

A new species of *Drechslera* on *Tribulus terrestris*

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ABSTRACT

Drechslera multiformis Jooste isolated from *Tribulus terrestris* Linn. hay is described and its morphological characteristics in different cultural conditions are discussed.

An interesting species of *Drechslera* Ito was isolated from *Tribulus terrestris* hay in the course of an investigation on toxigenic fungi in sheep pastures (Kellerman & Marasas 1971). After intensive study this isolate was found to have a unique combination of characteristics which warranted description of a new species.

Drechslera multiformis Jooste, sp. nov.

Coloniae in vitro plerumque himantoideae flocco delicato obsitae. *Mycelium* olivaceo-griseum, viridi-olivaceum vel olivaceo-nigrum. *Hyphae* submelleae vel atro-melleae, lucidae, laeves vel exique verrucosae, septatae, ramosae, 4-7 µm diametro. *Conidiophora* septata, atro-mellea ad umbrina basaliter fere flexuosa, conidiifera parte geniculata, plerumque 2-7 geniculis, 3-7 µm diametro et usque ad 300 µm longitudine, saepe ramosa ramis imparibus, saepe conidiis holoblasticis pseudoseptatis obovatis vel clavatis ad conidiophora affixa terminantia. *Cellulae conidiogenae* exiguae ad cicatricem conidicam inflatae, verrucosae et circa porum atro-umbrinae. *Conidia* 32,0-80,0 × 15,0-30,0 µm, solitaria, laevia variabilia, obovata, ellipsoidea, clavata vel teretiusecula, recta vel exigue curvata, latitudine maxima fere aut in media aut parte superiore sua, plerumque leniter ad apicem rotundatum vel rostellatum attenuata, interdum geniculata vel apicaliter furcata, 1-7 pseudo-septis, isabellina ad umbrina, extremis basilaribus apicalibusque aut similiter aut dilute coloratis, raro pseudorostrum conidiophoro secundario habent, hilo inconspicuo.

Habitat in *Tribulus terrestris* Linn. foeno, Bloemfontein, Africa australis.

Typus ut siccata cultura PREM 44794 et IMI 165250.

Colonies in vitro mostly velvety with delicate floccose overgrowth. *Mycelium* olivaceous grey, greenish olivaceous or olivaceous black. *Hyphae* pale to dark honey, bright, smooth or slightly roughened,

septate, branched, 4-7 µm in diameter. *Conidiophores* septate, dark honey to umber, basally mostly flexuous, 3-7 µm in diameter, and up to 300 µm long, conidium bearing part geniculate mostly with 2-7 geniculations, often branched with branches unequal, often terminating in holoblastic pseudoseptate, obovoid or clavate conidia remaining attached to the conidiophore. *Conidiogenous cells* slightly swollen at the conidial scar, verruculose and dark umber around the pore. *Conidia* 32,0-80,0 × 15,0-30,0 µm, smooth, variable, obovoid, ellipsoidal, clavate, or somewhat cylindrical, straight or slightly curved, maximum width mostly in the centre or upper part of the conidium, mostly tapering gently to a rounded or somewhat beaked tip, occasionally forked or geniculate, pseudoseptate with 1-7 pseudosepta, isabelline to umber, basal and apical ends similarly or lighter coloured, rarely with a false beak serving as a secondary conidiophore, hilum inconspicuous.

Transfers of the holotype have been deposited in the Potchefstroom University Culture Collection as No. 1215 and in the Centraalbureau voor Schimmelfcultures, Baarn, Netherlands as No. CBS 480.74.

METHODS

Owing to the known variability of members of the genus, the morphological characteristics of this species were studied following growth of the fungus in different cultural conditions. A culture originating from a single spore isolate was subcultured on Difco malt agar (MA), Difco potato-dextrose agar (PDA) and oatmeal agar (CBS-recipe)* (OA). Cultures were incubated at 20 °C, 25 °C, and 30 °C. Colony diameter was measured after 10 days and permanent mounts were made in Cunninghams mounting fluid (Cunningham, 1972). All microscopic observations were made on the fungus mounted in this medium. The conidiophore and conidium dimensions are summarized in Table 1. All colour designations are according to Rayner (1970).

* 30 g oatmeal boiled for 1h on low heat in 1 l water, strained and the filtrate made to 1 l, autoclaved for 1h at 100 kPa before addition of 15 g agar per l and final autoclaving for 20 min at 100 kPa.

TABLE 1— Colony diameter (mm) and conidium dimensions (µm) of *Drechslera multiformis* on different media after 10 days

Culture medium	Temperature °C	Conidial length (range and average)	Conidial width (range and average)	Number of septa	Colony diameter
Oatmeal agar	20	43-80 (67,6)	19-27 (23,6)	3-5	60
	25	45-75 (60,0)	17-25 (22,6)	3-6	60
	30	48-75 (62,1)	15-25 (20,7)	3-5	60
Malt agar	20	40-62 (52,4)	18-30 (24,7)	2-4	35-40
	25	35-62 (54,2)	15-30 (20,9)	3-7	35-40
	30	No sporulation	—	—	30-35
Potato-dextrose agar	20	52-67 (62,9)	22-30 (24,5)	4-5	30-35
	25	32-72 (56,2)	18-28 (22,3)	1-5	35-40
	30	40-70 (57,6)	15-25 (21,1)	3-5	25-30

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RESULTS

The colony growth at different temperatures is variable although fairly constant for each medium. On MA and PDA growth is somewhat restricted and the mycelium mainly olivaceous to greenish black, velvety and the colonies have an irregular edge.

An olivaceous black pigment diffuses into the agar. On OA the growth is rapid and luxurious. The cottony mycelium is olivaceous grey and the colony shows an olivaceous black centre. No pigment was observed in the agar.

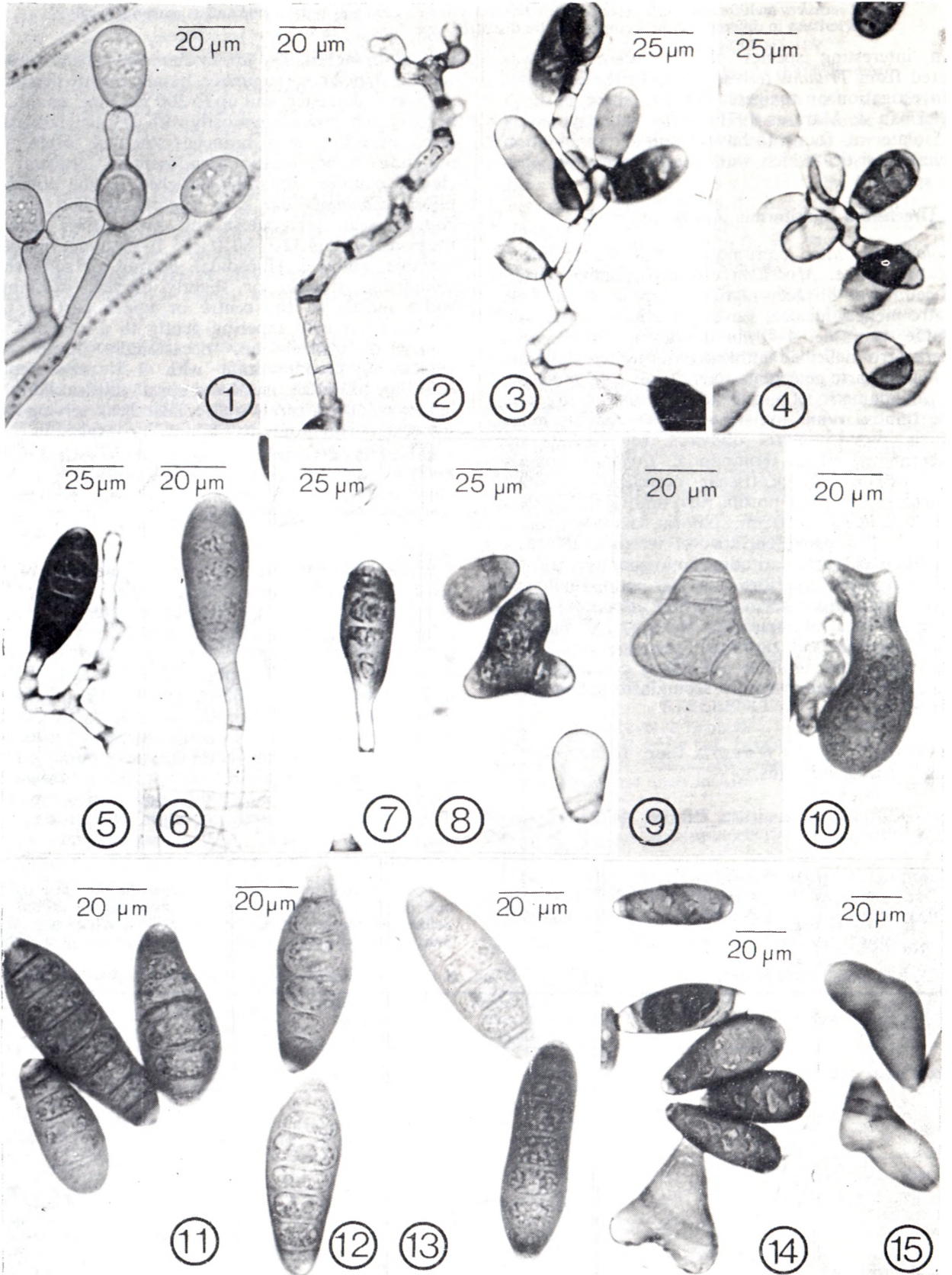


Fig. 1-15.—*Drechslera multiformis*. 1, young conidiophore with conidium with false beak; 2, branched conidiophore; 3, conidiophore; 4, conidium with false beak bearing secondary conidia; 5, branched conidiophore with holoblastic conidium; 6, terminal holoblastic conidium; 7, detached holoblastic conidium; 8-10, forked conidia; 11, ellipsoidal and clavate conidia; 12, beaked and clavate conidia; 13, ellipsoidal and somewhat cylindrical conidia; 14, obovoid and ellipsoidal conidia; 15, geniculate conidia.

The hyphae are light to dark honey, smooth, septate and have the same range of dimensions on all the media. They are often slightly roughened on PDA. The conidiophores are generally more darkly pigmented than the mycelium. Branching occurs regularly, but not predominantly (Figs. 2, 5). A feature of the conidiophore is the slight inflation near the conidial pore and the slightly verruculose and darkly pigmented area around the pore. The conidiophore varies at different temperatures. On PDA about 3-7 geniculations were observed (Fig. 3), while only 1-2 occurred at 30 °C. A similar observation was made on OA, although at lower temperatures the geniculations were more evenly spaced. A singular characteristic of this fungus is the production of single holoblastic terminal conidia on some conidiophores (Fig. 6). These conidia have their outer walls continuous with that of the conidiophores and generally remain attached to the conidiophore. However, it can become detached by breaking at the septum, which separates it from the conidiophore (Fig. 7). These terminal holoblastic conidia are observed in old as well as young cultures and is predominant on PDA at 30 °C.

The conidia are extremely variable in shape (Figs. 8-15). Typically they are obovoid or ellipsoidal and with the apical end tapering to a somewhat beaked tip. However, many variations of this shape occur on the various media and at the different temperatures. On OA the conidia are generally ellipsoidal and tapering to a rounded tip. Forked or geniculate conidia (Figs. 8, 9, 10, 15) occur at 20-25 °C, while the terminal holoblastic conidia are common at 30 °C. On MA at 20-25 °C the conidia are generally obovoid to clavate and conidia with false beaks bearing secondary conidia (Figs. 1, 4) occur occasionally. On PDA at 20 °C the conidia are mainly obovoid. However, terminal holoblastic conidia occur commonly at 25-30 °C, but forked conidia are rare at these temperatures.

CONCLUSIONS

Although this species has some features in common with other *Drechslera* spp., it has distinctive characteristics. It differs considerably in conidial morphology from other *Drechslera* spp. with branched conidiophores such as *D. miyakei* and *D. ravenelii* (Ellis 1971). *Bipolaris indica* (Wadhani &

Tewari, 1969) has obovoid, apically flattened and occasionally forked conidia. However, it has a prominent hilum which is absent in this species. Forked or geniculate conidia also occur in *Helminthosporium atypicum* (Deshpande & Deshpande, 1966). In *H. atypicum* this is a predominant characteristic compared to the relative rare occurrence of this type of conidia in *D. multififormis*. Furthermore, the terminal holoblastic conidia are absent in *H. atypicum* and its conidia are up to 10-septate compared to the maximum of 7 found in *D. multififormis*.

It may be concluded that *D. multififormis* is characterized by the branched conidiophores, the pigmented verruculose area surrounding the conidial scar and the terminal holoblastic conidia which predominates at temperatures above 25° C.

ACKNOWLEDGEMENTS

Dr W. F. O. Marasas, Plant Protection Research Institute, Pretoria, is thanked for making available the culture of the fungus to the author. Prof. M. C. Papendorf is thanked for his encouragement and the critical reading of the manuscript and Dr M. B. Ellis, Commonwealth Mycological Institute is thanked for his valued opinion on this fungus. The financial assistance of the South African C.S.I.R. and the Department of Agriculture Technical Services is gratefully acknowledged. Mr P. J. W. Jones of the Department of Latin, Potchefstroom University for C.H.E. is thanked for the preparation of the Latin diagnosis.

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