LEPTODISCUS AFRICANUS SP.NOV.

Investigations on the mycoflora associated with an *Acacia karroo* community in the Potchefstroom area have revealed that a surprisingly large number of the isolated organisms represent new and undescribed genera and species. One of the fungi isolated from the leaf-litter and superficial soil layers bears a close resemblance to *Leptodiscus*, a monotypic genus erected by Gerdemann (1953). According to the author this genus resembles *Discosia*, *Discosiella*, *Dinamosporium*, *Dinamosporiella*, *Pseudolachnea* and *Didymothozetia* in some of its features but is not congeneric with any of these taxa.

A critical diagnosis of this organism suggests that it could be satisfactorily accommodated in and described as a new species of the genus *Leptodiscus*.

Leptodiscus africanus sp.nov. (Pl. 26)

Fungus imperfectus in cultura descriptus. Coloniae tarde crescentes, prostratae, zonatae, cremeae vel pallide brunneae, hyphis delicatulis saepe aggregatae. Fructificationes (acervuli atypici vel sporodochia) superficiales, hyalinae vel brunneae, e cellulis subglobosis compositae. Cellulae sporogenae obsoletae aut praesentes vel singulae vel concatenatae, hyalinae 3–5 μ diam., conidium singulum aut catervas conidiorum ferentes. Conidia acrogena, blastosporae in cellulis acervuli vel ex hyphis ennata, cylindracea, recta vel curvata, hyalina, una setula subutrinque, 11–17·5 × 2–3 μ, setulis 6·5–13 μ longis. Sclerotia nulla.

Habitat in humo. Typus cultura ex humo sub *Acacia karroo* in Potchefstroom, Transvaal, Africa meridionali, in 1964 a M. C. Papendorf (MCP. 98) isolata, in Herb. PRE 43017, Pretoria, Herb. fungorum Potschefstroom Universitate et CBS coll. (CBS 400.65) in Baarn depositus.

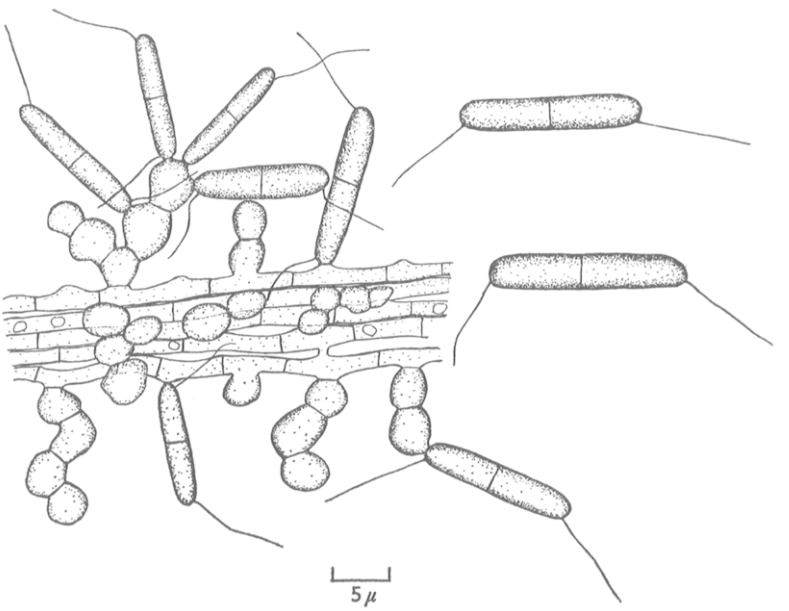
Colonies on potato–carrot agar slow growing and reaching a diameter of 2–4 cm in 14 days, delicate, prostrate and superficial with aerial mycelium lacking except in central region where occasional tufts of ropy bundles develop to a height of 3–5 mm, faintly zonate where spore-masses appear marginally, creamy white to light brown. Hyphae frequently septate, hyaline, 1·5–2·5 μ diam, often aggregated into ropy bundles and anastomosing freely. Conidiophores one- to many-celled, simple or branched, cells more or less globose or irregular, 3–5 μ diam, often aggregated forming dense stroma-like structures bearing abundant conidia and forming disk-like or irregular masses resembling acervuli. Conidia borne directly on hyphae and singly or in groups on cells of conidiophore, sessile or shortly stalked, cylindrical with rounded ends, smooth, thin-walled, hyaline or faintly coloured, medianly 1-septate, occasionally slightly constricted at the central septum, very rarely with 2 or 3 septa, 11·0–17·5 × 2–3 μ, bearing a simple, filamentous setula sublaterally at each end, 6·5 × 13·0 μ.

Isolated from leaf-litter and top-soil of *Acacia karroo* community, Potchefstroom, Transvaal, Republic of South Africa, Jan./Feb. 1964, M. C. Papendorf. (M.C.P. 98). (**PRE** 43017 National Herbarium, Pretoria, Holotype.)

Transfers of the holotype have been deposited in the Centraalbureau

voor Schimmelcultures, Baarn, Netherlands (CBS 400.65) and in the Cryptogamic Herbarium, University, Potchefstroom, South Africa.

This fungus developed successfully on various agar media including potato–carrot, oatmeal, maize, potato–dextrose and hay-infusion agar. Potato–carrot agar was found to be a particularly suitable medium for the study of cultural and morphological characters. Abundant sporulation often hampered the direct observation of morphological details and the removal of superfluous conidia was found necessary. This was accomplished



Text-fig. 1. *Leptodiscus africanus*. Hyphae, conidiophores and conidia.

by removing an agar block from a Petri dish culture, transferring it to a clean, dry specimen slide and washing gently under a moderate flow from a tap. After this treatment relatively small numbers of conidia were found to be still adhering to their bearer cells. Covering with a cover slip made direct observation and even photography possible.

The growth of the organism was more or less similar on all the media employed, the only exception being potato–dextrose agar, on which there was a much more profuse development of aerial mycelium producing a funiculose mat 1–2 mm thick. In contrast to all other cultures those on potato–dextrose were distinctly pigmented and, also on the reverse side, of a greenish grey-black colour while the usual prostrate, marginal mycelial growth was lacking. The aerial mycelium consisted mostly of vertical ropy or ribbon-like bundles on which the spores were borne either directly on the hyphae or on the cells of the conidiophores. Due to the absence of prostrate mycelium of the colonies on this medium the usual acervulus-like fruiting structures were never observed in these cultures.

The general pattern of development and morphology of these cultures

and the size and shape of the conidiophores and conidia were found to be very constant and uniform. In only a single case large numbers of abnormal spores were encountered, these conidia being prominently constricted at the central septum and the two cells conspicuously enlarged to appear distinctly dumb-bell shaped with a width of up to 6·0 μ. There was no obvious explanation for this phenomenon but it could possibly be attributed to a heavy bacterial contamination of the culture.

The fungus described appears to be closely related to *Leptodiscus terrestris* but it does display features which are not in conformity with certain details of the generic diagnosis given by Gerdemann (1953).

First, it does not seem to parasitize leguminous plants, like *Medicago sativa*, readily. Sterilized leaves inoculated with viable spores were never affected in any characteristic way and no fruiting bodies similar to those described by Gerdemann were produced. In addition no sign of the very prominent sclerotial stage mentioned by the original author was observed on either plant material or any of the nutrient media employed.

Gerdemann (1953) emphasized the unique way in which the superficial, radiate, stromatic fruiting body develops from a single central cell. McVey & Gerdemann (1960) reported on the results of a more detailed and thorough investigation confirming the original observations on the development of the fruiting structure. Circular or irregular disk-like 'stromatic' bodies also occur in *L. africanus* but the details of their initiation and development do not correspond with what is found in *L. terrestris*. Instead of arising from a single central cell which develops radially into a disk-like stroma the corresponding structure of *L. africanus* is more probably a localized assemblage of a large number of separate, many-celled and freely branched conidiophores. Gerdemann regards the fruiting structure of *L. terrestris* to be neither a sporodochium nor an acervulus but more probably a 'large, complex, highly developed conidiophore'. This interpretation is certainly not applicable to *L. africanus*.

According to Gerdemann (1953) and McVey & Gerdemann (1960) the conidia of *L. terrestris* are produced in successive layers and are embedded in and held together by a mucilaginous substance. Similar phenomena were never observed in any of the cultures of *L. africanus*.

The conidium of *L. terrestris* is described as being 'allantoid in shape' with the upper end forming a continuous, smooth curve and the lower end tending to be slightly flattened at the point where the spore was attached to the sporogenous cell. Both ends of the conidium are ornamented with a single, simple, filamentous seta. In contrast to this the conidium of *L. africanus* is cylindrical with both ends rounded and with both the setae borne sub-laterally.

There seems to be sufficiently fundamental developmental and morphological differences between this new fungus and the closely related *L. terrestris* to serve as justification for considering the establishment of a new genus to accommodate this type, but it would probably be advisable to postpone a final decision on this issue until further information and material become available.

The work being done on the mycoflora of this area is supported by the Council for Scientific and Industrial Research, Pretoria, and by the Department of Agricultural Technical Services of the R. S. Africa.

The author wishes to express his gratitude to Dr J. A. von Arx, Centraalbureau voor Schimmelcultures, Baarn, Netherlands, for his valuable suggestions and for reading the manuscript and preparing the Latin diagnosis.

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EXPLANATION OF PLATE 26

Leptodiscus africanus

Fig. 1. Conidium, × 3600.

Fig. 2. Hyphae with sessile conidia, × 1600.

Fig. 3. Conidiophores and conidia, × 700.

Fig. 4. Conidiophores and conidia, × 1700.

Fig. 5. Culture on potato–carrot agar showing conidia, aggregation of conidia and part of a fructification on extreme left, × 350.

EXAMINATION OF MYCOLOGICAL SPECIMENS IN THE SCANNING ELECTRON MICROSCOPE

The technique of scanning electron microscopy allows solid specimens to be examined directly. There appears to be no previous published record of fungal structures having been examined in this manner.

Before the introduction of the scanning microscope the only available method for examining the ultra-structure of the surface features of intact microbial specimens involved the preparation of carbon replicas which could then be examined in the transmission electron microscope. Alternatively the cell contents could be removed from the material, e.g. hyphae, spores and the wall preparation then shadowed with metals such as nickel/palladium or gold/palladium before examining in the transmission electron microscope.

The present note reports the results of the examination of the surface features of the conidia of *Acremoniella* sp. **IMI** 111824) in the Stereoscan M.K. II electron microscope (Cambridge Instrument Co., Ltd.). The fungus was isolated from kaolin pellets, containing vanillic acid, during their incubation on the surface of soil (Jones & Farmer, 1967). This organism was examined at the Commonwealth Mycological Institute, Kew, and did not match any culture of the same genus maintained there (personal communication, Dr Onions).

Preparations of aerial hyphae stained with lactophenol-cotton blue (Pl. 27, fig. 3) and examined in the light microscope revealed one-celled conidia enveloped with what appeared to be a net-like veil. For examination in the scanning electron microscope the aerial hyphae, including the