyptus*, Colombia
CMW 2732	*M. cryptica*	*Colletogloeopsis nubilosum*	AF309622	*Eucalyptus*, Chile
CMW 3279[1]	*M. cryptica*	*Colletogloeopsis nubilosum*	AF309623	*Eucalyptus*, Australia
CMW 3042[1]	*M. crystallina*	*Pseudocercospora crystallina*	AF309611	*Eucalyptus*, South Africa
CMW 4934, 5166	*M. ellipsoidea*	*Uwebraunia ellipsoidea*	AF309592, AF309593	*Eucalyptus*, South Africa
CMW 9098*	*M. ellipsoidea*	*Uwebraunia ellipsoidea*	AF468874	*Eucalyptus*, KwaZulu-Natal, RSA
CMW 9099*	*M. ellipsoidea*	*Uwebraunia ellipsoidea*	AF468875	*Eucalyptus*, KwaZulu-Natal, RSA
CMW 9100*	*M. ellipsoidea*	*Uwebraunia ellipsoidea*	AF468876	*Eucalyptus*, KwaZulu-Natal, RSA
CMW 5224[1]	*M. flexuosa*	Unknown	AF309603	*Eucalyptus*, Colombia
CMW 9094*	*M. fori*	*Pseudocercospora fori*	AF468868	*Eucalyptus*, Tzaneen, RSA
CMW 9095*	*M. fori*	*Pseudocercospora fori*	AF468869	*Eucalyptus*, Tzaneen, RSA
CMW 4942[1]	*M. heimii*	*Pseudocercospora heimii*	AF309606	*Eucalyptus*, Madagascar
CMW 3046[1]	*M. heimioides*	*Pseudocercospora heimioides*	AF309609	*Eucalyptus*, Indonesia
CMW 4943[1], 5149[1]	*M. irregulariramosa*	*Pseudocercospora irregulariramosa*	AF309607, AF309608	*Eucalyptus*, South Africa

CMW 9097*	*M. irregulariramosa*	*Pseudocercospora irregulariramosa*	AF468877	*Eucalyptus*, Tzaneen, RSA
CMW 5825*	*M. irregulariramosa*	*Pseudocercospora irregulariramosa*	AF468878	*Eucalyptus*, Tzaneen, RSA
CMW 4937, 4936	*M. juvenis*	*Uwebraunia juvenis*	AF309604, AF309605	*Eucalyptus*, South Africa
CMW 9101*	*M. juvenis*	*Uwebraunia juvenis*	AF468879	*Eucalyptus*, Umtata, RSA
CMW 9102*	*M. juvenis*	*Uwebraunia juvenis*	AF468880	*Eucalyptus*, KwaZulu-Natal, RSA
CMW 9103*	*M. juvenis*	*Uwebraunia juvenis*	AF468881	*Eucalyptus*, KwaZulu-Natal, RSA
STE-U 825[1]	*M. lateralis*	*Dissoconium dekkeri*	AF309624	*Eucalyptus*, South Africa
CMW 4935	*M. lateralis*	*Dissoconium dekkeri*	AF309625	*Eucalyptus*, Zambia
CMW 9106*	*M. lateralis*	*Dissoconium dekkeri*	AF468882	*Eucalyptus*, Tzaneen, RSA
CMW 9107*	*M. lateralis*	*Dissoconium dekkeri*	AF468883	*Eucalyptus*, KwaZulu-Natal, RSA
STE-U 348	*M. marasasii*	*Stenella marasasii*	AF309591	*Syzygium*, South Africa
CMW 5150, 3278	*M. marksii*	Unknown	AF309588, AF309598	*Eucalyptus*, Australia
CMW 9090*	*M. marksii*	Unknown	AF468870	*Eucalyptus*, KwaZulu-Natal, RSA
CMW 9091*	*M. marksii*	Unknown	AF 468871	*Eucalyptus*, KwaZulu-Natal, RSA
CMW 9092*	*M. marksii*	Unknown	AF468872	*Eucalyptus*, Tzaneen, RSA
CMW 9093*	*M. marksii*	Unknown	AF468873	*Eucalyptus*, Tzaneen, RSA
CMW 2734	*M. molleriana*	*Colletogloeopsis molleriana*	AF309619	*Eucalyptus*, U.S.A

CMW 4940	*M. molleriana*	*Colletogloeopsis molleriana*	AF309620	*Eucalyptus*, Portugal
CMW 3282	*M. nubilosa*	Unknown	AF309618	*Eucalyptus*, Australia
CMW 9104*	*M. nubilosa*	Unknown	AF449096	*Eucalyptus*, KwaZulu-Natal, RSA
CMW 9105*	*M. nubilosa*	Unknown	AF449097	*Eucalyptus*, Umtata, RSA
CMW 3358[1]	*M. parkii*	*Stenella parkii*	AF309590	*Eucalyptus*, Brazil
CMW5348[1]	*M. suttoniae*	*Phaeophleospora eppicocoides*	AF309621	*Eucalyptus*, Indonesia
CMW 5348	*M. syzgii*	*Cercostigmina punctata*	AF309610	*Syzygium*, South Africa
CMW 5005[1]	*M. tasmaniensis*	*Mycovellosiella tasmaniensis*	AF309617	*Eucalyptus*, Australia
STE-U 2768, 2769	*M. walkeri*	*Sonderhenia eucalypticola*	AF309615, AF309616	*Eucalyptus*, Uruguay
CMW5129	*Mycosphaerella* state unknown	*Phaeophleospora destructans*	AF309614	*Eucalyptus*, Indonesia
CMW 5351	*Mycosphaerella* state unknown	*Phaeophleospora eugeniae*	AF309613	*Eugenia*, Brazil
CMW 5227[1]	*Mycosphaerella* state unknown	*Pseudocercospora basiramifera*	AF309595	*Eucalyptus*, Thailand
CMW 5228[1], 5229[1]	*Mycosphaerella* state unknown	*Pseudocercospora eucalyptorum*	AF309598, AF309599	*Eucalyptus*, South Africa
CMW 4948	*Mycosphaerella* state unknown	*Pseudocercospora natalensis*	AF309594	*Eucalyptus*, South Africa
CMW 5146	*Mycosphaerella* state unknown	*Pseudocercospora paraguayensis*	AF309596	*Eucalyptus*, Brazil
CMW 5151[1]	*Mycosphaerella* state unknown	*Pseudocercospora robusta*	AF309597	*Eucalyptus*, Malaysia

CMW 5349	*Mycosphaerella* state unknown	*Pseudocercospora syzgiicola*	AF309600	*Syzygium*, South Africa

STE-U = Culture collection of the Department of Plant Pathology, University of Stellenbosch

CMW = Culture collection of the Forestry and Agricultural Biotechnology Institute (FABI), University of Pretoria.

CMW* = Isolates of *Mycosphaerella* sequenced during this study.

\[1] = Ex-type cultures

Figure 1: Adaxial view of leaf symptoms associated with *Mycosphaerella* species isolated from South Africa. **(A)** *M. nubilosa*, **(B)** *M. ellipsoidea*, **(C)** *M. juvenis*, **(D)** *M. lateralis*, **(E)** *M. marksii* and **(F)** *M. irregulariramosa*

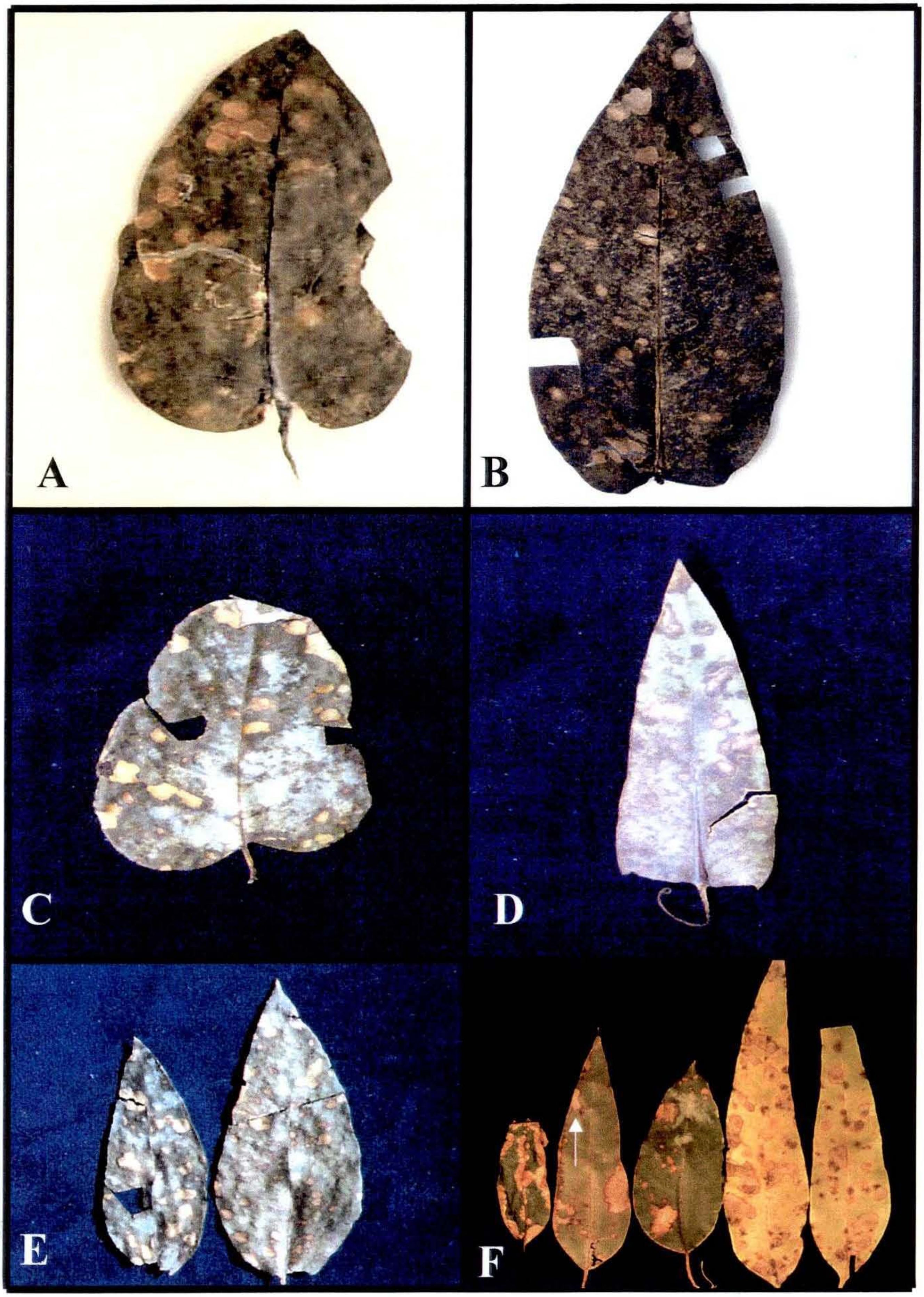
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Figure 2: Lesions showing pseudothecial arrangement of *Mycosphaerella* species isolated from South Africa. **(A)** *M. nubilosa*, **(B)** *M. irregulariramosa*, **(C)** *M. juvenis*, **(D)** *M. lateralis*, **(E)** *M. marksii*, **(F)** *M. ellipsoidea*.

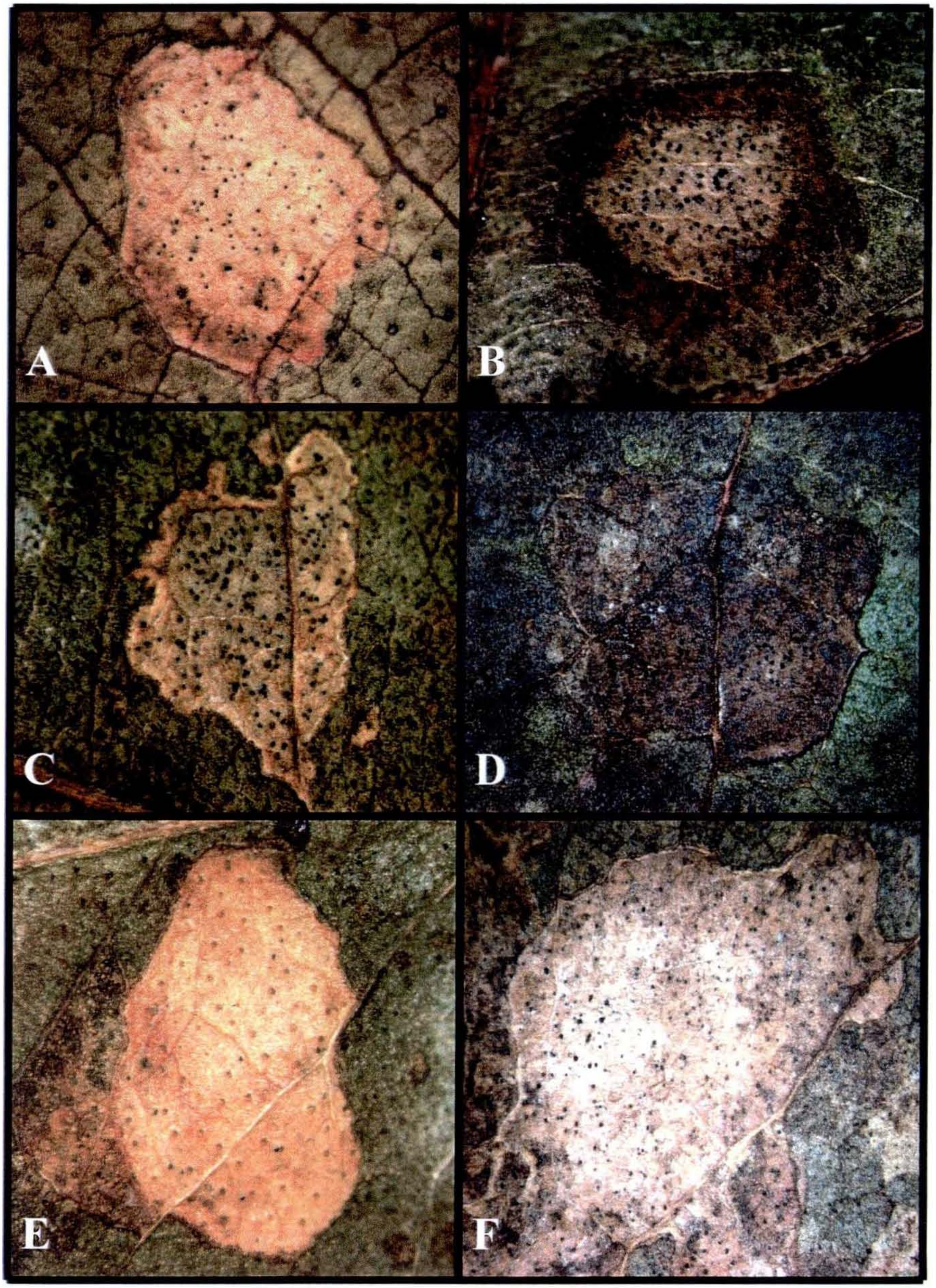
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Figure 3: Ascospore germination patterns of *Mycosphaerella* species isolated from South Africa. **(A)** *M. nubilosa* Type C, **(B)** *M. irregulariramosa* Type I, **(C)** *M. juvenis* Type F, **(D)** *M.lateralis* Type I, **(E)** *M. marksii* Type B, **(F)** *M. ellipsoidea* Type I. See Crous (1998) for definition of germination type. Scale bar = 10 μm.

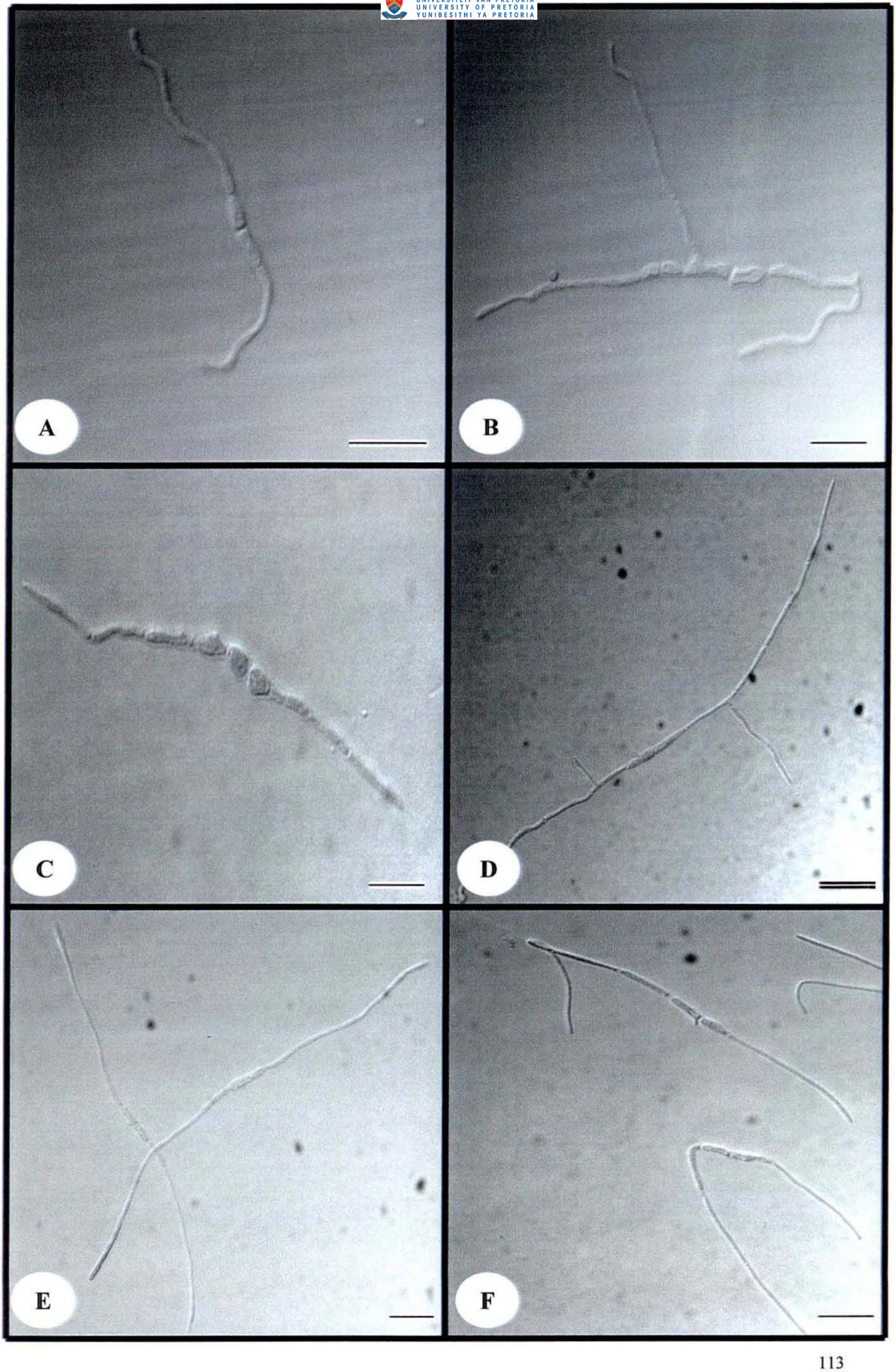
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Figure 4: Cultural morphology of *Mycosphaerella* species isolated from Pietermaritzburg, Tzaneen and Umtata. **(A)** *M. nubilosa*, **(B)** *M. ellipsoidea*, **(C)** *M. juvenis*, **(D)** *M. lateralis* **(E)** *M. marksii*, **(F)** *M. irregulariramosa*

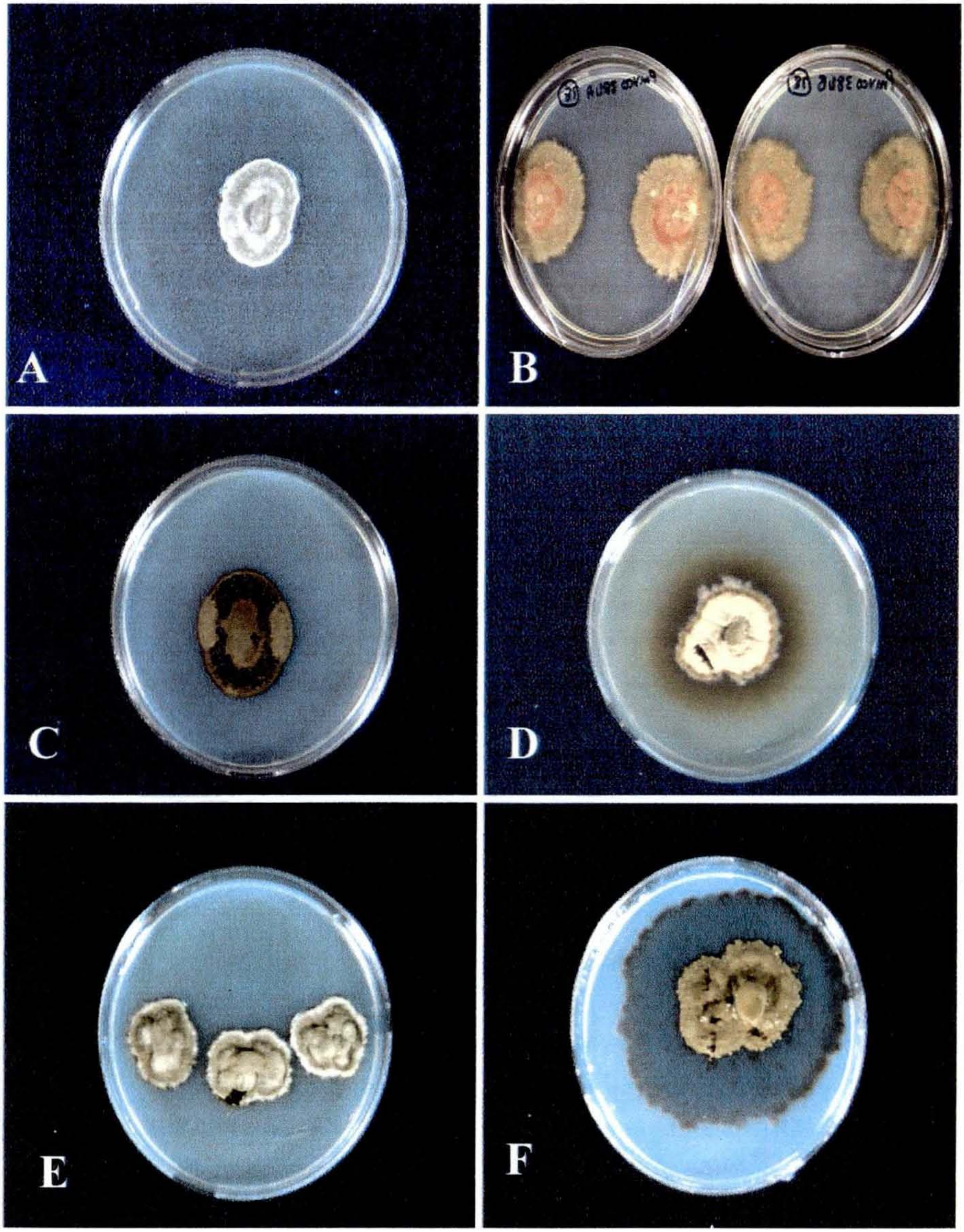
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Figure 5: Cladogram of *Mycosphaerella* species on *Myrtaceae* and *Mycosphaerella* species isolated from various *Eucalyptus* spp. One of 4 most parsimonious trees (length = 1562, CI = 0.5038, RI = 0.7879, HI = 0.4962) inferred from heuristic searches using PAUP version 4.0b1. Bootstrap support values of 1000 replicates is listed above branches

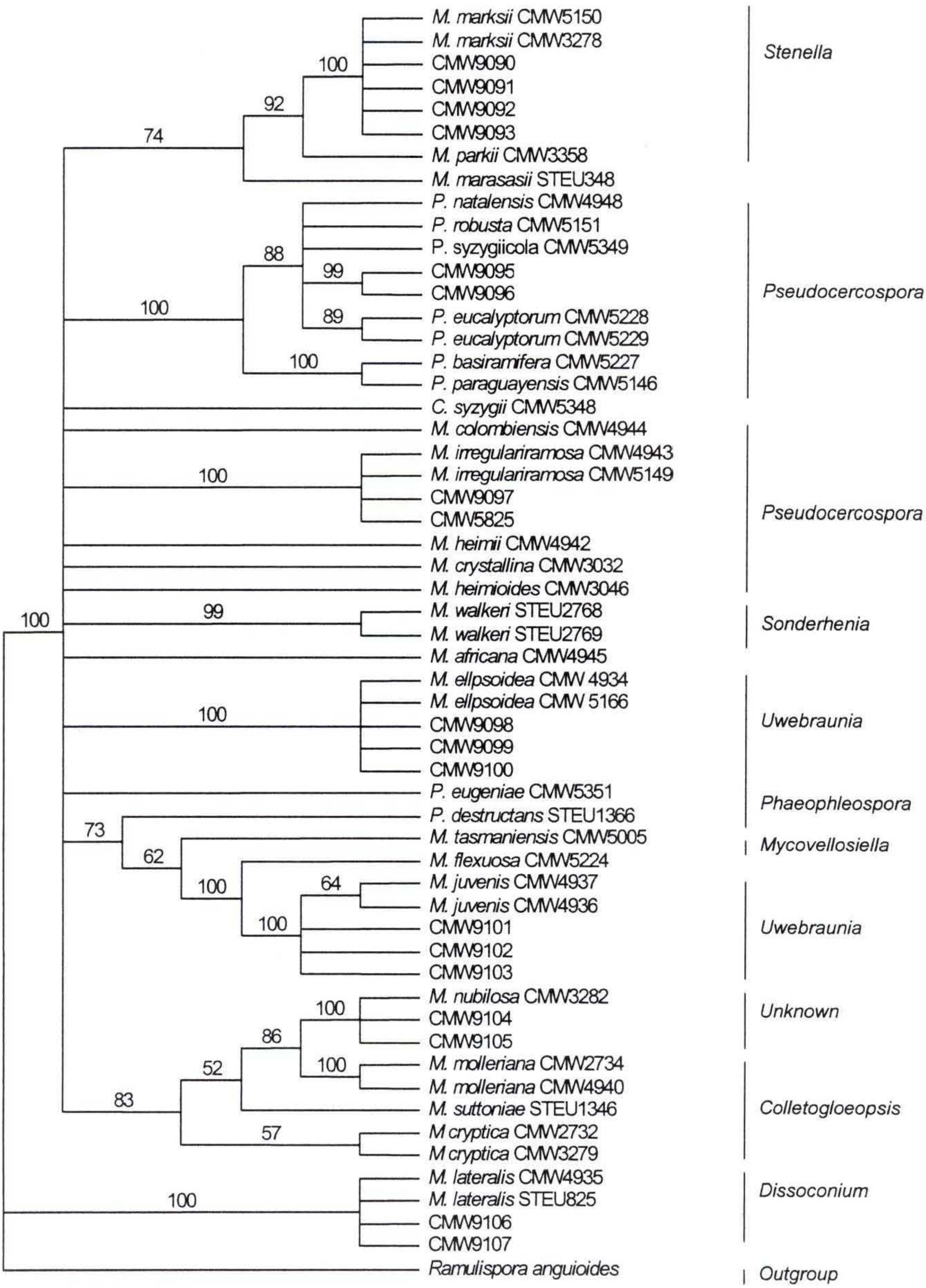
M. marksii CMW5150
M. marksii CMW3278
CMW9090
CMW9091
CMW9092
CMW9093
M. parkii CMW3358
M. marasasii STEU348
P. natalensis CMW4948
P. robusta CMW5151
P. syzygiicola CMW5349
CMW9095
CMW9096
P. eucalyptorum CMW5228
P. eucalyptorum CMW5229
P. basiramifera CMW5227
P. paraguayensis CMW5146
C. syzygii CMW5348
M. colombiensis CMW4944
M. irregulariramosa CMW4943
M. irregulariramosa CMW5149
CMW9097
CMW5825
M. heimii CMW4942
M. crystallina CMW3032
M. heimioides CMW3046
M. walkeri STEU2768
M. walkeri STEU2769
M. africana CMW4945
M. ellpsoidea CMW 4934
M. ellpsoidea CMW 5166
CMW9098
CMW9099
CMW9100
P. eugeniae CMW5351
P. destructans STEU1366
M. tasmaniensis CMW5005
M. flexuosa CMW5224
M. juvenis CMW4937
M. juvenis CMW4936
CMW9101
CMW9102
CMW9103
M. nubilosa CMW3282
CMW9104
CMW9105
M. molleriana CMW2734
M. molleriana CMW4940
M. suttoniae STEU1346
M cryptica CMW2732
M cryptica CMW3279
M. lateralis CMW4935
M. lateralis STEU825
CMW9106
CMW9107
Ramulispora anguioides
100
92
74
88
99
100
89
100
100
99
100
100
73
62
100
64
100
100
86
100
52
83
57
100
Stenella
Pseudocercospora
Pseudocercospora
Sonderhenia
Uwebraunia
Phaeophleospora
Mycovellosiella
Uwebraunia
Unknown
Colletogloeopsis
Dissoconium
Outgroup

Figure 6: Teleomorph and anamorph structures of *M. fori* sp. nov., identified from leaves of *E. grandis* in Tzaneen, South Africa. **(A)** Bitunicate 8-spored asci. **(B)** Fascicle of conidiophores arising from a brown stroma. **(C)** Type C ascospore germination pattern, with spores germinating from both spore plows and producing parallel germ tubes with no visible constriction. **(D)** **(E)** Solitary, subcylindrical conidia showing a subobtuse apex and a truncate base. Scale bar = 10 μm.

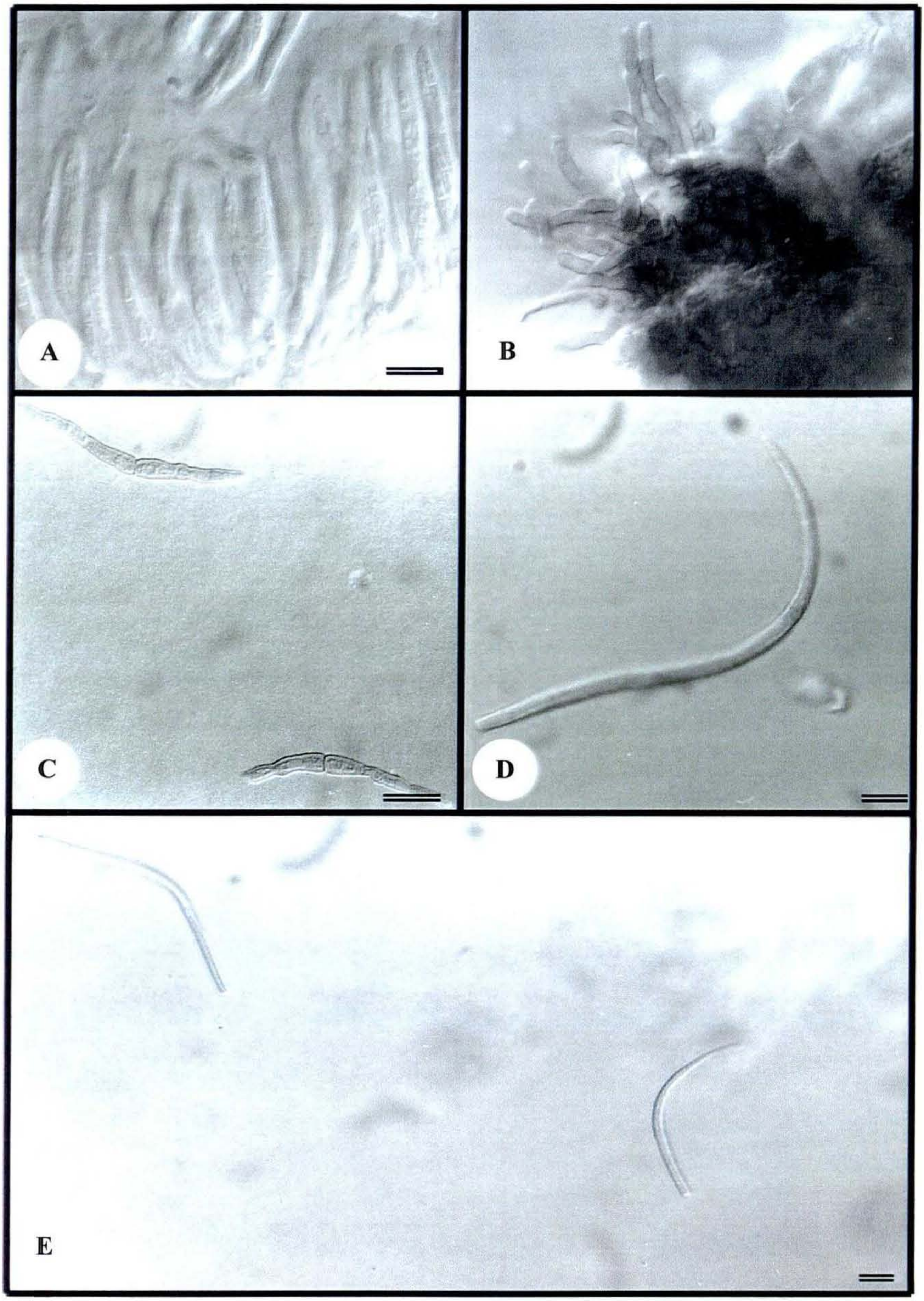
A
B
C
D
E

Figure 7: Line drawing of *M. fori* sp. nov and *P. fori* sp. nov. **(A)** Subcylindrical to narrowly obclavate, straight or incurved asci. **(B)** Thick-walled ellipsoidal ascospores with subobtuse apices. **(C)** Type C ascospore germination patterns. **(D)** Pale brown variously curved solitary conidia. **(E)** Conidiophores and terminal pale brown conidiogenous cells showing several geniculations. Scale bar =10 μm.

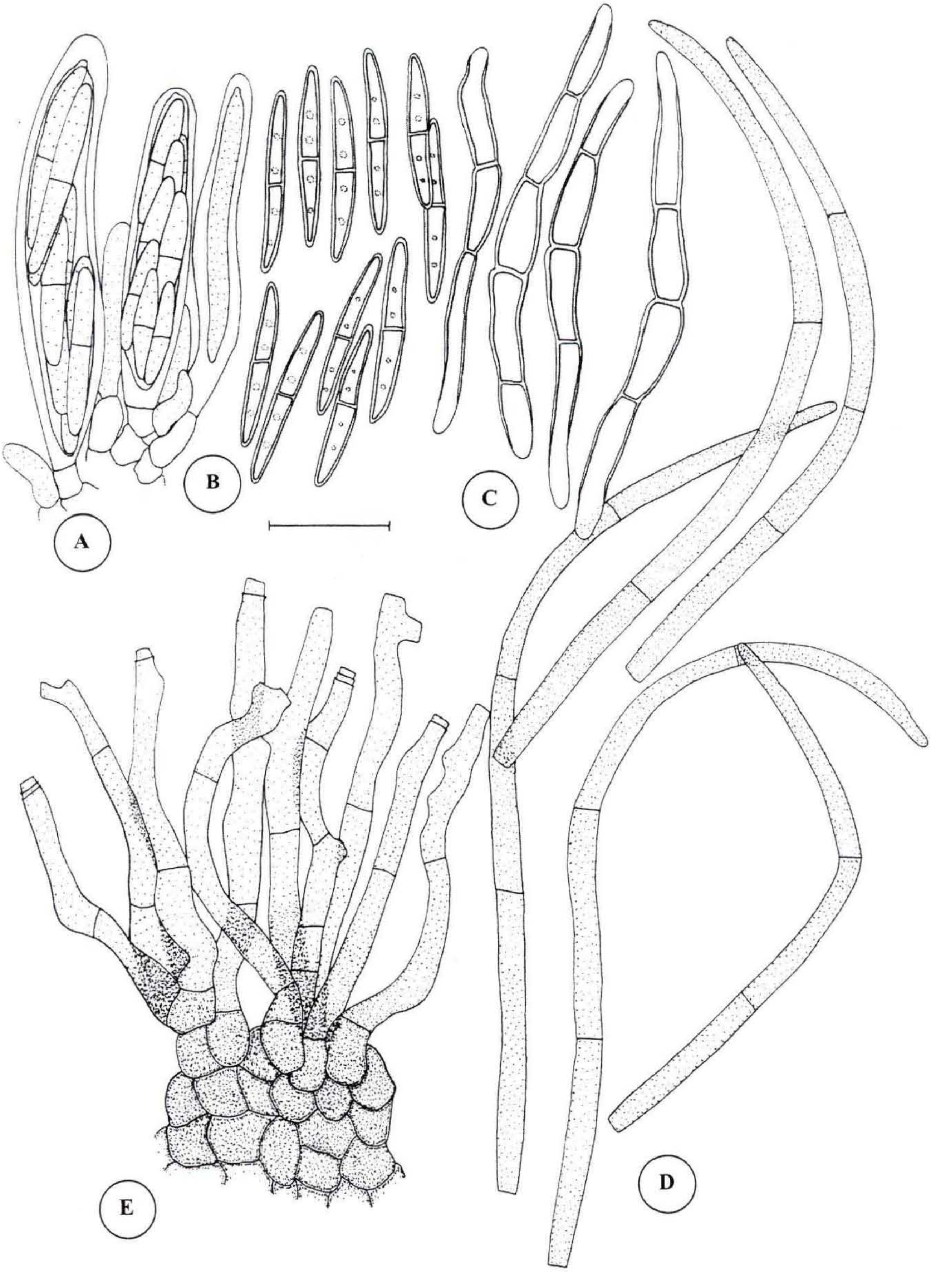
A
B
C
D
E

Figure 8: ITS DNA sequences of *Mycosphaerella* species from *Myrtaceae* generated using primers ITS 1, ITS 2, ITS 3 and LR 1. Sequence data set contains sequences of *Mycosphaerella* spp. isolated from various *Eucalyptus* spp. during this study and published sequences of *Mycosphaerella* spp. and their anamorphs from other *Myrtaceous* hosts. (Table 1). Gaps inserted during sequence alignments are indicated by a dash (-).

```
                                       10         20         30         40
M.marksiiCMW5150          TCCGTAGGTG AACC----TG CGGAGGGATC ATTACC-GAG
M.marksiiCMW3278          TCCGTAGGTG AACC----TG CGGAGGGATC ATTACC-GAG
CMW9090                   TCCGTAGGTG AACC----TG CGGAGGGATC ATTACC-GAG
CMW9091                   TCCGTAGGTG AACC----TG CGGAGGGATC ATTACC-GAG
CMW9092                   TCCGTAGGTG AACC----TG CGGAGGGATC ATTACC-GAG
CMW9093                   TCCGTAGGTG AACC----TG CGGAGGGATC ATTACC-GAG
M. parkiiCMW3358          TCCGTAGGTG AACC----TG CGGAGGGATC ATTACT-GAG
M. marasasiiSTEU348       TCCGTAGGTG AACC----TG CGGAGGGATC ATTACT-GAG
P. natalensisCMW4948      TCCGTAGGTG AACC----TG CGGAGGGATC ATTACT-GAG
P. robustaCMW5151         TCCGTAGGTG ATCC----TG CGGAGGGATC ATTACT-GAG
P. syzygiicolaCMW5349     TCCGTAGGTG AACC----TG CGGAGGGATC ATTACT-GAG
CMW9094                   TCCGTAGGTG AACC----TG CGGAGGGATC ATTACT-GAG
CMW9095                   TCCGTAGGTG AACC----TG CGGAGGGATC ATTACT-GAG
P. eucalyptorumCMW5228    TCCGTAGGTG AACC----TG CGAAGGGATC ATTACT-GAG
P. eucalyptorum5229       TCCGTAGGTG AACC----TG CGGAGGGATC ATTACT-GAG
P. basiramiferaCMW5227    TCCGTAGGTG AACC----TG CGGAGGGATC ATTACT-GAG
P. paraguayensisCMW5146   TCCGTAGGTG ATCC----TG CGGAGGGATC ATTACT-GAG
C. syzygiiCMW5348         TCCGTAGGTG AACC----TG CGGAGGGATC ATTACT-GAG
M._colombiensisCMW4944    TCCGTAGGTG AACC----TG CGGAGGGATC ATTACT-GAG
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M._irregulariramosaCMW5149TCCGTAGGTG AACC----TG CGGAGGGATC ATTACT-GAG
CMW9097                   TCCGTAGGTG AACC----TG CGGAGGGATC ATTACT-GAG
CMW5825                   TCCGTAGGTG AACC----TG CGGAGGGATC ATTACT-GAG
M._heimiiCMW4942          TCCGTAGGTG AACC----TG CGGAGGGATC ATTACT-GAG
M._crystallinaCMW3032     TCCGTAGGTG AACC----TG CGGAGGGATC ATTACT-GAG
M._heimioidesCMW3046      TCCGTAGGTG AACC----TG CGGAGGGATC ATTACT-GAG
M._walkeriSTEU2768        TCGGTAGGTG AACC----TG CGGAGGGATC ATTACC-GAG
M._walkeriSTEU2769        TCGGTAGGTG AACC----TG CGGAGGGATC ATTACC-GAG
M._africanaCMW4945        TCCGTAGGTG AACC----TG CGGAGGGATC ATTACT-GAG
M._ellpsoideaCMW4943      TCCGTAGGTG AACC----TG AGGAGGGATC ATTACT-GAG
M._ellpsoideaCMW5166      TCCGTAGGTG AACC----TG AGGAGGGATC ATTACT-GAG
CMW9098                   TCCCGTAGTG AACC----TG AGGAGGGATC ATTACT-GAG
CMW9099                   TCCGTAGGTG AACC----TG AGGAGGGATC ATTACT-GAG
CMW9100                   TCCGTAGGTG AACC----TG AGGAGGGATC ATTACT-GAG
P._eugeniaeCMW5351        TCCGTAGGTG AACC----TG CGGAGGGATC ATTACT-GAG
P._destructansSTEU1366    TCCGTAGGTG AACC----TG CGGAGGGATC ATTACC-GAG
M._tasmaniensisCMW5005    TCCGTAGGTG AACC----TG CGGAGGGATC ATTACC-GAG
M._flexuosaCMW5224        TCGGTAGGTG AACC----TG CGGAGGGATC ATTACT-GAG
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CMW9101                   TCCGTAGGTG AACC----TG CGGAGGGATC ATTACC-GAG
CMW9102                   TCCGTAGGTG AACC----TG CGGAGGGATC ATTACC-GAG
CMW9103                   TCCGTAGGTG AACC----TG CGGAGGGATC ATTACC-GAG
M._nubilosaCMW3282        TCCGTAGGTG AACC----TG CGGAGGGATC ATTACT-GAG
CMW9104                   TCCGTAGGTG AACC----TG CGGAGGGATC ATTACT-GAG
CMW9105                   TCCGTAGGTG AACC----TG CGGAGGGATC ATTACT-GAG
M._mollerianaCMW2734      TCCGTAGGTG AACC----TG CGGAGGGATC ATTACT-GAG
M._mollerianaCMW4940      TCCGTAGGTG AACC----TG CGGAGGGATC ATTACT-GAG
M._crypticaCMW2732        TCCGTAGGTG AACC----TG CGTAGGGATC ATTACC-GAG
M._crypticaCMW3279        TCCGTAGGTG AACC----TG CGGAGGGATC ATTACC-GAG
M._suttoniaeSTEU1346      TCCGTAGGTG AACC----TG CGGAGGGATC ATTACC-GAG
M._lateralisCMW4935       TCCGTAGGTG AACC----TG CGGAGGGATC ATTACCAGA-
M._lateralisSTEU825       TCCGTAGGTG AACC----TG CGGAGGGATC ATTACCAGA-
CMW9106                   TCCGTAGGTG AACC----TG CGGAGGGATC ATTACCAGA-
CMW9107                   TCCGTAGGTG AACC----TG CGGAGGGATC ATTACCAGA-
Ramulispora_anguioides    TCCGTAGGTG AACC----TG CGGAAGGATC ATTAATAGAG
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M._marksiiCMW3278              ---TGAGGGT TT-CGGC-CC G--------A CCTC----CA
CMW9090                        ---TGAGGGT TT-CGGC-CC G--------A CCTC----CA
CMW9091                        ---TGAGGGT TT-CGGC-CC G--------A CCTC----CA
CMW9092                        ---TGAGGGT TT-CGGC-CC G--------A CCTC----CA
CMW9093                        ---TGAGGGT TT-CGGC-CC G--------A CCTC----CA
M._parkiiCMW3358               ---TGAGGGT TTCACC-GCC G--------A CCTC----CA
M._marasasiiSTEU348            ---TGAGGGC CTCCAGT-CC G--------A CCTC----CA
P._natalensisCMW4948           ---TGAGGGC -TCACG-CCC G--------A CCTC----CA
P._robustaCMW5151              ---TGAGGGC -TCACG-CCC G--------C CCTC----CA
P._syzygiicolaCMW5349          ---TGAGGGC -TCACG-CCC G--------A CCTC----CA
CMW9094                        ---TGAGGGC -TCACG-CCC G--------A CCTC----CA
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P._eucalyptorumCMW5228         ---TGAGGGC -TCACG-CCC G--------A CCTC----CA
P._eucalyptorum5229            ---TGAGGGC -TCACG-CCC G--------A CCTC----CA
P._basiramiferaCMW5227         ---TGAGGGC -TCACG-CCC G--------A CCTC----CA
P._paraguayensisCMW5146        ---TGAGGGC -TCACG-CCC G--------C CCTC----CA
C._syzygiiCMW5348              ---TGAGGGT -TCACG-CCC G--------A CCTC----CA
M._colombiensisCMW4944         ---TGAGGGC CTCCG-GTCC G--------A CCTC----CA
M._irregulariramosaCMW4943---TGAGGGC TTC--GGTCC G--------A CCTC----CA
M._irregulariramosaCMW5149---TGAGGGC TTC--GGTCC G--------A CCTC----CA
CMW9097                        ---TGAGGGC TTC--GGTCC G--------A CCTC----CA
CMW5825                        ---TGAGGGC TTC--GGTCC G--------A CCTC----CA
M._heimiiCMW4942               ---TGAGGGC TA---GGTCC G--------A CCTC----CA
M._crystallinaCMW3032          ---TGAGGGT TCGG---TCC G--------A CCTC----CA
M._heimioidesCMW3046           ---TGAGGGC TTC--GGTCC G--------A CCTC----CA
M._walkeriSTEU2768             ---TGAGGGC C--CCGGCCC G--------A CCTC----CA
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M._africanaCMW4945             ---TGAGGGC -TCACG-CCC G--------A CCTC----CA
M._ellpsoideaCMW4943           ---TGAGGGC -TCACG-CCC A--------T TCT------A
M._ellpsoideaCMW5166           ---TGAGGGC -TCACG-CCC A--------T TCT------A
CMW9098                        ---TGAGGGC -TCACG-CCC A--------T TCT------A
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P._eugeniaeCMW5351             ---TGAGGGC CTTCGGTC-C G--------A CCTC----CA
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M._crypticaCMW3279             ---TGAGGGC GCCCG--CCC G--------A CCTC----CA
M._suttoniaeSTEU1346           ---CGAGGGC GTCAGGCC-C G--------A CCTC----CG
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M._lateralisSTEU825            -----AG--- ---ACGCCTC GGC--GGAAA CGCCGGGG--
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CMW9107                        -----AG--- ---ACGCCTC GGC--GGAAA CGCCGGGG--
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	90	100	110	120
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CMW9090	ACCCT-----	------TT--	----GT----	---------G
CMW9091	ACCCT-----	------TT--	----GT----	---------G
CMW9092	ACCCT-----	------TT--	----GT----	---------G
CMW9093	ACCCT-----	------TT--	----GT----	---------G
M._parkiiCMW3358	ACCCT-----	------TT--	----GT----	---------G
M._marasasiiSTEU348	ACCCT-----	------TT--	----GT----	---------G
P._natalensisCMW4948	ACCCT-----	------TT--	----GT----	---------G
P._robustaCMW5151	ACCCT-----	------TT--	----GT----	---------G
P._syzygiicolaCMW5349	ACCCT-----	------TT--	----GT----	---------G
CMW9094	ACCCT-----	------TT--	----GT----	---------G
CMW9095	ACCCT-----	------TT--	----GT----	---------G
P._eucalyptorumCMW5228	ACCCT-----	------TT--	----GT----	---------G
P._eucalyptorum5229	ACCCT-----	------TT--	----GT----	---------G
P._basiramiferaCMW5227	ACCCT-----	------TT--	----GT----	---------G
P._paraguayensisCMW5146	ACCCT-----	------TT--	----GT----	---------G
C._syzygiiCMW5348	ACCCT-----	------TT--	----GT----	---------G
M._colombiensisCMW4944	ACCCT-----	------TT--	----GT----	---------G
M._irregulariramosaCMW4943	ACCCT-----	------TT--	----GT----	---------G
M._irregulariramosaCMW5149	ACCCT-----	------TT--	----GT----	---------G
CMW9097	ACCCT-----	------TT--	----GT----	---------G
CMW5825	ACCCT-----	------TT--	----GT----	---------G
M._heimiiCMW4942	ACCCT-----	------TT--	----GT----	---------G
M._crystallinaCMW3032	ACCCT-----	------TT--	----GT----	---------G
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CMW9105	ACCCC-----	-----AT---	----GT----	--------TT
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M._mollerianaCMW4940	ACCCC-----	-----AT---	----GT----	---------T
M._crypticaCMW2732	ACCCT-----	------TT--	----GT----	---------G
M._crypticaCMW3279	ACCCC-----	-----AT---	----GT----	---------T
M._suttoniaeSTEU1346	ACCCT-----	-----TTT--	----GT----	---------G
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M._lateralisSTEU825	-CCTTCGTCC	AACCCTTTGT	GAACGT----	-ATCTC----
CMW9106	-CCTTCGTCC	AACCCTTTGT	GAACGT----	-ATCTC----
CMW9107	-CCTTCGTCC	AACCCTTTGT	GAACGT----	-ATCTC----
Ramulispora_anguioides	ACCCTCCTCG	GAGGGTTTAG	AGACGTCGAG	CCTCTCGGAG

```
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M._marksiiCMW3278              AA-------- -------TCA AACCT----- ----------
CMW9090                        AA-------- -------TCA AACCT----- ----------
CMW9091                        AA-------- -------TCA AACCT----- ----------
CMW9092                        AA-------- -------TCA AACCT----- ----------
CMW9093                        AA-------- -------TCA AACCT----- ----------
M._parkiiCMW3358               AA-------- -------CCA CAACT----- ---------T
M._marasasiiSTEU348            AA-------- -------CCA ACACT----- ----------
P._natalensisCMW4948           AA-------- -------CCA CA-CT----- ----------
P._robustaCMW5151              AA-------- -------CCA CA-CT----- ----------
P._syzygiicolaCMW5349          AA-------- -------CCA CA-CT----- ----------
CMW9094                        AA-------- -------C-A CATCT----- ----------
CMW9095                        AA-------- -------C-A CATCT----- ----------
P._eucalyptorumCMW5228         AA-------- -------CCA CA-CT----- ----------
P._eucalyptorum5229            AA-------- -------CCA CA-CT----- ----------
P._basiramiferaCMW5227         AA-------- -------CCA AA-CT----- ----------
P._paraguayensisCMW5146        AA-------- -------CCA AA-CT----- ----------
C._syzygiiCMW5348              AA-------- --------CA AATCT----- ----------
M._colombiensisCMW4944         AA-------- -------CCA AT-CT----- ----------
M._irregulariramosaCMW4943     AA-------- -------CCA AA-CT----- ----------
M._irregulariramosaCMW5149     AA-------- -------CCA AA-CT----- ----------
CMW9097                        AA-------- -------CCA AA-CT----- ----------
CMW5825                        AA-------- -------CCA AA-CT----- ----------
M._heimiiCMW4942               AA-------- -------CCA AA-CT----- ----------
M._crystallinaCMW3032          AA-------- -------CCA AA-CT----- ----------
M._heimioidesCMW3046           AA-------- -------CCA AA-CT----- ----------
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M._walkeriSTEU2769             GA-------- -------CCC AACTT----- ----------
M._africanaCMW4945             AA-------- -------CCA ACTCT----- ----------
M._ellpsoideaCMW4943           AA-------- -------CTA CAACT----- --------CT
M._ellpsoideaCMW5166           AA-------- -------CTA CAACT----- --------CT
CMW9098                        AA-------- -------CTA CAACT----- --------CT
CMW9099                        AA-------- -------CTA CAACT----- --------CT
CMW9100                        AA-------- -------CTA CAACT----- --------CT
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M._flexuosaCMW5224             AA-------- -------TTC GACCT----- --------CT
M._juvenisCMW4937              AA-------- -------TCT CACCT----- --------CT
M._juvenisCMW4936              AA-------- -------TCT CACCT----- --------CT
CMW9101                        AA-------- -------TCT CACCT----- --------CT
CMW9102                        AA-------- -------TCT CACCT----- --------CT
CMW9103                        AA-------- -------TCT CACCT----- --------CT
M._nubilosaCMW3282             TC-------- -------CCA CCAC------ ----------
CMW9104                        TC-------- -------CCA CCAC------ ----------
CMW9105                        TC-------- -------CCA CCAC------ ----------
M._mollerianaCMW2734           TC-------- --------CA AACCA----- --------C-
M._mollerianaCMW4940           TC-------- --------CA AACCA----- --------C-
M._crypticaCMW2732             AA-------- -------CG- CATCC----- ---------C
M._crypticaCMW3279             TT-------- -------CCA A---C----- --------CA
M._suttoniaeSTEU1346           TC-------- -------CTA CACCC----- ---------T
M._lateralisCMW4935            ---------- ---------- ---------- ----------
M._lateralisSTEU825            ---------- ---------- ---------- ----------
CMW9106                        ---------- ---------- ---------- ----------
CMW9107                        ---------- ---------- ---------- ----------
Ramulispora_anguioides         AAGCTCGGTT CAGACCTCCA CCCTTGAA-T AAAAAACCTT
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CMW9091	-GTTGCTTCG	G--GGGCGAC	CCT-GCCG--	---TTCGCGG
CMW9092	-GTTGCTTCG	G--GGGCGAC	CCT-GCCG--	---TTCGCGG
CMW9093	-GTTGCTTCG	G--GGGCGAC	CCT-GCCG--	---TTCGCGG
M._parkiiCMW3358	-GTTGCTTCG	G--GGGCGAC	CCT-GCCG--	---TTCGCGG
M._marasasiiSTEU348	-GTTGCTTCG	G--GGGCGAC	CCT-GCCT--	---TTC-GGG
P._natalensisCMW4948	TGTTGCTTCG	G--GGGCGAC	CCT-GCCGGC	-ACTTCGTCG
P._robustaCMW5151	TGTTGCTTCG	G--GGGCGAC	CCT-GCCGGC	-ACTTCGTCG
P._syzygiicolaCMW5349	TGTTGCTTCG	G--GGGCGAC	CCT-GCCGGC	-ACTTCGTCG
CMW9094	TGTTGCTTCG	G--GGGCGAC	CCT-GCCGGC	C-CTGCGTCG
CMW9095	TGTTGCTTCG	G--GGGCGAC	CCT-GCCGGC	C-CTGCGTCG
P._eucalyptorumCMW5228	TGTTGCTTCG	G--GGGCGAC	CCT-GCCGGC	-ACTTCGTCG
P._eucalyptorum5229	TGTTGCTTCG	G--GGGCGAC	CCT-GCCGGC	-ACTTCGTCG
P._basiramiferaCMW5227	TGTTGCTTCG	G--GGGCGAC	CCT-GCCGAC	GACTTGGTCG
P._paraguayensisCMW5146	TGTTGCTTCG	G--GGGCGAC	CCT-GCCGAC	GACTCCGTCG
C._syzygiiCMW5348	TGTTGCTTCG	G--GGGCGAC	CCT-GCCGGC	A-CTTTGTCG
M._colombiensisCMW4944	TGTTGCTTCG	G--GGGCGAC	CCT-GCCGC-	--TTCGGCGG
M._irregulariramosaCMW4943	TGTTGCTTCG	G--GGGCGAC	CCT-GCCG--	--CTTCGGCG
M._irregulariramosaCMW5149	TGTTGCTTCG	G--GGGCGAC	CCT-GCCG--	--CTTCGGCG
CMW9097	TGTTGCTTCG	G--GGGCGAC	CCT-GCCG--	--CTTCGGCG
CMW5825	TGTTGCTTCG	G--GGGCGAC	CCT-GCCG--	--CTTCGGCG
M._heimiiCMW4942	TGTTGCTTCG	G--GGGCGAC	CCT-GCCG--	--CTTGGGCG
M._crystallinaCMW3032	TGTTGCTTCG	G--GGGCGAC	CCT-GCCGC-	---TTTGGCG
M._heimioidesCMW3046	TGTTGCTTCG	G--GGGCGAC	CCT-GCCG--	--CTTCGGCG
M._walkeriSTEU2768	-GTTGCTTCG	G--GGGCGAC	CCT-GCCGTC	----TCGGCG
M._walkeriSTEU2769	-GTTGCTTCG	G--GGGCGAC	CCT-GCCG--	--TCTCGGCG
M._africanaCMW4945	-GTTGCTTCG	G--GGGCGAC	CCC-GCCG--	--TTTCGGCG
M._ellpsoideaCMW4943	-GTTGCTTCG	G--GGGCGAC	CCC-GCCG--	--TCTC--GG
M._ellpsoideaCMW5166	-GTTGCTTCG	G--GGGCGAC	CCC-GCCG--	--TCTC--GG
CMW9098	-GTTGCTTCG	G--GGGCGAC	CCC-GCCG--	--TCTC--GG
CMW9099	-GTTGCTTCG	G--GGGCGAC	CCC-GCCG--	--TCTC--GG
CMW9100	-GTTGCTTCG	G--GGGCGAC	CCC-GCCG--	--TCTC--GG
P._eugeniaeCMW5351	CGTTGCTTCG	G--GGGCGAC	CCC-GCCG--	--TTTCGG-C
P._destructansSTEU1366	-GTTGCTTCG	G--GGGCGAC	CCC-GCCGTT	---TCGGCGG
M._tasmaniensisCMW5005	TGTTGCTTCG	G--GGGCGAC	CCG-GCCGTC	---CGGGCCG
M._flexuosaCMW5224	-GTTGCCTCG	G--GGGCGAC	CCG-GCCCTC	---TGGGT-G
M._juvenisCMW4937	-GTTGCCTCG	G--GGGTGAC	CCG-GCCCTC	---TGGGT-G
M._juvenisCMW4936	-GTTGCCTCG	G--GGGTGAC	CCG-GCCCTC	---TGGGT-G
CMW9101	-GTTGCCTCG	G--GGGCGAC	CCG-GCCCTC	---TGGGT-G
CMW9102	-GTTGCCTCG	G--GGGCGAC	CCG-GCCCTC	---TGGGT-G
CMW9103	-GTTGCCTCG	G--GGGCGAC	CCG-GCCCTC	---TGGGT-G
M._nubilosaCMW3282	-GTTGCCTCG	G--GGGCGAC	CCG-GCCCCC	G-------CG
CMW9104	-GTTGCCTCG	G--GGGCGAC	CCG-GCCCCC	G-------CG
CMW9105	-GTTGCCTCG	G--GGGCGAC	CCG-GCCCCC	G-------CG
M._mollerianaCMW2734	-GTTGCCTCG	G--GGGCGAC	CCG-GCCG--	---C-CGCGC
M._mollerianaCMW4940	-GTTGCCTCG	G--GGGCGAC	CCG-GCCG--	---C-CGCGC
M._crypticaCMW2732	-GTTGCGTCG	G--GGCCGAC	CCT-GCCGCC	------GT-G
M._crypticaCMW3279	TGTTGCCTCG	G--GGGCGAC	CCG-GCCG--	-----CCGTG
M._suttoniaeSTEU1346	-GTTGCCTCG	G--GGGCGAC	CCG-GCC---	----GCCGCG
M._lateralisCMW4935	TATTGCCCCG	G---GGGAAC	CC-CGCCTGT	CAT----GGG
M._lateralisSTEU825	TATTGCCCCG	G---GGGAAC	CC-CGCCTGT	CAT----GGG
CMW9106	TATTGCCCCG	G---GGGAAC	CC-CGCCTGT	CAT----GGG
CMW9107	TATTGCCCCG	G---GGGAAC	CC-CGCCTGT	CAT----GGG
Ramulispora_anguioides	TGTTGCTTTG	GCAGGACGCC	TCGCGCCAGC	GGCTTCGGCT

	210	220	230	240
M._marksiiCMW5150	CG-CGGC--G	CCCCCGGGGG	AAA--TCA--	AACACTGCGT
M._marksiiCMW3278	CG-CGGC--G	CCCCCGGGGG	AAA--TCA--	AACACTGCGT
CMW9090	CG-CGGC--G	CCCCCGGGGG	AAA--TCA--	AACACTGCGT
CMW9091	CG-CGGC--G	CCCCCGGGGG	AAA--TCA--	AACACTGCGT
CMW9092	CG-CGGC--G	CCCCCGGGGG	AAA--TCA--	AACACTGCGT
CMW9093	CG-CGGC--G	CCCCCGGGGG	AAA--TCA--	AACACTGCGT
M._parkiiCMW3358	CATCGC---G	CCCCCGGAGG	A----TACTT	AACCCTGCAT
M._marasasiiSTEU348	CAG-TGC--G	CCCCCGGAGG	ATATCAA--A	A-CGCTGCAT
P._natalensisCMW4948	CC-GGGC--G	CCCCCGAAGG	TC--TCCA--	AACACTGCAT
P._robustaCMW5151	CC-GGGC--G	CCCCCGAAGG	TC--TCCA--	AACACTGCAT
P._syzygiicolaCMW5349	CC-GGGC--G	CCCCCGAAGG	TC--TCCA--	AACACTGCAT
CMW9094	CC-GGGC--G	CCCCCGAAGG	TC--TCCA--	AACACTGCAT
CMW9095	CC-GGGC--G	CCCCCGAAGG	TC--TCCA--	AACACTGCAT
P._eucalyptorumCMW5228	CC-GGGC--G	CCCCCGGAGG	TC--TCCA--	AACACTGCAT
P._eucalyptorum5229	CC-GGGC--G	CCCCCGGAGG	TC--TCCA--	AACACTGCAT
P._basiramiferaCMW5227	CC-GGGC--G	CCCCCGGAGG	TC--TTCT-A	AACACTGCAT
P._paraguayensisCMW5146	CC-GGGC--G	CCCCCGGAGG	TC--TTCT-A	AACACTGCAT
C._syzygiiCMW5348	CC--GGGC-G	CCCCCGGAGG	TCCATC----	---TCTGCGT
M._colombiensisCMW4944	TG-CGGC--G	CCCCCGGAGG	CCATCA----	AACACTGCAT
M._irregulariramosaCMW4943	GT-GCGGC-G	CCCCCGGAGG	CCATTA----	AACACTGCAT
M._irregulariramosaCMW5149	GT-GCGGC-G	CCCCCGGAGG	CCATTA----	AACACTGCAT
CMW9097	GT-GCGGC-G	CCCCCGGAGG	CCATTA----	AACACTGCAT
CMW5825	GT-GCGGC-G	CCCCCGGAGG	CCATTA----	AACACTGCAT
M._heimiiCMW4942	GT-GCGGC-G	CCCCCGGAGG	CCATTA----	AACACTGCAT
M._crystallinaCMW3032	GT-GCGGC-G	CCCCCGGAGG	-CCA---TTA	AACACTGCAT
M._heimioidesCMW3046	GT-GCGGC-G	CCCCCGGAGG	CCAT-----A	AACACTGCAT
M._walkeriSTEU2768	GC-GCGGC-G	CCCCCGGAGG	-CCC-TC--A	AACACTGCAT
M._walkeriSTEU2769	GC-GCGGC-G	CCCCCGGAGG	C--CCTC--A	AACACTGCAT
M._africanaCMW4945	AC-G-GCG-G	CCCCCGGAGG	TCATCA---A	A-CACTGCAT
M._ellpsoideaCMW4943	CGGTGGC--G	CTCCCGGTGG	CCAATTATTA	AACTCTGCAT
M._ellpsoideaCMW5166	CGGTGGC--G	CTCCCGGTGG	CCAATTATTA	AACTCTGCAT
CMW9098	CGGTGGC--G	CTCCCGGTGG	CCAATTATTA	AACTCTGCAT
CMW9099	CGGTGGC--G	CTCCCGGTGG	CCAATTATTA	AACTCTGCAT
CMW9100	CGGTGGC--G	CTCCCGGTGG	CCAATTATTA	AACTCTGCAT
P._eugeniaeCMW5351	G--GAGGT-G	CCCCCGGTGG	CCCCATC--A	AACTCTGCAT
P._destructansSTEU1366	A---GG-T-G	CCCCCGGTGG	CCCCA-TCA-	AACTCTGCAT
M._tasmaniensisCMW5005	CC-GC-----	CCCCCGGTGG	ACCCCCTCTC	AACTCT-CGC
M._flexuosaCMW5224	CC-GGG---G	CCCCCGGCGG	ACACC-TCA-	A-CTCTGCAT
M._juvenisCMW4937	CC-GGG---G	CCCCCGGCGG	ACCAC-TCA-	A-CTCTGCAT
M._juvenisCMW4936	CC-GGG---G	CCCCCGGCGG	ACCAC-TCA-	A-CTCTGCAT
CMW9101	CC-GGG---G	CCCCCGGCGG	ACCAC-TCA-	A-CTCTGCAT
CMW9102	CC-GGG---G	CCCCCGGCGG	ACCAC-TCA-	A-CTCTGCAT
CMW9103	CC-GGG---G	CCCCCGGCGG	ACCAC-TCA-	A-CTCTGCAT
M._nubilosaCMW3282	CC---GGG-G	CCCTCGCAGG	ACCCCTC--A	ACG-CTGCAT
CMW9104	CC---GGG-G	CCCTCGCAGG	ACCCCTC--A	ACG-CTGCAT
CMW9105	CC---GGG-G	CCCTCGCAGG	ACCCCTC--A	ACG-CTGCAT
M._mollerianaCMW2734	CG--G-G--G	CCCCCGGTGG	ACCC-TC--A	A-CTCTGCAT
M._mollerianaCMW4940	CG-GG-GC--	-CCCCGGTGG	ACCCT-C--A	A-CTCTGCAT
M._crypticaCMW2732	CC-GGG---G	CCCCCGGCGG	ACCCCT---C	AACTCTGCAT
M._crypticaCMW3279	CC-G-G-G-G	CCCCCGGCGG	ACCCCTC--A	A-CTCTGCAT
M._suttoniaeSTEU1346	TC-GGG-C--	CCCCCTGAGG	---ACCCTCT	AACCCTGCGT
M._lateralisCMW4935	CGTG-GGC--	CCCC-GGTGG	CCA--ACTCA	AACTC-TGTT
M._lateralisSTEU825	CGTG-GGC--	CCCC-GGTGG	CCA--ACTCA	AACTC-TGTT
CMW9106	CGTG-GGC--	CCCC-GGTGG	CCA--ACTCA	AACTC-TGTT
CMW9107	CGTG-GGC--	CCCC-GGTGG	CCA--ACTCA	AACTC-TGTT
Ramulispora_anguioides	GTTGAGTG-C	CTGCCAGAGG	ACCA----CA	ACTCTTGTTT

	250	260	270	280
M._marksiiCMW5150	CAATTTG-TG	TCGGAGTACT	T---------	-GTTAAT--A
M._marksiiCMW3278	CAATTTG-TG	TCGGAGTACT	T---------	-GTTAAT--A
CMW9090	CAATTTG-TG	TCGGAGTACT	T---------	-GTTAAT--A
CMW9091	CAATTTG-TG	TCGGAGTACT	T---------	-GTTAAT--A
CMW9092	CAATTTG-TG	TCGGAGTACT	T---------	-GTTAAT--A
CMW9093	CAATTTG-TG	TCGGAGTACT	T---------	-GTTAAT--A
M._parkiiCMW3358	CA-TT--GCG	TCGGAGTAAT	T------T-T	A-TTAATACA
M._marasasiiSTEU348	C--TTT-GCG	TCGGAGTATC	-A-----AT-	--CAAATT-G
P._natalensisCMW4948	C--TTTG-CG	TCGGAGT--T	TA-----A--	A-CAAATT-A
P._robustaCMW5151	C--TCTG-CG	TCGGAGT--T	TA-----A--	A-CAAATT-A
P._syzygiicolaCMW5349	C--TTTG-CG	TCGGAGT--T	TA-----A--	A-CAAATT-A
CMW9094	C--TTTG-CG	TCGGAGT--T	TA-----A--	A-CAAATT-A
CMW9095	C--TTTG-CG	TCGGAGT--T	TA-----A--	A-CAAATT-A
P._eucalyptorumCMW5228	C--TTTG-CG	TCGGAGT--T	TA-----A--	A-CAAATT-A
P._eucalyptorum5229	C--TTTG-CG	TCGGAGT--T	TA-----A--	A-CAAATT-A
P._basiramiferaCMW5227	C--TTTG-CG	TCGGAGT--T	TA-----A--	A-CAAATT-A
P._paraguayensisCMW5146	C--TTTG-CG	TCGGAGT--T	TA-----A--	A-CAAATT-A
C._syzygiiCMW5348	CGGAGTTTAA	GTCAATTA--	A-GCAAGTTT	AAGTCAATTA
M._colombiensisCMW4944	C--ATTG-CG	TCGGAG---T	AA-----A--	AGTAAATG-A
M._irregulariramosaCMW4943	CA--TTG-CG	TCGGAG---T	TA-----A--	AGTAAAT-TA
M._irregulariramosaCMW5149	CA--TTG-CG	TCGGAG---T	TA-----A--	AGTAAAT-TA
CMW9097	CA--TTG-CG	TCGGAG---T	TA-----A--	AGTAAAT-TA
CMW5825	CA--TTG-CG	TCGGAG---T	TA-----A--	AGTAAAT-TA
M._heimiiCMW4942	CA--TTG-CG	TCGGAGTAA-	-------A--	AGTAAAT-TA
M._crystallinaCMW3032	-CA-TT-GCG	TCGGAGTTAA	AG-----TAA	ATTAAAC--A
M._heimioidesCMW3046	CA--TTG-CG	TCGGAGT---	-------AAA	AGTAAAT-TA
M._walkeriSTEU2768	CC---TCGCG	TCGGAGTCTC	A---------	-GTAAATGAA
M._walkeriSTEU2769	CC--TCG-CG	TCGGAGTCTC	A---------	-GTAAATG-A
M._africanaCMW4945	C--TTTG-CG	TCGGAGTCTT	AA--------	AGTAAAT-TA
M._ellpsoideaCMW4943	C--TCTTGCG	TCGGAGTCTT	-A-----A--	A-GAAATTTA
M._ellpsoideaCMW5166	C--TCTTGCG	TCGGAGTCTT	-A-----A--	A-GAAATTTA
CMW9098	C--TCTTGCG	TCGGAGTCTT	-A-----A--	A-GAAATTTA
CMW9099	C--TCTTGCG	TCGGAGTCTT	-A-----A--	A-GAAATTTA
CMW9100	C--TCTTGCG	TCGGAGTCTT	-A-----A--	A-GAAATTTA
P._eugeniaeCMW5351	CTCTT-G-CG	TCGGAGTCTT	CA-----AAA	G---AATTCA
P._destructansSTEU1366	CT-CTTGC-G	TCGGAGTCTT	CA-----A--	-AAGAATTCA
M._tasmaniensisCMW5005	GT-CCCGCCG	TCT-AGTCTT	TG-----ATT	ATTGAATTGA
M._flexuosaCMW5224	CT--TTGC-G	TCTGAGTATG	AT-----AT-	-TTGAATCAA
M._juvenisCMW4937	CT--GTGC-G	TCTGAGTA-A	AT-----AT-	-TTGAATCAA
M._juvenisCMW4936	CT--GTGC-G	TCTGAGTA-A	AT-----AT-	-TTGAATCAA
CMW9101	CT--GTGC-G	TCTGAGTA-A	AT-----AT-	-TTGAATCAA
CMW9102	CT--GTGC-G	TCTGAGTA-A	AT-----AT-	-TTGAATCAA
CMW9103	CT--GTGC-G	TCTGAGTA-A	AT-----AT-	-TTGAATCAA
M._nubilosaCMW3282	C--TGTG-CG	TCGGAGTAAT	AC-----AA-	--CCAATC-A
CMW9104	C--TGTG-CG	TCGGAGTAAT	AC-----AA-	--CCAATC-A
CMW9105	C--TGTG-CG	TCGGAGTAAT	AC-----AA-	--CCAATC-A
M._mollerianaCMW2734	C--TCTG-CG	TCTGAGTCAC	AA-----AA-	--TCAATC-A
M._mollerianaCMW4940	C--TCTG-CG	TCTGAGTCAC	AA-----AA-	--TCAATC-A
M._crypticaCMW2732	C--TTTG-CG	TCTGAGTGAT	-A-----A--	CGAAAAT-CA
M._crypticaCMW3279	C--TTTG-CG	TCTGAGTGAT	AA--------	CGAAAAT-CA
M._suttoniaeSTEU1346	CC-TCTTGCG	TCTGAGTCGT	-G-----AGT	A-GAAATTGA
M._lateralisCMW4935	TTTATTGCCG	TCTGAGTAAC	AA------A-	--CAAATCAA
M._lateralisSTEU825	TTTATTGCCG	TCTGAGTAAC	AA------A-	--CAAATCAA
CMW9106	TTTATTGCCG	TCTGAGTAAC	AA------A-	--CAAATCAA
CMW9107	TTTATTGCCG	TCTGAGTAAC	AA------A-	--CAAATCAA
Ramulispora_anguioides	TTAGTG-ATG	TCTGAGTACT	AT--------	--ATAAT--A

	290	300	310	320
M._marksiiCMW5150	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
M._marksiiCMW3278	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
CMW9090	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
CMW9091	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
CMW9092	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
CMW9093	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
M._parkiiCMW3358	T--AAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
M._marasasiiSTEU348	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
P._natalensisCMW4948	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
P._robustaCMW5151	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
P._syzygiicolaCMW5349	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
CMW9094	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
CMW9095	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
P._eucalyptorumCMW5228	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
P._eucalyptorum5229	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
P._basiramiferaCMW5227	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
P._paraguayensisCMW5146	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
C._syzygiiCMW5348	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
M._colombiensisCMW4944	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCCAGCATCG
M._irregulariramosaCMW4943	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCCAGCATCG
M._irregulariramosaCMW5149	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCCAGCATCG
CMW9097	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCCAGCATCG
CMW5825	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCCAGCATCG
M._heimiiCMW4942	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCCAGCATCG
M._crystallinaCMW3032	A----AACTT	TCAACAACGG	ATCTCTTGGT	TCCAGCATCG
M._heimioidesCMW3046	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCCAGCATCG
M._walkeriSTEU2768	A-CAAAACTT	TCAACAACGA	ATCTCTTGGT	TCTGGCATCG
M._walkeriSTEU2769	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
M._africanaCMW4945	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
M._ellpsoideaCMW4943	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
M._ellpsoideaCMW5166	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
CMW9098	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
CMW9099	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
CMW9100	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
P._eugeniaeCMW5351	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
P._destructansSTEU1366	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
M._tasmaniensisCMW5005	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
M._flexuosaCMW5224	T-CAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
M._juvenisCMW4937	ATCAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
M._juvenisCMW4936	ATCAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
CMW9101	ATCAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
CMW9102	ATCAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
CMW9103	ATCAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
M._nubilosaCMW3282	ATTAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
CMW9104	ATTAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
CMW9105	ATTAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
M._mollerianaCMW2734	ATCAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
M._mollerianaCMW4940	ATCAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
M._crypticaCMW2732	ATCAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
M._crypticaCMW3279	ATCAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
M._suttoniaeSTEU1346	ATCAAAACTT	TCAACAACGG	ATCTCTTGGT	TCCGGCATCG
M._lateralisCMW4935	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
M._lateralisSTEU825	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
CMW9106	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
CMW9107	AACAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG
Ramulispora_anguioides	GTTAAAACTT	TCAACAACGG	ATCTCTTGGT	TCTGGCATCG

	330	340	350	360
M._marksiiCMW5150	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
M._marksiiCMW3278	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
CMW9090	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
CMW9091	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
CMW9092	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
CMW9093	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
M._parkiiCMW3358	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
M._marasasiiSTEU348	ATGAAGAACG	GAACGAAATG	CGATAAGTAA	TGTGAATTGC
P._natalensisCMW4948	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
P._robustaCMW5151	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
P._syzygiicolaCMW5349	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
CMW9094	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
CMW9095	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
P._eucalyptorumCMW5228	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
P._eucalyptorum5229	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
P._basiramiferaCMW5227	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
P._paraguayensisCMW5146	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
C._syzygiiCMW5348	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
M._colombiensisCMW4944	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
M._irregulariramosaCMW4943	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
M._irregulariramosaCMW5149	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
CMW9097	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
CMW5825	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
M._heimiiCMW4942	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
M._crystallinaCMW3032	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
M._heimioidesCMW3046	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
M._walkeriSTEU2768	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
M._walkeriSTEU2769	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
M._africanaCMW4945	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
M._ellpsoideaCMW4943	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
M._ellpsoideaCMW5166	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
CMW9098	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
CMW9099	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
CMW9100	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
P._eugeniaeCMW5351	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGGGAATTGC
P._destructansSTEU1366	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
M._tasmaniensisCMW5005	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
M._flexuosaCMW5224	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
M._juvenisCMW4937	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
M._juvenisCMW4936	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
CMW9101	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
CMW9102	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
CMW9103	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
M._nubilosaCMW3282	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
CMW9104	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
CMW9105	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
M._mollerianaCMW2734	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
M._mollerianaCMW4940	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
M._crypticaCMW2732	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
M._crypticaCMW3279	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
M._suttoniaeSTEU1346	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
M._lateralisCMW4935	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
M._lateralisSTEU825	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
CMW9106	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
CMW9107	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC
Ramulispora_anguioides	ATGAAGAACG	CAGCGAAATG	CGATAAGTAA	TGTGAATTGC

	370	380	390	400
M._marksiiCMW5150	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
M._marksiiCMW3278	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
CMW9090	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
CMW9091	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
CMW9092	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
CMW9093	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
M._parkiiCMW3358	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
M._marasasiiSTEU348	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
P._natalensisCMW4948	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
P._robustaCMW5151	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
P._syzygiicolaCMW5349	AGAATTCAGC	GAATCATCCA	ATCTTTGAAC	GCACATTGCG
CMW9094	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
CMW9095	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
P._eucalyptorumCMW5228	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
P._eucalyptorum5229	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
P._basiramiferaCMW5227	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
P._paraguayensisCMW5146	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
C._syzygiiCMW5348	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
M._colombiensisCMW4944	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
M._irregulariramosaCMW4943	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
M._irregulariramosaCMW5149	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
CMW9097	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
CMW5825	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
M._heimiiCMW4942	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
M._crystallinaCMW3032	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
M._heimioidesCMW3046	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
M._walkeriSTEU2768	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
M._walkeriSTEU2769	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
M._africanaCMW4945	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
M._ellpsoideaCMW4943	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
M._ellpsoideaCMW5166	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
CMW9098	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
CMW9099	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
CMW9100	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
P._eugeniaeCMW5351	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
P._destructansSTEU1366	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
M._tasmaniensisCMW5005	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
M._flexuosaCMW5224	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
M._juvenisCMW4937	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
M._juvenisCMW4936	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
CMW9101	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
CMW9102	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
CMW9103	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
M._nubilosaCMW3282	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
CMW9104	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
CMW9105	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
M._mollerianaCMW2734	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
M._mollerianaCMW4940	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
M._crypticaCMW2732	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
M._crypticaCMW3279	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
M._suttoniaeSTEU1346	AGAATTCCGT	GAATAATCGA	ATCTTTGAAC	GCACATTGCG
M._lateralisCMW4935	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
M._lateralisSTEU825	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
CMW9106	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
CMW9107	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG
Ramulispora_anguioides	AGAATTCAGT	GAATCATCGA	ATCTTTGAAC	GCACATTGCG

	410	420	430	440
M._marksiiCMW5150	CCCCGTGGTA	TTCCGCGGGG	CATGCCTGTT	CGAGCGTCAT
M._marksiiCMW3278	CCCCGTGGTA	TTCCGCGGGG	CATGCCTGTT	CGAGCGTCAT
CMW9090	CCCCGTGGTA	TTCCGCGGGG	CATGCCTGTT	CGAGCGTCAT
CMW9091	CCCCGTGGTA	TTCCGCGGGG	CATGCCTGTT	CGAGCGTCAT
CMW9092	CCCCGTGGTA	TTCCGCGGGG	CATGCCTGTT	CGAGCGTCAT
CMW9093	CCCCGTGGTA	TTCCGCGGGG	CATGCCTGTT	CGAGCGTCAT
M._parkiiCMW3358	CCCCGTGGTA	TTCCGCGGGG	CATGCCTGTT	CGAGCGTCAT
M._marasasiiSTEU348	CCCCGTGGTA	TTCCGCGGGG	CATGCCTGTT	CGAGCGTCAT
P._natalensisCMW4948	CCCTTTGGTA	TTCCGAAGGG	CATGCCTGTT	CGAGCGTCAT
P._robustaCMW5151	CCCTTTGGTA	TTCCGAAGGG	CATGCCTGTT	CGAGCGTCAT
P._syzygiicolaCMW5349	CCCTTTGGTA	TTCCGAAGGG	CATGCCTGTT	CGAGCGTCAT
CMW9094	CCCTTTGGTA	TTCCGAAGGG	CATGCCTGTT	CGAGCGTCAT
CMW9095	CCCTTTGGTA	TTCCGAAGGG	CATGCCTGTT	CGAGCGTCAT
P._eucalyptorumCMW5228	CCCTTTGGTA	TTCCGAAGGG	CATGCCTGTT	CGAGCGTCAT
P._eucalyptorum5229	CCCTTTGGTA	TTCCGAAGGG	CATGCCTGTT	CGAGCGTCAT
P._basiramiferaCMW5227	CCCTTTGGTA	TTCCGAAGGG	CATGCCTGTT	CGAGCGTCAT
P._paraguayensisCMW5146	CCCTTTGGTA	TTCCGAAGGG	CATGCCTGTT	CGAGCGTCAT
C._syzygiiCMW5348	CCCCCTGGTA	TTCCGGGGGG	CATGCCTGTT	CGAGCGTCAT
M._colombiensisCMW4944	CCCTCTGGTA	TTCCGGGGGG	CATGCCTGTT	CGAGCGTCAT
M._irregulariramosaCMW4943	CCCTCTGGTA	TTCCGGGGGG	CATGCCTGTT	CGAGCGTCAT
M._irregulariramosaCMW5149	CCCTCTGGTA	TTCCGGGGGG	CATGCCTGTT	CGAGCGTCAT
CMW9097	CCCTCTGGTA	TTCCGGGGGG	CATGCCTGTT	CGAGCGTCAT
CMW5825	CCCTCTGGTA	TTCCGGGGGG	CATGCCTGTT	CGAGCGTCAT
M._heimiiCMW4942	CCCTCTGGTA	TTCCGGGGGG	CATGCCTGTT	CGAGCGTCAT
M._crystallinaCMW3032	CCCCCTGGTA	TTCCGGGGGG	CATGCCTGTT	CGAGCGTCAT
M._heimioidesCMW3046	CCCTCTGGTA	TTCCGGGGGG	CATGCCTGTT	CGAGCGTCAT
M._walkeriSTEU2768	CCCTCTGGTA	TTCCGGGGGG	CATGCCTGTT	CGAGCGTCAT
M._walkeriSTEU2769	CCCTCTGGTA	TTCCGGGGGG	CATGCCTGTT	CGAGCGTCAT
M._africanaCMW4945	CCCCGTGGTA	TTCCGCGGGG	CATGCCTGTT	CGAGCGTCAT
M._ellpsoideaCMW4943	CCCCGTGGTA	TTCCGCGGGG	CATGCCTGTT	CGAGCGTCAT
M._ellpsoideaCMW5166	CCCCGTGGTA	TTCCGCGGGG	CATGCCTGTT	CGAGCGTCAT
CMW9098	CCCCGTGGTA	TTCCGCGGGG	CATGCCTGTT	CGAGCGTCAT
CMW9099	CCCCGTGGTA	TTCCGCGGGG	CATGCCTGTT	CGAGCGTCAT
CMW9100	CCCCGTGGTA	TTCCGCGGGG	CATGCCTGTT	CGAGCGTCAT
P._eugeniaeCMW5351	CCCCGTGGTA	TTCCGCGGGG	CATGCCTGTT	CGAGCGTCAT
P._destructansSTEU1366	CCCCGTGGTA	TTCCGCGGGG	CATGCCTGTT	CGAGCGTCAT
M._tasmaniensisCMW5005	CCCCCTGGTA	TTCCGGGGGG	CATGCCTGTT	CGAGCGTCAT
M._flexuosaCMW5224	CCCCTTGGTA	TTCCGGGGGG	CATGCCTGTT	CGAGCGTCAT
M._juvenisCMW4937	CCCCTTGGTA	TTCCGGGGGG	CATGCCTGTT	CGAGCGTCAT
M._juvenisCMW4936	CCCCTTGGTA	TTCCGGGGGG	CATGCCTGTT	CGAGCGTCAT
CMW9101	CCCCTTGGTA	TTCCGGGGGG	CATGCCTGTT	CGAGCGTCAT
CMW9102	CCCCTTGGTA	TTCCGGGGGG	CATGCCTGTT	CGAGCGTCAT
CMW9103	CCCCTTGGTA	TTCCGGGGGG	CATGCCTGTT	CGAGCGTCAT
M._nubilosaCMW3282	CCCTCTGGTA	TTCCGGAGGG	CATGCCTGTT	CGAGCGTCAT
CMW9104	CCCTCTGGTA	TTCCGGAGGG	CATGCCTGTT	CGAGCGTCAT
CMW9105	CCCTCTGGTA	TTCCGGAGGG	CATGCCTGTT	CGAGCGTCAT
M._mollerianaCMW2734	CCCTCTGGTA	TTCCGGAGGG	CATGCCTGTT	CGAGCGTCAT
M._mollerianaCMW4940	CCCTCTGGTA	TTCCGGAGGG	CATGCCTGTT	CGAGCGTCAT
M._crypticaCMW2732	CCCCCTGGTA	TTCCGGAGGG	CATGCCTGTT	CGAGCGTCAT
M._crypticaCMW3279	CCCTCTGGTA	TTCCGGAGGG	CATGCCTGTT	CGAGCGTCAT
M._suttoniaeSTEU1346	CCCTCCGGTA	TTCCGGAGGG	CATGCCTGTT	CGAGCGTCAT
M._lateralisCMW4935	CCCCCTGGTA	TTCCGGGGGG	CATGCCTGTT	CGAGCGTCAT
M._lateralisSTEU825	CCCCCTGGTA	TTCCGGGGGG	CATGCCTGTT	CGAGCGTCAT
CMW9106	CCCCCTGGTA	TTCCGGGGGG	CATGCCTGTT	CGAGCGTCAT
CMW9107	CCCCCTGGTA	TTCCGGGGGG	CATGCCTGTT	CGAGCGTCAT

	450	460	470	480
M._marksiiCMW5150	TTCACCAC-T	CGAGT-CTG-	-ACTCGGTAT	TGGGCGTCG-
M._marksiiCMW3278	TTCACCAC-T	CGAGT-CTG-	-ACTCGGTAT	TGGGCGTCG-
CMW9090	TTCACCAC-T	CGAGT-CTG-	-ACTCGGTAT	TGGGCGTCG-
CMW9091	TTCACCAC-T	CGAGT-CTG-	-ACTCGGTAT	TGGGCGTCG-
CMW9092	TTCACCAC-T	CGAGT-CTG-	-ACTCGGTAT	TGGGCGTCG-
CMW9093	TTCACCAC-T	CGAGT-CTG-	-ACTCGGTAT	TGGGCGTCG-
M._parkiiCMW3358	TTCACCAC-T	CGAGT-CTG-	-ACTCGGTAT	TGGGCGTCG-
M._marasasiiSTEU348	TTCACCAC-T	CAAGC-CTG-	-GCTTGGTAT	TGGGCGTCG-
P._natalensisCMW4948	TTCACCAC-T	CAAGC-CTG-	-GCTTGGTAT	TGGGCGTCG-
P._robustaCMW5151	TTCACCAC-T	CAAGC-CTG-	-GCTTGGTAT	TGGGCGTCG-
P._syzygiicolaCMW5349	TTCACCAC-T	CAAGC-CTG-	-GGTTGGTAT	TGGGCGTCG-
CMW9094	TTCACCAC-T	CAAGC-CTG-	-GCTTGGTAT	TGGGCGTCG-
CMW9095	TTCACCAC-T	CAAGC-CTG-	-GCTTGGTAT	TGGGCGTCG-
P._eucalyptorumCMW5228	TTCACCAC-T	CAAGC-CTA-	-GCTTGGTAT	TGGGCGTCG-
P._eucalyptorum5229	TTCACCAC-T	CAAGC-CTA-	-GCTTGGTAT	TGGGCGTCG-
P._basiramiferaCMW5227	TTCACCAC-T	CAAGC-CTG-	-GCTTGGTAT	TGGGCGTCG-
P._paraguayensisCMW5146	TTCACCAC-T	CAAGC-CTG-	-GCTTGGTAT	TGGGCGTCG-
C._syzygiiCMW5348	TTCACCAC-T	CAAGC-CTC-	-GCTTGGTAT	TGGGCGTCG-
M._colombiensisCMW4944	TTCACCAC-T	CAAGC-CTG-	-GCTTGGTAT	TGGGCGTCG-
M._irregulariramosaCMW4943	TTCACCAC-T	CAAGC-CTG-	-GCTTGGTAT	TGGGCGTCG-
M._irregulariramosaCMW5149	TTCACCAC-T	CAAGC-CTG-	-GCTTGGTAT	TGGGCGTCG-
CMW9097	TTCACCAC-T	CAAGC-CTG-	-GCTTGGTAT	TGGGCGTCG-
CMW5825	TTCACCAC-T	CAAGC-CTG-	-GCTTGGTAT	TGGGCGTCG-
M._heimiiCMW4942	TTCACCAC-T	CAAGC-CTG-	-GCTTGGTAT	TGGGCGTCG-
M._crystallinaCMW3032	TTCACCAC-T	CAAGC-CTG-	-GCTTGGTAT	TGGGCGTCG-
M._heimioidesCMW3046	TTCACCAC-T	CAAGC-CTG-	-GCTTGGTAT	TGGGCGTCG-
M._walkeriSTEU2768	TTCACCAC-T	CAAGC-CTG-	-GCTTGGTAT	TGGGCGTCG-
M._walkeriSTEU2769	TTCACCAC-T	CAAGC-CTG-	-GCTTGGTAT	TGGGCGTCG-
M._africanaCMW4945	TTCACCAC-T	CAAGC-CTA-	-GCTTGGTAT	TGGGCGTCG-
M._ellpsoideaCMW4943	TTCACCAC-T	CAAGC-CTA-	-GCTTGGTAT	TGGGCGTCG-
M._ellpsoideaCMW5166	TTCACCAC-T	CAAGC-CTA-	-GCTTGGTAT	TGGGCGTCG-
CMW9098	TTCACCAC-T	CAAGC-CTA-	-GCTTGGTAT	TGGGCGTCG-
CMW9099	TTCACCAC-T	CAAGC-CTA-	-GCTTGGTAT	TGGGCGTCG-
CMW9100	TTCACCAC-T	CAAGC-CTA-	-GCTTGGTAT	TGGGCGTCG-
P._eugeniaeCMW5351	TTCACCAC-T	CAAGC-CTC-	-GCTTGGTAT	TGGGCGTCG-
P._destructansSTEU1366	TTCACCAC-T	CAAGC-CTC-	-GCTTGGTAT	TGGGCGTCG-
M._tasmaniensisCMW5005	TTCACCAC-T	CAAGC-CCG-	-GCTTGGTAT	TGGGCCTCG-
M._flexuosaCMW5224	TTCACCAC-T	CAAGC-CTG-	-GCTTGGTAT	TGGGCGAGG-
M._juvenisCMW4937	TTCACCAC-T	CAAGC-CTG-	-GCTTGGTAT	TGGGCGAGG-
M._juvenisCMW4936	TTCACCAC-T	CAAGC-CTG-	-GCTTGGTAT	TGGGCGAGG-
CMW9101	TTCACCAC-T	CAAGC-CTG-	-GCTTGGTAT	TGGGCGAGG-
CMW9102	TTCACCAC-T	CAAGC-CTG-	-GCTTGGTAT	TGGGCGAGG-
CMW9103	TTCACCAC-T	CAAGC-CTG-	-GCTTGGTAT	TGGGCGAGG-
M._nubilosaCMW3282	TTCACCAC-T	CCAGC-CCC-	-GCTGGGTCT	TGGGCGCCG-
CMW9104	TTCACCAC-T	CCAGC-CCC-	-GCTGGGTCT	TGGGCGCCG-
CMW9105	TTCACCAC-T	CCAGC-CCC-	-GCTGGGTCT	TGGGCGCCG-
M._mollerianaCMW2734	TACACCAC-T	CCGGC-CTC-	-GCTGGGTAT	TGGGCGCCG-
M._mollerianaCMW4940	TACACCAC-T	CCGGC-CTC-	-GCTGGGTAT	TGGGCGCCG-
M._crypticaCMW2732	TACACCAC-T	CCAGC-CTC-	-GCTGGGTAT	TGGGCGTCT-
M._crypticaCMW3279	TACACCCC-T	CCAGC-CTC-	-GCTGGGTGT	TGGGCATCG-
M._suttoniaeSTEU1346	CAACCCACCT	CAAGC-CTC-	-GCTTGGTGT	TGGGCGTCG-
M._lateralisCMW4935	TACAACCAAT	CCAGC-CCC-	-GCTGGGTAT	TGGGCGTCG-
M._lateralisSTEU825	TACAACCAAT	CCAGC-CCC-	-GCTGGGTAT	TGGGCGTCG-
CMW9106	TACAACCAAT	CCAGC-CCC-	-GCTGGGTAT	TGGGCGTCG-
CMW9107	TACAACCAAT	CCAGC-CCC-	-GCTGGGTAT	TGGGCGTCG-
Ramulispora_anguioides	TATAACCACT	CAAGCTCTC-	-GCTTGGTAT	TGGGGTTCG-

	490	500	510	520
M._marksiiCMW5150	-CGTT-T--C	G-ATGCG---	---CGCCTTA	AAGTTT---C
M._marksiiCMW3278	-CGTT-T--C	G-ATGCG---	---CGCCTTA	AAGTTT---C
CMW9090	-CGTT-T--C	G-ATGCG---	---CGCCTTA	AAGTTT---C
CMW9091	-CGTT-T--C	G-ATGCG---	---CGCCTTA	AAGTTT---C
CMW9092	-CGTT-T--C	G-ATGCG---	---CGCCTTA	AAGTTT---C
CMW9093	-CGTT-T--C	G-ATGCG---	---CGCCTTA	AAGTTT---C
M._parkiiCMW3358	-CGGCTTC-C	G-CCGCG---	---CGCCTCA	AAGTCTC--C
M._marasasiiSTEU348	-CGGC-T---	--CCGCG---	---CGCCTCA	AAGTCTC--C
P._natalensisCMW4948	-CGG-TG---	--CCGCG---	---CGCCTTA	AAGTCT---C
P._robustaCMW5151	-CGGCT----	--CCCCG---	---CGCCTTA	AAGTCT---C
P._syzygiicolaCMW5349	-CGGCT----	--CCGCG---	---CGCCTTA	AAGTCT---C
CMW9094	-CGGCT----	--CCGCG---	---CGCCTTA	AAGTCT---C
CMW9095	-CGGCT----	--CCGCG---	---CGCCTTA	AAGTCT---C
P._eucalyptorumCMW5228	-CGGCT----	--CCGCG---	---CGCCTTA	AAGTCT---C
P._eucalyptorum5229	-CGGCT----	--CCGCG---	---CGCCTTA	AAGTCT---C
P._basiramiferaCMW5227	-CGG-TGTT-	--CCGCG---	---CGCCTTA	AAGTCTT--C
P._paraguayensisCMW5146	-CGG-TGTT-	--CCGCG---	---CGCCTTA	AAGTCTT--C
C._syzygiiCMW5348	-CGGGTCTG-	--CCGCG---	---CGCCTTA	AAGTCTT-CC
M._colombiensisCMW4944	-CGG--TG-C	C---GCG---	---CGCCTTA	AAGTCTT--C
M._irregulariramosaCMW4943	-CGGCT----	--CCGCG---	---CGCCTTA	AAGTCTT--C
M._irregulariramosaCMW5149	-CGGCT----	--CCGCG---	---CGCCTTA	AAGTCTT--C
CMW9097	-CGGCT----	--CCGCG---	---CGCCTTA	AAGTCTT--C
CMW5825	-CGGCT----	--CCGCG---	---CGCCTTA	AAGTCTT--C
M._heimiiCMW4942	-CGGCT----	--CCGCG---	---CGCCTTA	AAGTCTT--C
M._crystallinaCMW3032	-CGGCT----	--CCGCG---	---CGCCTTA	AAGTCTT--C
M._heimioidesCMW3046	-CGGCTT---	---CGCG---	---CGCCTTA	AAGTCTT--C
M._walkeriSTEU2768	-CG-G-TG-C	---CGCG---	---CGCCTCA	AAGTCTT--C
M._walkeriSTEU2769	-CGGT-GC-C	----GCG---	---CGCCTCA	AAGTCTT--C
M._africanaCMW4945	-CGG-TT---	--CCGCG---	---CGCCTTA	AAGTCT---C
M._ellpsoideaCMW4943	-CGACTTC--	GGTCGCG---	---CGCCTTA	AAGTCTC--C
M._ellpsoideaCMW5166	-CGACTTC--	GGTCGCG---	---CGCCTTA	AAGTCTC--C
CMW9098	-CGACTTC--	GGTCGCG---	---CGCCTTA	AAGTCTC--C
CMW9099	-CGACTTC--	GGTCGCG---	---CGCCTTA	AAGTCTC--C
CMW9100	-CGACTTC--	GGTCGCG---	---CGCCTTA	AAGTCTC--C
P._eugeniaeCMW5351	-CGGT-TC-C	GGCCGCG---	---CGCCTCA	AAGTCT---C
P._destructansSTEU1366	-CGGCTCC--	GGCCGCG---	---CGCCTCA	AAGTCT---C
M._tasmaniensisCMW5005	-CGGC-CAGC	--CCGCG---	---TGCCCTA	ATGTCT----
M._flexuosaCMW5224	-CGGCTTC-C	GGCCGCC---	---CGC-TCA	AAGTCT---C
M._juvenisCMW4937	-CGGCTTCGC	GGCCGCC---	---CGCCTCA	AAGTCT---C
M._juvenisCMW4936	-CGGCTTCGC	GGCCGCC---	---CGCCTCA	AAGTCT---C
CMW9101	-CGGCTTCGC	GGCCGCC---	---CGCCTCA	AAGTCT---C
CMW9102	-CGGCTTCGC	GGCCGCC---	---CGCCTCA	AAGTCT---C
CMW9103	-CGGCTTCGC	GGCCGCC---	---CGCCTCA	AAGTCT---C
M._nubilosaCMW3282	-CGG-----C	CTCCGCG---	---CGCCTCA	ATGTCT---C
CMW9104	-CGG-----C	CTCCGCG---	---CGCCTCA	ATGTCT---C
CMW9105	-CGG-----C	CTCCGCG---	---CGCCTCA	ATGTCT---C
M._mollerianaCMW2734	-CGGC----C	-TCCGCG---	---CGCCTCG	AAGTCT---C
M._mollerianaCMW4940	-TGGC----C	-TCCGCG---	---CGCCTCG	AAGTCT---C
M._crypticaCMW2732	-CGGC-T--C	---CGCG---	---CGCCTCA	ATGTCT---C
M._crypticaCMW3279	-CGG-----C	CTCCGCG---	---CGCCTCA	ATGTCT---C
M._suttoniaeSTEU1346	-CGGC----C	G-CCGCG---	---CGCCCTA	ATGTCCC--C
M._lateralisCMW4935	-CGGC----C	TGCCGCG---	---CGCCTCA	AAGTCTT---
M._lateralisSTEU825	-CGGC----C	TGCCGCG---	---CGCCTCA	AAGTCTT---
CMW9106	-CGGC----C	TGCCGCG---	---CGCCTCA	AAGTCTT---
CMW9107	-CGGC----C	TGCCGCG---	---CGCCTCA	AAGTCTT---
Ramulispora_anguioides	-CG-GTTTC-	GCG-GC----	----CTCT-A	AACTCA---G

	530	540	550	560
M._marksiiCMW5150	CGGCTG-GAC	CGTC-CGTCT	CCGAGCGTTG	TGGCATCTGT
M._marksiiCMW3278	CGGCTG-GAC	CGTC-CGTCT	CCGAGCGTTG	TGGCATCTGT
CMW9090	CGGCTG-GAC	CGTC-CGTCT	CCGAGCGTTG	TGGCATCTGT
CMW9091	CGGCTG-GAC	CGTC-CGTCT	CCGAGCGTTG	TGGCATCTGT
CMW9092	CGGCTG-GAC	CGTC-CGTCT	CCGAGCGTTG	TGGCATCTGT
CMW9093	CGGCTG-GAC	CGTC-CGTCT	CCGAGCGTTG	TGGCATCTGT
M._parkiiCMW3358	-GGCTG-GGC	AGCC-CGTCT	CCGAGCGTTG	TGGCATC--A
M._marasasiiSTEU348	-GGCTGGAGC	TGTC-CGTCT	CCGAGCGTTG	TGAATCTCAT
P._natalensisCMW4948	CGGCTG-AGC	CATT-CGTCT	CTAAGCGTTG	TGG-ATTTTT
P._robustaCMW5151	CGGCTG-AGC	CATT-CGTCT	CTAAGCGTTG	TGG-ATTTTT
P._syzygiicolaCMW5349	CGGCTG-AGC	CATT-CGTCT	CTAAGCGTTG	TGG-ATTTTT
CMW9094	CGGCTG-AGC	CATT-CGTCT	CTAAGCGTTG	TGG-ATTTTT
CMW9095	CGGCTG-AGC	CATT-CGTCT	CTAAGCGTTG	TGG-ATTTTT
P._eucalyptorumCMW5228	CGGGTG-AGC	CATT-CGTCT	CTAAGCGTTG	TGG-ATTTTT
P._eucalyptorum5229	CGGGTG-AGC	CATT-CGTCT	CTAAGCGTTG	TGG-ATTTTT
P._basiramiferaCMW5227	CGGCTG-AGC	TGTC-CGTCT	CTAAGCGTTG	TGG-ATTTTT
P._paraguayensisCMW5146	CGGCTG-AGC	TGTC-CGTCT	CTAAGCGTTG	TGG-ATTTTT
C._syzygiiCMW5348	GGGTTG-AGC	TGTC-CGTCT	CTAAGCGTTG	TGG-AA-TTT
M._colombiensisCMW4944	CGGCTG-AGC	TGTC-CGTCT	CTAAGCGTTG	TGGCA----A
M._irregulariramosaCMW4943	CGGCTG-AGC	TGTC-CGTCT	CTAAGCGTTG	TGGCAACTAT
M._irregulariramosaCMW5149	CGGCTG-AGC	TGTC-CGTCT	CTAAGCGTTG	TGGCAACTAT
CMW9097	CGGCTG-AGC	TGTC-CGTCT	CTAAGCGTTG	TGGCAACTAT
CMW5825	CGGCTG-AGC	TGTC-CGTCT	CTAAGCGTTG	TGGCAACTAT
M._heimiiCMW4942	CGGCTG-AGC	TGTC-CGTCT	CTAAGCGTTG	TGGCAACTAT
M._crystallinaCMW3032	CGGCTG--AG	CTGTCCGTCT	CTAAGCGTTG	TGGCAA----
M._heimioidesCMW3046	CGGCTG-AGC	TGTC-CGTCT	CTAAGCGATG	TGGCAACTAT
M._walkeriSTEU2768	CGGGTG-AGC	TGCC-CGTCT	CCAAGCGTTG	TGGCGACT--
M._walkeriSTEU2769	CGGCTG-AGC	TGCC-CGTCT	CCAAGCGTTG	TGGCGACTAT
M._africanaCMW4945	CGGCTG-AGC	AGTT-CGTCT	CTAAGCGTTG	TGGCATATAT
M._ellpsoideaCMW4943	-GGCTG-AGC	AGTC-TGTCT	CCGAGCGTTG	TG--ATACAT
M._ellpsoideaCMW5166	-GGCTG-AGC	AGTG-TGTCT	CCGAGCGTTG	TG--ATACAT
CMW9098	-GGCTG-AGC	AGTC-TGTCT	CCGAGCGTTG	TG--ATACAT
CMW9099	-GGCTG-AGC	AGTC-TGTCT	CCGAGCGTTG	TG--ATACAT
CMW9100	-GGCTG-AGC	AGTC-TGTCT	CCGAGCGTTG	TG--ATACAT
P._eugeniaeCMW5351	CGGCCG-AGC	AGTC-CGTCT	CCAAGCGTTG	TGAC-ATT--
P._destructansSTEU1366	CGGCCG-AGC	AGTC-CGTCT	CCAAGCGTTG	TGGCATTT--
M._tasmaniensisCMW5005	CGGCCG-CGC	CGTC-CGTCT	CCCCGCGTTG	TGGCAATCAT
M._flexuosaCMW5224	CG-CTG-GAC	CGAC-CGTCT	CTAAGCGTTG	TGAC-TAAAT
M._juvenisCMW4937	CGGCTG-GAC	GGAT-CGTCT	CTAAGCGTTG	TGAC-TTCGT
M._juvenisCMW4936	CGGCTG-GAC	GGAT-CGTCT	CTAAGCGTTG	TGAC-TTCGT
CMW9101	CGGCTG-GAC	GGAT-CGTCT	CTAAGCGTTG	TGAC-TTCGT
CMW9102	CGGCTG-GAC	GGAT-CGTCT	CTAAGCGTTG	TGAC-TTCGT
CMW9103	CGGCTG-GAC	GGAT-CGTCT	CTAAGCGTTG	TGAC-TTCGT
M._nubilosaCMW3282	CGGCCG-AGC	CGAC-CGTCT	CTCAGCGTTG	TGGCACTACT
CMW9104	CGGCCG-AGC	CGAC-CGTCT	CTCAGCGTTG	TGGCACTACT
CMW9105	CGGCCG-AGC	CGAC-CGTCT	CTCAGCGTTG	TGGCACTACT
M._mollerianaCMW2734	CGGCCG-AGC	CGAC-CGTCT	CCAAGCGTTG	TGGCACAACT
M._mollerianaCMW4940	CGGCCG-AGC	CGAC-CGGCT	CCAAGCGTTG	TGGCACAACT
M._crypticaCMW2732	CGGCCG-AGC	CGAC-CGTCT	CTAAGCGTTG	TGGCACAACT
M._crypticaCMW3279	CGGCCG-AGC	CGAC-CGTCT	CTAAGCGTTG	TGGCACAACT
M._suttoniaeSTEU1346	-GGCCG-AGC	CGGC-CGTCC	CGAAGCGTTG	TGG-CGTCTA
M._lateralisCMW4935	CGGCGGAAGC	CG-CCCGTTC	CTCTGCGTGA	TGACACATCG
M._lateralisSTEU825	CGGCGGAAGC	CG-CCCGTTC	CTCTGCGTGA	TGACACATCG
CMW9106	CGGCGGAAGC	CG-CCCGTTC	CTCTGCGTGA	TGACACATCG
CMW9107	CGGCGGAAGC	CG-CCCGTTC	CTCTGCGTGA	TGACACATCG
Ramulispora_anguioides	TGGCGG--TG	CCTGTCGGCT	CTACGCGTAG	TAATA-CTCC

	570	580	590	600
M._marksiiCMW5150	C-----TCGC	TAGG---GAG	C-CGCGGA-G	GG--CGTTGG
M._marksiiCMW3278	C-----TCGC	TAGG---GAG	C-CGCGGA-G	GG--CGTTGG
CMW9090	C-----TCGC	TAGG---GAG	C-CGCGGA-G	GG--CGTTGG
CMW9091	C-----TCGC	TAGG---GAG	C-CGCGGA-G	GG--CGTTGG
CMW9092	C-----TCGC	TAGG---GAG	C-CGCGGA-G	GG--CGTTGG
CMW9093	C-----TCGC	TAGG---GAG	C-CGCGGA-G	GG--CGTTGG
M._parkiiCMW3358	CAGTTCTCGC	TAGG---GAG	T-CGCGGAC-	GGC--GTCGG
M._marasasiiSTEU348	-T-C--GCGC	TAGG---GAG	T-CGCGGGCA	CAC---GCGG
P._natalensisCMW4948	CA-A-TTCGC	TTCG---GAG	TGCGGG-T-G	GCC---GCGG
P._robustaCMW5151	CA-A-TTCGC	TTTG---GAG	CGCGGG-T-G	GCC---GCGG
P._syzygiicolaCMW5349	CA-A-TTCGC	TTCG---GAG	TGCGGG-T-G	GCC---GCGG
CMW9094	CA-A-TTCGC	TTCG---GAG	TGCGGG-T-G	GCC---GCGG
CMW9095	CA-A-TTCGC	TTCG---GAG	TGCGGG-T-G	GCC---GCGG
P._eucalyptorumCMW5228	CA-A-TTCGC	TTCG---GAG	TGCGGG-T-G	GCC---GCGG
P._eucalyptorum5229	CA-A-TTCGC	TTCG---GAG	TGCGGG-T-G	GCC---GCGG
P._basiramiferaCMW5227	CA-A-TTCGC	TTCG---GAG	TGCGGA-T-G	GCC---GCGG
P._paraguayensisCMW5146	CA-A-TTCGC	TTCG---GAG	TGCGGA-T-G	GCC---GCGG
C._syzygiiCMW5348	AACTATTCGC	TTCG---GAG	-----GGTGG	GTGGCCGCGG
M._colombiensisCMW4944	CT-A-TTCGC	TTCG---GAG	G-C-CGGG-C	GG--CCGCGG
M._irregulariramosaCMW4943	------TCGC	TTCG---GAG	G-CCGGGT-G	GCC--GC-GG
M._irregulariramosaCMW5149	------TCGC	TTCG---GAG	G-CCGGGT-G	GCC--GC-GG
CMW9097	------TCGC	TTCG---GAG	G-CCGGGT-G	GCC--GC-GG
CMW5825	------TCGC	TTCG---GAG	G-CCGGGT-G	GCC--GC-GG
M._heimiiCMW4942	------TCGC	TTCG---GAG	G-T-CGGG-T	GGC--CGCGG
M._crystallinaCMW3032	--CTATTCGC	TTCG---GAG	GTCGG-----	GTGGCCGCGG
M._heimioidesCMW3046	C------CGC	TTTG---GAG	---GCGGG-T	GGC----CGG
M._walkeriSTEU2768	---A-TTCGC	TTCG---GGG	--CGCGGG-C	GGC--CGCGG
M._walkeriSTEU2769	------TCGC	TT-C--GGGG	C--GCGGG-C	GGC-CGC-GG
M._africanaCMW4945	TT-----CGC	TG--AAAGAG	TT--CGGGAC	GGCT-TTTGG
M._ellpsoideaCMW4943	-A-T--TCGC	TAGG---GAT	GACA-GGTCT	GTC---GCGG
M._ellpsoideaCMW5166	-A-T--TCGC	TAGG---GAT	GACA-GGTCT	GTC---GCGG
CMW9098	-A-T--TCGC	TAGG---GAT	GACA-GGTCT	GTC---GCGG
CMW9099	-A-T--TCGC	TAGG---GAT	GACA-GGTCT	GTC---GCGG
CMW9100	-A-T--TCGC	TAGG---GAT	GACA-GGTCT	GTC---GCGG
P._eugeniaeCMW5351	-----TTCAC	TG-G--GGAG	G-ACGGGT-C	TGC-CGC-GG
P._destructansSTEU1366	------TCGC	TGGG---GAG	CACG-GGTC-	TGCCGCG-GC
M._tasmaniensisCMW5005	--GT--TCGC	GACG---GAG	C-CG-GCCC-	GGCGTGG-GC
M._flexuosaCMW5224	TGGA--CCGC	TTGT---GAG	TATG-GGAC-	GTCCTCG-GC
M._juvenisCMW4937	TGGA--CCGC	TTGC---GAG	TACG-GGAC-	GTCCTCG-GC
M._juvenisCMW4936	TGGA--CCGC	TTGC---GAG	TACG-GGAC-	GTCCTCG-GC
CMW9101	TGGA--CCGC	TTGC---GAG	TACG-GGAC-	GTCCTCG-GC
CMW9102	TGGA--CCGC	TTGC---GAG	TACG-GGAC-	GTCCTCG-GC
CMW9103	TGGA--CCGC	TTGC---GAG	TACG-GGAC-	GTCCTCG-GC
M._nubilosaCMW3282	GT---TTCGC	T--GACGGGG	ACC--GGTCT	GGCGGCGCGC
CMW9104	GT---TTCGC	T--GACGGGG	ACC--GGTCT	GGCGGCGCGC
CMW9105	GT---TTCGC	T--GACGGGG	ACC--GGTCT	GGCGGCGCGC
M._mollerianaCMW2734	GT-T--TCGC	TTTC---GGG	-AC-CGGTCT	GGCGGCGCGC
M._mollerianaCMW4940	GT-T--TCGC	TTTC---GGG	-AC-CGGTCT	GGCGGCGCGC
M._crypticaCMW2732	GT---TTCGC	TTCC---GGG	A-CCGGTC-T	GGC-GTCGCG
M._crypticaCMW3279	GT---TTCGC	TT--CCGG-G	AC--CGGTCT	GGCG-TCGCG
M._suttoniaeSTEU1346	CTGTGC-CGC	TTCC---GGG	AC-C-GGTCT	GGCGGTGTGC
M._lateralisCMW4935	------TCGC	TTGG---GA-	CACGGGGGTG	AGCGCCCGGA
M._lateralisSTEU825	------TCGC	TTGG---GA-	CACGGGGGTG	AGCGCCCGGA
CMW9106	------TCGC	TTGG---GA-	CACGGGGGTG	AGCGCCCGGA
CMW9107	------TCGC	TTGG---GA-	CACGGGGGTG	AGCGCCCGGA
Ramulispora_anguioides	------TCGC	GAT---TGAG	TCCGGTA---	GGTTTACTTG

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                                   610        620        630        640
M._marksiiCMW5150            CC-------- GTTAAACACC CCAT--CAAA GGTTGAC-CT
M._marksiiCMW3278            CC-------- GTTAAACACC CCAT--CAAA GGTTGAC-CT
CMW9090                      CC-------- GTTAAACACC CCAT--CAAA GGTTGAC-CT
CMW9091                      CC-------- GTTAAACACC CCAT--CAAA GGTTGAC-CT
CMW9092                      CC-------- GTTAAACACC CCAT--CAAA GGTTGAC-CT
CMW9093                      CC-------- GTTAAACACC CCAT--CAAA GGTTGAC-CT
M._parkiiCMW3358             CC-------- GTTAAATACC CCAT--CAAA GGTTGAC-CT
M._marasasiiSTEU348          CC-------- GTTAAATACC CCAT--CAAA GGTTGAC-CT
P._natalensisCMW4948         CC-------- GTTAAATCTT TATT--CAAA GGTTGAC-CT
P._robustaCMW5151            CC-------- GTTAAATCTT TATT--GAAA GGTTGAC-CT
P._syzygiicolaCMW5349        CC-------- GTTAAATCTT TATT--CAAA GGTTGAC-CT
CMW9094                      CC-------- GTTAAATCTT TATT--CAAA GGTTGAC-CT
CMW9095                      CC-------- GTTAAATCTT TATT--CAAA GGTTGAC-CT
P._eucalyptorumCMW5228       CC-------- GTTAAATCTT TATT--CAAA GGTTGAC-CT
P._eucalyptorum5229          CC-------- GTTAAATCTT TATT--CAAA GGTTGAC-CT
P._basiramiferaCMW5227       CC-------- GTTAAATCTT TATT--CAAA GGTTGAC-CT
P._paraguayensisCMW5146      CC-------- GTTAAATCTT TATT--CAAA GGTTGAC-CT
C._syzygiiCMW5348            CC-------- GTTAAATCTT TATTCA-AA- GGTTGAC-CT
M._colombiensisCMW4944       CC-------- GTTAAATCTT TCA---CAA- GGTTGAC-CT
M._irregulariramosaCMW4943   CC-------- GTTAAATCTT T---CACAA- GGTTGAC-CT
M._irregulariramosaCMW5149   CC-------- GTTAAATCTT T---CACAA- GGTTGAC-CT
CMW9097                      CC-------- GTTAAATCTT T---CACAA- GGTTGAC-CT
CMW5825                      CC-------- GTTAAATCTT T---CACAA- GGTTGAC-CT
M._heimiiCMW4942             CC-------- GTTAAATCTT T---CACAA- GGTTGAC-CT
M._crystallinaCMW3032        CC-------- GTTAAATCTT T---CACAA- GGTTGAC-CT
M._heimioidesCMW3046         CC-------- GTTAAATCTT T---CACAA- GGTTGAC-CT
M._walkeriSTEU2768           CC-------- GTTAAATCTT TCAC----AA GGTTGAC-CT
M._walkeriSTEU2769           CC-------- GTTAAATCTT TCAC----AA GGTTGAC-CT
M._africanaCMW4945           CC-------- GTTAAATCTT TCTT---AAA GGTTGAC-CT
M._ellpsoideaCMW4943         CC-------- GTTAAATCTT TATA-ACA-- GGTTGAC-CT
M._ellpsoideaCMW5166         CC-------- GTTAAATCTT TATA-ACA-- GGTTGAC-CT
CMW9098                      CC-------- GTTAAATCTT TATA-ACA-- GGTTGAC-CT
CMW9099                      CC-------- GTTAAATCTT TATA-ACA-- GGTTGAC-CT
CMW9100                      CC-------- GTTAAATCTT TATA-ACA-- GGTTGAC-CT
P._eugeniaeCMW5351           CC-------- GTTAAATCCT T-AT--CAAA GGTTGAC-CT
P._destructansSTEU1366       C--------- GTTAAAT-CC T-TATCA-AA GGTTGAC-CT
M._tasmaniensisCMW5005       C--------- GTCAACGACC C-CATCTTCA GGTTGAC-CT
M._flexuosaCMW5224           C--------- GTTAAA-CTT ATTACACAA- GGTTGAC-CT
M._juvenisCMW4937            C--------- GTTAAACCCT TTTAT-CAAA GGTTGAC-CT
M._juvenisCMW4936            C--------- GTTAAACCCT TTTAT-CAAA GGTTGAC-CT
CMW9101                      C--------- GTTAAACCCT TTTAT-CAAA GGTTGAC-CT
CMW9102                      C--------- GTTAAACCCT TTTAT-CAAA GGTTGAC-CT
CMW9103                      C--------- GTTAAACCCT TTTAT-CAAA GGTTGAC-CT
M._nubilosaCMW3282           C--------- GTTAAACCCT T-TCACCAAA GGTTGAC-CT
CMW9104                      C--------- GTTAAACCCT T-TCACCAAA GGTTGAC-CT
CMW9105                      C--------- GTTAAACCCT T-TCACCAAA GGTTGAC-CT
M._mollerianaCMW2734         C--------- GTTAAACCCT T-TCAC-AAA GGTTGAC-CT
M._mollerianaCMW4940         C--------- GTTAAACCCT T-TCA-CAAA GGTTGAC-CT
M._crypticaCMW2732           CC-------- GTCAACCCCC TCTC-TCACA GGTTGAC-CT
M._crypticaCMW3279           CC-------- GTCAACCCCC TCTC-TCACA GGTTGAC-CT
M._suttoniaeSTEU1346         C--------- GTCAAACCCC T-TCATCAAA GGTTGAC-CT
M._lateralisCMW4935          --AAACATCG GCGGAGACGT CGATTTC-AA GGTTGAC-CT
M._lateralisSTEU825          --AAACATCG GCGGAGACGT CGATTTC-AA GGTTGAC-CT
CMW9106                      --AAACATCG GCGGAGACGT CGATTTC-AA GGTTGAC-CT
CMW9107                      --AAACATCG GCGGAGACGT CGATTTC-AA GGTTGAC-CT
Ramulispora_anguioides       CCAACAACC- -----CCCAA TTTTTTACA- GGTTGAC-CT
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                             640        650
M._marksiiCMW5150            CGGATCAGGT AGGGATA
M._marksiiCMW3278            CGGATCAGGT AGGGATA
CMW9090                      CGGATCAGGT AGGGATA
CMW9091                      CGGATCAGGT AGGGATA
CMW9092                      CGGATCAGGT AGGGATA
CMW9093                      CGGATCAGGT AGGGATA
M._parkiiCMW3358             CGGATCAGGT AGGGATA
M._marasasiiSTEU348          CGGATCAGGT AGGGATA
P._natalensisCMW4948         CGGATCAGGT AGGGATA
P._robustaCMW5151            CGGATCAGGT AGGGATA
P._syzygiicolaCMW5349        CGGATCAAGT AGGGATA
CMW9094                      CGGATCAGGT AGGGATA
CMW9095                      CGGATCAGGT AGGGATA
P._eucalyptorumCMW5228       CGGATCAGGT AGGGATA
P._eucalyptorum5229          CGGATCAGGT AGGGATA
P._basiramiferaCMW5227       CGGATCAGGT AGGGATA
P._paraguayensisCMW5146      CGGATCAGGT AGGGATA
C._syzygiiCMW5348            CGGATCAGGT AGGGATA
M._colombiensisCMW4944       CGGATCAGGT AGGGATA
M._irregulariramosaCMW4943   CGGATCAGGT AGGGATA
M._irregulariramosaCMW5149   CGGATCAGGT AGGGATA
CMW9097                      CGGATCAGGT AGGGATA
CMW5825                      CGGATCAGGT AGGGATA
M._heimiiCMW4942             CGGATCAGGT AGGGATA
M._crystallinaCMW3032        CGGATCAGGT AGGGATA
M._heimioidesCMW3046         CGGATCAGGT AGGGATA
M._walkeriSTEU2768           CGGATCAGGT AGGGATA
M._walkeriSTEU2769           CGGATCAGGT AGGGATA
M._africanaCMW4945           CGGATCAGGT AGGGATA
M._ellpsoideaCMW4943         CGGATCAGGT AGGGATA
M._ellpsoideaCMW5166         CGGATCAGGT AGGGATA
CMW9098                      CGGATCAGGT AGGGATA
CMW9099                      CGGATCAGGT AGGGATA
CMW9100                      CGGATCAGGT AGGGATA
P._eugeniaeCMW5351           CGGATCAGGT AGGGATA
P._destructansSTEU1366       CGGATCAGGG AGGGATA
M._tasmaniensisCMW5005       CGGATCAGGT AGGGATA
M._flexuosaCMW5224           CGGATCAGGT AGGGATA
M._juvenisCMW4937            CGGATCAGGT AGGGATA
M._juvenisCMW4936            CGGATCAGGT AGGGATA
CMW9101                      CGGATCAGGT AGGGATA
CMW9102                      CGGATCAGGT AGGGATA
CMW9103                      CGGATCAGGT AGGGATA
M._nubilosaCMW3282           CGGATCAGGT AGGGATA
CMW9104                      CGGATCAGGT AGGGATA
CMW9105                      CGGATCAGGT AGGGATA
M._mollerianaCMW2734         CGGATCAGGT AGGGATA
M._mollerianaCMW4940         CGGATCAGGT AGGGATA
M._crypticaCMW2732           CGGATCAGGT AGGGATA
M._crypticaCMW3279           CGGATCAGGT AGGGATA
M._suttoniaeSTEU1346         CGGATCAGGC AGGGATA
M._lateralisCMW4935          CGGATCAGGT AGGGATA
M._lateralisSTEU825          CGGATCAGGT AGGGATA
CMW9106                      CGGATCAGGT AGGGATA
CMW9107                      CGGATCAGGT AGGGATA
Ramulispora_anguioides       CGGATCAGGT AGGGATA
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