

Colletotrichum gloeosporioides ASSOCIATED WITH LESIONS ON BRANCHES OF
Eucalyptus pellita AFFECTED BY THE "MAL DO RIO DOCE" DISEASE¹ /

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Resumen

El hongo *Colletotrichum gloeosporioides* (Penz) Sacc se aisló de lesiones situadas en ramas laterales de *Eucalyptus pellita* F. Muell. El aislamiento resultó patogénico a plántulas y ramas de *E. grandis* W. Hill ex Maiden y a frutos de *Carica papaya* L., *Psidium guajava* L., *Mangifera indica* L. y *Capsicum annum* L. El significado de este hallazgo se discute en relación con el "Mal do Rio Doce", importante enfermedad de etiología desconocida que daña las especies de *Eucalyptus* en el Estado de Minas Gerais, Brasil.

Introduction

Diseases causing losses to *Eucalyptus* spp. in Brazil have been limited to the *Criphonectria* canker (6, 7), rust (4, 5), damping off and leaf spots caused by *Cylindrocladium* spp. (1, 8) and a disease of unknown etiology called "Mal do Rio Doce" or "Seca de Ponteiros" (3). Although *Colletotrichum* spp. have been isolated from several *Eucalyptus* spp. (2, 9, 10) there is no report of an attack causing consistent field losses in Brazil.

This paper reports the occurrence and pathogenicity of *Colletotrichum gloeosporioides* (Penz) Sacc. isolated from lesions on lateral branches of *Eucalyptus pellita* F. Muell. affected by the "Mal do Rio Doce" disease in Belo Oriente, State of Minas Gerais, Brazil.

Material and methods

Isolation — Stems of ten-month-old plants containing lesions at the base of lateral branches (Figure 1), were collected from five different *Eucalyptus* species (Table 1) in August 1982. Fungal isolation in potato-dextrose-agar (PDA) was performed after surface disinfection with 1% sodium hypochlorite for two minutes. The isolate UnB 750 of *C. gloeosporioides* was obtained.

Inoculation — Seedlings and branches of *E. grandis* W. Hill ex Maiden and fruits of red guava (*Psidium guajava* L.), mango (*Mangifera indica* L.) cv "Bourbon", pepper (*Capsicum annum* L.) cv Ikeda, papaya (*Carica papaya* L.) cv. Havaiano, eggplant (*Solanum melongena* L.) cv. Embu, *S. gilo* Raddi cv. Redondo verde and orange (*Citrus sinensis* Osbeck) cv. Pera, were inoculated with the UnB 750 isolate of *C. gloeosporioides*. Single spore cultures were grown on PDA plates for 8 to 10 days and the conidia produced were removed with sterile distilled water to form a suspension (10^7 cells per ml). This inoculum was sprayed on ten-week-old seedlings of a South African provenance of *E. grandis* and on branches of an eighteen-month-old Rhodesian provenance of the same species. The fruits were inoculated by placing five drops of the spore suspension on their surface within an area delimited by a 2 cm diameter circle. Both plants and fruits were inoculated after rupturing the epidermis with a needle or by simple inoculum spray on healthy materials. Inoculated samples were kept in a moisture saturated chamber for 48 hours before incubation at 25°C.

¹ Received for publication in June 4, 1984

The research was partially supported by "Cia. Agric. e Florestal Sta. Bárbara", "Florestas Rio Doce S/A" and "Acesita Florestal S/A", all three located in the State of Minas Gerais, Brazil.

Thanks are due to Dr. E. W. Kitajima from the "Universidade de Brasília" for the revision of the manuscript, to João M. de Souza, Diassis Anélio and Francisco G. Sá for technical assistance, to José de Ribamar Pereira Frazão for typing the manuscript and to Nestor Bezerra for the photographic work.

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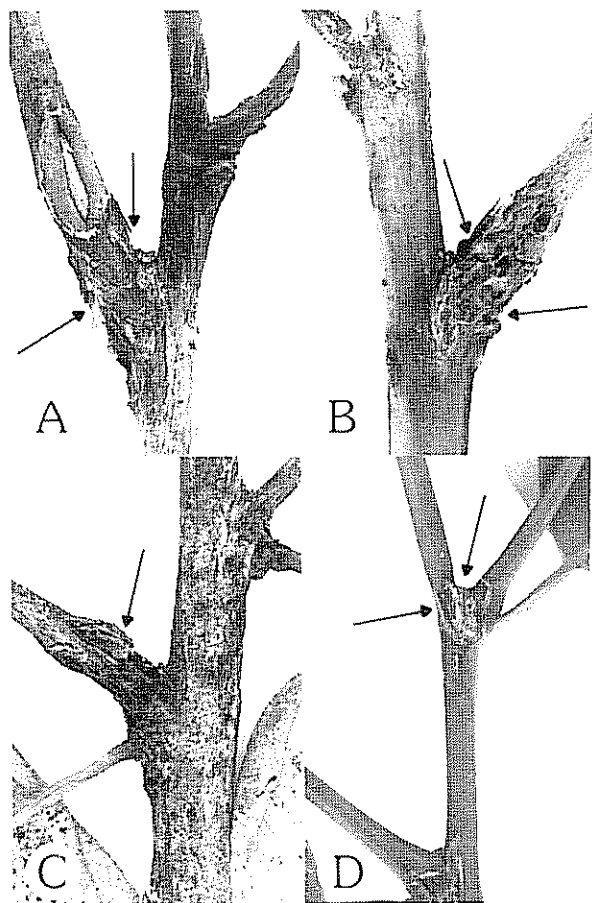


Fig 1. Lesions at the base of lateral branches (arrows) characteristically found on (A) *Eucalyptus grandis* (K. Tablelands provenance), (B) *E. pellita* (NE Coen provenance) and (C) *E. urophylla* (Australia 9003 provenance) affected by the "Mal do Rio Doce". *Colletotrichum gloeosporioides* isolated from (B) *E. pellita* was pathogenic to a Rhodesian provenance of *E. grandis* (D)

Table 1. Isolation of *Colletotrichum gloeosporioides* from five *Eucalyptus* species affected by the "Mal do Rio Doce" disease in Belo Oriente, MG, Brazil, 1982.

Species	Provenance	<i>C. gloeosporioides</i>
<i>E. camaldulensis</i>	Gibb River	-
<i>E. grandis</i>	K, Tablelands	-
<i>E. pellita</i>	NE Coen	+
<i>E. punctata</i>	Manduri	-
<i>E. saligna</i>	Cesanook	-
<i>E. urophylla</i>	Australia 9003	-

-absence or +presence of *C. gloeosporioides* on lesions at the base of lateral branches

All experiments were done with three replicates, and sterile water replaced the spore suspension on the control treatments. Results were recorded a week and three weeks after inoculation on fruits or seedlings and branches, respectively. Reisolations from the inoculated areas presenting lesions always produced typical colonies of *C. gloeosporioides*.

Results and discussion

C. gloeosporioides was consistently isolated from lesions found on lateral branches of ten-month-old *E. pellita* (NE Coen provenance) affected by the "Mal do Rio Doce" (Figure 1). Although *E. grandis*, *E. camaldulensis* Dehnh., *E. punctata* DF., *E. saligna* Sm and *E. urophylla* S T. Blake showed similar symptoms, attempts to isolate the fungus resulted negative (Table 1).

When inoculated on *E. grandis*, the UnB 750 isolate was pathogenic on lateral branches of eighteen-month-old plants and killed the top of ten-week-old seedlings

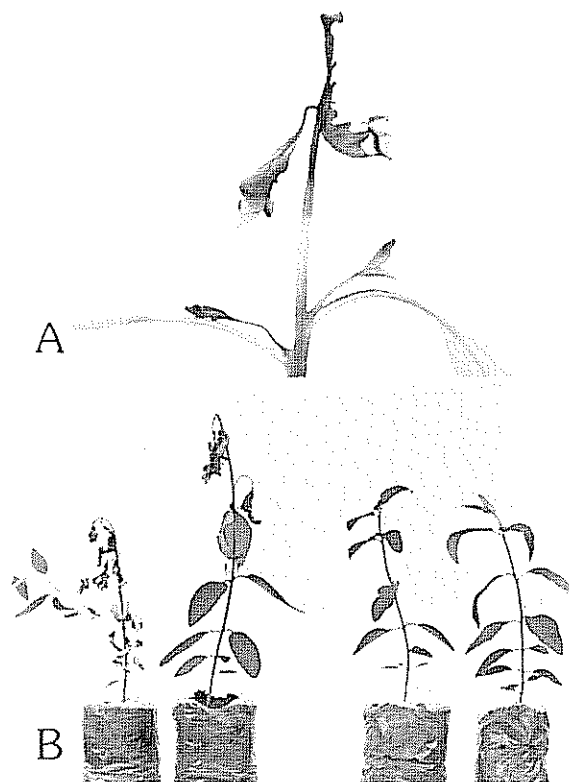


Fig 2. Seedling blight due to infection of a South African provenance of *E. grandis* by *Colletotrichum gloeosporioides* (isolate UnB 750) spray inoculated on intact seedlings (A) or on seedlings punctured with a hypodermic needle (B), at 24 ± 2 C using a conidial suspension containing 10^7 cells per ml

The etiology of "Mal do Rio Doce" disease is not known. Although air pollution, flooding followed by a period of water stress, mineral toxicity or mineral deficiency are being considered as possible primary causes of this syndrome, fungal infection is not definitely its main cause (3). However, infection by *C. gloeosporioides* can contribute to some of the dieback and girdling of branches found in the field, as seen in the inoculation of a susceptible species (Figures 1 and 2). Further characterization of the isolate through the inoculation of fruits of species known as hosts of *C. gloeosporioides* resulted in higher pathogenicity towards guava, mango and papaya as compared to three solanaceous species and orange (Figure 3 and Table 2).

It is important to determine if isolates causing anthracnose on those fruit crops can infect *Eucalyptus*. Levels and genetic variability of the fungal inoculum in the field, possible involvement of other

hosts as inoculum sources and the host range of *C. gloeosporioides* within the genus *Eucalyptus*, are major research lines to be considered in the future.

This is the first record of *C. gloeosporioides* on *Eucalyptus pellita* in Brazil. The data presented do not indicate that this fungus will cause losses in the area, although its high pathogenicity obviously suggests a potential for epidemic action.

Bitancourt (2) found three *Eucalyptus* species attacked by *C. eucalypti* and Viegas (10) indicated *Glomerella eucalyptidea* Avena-Saccá as pathogenic to seven other *Eucalyptus* species and listed *Gloeosporium eucalypti* McAlp. (= *C. gloeosporioides* Penz.) as pathogenic to *E. carynocalix* F. Muell. The relationship between the UnB 750 isolate and those fungi was not established.

Table 2. Pathogenicity of *Colletotrichum gloeosporioides* (UnB 750 isolate) to seedlings of *Eucalyptus grandis* and to fruits of seven other species.

Host ¹	Pathogenicity ²	
	Wound inoculation ³	Intact surface inoculation
<i>E. grandis</i>	+	+
<i>Psidium guajava</i>	+	+
<i>Mangifera indica</i>	+	+
<i>Carica papaya</i>	+	+
<i>Capsicum anuum</i>	+	—
<i>Solanum melongena</i>	—	—
<i>S. gilo</i>	—	—
<i>Citrus sinensis</i>	—	—

1 Except for the 2 month old seedlings of *E. grandis* (South African provenance) the other inoculations were on ripening fruits of Red guava, "Bourbon" mango, "Havaiano" papaya, "Ikeda" pepper, "Embu" eggplant and "Pear" orange.

2 Inoculated material was kept for 48 hours in moisture saturated conditions before incubation for 3 weeks at 25°C (seedlings) or one week at 30°C (fruits). The isolate UnB 750 was obtained from branch lesions present on *E. pellita* affected by "Mal do Rio Doce" disease.

3 Epidermic wounds produced by a hypodermic needle.

Summary

Colletotrichum gloeosporioides (Penz.) Sacc. was isolated from lesions on lateral branches of *Eucalyptus pellita* F. Muell. The isolate was pathogenic to seedlings and branches of *E. grandis* W. Hill ex Maiden and to fruits of *Carica papaya* L., *Psidium guajava* L., *Mangifera indica* L. and *Capsicum anuum* L. The significance of this record is discussed in

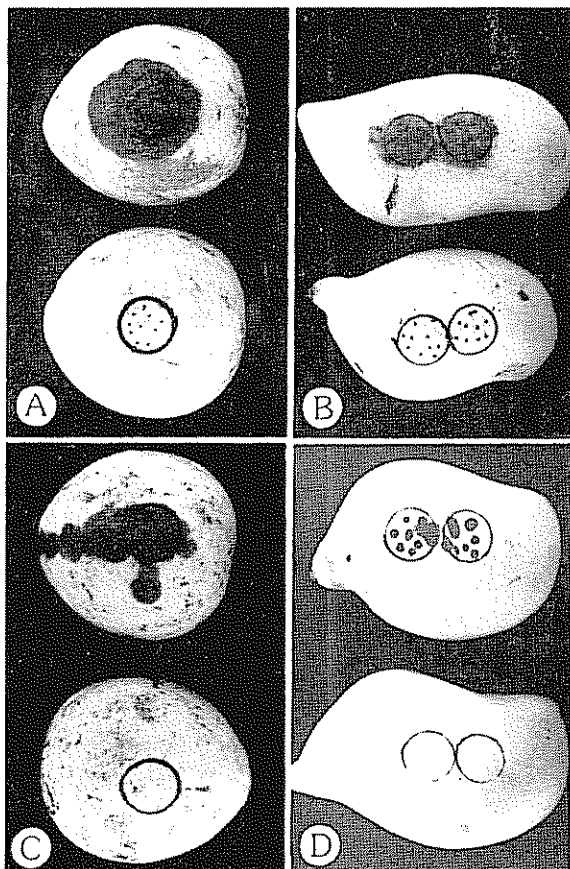


Fig. 3. Infection of Bourbon mango (*Mangifera indica*) and Red guava (*Psidium guajava*) by *Colletotrichum gloeosporioides* (isolate UnB 750) using drops of conidial suspensions (10^7 cells per ml) placed on punctured fruit epidermis (A and B) or on unwounded epidermis (C and D), at 30°C.

relation to the "Mal do Rio Doce", an important disease of *Eucalyptus* spp. of unknown etiology present in the State of Minas Gerais, Brazil.

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