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SHORT RESEARCH NOTE

Muribasidiospora indica causing a prominent leaf spot disease on *Rhus lancea* in South Africa

P. W. Crous[A,D], *J. Z. Groenewald*[B] *and G. Carroll*[C]

[A]Centraalbureau voor Schimmelcultures, Fungal Biodiversity Centre, Uppsalalaan 8, 3584 CT Utrecht, The Netherlands.
[B]Department of Plant Pathology, University of Stellenbosch, P. Bag X1, Matieland 7602, South Africa.
[C]Department of Biology, University of Oregon, Eugene, OR 97403, USA.
[D]Corresponding author; email: crous@cbs.knaw.nl

Abstract. *Muribasidiospora indica* was identified as the causal organism associated with leaf spots of *Rhus lancea* in South Africa. The disease appears more commonly in the warmer provinces of South Africa (Gauteng, Free State) than in the Western Cape. The morphological identification of the causal organism was confirmed by comparing sequence data of the large subunit rRNA gene (28S) with that of reference strains of *M. indica*. This is the first confirmed record of this species occurring in Africa, where it appears to be a serious leaf pathogen on members of the Anacardiaceae.

Additional keywords: Anacardiaceae, Basidiomycete, Exobasidiales, large subunit rRNA gene.

The genus *Rhus* (Anacardiaceae) contains many hardy species that readily grow as healthy shrubs or trees in various marginal sites throughout South Africa. One such species that is commonly planted as an ornamental tree is *Rhus lancea*, which has characteristically 3-foliate, narrowly lanceolate leaves. This small to medium sized (up to 8 m high) evergreen tree is commonly encountered along rivers and in open woodlands at a variety of altitudes. It occurs naturally in Namibia as well as in South Africa, with its South African distribution stretching from the Western Cape to the Free State, Gauteng, Mpumalanga, and further north (Palgrave 1981).

A leaf spot disease of *Rhus lancea* has been present in South Africa for many years and is a common sight on trees growing along the highways in the Free State and Gauteng Provinces. It was only during the extremely hot, dry summer of 2002, however, that this disease was also noted to occur on trees growing in Somerset West in the Western Cape Province.

Leaf spots were diffuse, circular, confluent, red to red-purple with a narrow chlorotic margin on the adaxial surface, becoming dark red to brown/black on older leaves, up to 1.5-cm-diameter; on the abaxial surface spots were diffuse, chlorotic, later becoming dark brown (Figs 1 and 2). Leaf spots were covered (primarily on abaxial surface) with a thin hymenial layer of subcylindrical basidia (cream in appearance). Basidia tapered to a narrow base, and gave rise to two divergent sterigmata, that again tapered to a small, flat-tipped locus. Sterigmata gave rise to aseptate, asymmetrical, clavate to obovoid primary basidiospores, 12–20 × 8–16 μm. Upon germination, these basidiospores became muriformly septate. Individual cells formed sterigmata, and gave rise to aseptate, subcylindrical secondary basidiospores, 9–20 × 1–2 μm. Germinating secondary basidiospores on 2% malt-extract agar (MEA; Biolab, Midrand, Johannesburg) gave rise to a yeast phase with long, filiform yeast cells and, in some cases, underwent microcyclic conidiation and gave rise to further secondary basidiospores (Fig. 3). These criteria closely matched those ascribed to *Muribasidiospora indica* (Rajendren 1968; Begerow *et al*. 2001).

To confirm the identity of the causal organism described here, genomic DNA was isolated from fungal growth on MEA agar according to the protocol of Lee and Taylor (1990). The 5′ end of the large subunit rRNA gene (28S) was amplified and sequenced using the primers ITS1 (White *et al*. 1990) and LR5 (Vilgalys and Hester 1990). The sequence data revealed that there was a 98% sequence similarity (12 changes over 604 bases) between the sequence of the causal organism isolated in this study (GenBank AY204506), and that of *M. indica* (GenBank AF352058: Begerow *et al*. 2001). Although these minor base pair differences suggest cryptic speciation, more isolates from different regions will have to be studied to confirm this. The sequence was added to selected taxa from the data set (TreeBase accession number M1168) of Begerow *et al*.

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Figs 1–2. Leaf spots caused by *Muribasidiospora indica* on *Rhus lancea* (CBS 6588).

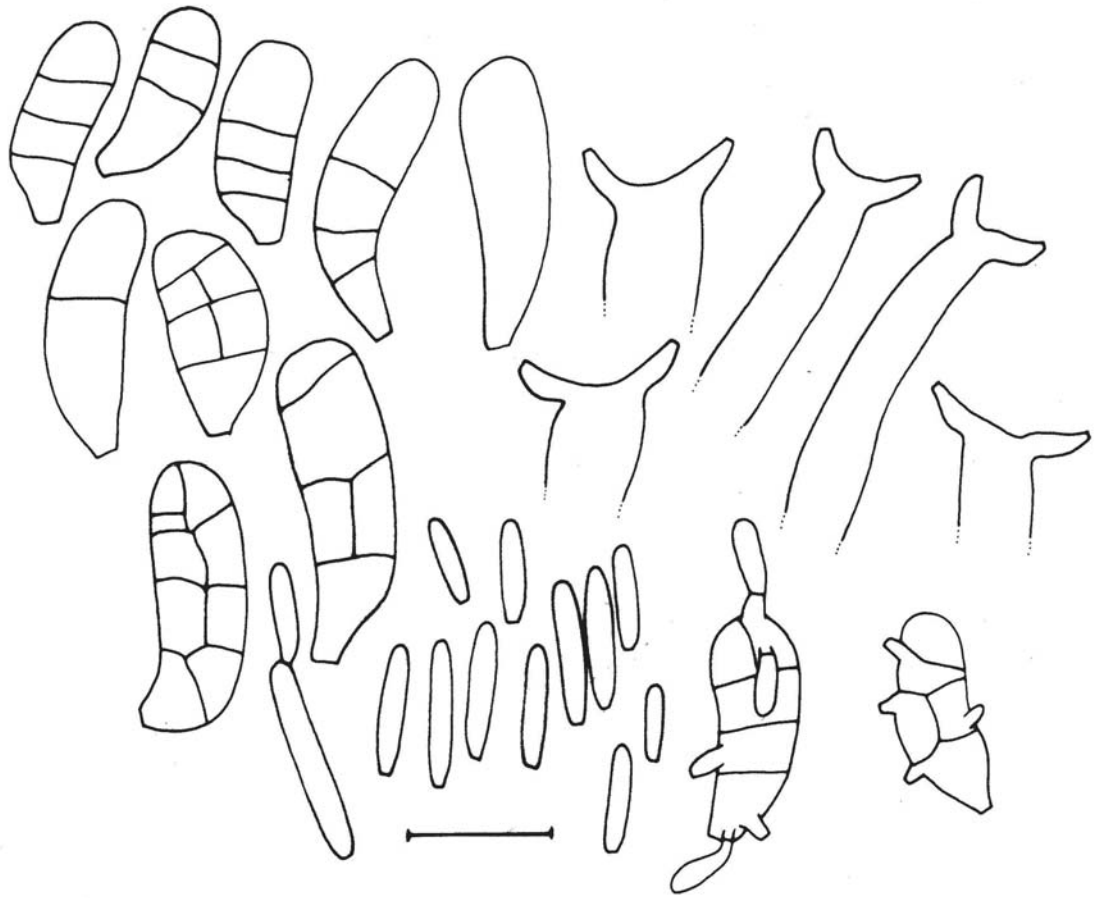

Fig. 3. *Muribasidiospora indica* (CBS 6588). Basidial apices with two divergent sterigmata, giving rise to asymmetrical, clavate to obovoid, muriformly septate, primary basidiospores and aseptate secondary basidiospores. Bar = 10 μm.

(2001), and additional taxa were added from GenBank. Phylogenetic analysis using parsimony showed that the two *M. indica* isolates grouped with a bootstrap support value of 100% (Fig. 4).

The genus *Muribasidiospora* is presently known to accommodate three species that occur in India, namely *M. celtidis*, *M. hesperidium* and *M. indica* (Rajendren 1968; Begerow *et al.* 2001). *M. celtidis* occurs on Ulmaceae, and the latter two species on Anacardiaceae, with *M. herperidium* having narrower primary basidiospores (12–25 × 7–9 μm) than *M. indica* (12–20 × 8–16 μm) (Rajendren 1968; Begerow *et al.* 2001). Phylogenetically

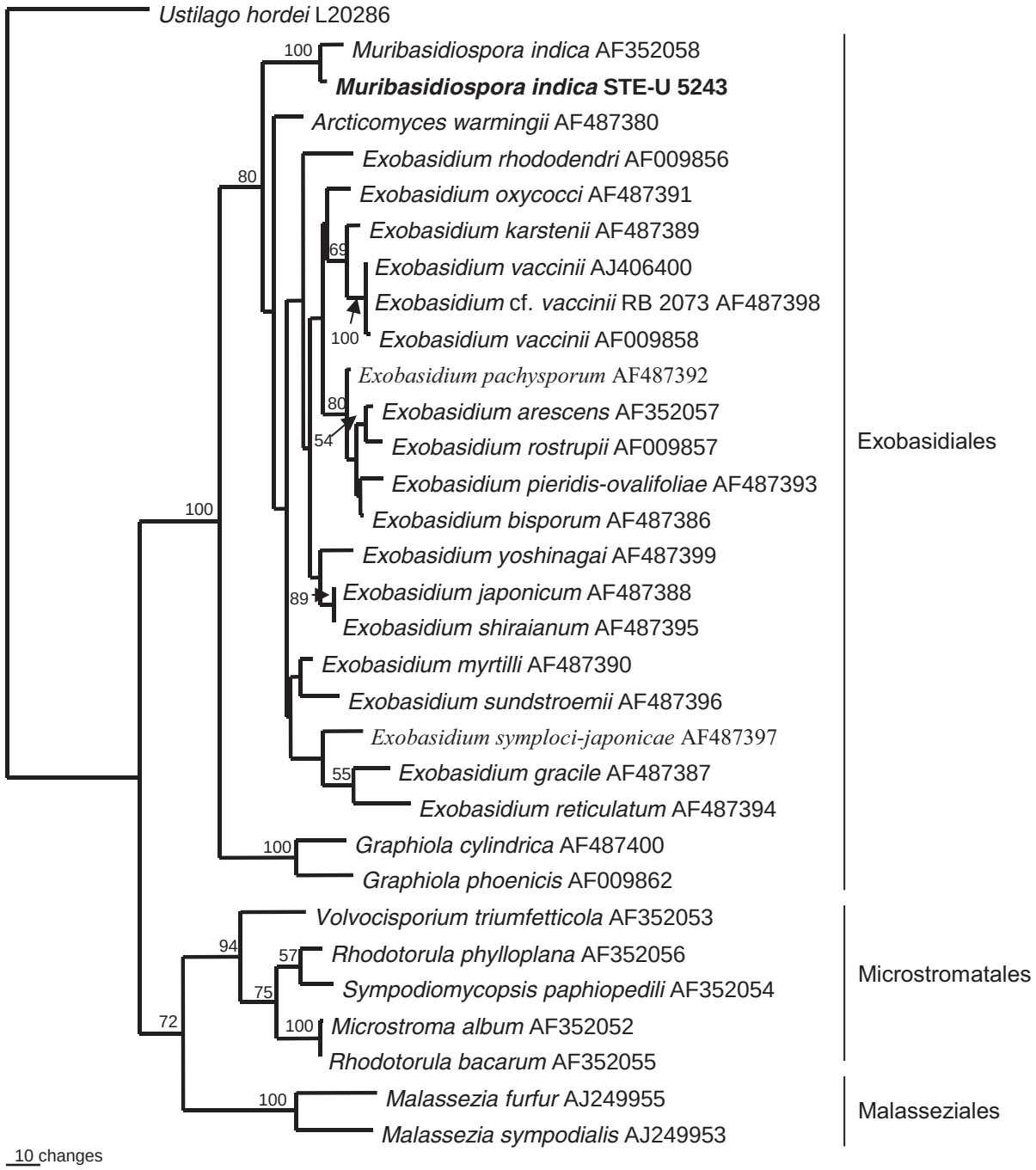

Fig. 4. One of 31 most parsimonious trees (length = 574 steps, CI = 0.587, RI = 0.693, RC = 0.407) obtained from a heuristic search using a 538 bp alignment of the 5′ end of the large subunit rRNA gene. Bootstrap support values from 1000 replicates are shown above the lines. *Ustilago hordei* was used as outgroup.

Muribasidiospora is very closely related to *Exobasidium* (Exobasidiales), but appears to represent a genus in its own right (Begerow *et al.* 2001). Other than the report of *M. hesperidium* listed as occurring on *Rhus* spp. in Tanzania (Ebbels and Allen 1979), this is the first confirmed record of a *Muribasidiospora* species occurring on *Rhus* in Africa. Presently there are no control measures known for the disease and, although it defoliates seriously infected trees, thus reducing their growth, trees seem to recover with time. Further collections should now be made to determine the possible impact, distribution and host range of *M. indica* on Anacardiaceae in southern Africa.

Specimen examined: South Africa, Western Cape Province, Somerset West, 9 La Barrage Ave., living leaves of *Rhus lancea*, Mar. 2002, M. Crous, CBS 6588, cultures STE-U 5243–5245 (5245 = CBS 110581).

Acknowledgement

PWC acknowledges his son, Max (6), who continually collected *Rhus* leaves for study, insisting that the causal organism be identified!

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