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Ten interesting species of aquatic Hyphomycetes from South Africa

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ABSTRACT

Examination of the foam spora of South Africa has revealed the presence of ten interesting species from nine genera, seven of which are new records for the African continent and three for South Africa. These are *Anguillospora crassa* Ingold, *Condylospora spumigena* Nawawi, *Flabellospora verticillata* Alasoadura, *Lateriramulosa uni-inflata* Matsushima, *Lemonniera alabamensis* Sinclair & Morgan-Jones, *Lemonniera filiformis* Petersen ex Dyko, *Lunulospora cymbiformis* Miura, *Speiropsis irregularis* Petersen, *Tetrachaetum elegans* Ingold and *Tricellula aquatica* Webster.

RÉSUMÉ

ESPÈCES INTÉRESSANTES D'HYPHOMYCÈTES AQUATIQUES D'AFRIQUE DU SUD

L'examen des spores présentes dans l'écume des eaux en Afrique du Sud a révélé la présence de dix espèces intéressantes appartenant à neuf genres; sept d'entre elles sont relevées pour la première fois sur le continent africain et trois en Afrique du Sud. Ce sont: Anguillospora crassa *Ingold*, Condylospora spumigena *Nawawi*, Flabellospora verticillata *Alasoadura*, Lateriramulosa uni-inflata *Matsushima*, Lemonniera alabamensis *Sinclair & Morgan-Jones*, Lemonniera filiformis *Petersen ex Dyko*, Lunulospora cymbiformis *Miura*, Speiropsis irregularis *Petersen*, Tetrachaetum elegans *Ingold et* Tricellula aquatica *Webster*.

INTRODUCTION

The following are some preliminary results of an extensive project under way to document the aquatic hyphomycete flora in South Africa. Among the many well-known aquatic hyphomycetes recovered and the many resulting taxonomic problems generated are ten interesting fungi, each of which is at least a new record for the Republic. Subsequent publications by the authors will include complete lists of all the fungi recorded.

At various sites throughout South Africa, foam samples were recovered from flowing fresh waters and fixed with IKI immediately to prevent germination of the spores. Within no specific time period the samples were filtered through 8 µm pore size millipore filters. The specimens thus collected were mounted in lactophenol cotton blue and identifications made on spore morphology.

AQUATIC HYPHOMYCETES

Anguillospora crassa *Ingold* (Fig. 1A). England is the type locality of this fungus (Ingold, 1958b) and it appears to have a ubiquitous distribution being recorded from Hungary, (Gonczol, 1971), Sweden and Tanganyika (Nilsson, 1964), U.S.A. (Petersen, 1962), West Indies (Hudson and Ingold, 1960), East New Guinea (Tubaki, 1965), Japan (Miura, 1974; Tubaki, 1960) and India (Thakur, 1977). Ingold's (1958b) type is 120–200 µm long × 15–20 µm wide. Frequently our specimens as well as some of other authors (Tubaki, 1960) are up to 4–5 µm narrower. One specimen from the Politsi River in the Debengeni Forest Reserve in the N.E. Transvaal was 225 µm long. Another spore from the same locality was markedly attenuate as figured. *A. crassa* is a new record for South Africa.

Collections examined:

TRANSVAAL. — 2330 (Tzaneen): Politsi River tributary, Magoebaskloof, Debengeni Forest Reserve (–CC), 17 Aug. 1979, R. C. Sinclair. 2430 (Pilgrim's Rest): Blyde River at Junction Hoedspruit-Strijdom Tunnel (–BC), 18 Aug. 1979, R. C. Sinclair; near Mariepskop on Mariepskop-Klaserie Road (–DB), 18 Aug. 1979, R. C. Sinclair. 2530 (Lydenburg): near Sabie (–BB), 19 Aug. 1979, R. C. Sinclair.

CAPE. — 3319 (Worcester): Entrance to Bainskloof Pass, Wellington (–CA), 31 Oct. 1980, A. Eicker.

Condylospora spumigena *Nawawi* (Fig. 1B). Malaysia is the type locality of this fungus (Nawawi, 1976a), although it has often been recorded elsewhere prior to description. *Obstipispora chewaclensis* Sinclair & Morgan-Jones (Sinclair & Morgan-Jones, 1979a) described from Alabama, U.S.A. is very likely the same fungus. It has also been recorded from Japan (Miura, 1974; Tubaki, 1960, 1966), Papua, New Guinea (Tubaki, 1965) and India (Ingold & Webster, 1973). Nawawi's (1976a) type is 10–15 septate and has an overall length of 72–104 µm with a 30–120° bend about halfway through the length with the proximal half being longer. One spore collected near Mariepskop Air Force Base in the N.E. Transvaal was unusual in having no septa and an extra 180° sigmoid bend fitted tightly next to the normal flexion. This may represent a new species. Another spore, as figured, from the same locality has 2 more septae than the type. This spore also has a shorter proximal half which is slightly swollen being 1–2 µm wider than the type but is probably close enough to be considered the same species. Ingold (1956) illustrated a spore closely similar to *C. spumigena* from a river in Ibadan, Nigeria although positive diagnosis is not certain. These collections, therefore, are new records for the African continent.

Collections examined:

TRANSVAAL. — 2330 (Tzaneen): Politsi River tributary, Magoebaskloof, Debengeni Forest Reserve (–CC), 17 Aug.

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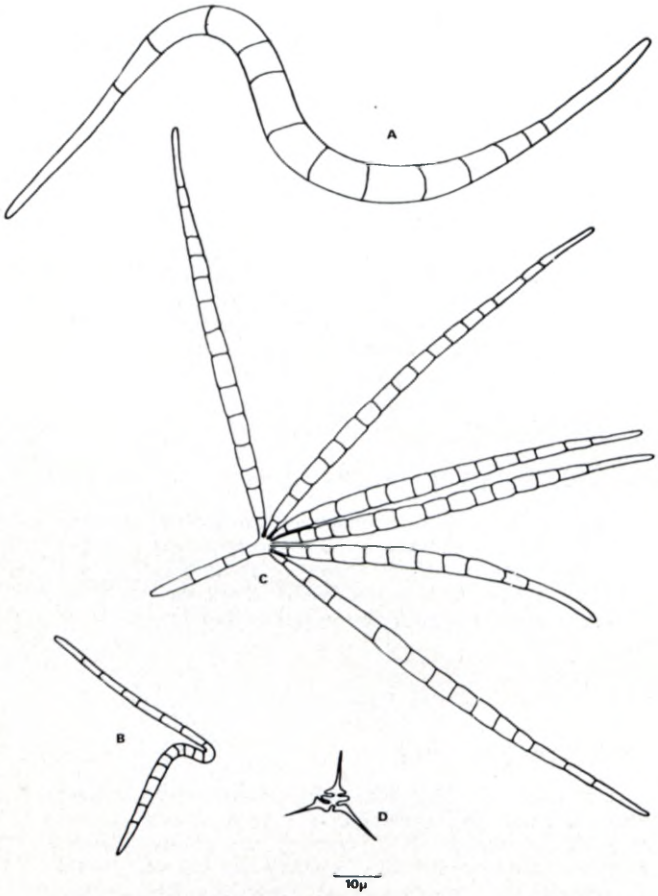

FIG. 1.—A, *Anguillospora crassa;* B, *Condylospora spumigena;* C, *Flabellospora verticillata;* D, *Lateriramulosa uni-inflata.*

1979, R. C. Sinclair. 2430 (Pilgrim's Rest): near Mariepskop Air Force Base (−DB), 18 Aug. 1979, R. C. Sinclair; near Mariepskop on Mariepskop-Klaserie Road (−DB), 18 Aug. 1979, R. C. Sinclair.

NATAL. — 2732 (Ubombo): Mbazwana Road, Sordwana Bay, Zululand (−BC), 31 Jan. 1981, J. V. van Greuning.

CAPE. — 3318 (Cape Town): Kirstenbosch Botanic Gardens (−CD), 21 June 1979, R. C. Sinclair; Table Mountain, near cable station (−CD), 21 June 1979, R. C. Sinclair; Eerste River, Jonkershoek near research facilities at Assegaaibosch (−DD), 21 June 1979, R. C. Sinclair. 3319 (Worcester): entrance to Bainskloof Pass, Wellington (−CA), 31 Oct. 1980, A. Eicker; Darling Bridge over Bainskloof River (−CA), 31 Oct. 1980, A. Eicker.

Flabellospora verticillata *Alasoadura* (Fig. 1C). Nigeria is the type locality of this fungus. Prior to description (Alasoadura, 1968) it was figured as unknown conidia from the U.S.A. (Conway, 1970), West Scotland (Ingold, 1973), West Indies (Hudson & Ingold, 1960), Papua, New Guinea (Tubaki, 1965) and on the African continent from Nigeria (Ingold, 1956, 1959), Sierra Leone (Le'John, 1965), Ghana (Dixon, 1959) and Uganda (Ingold, 1958a). Of all of these records, only that from the U.S.A. indicates the presence of the main axis 'stalk' cell generically characteristic for *Flabellospora.* Ingold's (1973) West Scotland collection does not agree geographically, as Alasoadura (1968) concluded the fungus is tropical in nature. Since description, only a Malaysian collection (Nawawi, 1976b) has been positively identified. Our South African collection, from a border zone between temperate and subtropical climates, is a new record for the Republic.

Collection examined:

TRANSVAAL. — 2430 (Pilgrim's Rest): near Mariepskop on Mariepskop-Klaserie Road (−DB), 18 Aug. 1979, R. C. Sinclair.

Lateriramulosa uni-inflata *Matsushima* (Fig. 1D). New Britain of the Solomon Islands is the type locality of this fungus (Matsushima, 1971). Prior to description this fungus was figured from England (Ingold & Ellis, 1952) and the U.S.A. (Crane, 1968). It has, since description, been recorded from Japan (Miura, 1974) and Czechoslovakia (Marvanova, 1973). Although this species is most often recorded as foam spora, the type was described from leaves in a terrestrial habitat. Marvanova (1973) believes this hyphomycete to be 'water borne' rather than truly aquatic. One of our collections from the area near Mariepskop Air Force Base differs slightly from the type in that the singly opposing branch is not as inflated at the base. Our collections are a new record for the African continent.

Collections examined:

TRANSVAAL. — 2430 (Pilgrim's Rest): near Mariepskop Air Force Base (−DB), 18 Aug. 1979, R. C. Sinclair; near Mariepskop on Mariepskop-Klaserie Road (−DB), 18 Aug. 1979, R. C. Sinclair. 2431 (Acornhoek): junction of Klaserie and Mariepskop Road (−CA), 17 Aug. 1979, R. C. Sinclair.

Lemonniera alabamensis *Sinclair & Morgan-Jones* (Fig. 2A). Previous records of this fungus are known only from the type locality, Alabama, U.S.A. (Sinclair & Morgan-Jones, 1979b). Among our collections there appears to be more variability in the number of septa per radiating branch. The type specimen is described as having 2 septa per branch but our specimens vary in having from 1−4. One collection from the Stellenbosch area was significantly larger, the branches being 55−65 μm × 3,5 μm as opposed to 30−35 μm × 2−3 μm of the type. This specimen is intermediate between *L. alabamensis* and *L. centrosphaera* Marvanova (Descals, Webster & Dyko, 1977). These collections are new records for the African continent.

Collections examined:

TRANSVAAL. — 2430 (Pilgrim's Rest): near Mariepskop on Mariepskop-Klaserie Road (−DB), 18 Aug. 1979, R. C. Sinclair. 2431 (Acornhoek): junction of Klaserie and Mariepskop Road (−CA), 17 Aug. 1979, R. C. Sinclair.

ORANGE FREE STATE. — 2828 (Bethlehem): Golden Gate Highlands Park (−DA), 14 March 1979, R. C. Sinclair.

CAPE. — 3318 (Cape Town): Eerste River on Stellenbosch University grounds (−DD), 21 June 1979, R. C. Sinclair.

Lemonniera filiformis *Petersen ex Dyko* (Fig. 2B). New York, U.S.A. is the type locality of this species and it has only been recorded elsewhere in England (Descals, Webster & Dyko, 1977). Our collections are therefore new records for the African continent.

Collections examined:

TRANSVAAL. — 2330 (Tzaneen): Politsi River tributary, Magoebaskloof, Debengeni Forest Reserve (−CC), 17 Aug. 1979, R. C. Sinclair. 2430 (Pilgrim's Rest): Blyde River at

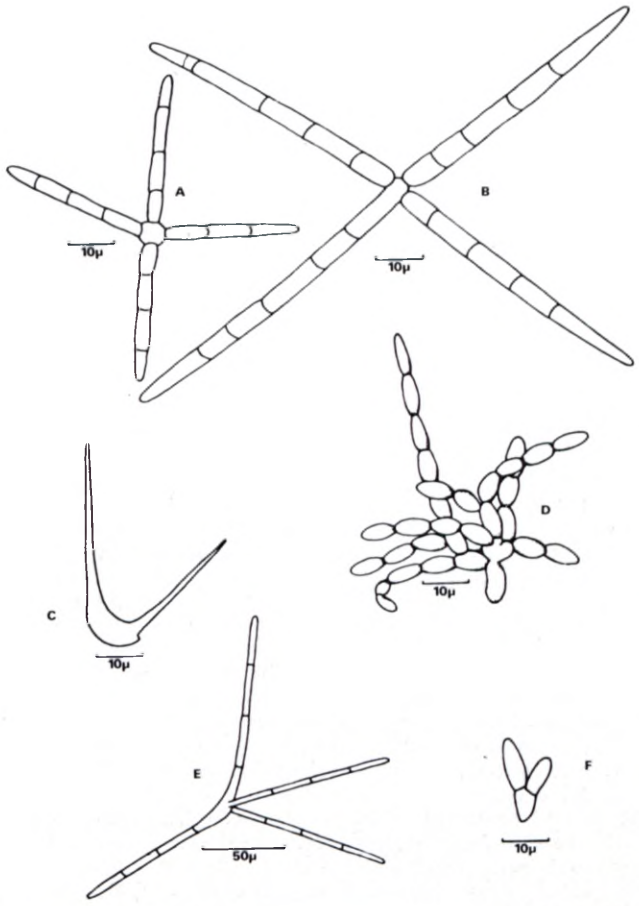

FIG. 2.—A, *Lemonniera alabamensis;* B, *Lemonniera filiformis;* C, *Lunulospora cymbiformis;* D, *Speiropsis irregularis;* E, *Tetrachaetum elegans;* F, *Tricellula aquatica.*

junction of Hoedspruit-Strijdom Tunnel (−BC), 18 Aug. 1979, R. C. Sinclair; near Mariepskop on Mariepskop-Klaserie Road (−DB), 18 Aug. 1979, R. C. Sinclair. 2431 (Acornhoek): junction of Klaserie and Mariepskop Road (−CA), 17 Aug. 1979, R. C. Sinclair.

Lunulospora cymbiformis *Miura* (Fig. 2C). The type locality is Japan and has only been recorded from other localities in that country (Miura, 1972, 1974). Our records are therefore new to the African continent.

Collections examined:

TRANSVAAL. — 2330 (Tzaneen): Politsi River tributary, Magoebaskloof, Debengeni Forest Reserve (−CC), 17 Aug. 1979, R. C. Sinclair. 2530 (Lydenburg): near Sabie (−BB), 19 Aug. 1979, R. C. Sinclair.

ORANGE FREE STATE. — 2828 (Bethlehem): Golden Gate Highlands Park (−DA), 14 March 1979, R. C. Sinclair.

CAPE. — 3318 (Cape Town): Eerste River, on Stellenbosch University grounds (−DD), 30 Oct. 1979, A. Eicker.

Speiropsis irregularis *Petersen* (Fig. 2D). New York, U.S.A. is the type locality of this species (Petersen, 1963). Prior to description, spores of this fungus appear to have been recorded among unknown conidia types from Canada (Ingold, 1960a) and Hungary (Gonczol, 1971). Subsequent to description, Miura (1974) recorded this fungus from Japan but we question his identification. From his illustration one does not get the impression that the spore developed as a result of acropetal cell proliferation as is described for the type of the genus, *Speiropsis pedatospora* Tubaki (Tubaki, 1958), as well as for the type of Petersen's species. Our collections are new records for the African continent.

Collections examined:

TRANSVAAL. — 2430 (Pilgrim's Rest): near Mariepskop Air Force Base (−DB), 18 Aug, 1979, R. C. Sinclair; near Mariepskop on Mariepskop-Klaserie Road (−DB), 18 Aug. 1979, R. C. Sinclair.

Tetrachaetum elegans *Ingold.* (Fig. 2E). The type locality is England (Ingold, 1942). This species is cosmopolitan having been recorded from such widespread areas as Ireland (Fenton, 1950), Sweden (Nilsson, 1958), Hungary (Gonczol, 1971), Australia (Cowling & Waid, 1963), Japan (Tubaki, 1960; Miura, 1974) Hawaii (Ranzoni, 1979), and the U.S.A. (Peterson, 1963). Ingold (1958, 1960b) has made collections of this species from Zimbabwe. Our collections are therefore new to South Africa.

Collections examined:

TRANSVAAL. — 2330 (Tzaneen): Politsi River tributary, Magoebaskloof, Debengeni Forest Reserve (−CC), 17 Aug. 1979, R. C. Sinclair. 2530 (Lydenburg): near Sabie (−BB), 19 Aug. 1979, R. C. Sinclair.

Tricellula aquatica *Webster* (Fig. 2F). For this species there is only the type locality, England (Webster, 1959) and one other England collection (Hudson & Sutton, 1964) on record. Our collections from the Olifants River, Transvaal show a wide range of spore sizes, up to twice the size of the type, as figured herein. Some of these larger spores may bear septa in the apical cells. It is possible that they are either unusual forms of the fungus or represent a new species. Further work will clarify this. These collections are new records for the African continent.

Collections examined:

TRANSVAAL. — 2330 (Tzaneen): Politsi River tributary, Magoebaskloof, Debengeni Forest Reserve (−CC), 17 Aug. 1979, R. C. Sinclair. 2430 (Pilgrim's Rest): Olifants River, Manoutsa Park (−BC), 18 Aug. 1979, R. C. Sinclair.

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