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PERCURRENTLY PROLIFERATING PHIALIDES IN COELOMYCETES

M. H. HASHMI

Department of Botany,
University of Karachi, Karachi-32, Pakistan.

Abstract

The morphology of conidiogenous cells in four coelomycetous genera, *Mastigosporella hyalina, Stegonsporium ovatum, Sphaerellopsis filum* and *Macrodiplodiopsis desmazieresii* is described. Conidiogenous cells are characterized as percurrently proliferating phialides.

Introduction

The modern concepts of conidium ontogeny have evolved mainly from observations on genera of hyphomycetes. The coelomycetes have received less attention because in many cases the small size of the conidiogenous cell makes the ultrastructural or light microscopic studies very difficult. A characteristic feature of many of these fungi is that they produce a plurality of blastic conidia in basipetal succession from the fertile apex, or apices of specialized conidiogenous cells called phialides or annellides. Time lapse light-microscopic studies have demonstrated that in phialides the conidiogenous locus is apparently fixed at the apex of the fertile cell, while in annellides it is located at successively higher levels due to the percurrent proliferation of the fertile cell (Cole & Kendrick, 1969; Morgan-Jones *et al.,* 1972). However, occasionally a phialide after producing conidia, gives rise to another phialide by growing on through its erstwhile fertile apex, then ceases elongation and produces another basipetal succession of phialoconidia. This kind of percurrent proliferation of phialides resembles annellidic ontogeny (Kendrick, 1971) with the difference that in the latter mechanism only one conidium is formed between proliferations (Hughes, 1953, 1968; Morgan-Jones *et al.,* 1972).

In this paper four coelomycetous genera bearing percurrently proliferating phialides have been reported. The information confirms and extends the earlier observations of Morgan-Jones *et al.,* (1972).

Materials and Methods

Temporary mounts of conidiogenous cells of *Mastigosporella hyalina, Stegonsporium ovatum, Macrodiplodiopsis desmazieresii* and *Sphaerellopsis filum* were observed under a phase-contrast microscope. Photomicrographs were taken under phase-contrast illumination with an Exakta camera attached through a bellows to a Zeiss model GFL microscope equipped with a Zeiss planapochromat oil immersion objective lens in conjunction with X10 compensating flat – field eye piece and an achromatic-aplanatic condenser (N.A. 1.4). Prints were made at a final enlargement of X2000.

Results and Discussion

The conidiogenous cells of *Mastigosporella hyalina* (Figs. 1 and 2) possess one or two inconspicuous collarettes. In Fig. 2 there are two collarettes, one above the other, indicating that proliferation is percurrent. The majority of conidiogenous cells of this fungus were observed to have only one collarette indicating that percurrent proliferation is probably not the rule. This does not necessarily suggest that in this case only one or two conidia are produced per conidiogenous cell.

The first conidium of *Stegonsporium ovatum* appears to arise holoblastically by the swelling of the whole apex of the conidiogenous cell (Figs. 3 and 4). In Fig. 3 a mature conidium is released and the extending protoplasmic bud, destined to become the next conidium, almost fills the open neck and the conidiogenous cell has three flaring collarettes in close proximity indicating percurrent proliferation. The release of the first conidium, it seems, is effected by a circumscissile break in the periclinal wall at or just below the level of the double septum. In the collarette at the lower left of Fig. 4 the protoplast, following release of a conidium, has retracted some distance below the open end of the conidiogenous cell (arrowhead in Fig. 4), and has assumed a hemispherical shape probably due to forces of surface tension. This situation has also been demonstrated in phialides of *Phialophora lagerbergii* (Cole & Kendrick, 1969), *Cryptocline effusa* (Morgan-Jones *et al.*, 1972) and *Anthopsis deltoidea* (Hashmi 1979). In the same figure the configuration at right is showing the protoplasmic bud proliferating with at least three discernible flaring collarettes (arrows in Fig. 4). This configuration is very similar to that of a typical phialide.

Macrodiplodiopsis desmazieresii has short ampulliform conidiogenous cells usually showing two or three inconspicuous collarettes (arrows in Figs. 5 and 6) which may be close together or some distance apart. These conidiogenous cells are comparable to the percurrently proliferating phialides of *Cryptocline taxicola* (Morgan-Jones *et al.*, 1972).

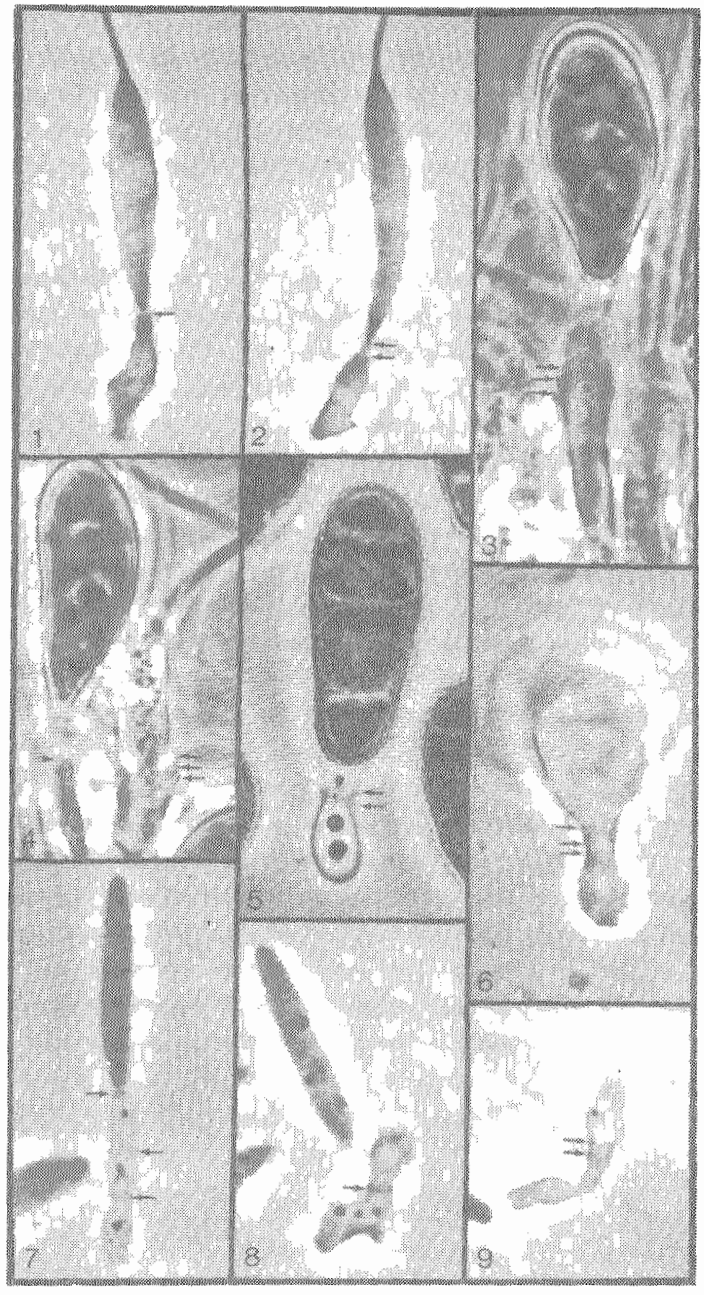

Fig. 1 and 2. *Mastigosporella hyalina*: 3 and 4, *Stegonsporium ovatum*; 5 and 6, *Macrodiplodiopsis desmazieresii*; 7, 8 and 9, *Darluca filum* (All at X2000, taken under phase-contrast illumination). Arrows indicate collarettes.

The conidiogenous cells of *Sphaerellopsis filum* possess one to three inconspicuous collarettes (Figs. 7, 8 and 9) which may be closely or distantly situated. The fertile cell, sometimes, becomes progressively longer (arrows in Fig. 7) by serial percurrent production of conidia resulting in inconspicuous collarettes. The conidia (Fig. 7) seem to originate from a point relatively deep inside the collarette as reported by Cole & Kendrick (1969) in phialidic fungi.

A number of genera of coelomycetes appear to possess conidiogenous cells with flared collarettes similar to those described here. Among them are *Cryptocline* spp., *Comatospora suttonii, Shanoria bambusarum* and *Annellolacinia dinemasporioides* (Morgan-Jones *et al.*, 1972). The proliferation of conidia exhibited by *Mastigosporella hyalina* and *Stegonsporium ovatum* is essentially similar to that of *Cryptocline effusa* (Morgan-Jones *et al.*, 1972) where the flared nature of collarettes conform to the enteroblastic-phialidic type of conidiogenesis. Hammill (1972) has classified *Stegonsporium* sp. as annellidic whereas Sutton (1980) described the conidiogenous cells of both *Mastigosporella hyalina* as well as *Stegonsporium* sp. as holoblastic, annellidic with percurrent proliferations. However, the modified definition of an annellide seems to exclude the possibility of any sort of flaring collerette remaining after secessation of a conidium. In annellides only a minute frill of torn outer wall forms the annular scar and the rest of the apical wall is involved in the differentiation of the next conidium (Kendrick, 1971). In *Macrodiplodiopsis desmazieresii* and *Sphaerellopsis filum* a similar state of affairs exists. The conidiogenous cells become progressively longer by serial percurrent proliferations bearing two or three flared collarettes. Sutton (1980) interprets conidiogenous cells as holoblastic, annellidic with 1-2 percurrent proliferations in the former and that of the latter as enteroblastic, phialidic with 1-3 percurrent proliferations. From a comparison of the definitions and observations given elsewhere (Sutton, 1980; Morganjones *et al.*, 1972; Kendrick, 1971; Sutton & Sandhu, 1968) and the observations recorded here, it is clear that *Mastigosporella hyalina, Stegonsporium ovatum, Macrodiplodiopsis desmazieresii* and *Sphaerellopsis filum* are similar to coelomycetes that produce conidia by percurrent proliferating phialides.

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