New generic and specific names are proposed for a fungus previously identified as *Stagonospora meliloti*, and causing a root and crown rot of *Medicago sativa* in Australia.

Acrocalymma medicaginis sp.nov.  (Fig. 1)  

Conidiomata on PDA dark brown or black, with a globose body 215–380 μm diam and a cylindrical or apically flared neck 115–185 × 60–105 μm. Overall height 310–435 μm. Wall 11–18 μm thick, the outer layer very dark and with cells occluded, median layers of paler, elongated cells, and cells of conidiogenous region hyaline. Conidiomata on leaf of *Zea mays* supported on Sachs' agar immersed, globose, papillate or sometimes with a cylindrical neck, dark brown, darker around the 11–18 μm diam, circular, central ostiole, 145–280 × 135–310 μm. Conidiogenous cells common cylindrically, sometimes lageniform, with a narrow channel and pronounced apical periclinal thickening, 5–12 μm diam, 5–5 (–6) μm. Conidia cylindrical to fusoid, straight, aseptate, obtuse at the apex and often somewhat truncate at the base, 11–21 × 3–5–5 (–6) μm, with a mucilaginous helmet-shaped appendage at each end. The apical appendage varies in shape, from more or less globose to mostly hemispherical or helmet-shaped, 2–4 × 2–3 (–5) μm, with the connexion to the conidium not clear. The basal appendage often...
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Fig. 1. Acrocalymma medicaginis. (A) Near-median vertical section of conidioma on PDA, × 230; (B) detail of conidioma wall, × 1450; (C) conidiogenous cells, ca × 2500; (D) conidia (apex uppermost) stained by modified Leifson’s method to demonstrate appendages; remnants of sheath still visible on body of conidium at right, × 2250; (E) Stagonospora meliloti, conidia from Klotzsch, Herb. Viv. Myc. No. 370 dupl. in FH, × 2500; (F) S. meliloti, conidia from PDA culture, DAR 38035, × 1450.
partly invests the end of the spore, tapered short cylindrical to hemispherical, 2–3 × 3–4 μm. Appendages were measured after staining by the modified Leifson’s method (Punithalingam & Woodhams, 1984). If conidia are first mounted in water and then stained by irrigation the appendages are more irregular in shape than when stained directly, with some apical appendages especially showing numerous poorly-staining fibrils radiating out from a deeply stained swollen base. In water mounts the appendages are much reduced in size and difficult to detect. They are revealed by other stains such as ammoniacal erythrosin, ammoniacal congo red, KOH/phloxine and Lugol’s iodine.

Transverse septa develop in exuded conidia which accumulate at the apices of some conidiomata in culture. Such conidia commonly are medianly 1-septate (ca 90 %, of septate conidia), and remain hyaline or develop a pale brown colour, and lack appendages. They germinate freely in situ and anastomosis between adjacent conidia is common. When asceptate conidia are germinated on water agar they develop 1 (–2) septa, and usually one germ tube emerges from near either end of the spore. Remnants of the appendages are still visible after 20 h incubation on water agar, with that at the base being more obvious than the apical appendage.

Colonies on PDA have varying amounts of pale grey aerial mycelium and produce a distinct greyish rose colour in the medium. Linear growth on PDA is greatest at 27.5 °C, with a radial increase of 30 mm in 15 days. Growth is also considerable at 24.5° and 31°, with radial increases of 26 mm and 28 mm respectively.


**Pathology**

*Acrocalymma medicaginis* has been isolated from lucerne plants affected by a root and crown rot in Queensland, New South Wales and South Australia (see above). Such plants show a reddish flecking in the cortex and vascular tissue of crowns and roots, and the bark of infected regions is often fissured. As the disease progresses, a dry rot develops and the older affected tissues darken. Disease development in glasshouse-grown plants is slow, with the rot extending only 1–2 cm on either side of the inoculation point in 4 months (Irwin, 1972). *Stagonospora meliloti* causes a similar disease in *M. sativa*, but is also responsible for a leaf spotting syndrome in various legumes. *A. medicaginis* has not been found associated with or isolated from leaf lesions by us. This apparent inability to cause a leaf disease was tested experimentally in parallel inoculations using *S. meliloti* and *A. medicaginis* as follows.

**Pathogenicity tests on leaves.** Stem cuttings were taken from a single clone of *M. sativa* cv. Baron. After establishment, the plants were defoliated to within 4 cm of the crown. Two weeks old regrowth was atomized to run-off with 2 × 10^6 conidia ml^-1 of two isolates, BRIP 5876.
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(A. medicaginis) and BRIP 14933 (S. meliloti). Two replicate pots, each containing a single plant, were inoculated with each isolate. A control pot was atomized with water only. After inoculation, plants were provided with 72 h of leaf wetness by enclosing the pot in a plastic bag at 25 °C (14 h photoperiod). After removal of the plastic bags, plants were grown under the same conditions. Macroscopic symptoms were first evident on plants inoculated with S. meliloti at 11 days after inoculation. No symptoms developed on plants inoculated with A. medicaginis. Leaf spots on plants inoculated with S. meliloti were broadly oval, buff-coloured without a dark border, irregular in outline, and at maturity measured 1–4 mm diam. Pycnidia were present in lesions 14 days after inoculation. Infected leaves senesced rapidly resulting in premature defoliation. S. meliloti was reisolated from lesions following surface sterilization in sodium hypochlorite (1 % available chlorine) and plating onto PDA.

Pathogenicity tests on crowns. Cuttings of the above clone were inoculated with the above two isolates, with 2 replications. Agar and mycelium were placed into an incision made in the tap root 10 mm below the crown. Plants were incubated under the above conditions for 4 weeks, then grown in a glasshouse (20–35 °C) for another 8 weeks, when they were destructively sampled. Plants inoculated with A. medicaginis developed a rot extending for 10 mm on either side of the inoculation site, with red flecking at the extremity of the decay and the older infected tissue dry and reddish black in colour. Similar symptoms were caused by S. meliloti, with the rot somewhat less extensive (7.5 mm to each side of inoculation point). Both fungi were recovered by isolation from red-flecked tissue onto PDA containing 100 μg ml⁻¹ streptomycin. Control plants (wounded, not inoculated) developed some rotting at the site of wounding but the decay did not extend, there was no associated red flecking, and neither of the fungi used to inoculate test plants was reisolated.

TAXONOMIC RELATIONSHIPS

Stagonospora meliloti has been reported under this name, or that of its teleomorph, Leptosphaeria pratensis Sacc. & Briard, on Medicago sativa from South Australia (Waceup & Talbot, 1981), Victoria (Woodcock & Clarke, 1983), Tasmania (Sampson & Walker, 1982), Queensland (Irwin, 1972) and New Zealand (Dingley, 1969) in the Australasian region. Our examination of specimens and cultures shows that this fungus does occur on M. sativa in the region, but also that A. medicaginis has been confused with it in South Australia, New South Wales and Queensland. Part of this confusion arises from the wide variability shown by S. meliloti in culture, and the similarity between A. medicaginis and some of the phenotypes of S. meliloti (Jones & Weimer, 1938). In addition the slow growth rate of growth of A. medicaginis and the difficulty in isolating it from tissue with secondary invaders would tend to reduce the chances of its detection in routine isolations. The pathogen is widely distributed in Queensland and present in many lucerne stands over 12 months old (Irwin, unpubl.).

The genus Stagonospora (Sacc.) Sacc. is characterized by unilocular, ostiolate, pycnidial conidiomata lined with holoblastic, occasionally annellidic conidiogenous cells producing conidia which are hyaline, cylindrical or fusiform, straight to slightly curved and with several transverse septa (Sutton, 1980). Clearly, therefore, one of the taxa previously assigned to S. meliloti in Australia cannot be accommodated in that genus. Further, we have examined an authentic specimen of Sphaeria meliloti Lasch (basionym for Stagonospora meliloti). Ostiolate pycnidia are in pale brown leaf lesions individually up to about 2 mm diam, or confluent to 5 mm diam. The pycnidia are pale brown, rounded in outline and more or less lenticular in lateral view, darker around the ostiole, and ca 250 μm diam. Conidia are hyaline, thin-walled, cylindrical, straight to slightly curved or bent, ends obtuse or one end truncate, smooth, 1–3 (4) septate, occasionally constricted, 15–28 × 3.5–5.5 (mostly 4.0–4.5) μm, and lack a sheath or appendages. Conidiogenous cells were not detected but a duplicate collection (in herb. B) has holoblastic, doliform or ampulliform conidiogenous cells 4–5 × 3–4 μm, rarely once-annellidic (J. Walker, pers. comm., 1986). Similar conidial dimensions (10–26 × 2.5–5.0 μm) and septation (0–4) were noted for other specimens and cultures of S. meliloti examined during this study, and clearly annellidic conidiogenous cells were seen in some, e.g. BRIP 14933.

The combination of phialidic conidiogenesis with polar appendages on aseptate conidia would appear to exclude the taxon described above from similar genera. Were it not for the phialidic conidiogenous cells A. medicaginis might have been included with some justification in Tiarospora. However in that genus single conidia are produced by each conidiogenous cell and there is no proliferation to give a succession of conidia. Furthermore, Tiarospora is very different in overall appearance.

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conidia are formed that the phialidic nature of the conidiogenous cells is revealed. Conidia of *Tiarospora* have bipolar appendages, but conidiogenous cells are thick-walled and 1-septate (Sutton, 1980). Similarly, differences in conidiomatal structure, conidio genesis, conidium septation or appendage placement in *Ceuthospora*, *Neottiospora*, *Comatospora*, *Giulia*, and *Neottiosporina* preclude their consideration as suitable genera for this taxon. *Choanatiara* Di Cosmo shows some similarity with *Acrocalymma*, but the pycnidia are thick-walled and the ostiole is at the apex of a lateral sinuate neck, periclinal thickening of the phialides is minute, the distal appendage is sometimes eccentric and subapical, and the basal appendage is in the form of a sheath in one species or is lacking in the type species (Nag Raj & Di Cosmo, 1984). The dissimilarities between the lucerne pathogen and the genera mentioned above are considered sufficient to warrant the establishment of a new anamorph genus to accommodate it.

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REFERENCES


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