

## CONIDIAL ONTOGENY IN *CERCOSPORA CANESCENS* ELLIS & MARTIN<sup>1</sup>

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### ABSTRACT

The conidial ontogeny in *Cercospora canescens* Ellis & Martin, pathogenic to blackgram (*Phaseolus mungo* L.), was studied. Conidial development starts with prolongation of the conidiophore from one side of the distal scar, nine hours after the previous crop of conidia was removed. After some growth for four hours the distal part of the conidiophore completely transforms into a conidium which separates. This type of conidial development which may be described as 'arthrospore-like' differs from the earlier reports.

### INTRODUCTION

The conidial ontogeny is extensively used in classification of hyphomycetes since the classical work of Hughes (1953) on this aspect. He included the genus *Cercospora* Fresenius in section II of hyphomycetes, which is characterized by production of conidia from successively formed new growing points. Apart from the general description of conidial production, ontogeny was studied for a single species *C. kikuchii* in culture (Yeh and Sinclair, 1979). Because of the paucity of information on conidiogenesis in *Cercospora* species, our observations on this aspect in *Cercospora canescens*, a pathogen on blackgram (*Phaseolus mungo* L.) are presented in this paper.

### MATERIALS AND METHODS

Leaves of blackgram infected with *C. canescens*, were collected from the plots raised in the botanical experimental garden of Nagarjuna University. The infected leaves very thoroughly washed to

remove the preformed conidia, and then incubated in humid petriplates. One or more incubated leaves were taken at hourly intervals and the infected portions cut from these leaves were fixed in FAA. The fixation was done upto 15 hours, since preliminary observations showed the conidia are fully formed by that time. Thin freehand sections were taken from the fixed material, stained with trypan blue, mounted in lactophenol and sealed with nail polish. The sections were observed under high power (10×40×) and camera lucida diagrams were drawn.

### OBSERVATIONS

No development of conidiophore was observed upto 8 hours, after previously formed conidia were removed. A finger like projection (6 µm length) of conidiophore from one side of the distal scar was observed after 9 hours. By 10th hour (Fig. 1 a-c) this was slightly pushed to a side as the conidiophore continues to grow. The newly forming portion measured about 12-15 µm and it is thin

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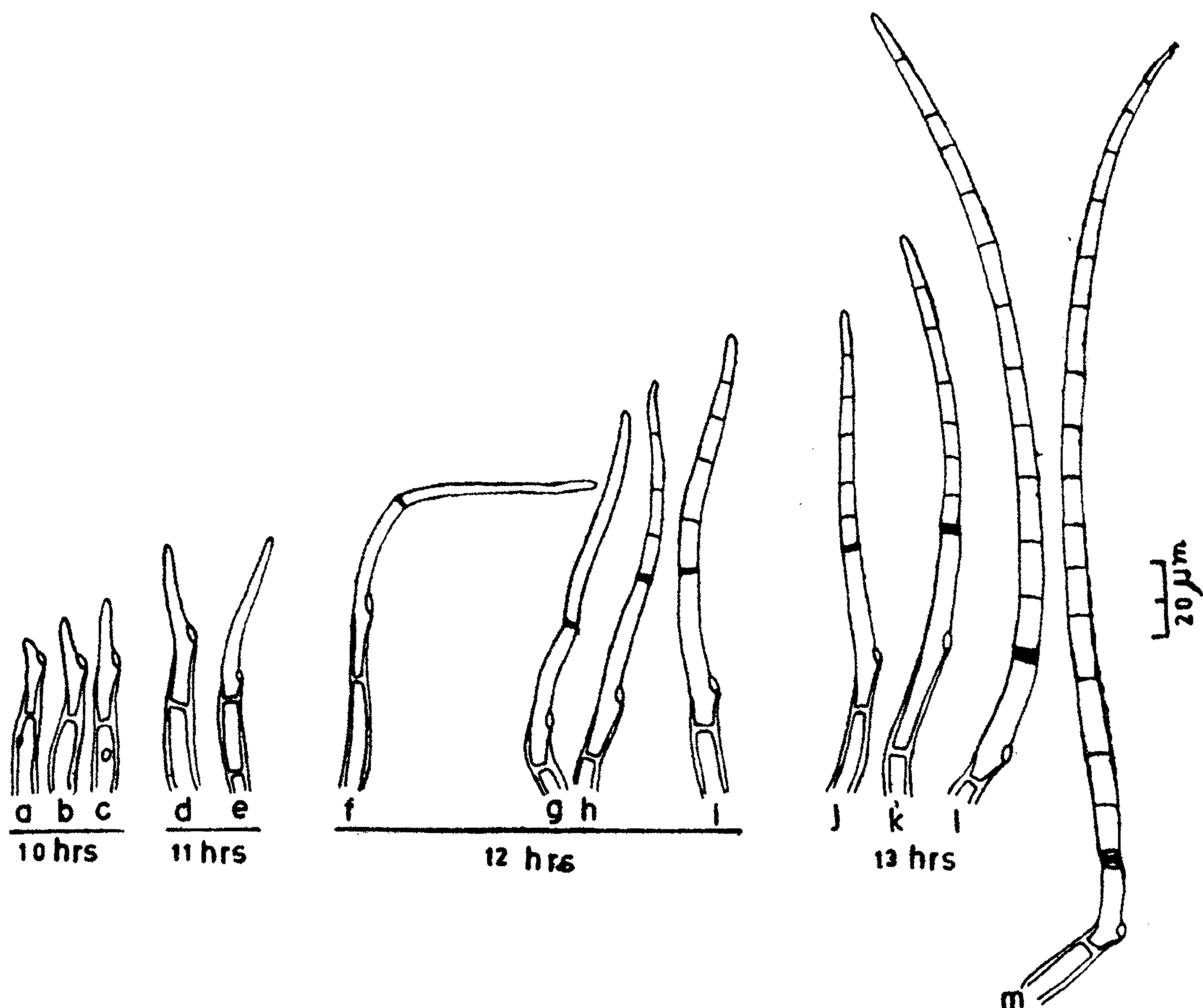


Fig. 1. Stages in the development of conidium from the conidiophore. a, b, c—Stages of development observed after 10 hours. d, e—Stages of development observed after 11 hours. f, g, h, i—Stages of development observed after 12 hours. j, k, l, m—Stages of development observed after 13 hours.

walled and hyaline. The growth of the conidiophore after one hour (Fig. 1 d,e.) attains a length of  $37.5 \mu\text{m}$ . Upto this stage, this portion remains aseptate. By 12th hour, (Fig. 1 f-i) the conidiophore elongates further and about  $20\text{-}30 \mu\text{m}$  above the previously formed scar, black pigment was deposited giving the appearance of a septum ; and even at this stage conidium is not evident, as it looks like a single structure. But it becomes clear that

the upper portion becomes the conidium. Even after the formation of septum, the distal part continues to grow, indicating the continuity of cytoplasm. In some of the conidiophores septa appeared in the distal part by this time.

At the end of 13th hour (Fig. 1 j-l), the distal part clearly appeared as conidium. It attained its maximum length and septa were also formed. A detachment occurred at the pigmented region

resulting in the separation of the conidium from the conidiophore (Fig. 1 m.).

### DISCUSSION

The observations clearly revealed that the conidiophores of *C. canescens* show indefinite growth and the conidia do not develop from a pre-determined growing point on the conidiophore. Further, the continued growth of the distal part even after the appearance of scar region, points out that the pigment might be deposited from the periphery like a ring leaving the central pore for cytoplasmic continuity in the early stages. This explains the presence of paler region in the centre of the scar on detached conidia and on conidiophores. Since the part that developed into conidium is in continuity with the lower portion in the early stages, the entire structure may be referred to as 'conidiophore' and hence, the conidium was formed as a result of delimitation of a portion of the conidiophore. This type of conidial development recalls the formation of arthrospores. This does not conform to the type of conidial development in *C. apii*. (Ellis, 1971 ; Fig. 189) where it was shown that the new coni-

dium forms from the conidiophore tip and scar deposits after the full development of the conidium. Further, in this type of conidial development, it is not possible to bear conidia laterally as well as at the tip at a time, as given in general descriptions by Chupp (1953) and Vasudeva (1963). However, illustrations of Ellis (1971) and general description given by Chupp (1953), and Vasudeva (1963) do not relate *C. canescens*. Since the conidial development was not studied in other *Cercospora* species, it is difficult to say whether the present observations apply in general to other species or not. It is possible that different types of conidial development occur in different species of *Cercospora*.

### REFERENCES

- CHUPP, C. 1953. *A monograph of the fungus genus Cercospora*. Ithaca. New York.
- ELLIS, M. B. 1971. *Dematiaceous hyphomycetes*. C. A. B. England.
- HUGHES, S. J. 1953. Conidiophores, conidia and classification. *Can J. Bot.*, **31** : 577-659.
- VASUDEVA, R. S. 1963. *Indian Cercosporae*, I. C. A. R., New Delhi.
- YEH, C. C. AND J. B. SINCLAIR 1979. Conidium ontogeny and morphology of *Cercospora kikuchii*. *Mycotaxon* **10** : 93-98.