

Phomopsis canker on weeping fig in Newfoundland¹

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Phomopsis cinerescens and a *Botryodiplodia* sp. were isolated in pure cultures from cankers on *Ficus benjamina*, weeping fig tree, grown in a shopping mall, St. John's, Newfoundland. Analysis of the growing conditions suggested the trees were being subject to stress induced by light, nutrient and medium factors, *inter alia*. This report is the first of *P. cinerescens* on *F. benjamina* in Canada. It is hypothesised that the fungus was introduced with the trees, penetrated through bark wounds, and incubated under conditions stressful to the well-being of the tree.

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On a isolé *Phomopsis cinerescens* et une espèce de *Botryodiplodia* en cultures pures de chancres infestant *Ficus benjamina*, figuier pleureur cultivé dans un mail commercial de Saint-Jean (Terre-Neuve). L'analyse des conditions de croissance donne à penser que les arbres ont fait l'objet d'un stress provoqué par certains facteurs comme, entre autres, l'éclaircissement, les apports nutritifs et le substrat. Il s'agit de la première mention de la présence de *P. cinerescens* sur *F. benjamina* au Canada. Il semblerait que le champignon a été introduit avec les arbres, a pénétré par les lésions de l'écorce et a profité de conditions stressantes (pour les arbres) pour entrer en incubation. On recommande de la bouillie bourguignonne comme moyen de lutte.

Introduction

Weeping fig or banyan tree (*Ficus benjamina* L.) displays an epiphytic habit (17) in its native environment (Malaysia) and Bailey (2) described it as a rather unimportant tree horticulturally. In the last decade, the weeping fig has become somewhat ubiquitous as a specimen tree in offices and shopping malls (9), and the object of several studies related to its acclimatization and culture in an artificial environment (5, 6, 10). In this novel environment it is said to be trouble-free but "meticulous in its demands" for light, water, nutrients and constancy of temperature (9).

Ten specimens of weeping fig were shipped to St. John's, Newfoundland, in a constant temperature refrigerated van (temperature unknown) from Florida in August/September 1978 for display in a local shopping mall. Transshipment time was 10 days. Specimens were planted in above-ground (1 m³, Fig. 1A, a) or below-ground (2 m³) concrete containers. The planting medium was soil amended with poultry manure and lime, and topped with a 10 cm layer of bark chips. The large containers were protected by grill-work (Fig. 1A, b). Tree height ranged from ca. 3 m to 9 m; the span of the tallest specimen was ca. 5 m. The trees were watered, misted and supplied with soluble 20:20:20 weekly. During the following months the trees produced abundant, healthy-looking foliage.

The purpose of this paper is to describe an outbreak of phomopsis canker on these interior-grown weeping fig trees, and to draw attention to this first report of the causal agent in Newfoundland.

Materials and methods

In April 1980 (20 m after planting in the shopping centre), a 4-m long branch exhibited wilt (Fig. 1A): 24 hr. later the foliage was dead. At the base of the branch a 40 cm X 10 cm lozenge-shaped diffuse, darkened canker, slightly sunken, was found (Fig. 1B). After the branch was removed, extensive discoloration was found to extend for more than 2 m above the canker, basipetally into the trunk (Fig. 1C), and radially more than ³/₄ cross-sectional area.

On examining the remaining trees, other cankered areas were identified which were mainly in the lower parts of the trees. Small areas were found on some mid-tree branches. Discolored patches were also found that did not fit the generalized shape of a diffuse canker (Fig. 1D), and browning was evident under the bark of these areas. After two months observation, more of these anomalous discolorations became apparent, their shapes and directions of slant being very suggestive of pressure by rope or some similar binding material. Likewise, after two months, an excised canker (25 cm) was found which displayed further growth of 2-3 cm into the surrounding bark.

The most severe cankers were excised with a sterilized pruning knife. Exposed areas were sterilized with shellac paint and, although not recommended by Tattar (16), a number of treated areas were covered with asphalt paint. Fungicidal treatments are also available (12, 13).

Stem and bark tissue pieces were surface-sterilized (10% javex, 1 min.) and plated out on freshly poured PDA. Dark/black colonies were obtained: two fungi were identified, *Botryodiplodia* sp. and *Phomopsis cinerescens* (Sacc.) Trav. (P. LeClair, personal communication).

Discussion

Although both genera contain parasitic members, *P. cinerescens* is the primary cause of fig canker (1). The association of *Botryodiplodia* and *Phomopsis* spp. is an

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interesting one since a similar association was demonstrated in the etiology of rose stem desiccation in Brazil (14). Circumstances curtailed the application of Koch's postulates to the fig complex.

Phomopsis is the imperfect stage of *Diaporthe*, a cosmopolitan fungus with a broad host range. *Phomopsis* spp. have been associated with leaf spots, twig blights, dieback, stem galls and cankers (3, 7, 13). Of the wide group of plants which display these symptoms, *Phomopsis* has been reported in Canada only on Juniper, Siberian Crabapple and cultivated apple, *Cupressus macrocarpa*, gardenia, pine and Douglas-fir (4). The only previous report of *Phomopsis* from Newfoundland was of *P. juniperovora* on imported ornamental junipers (15); the other occasions were reported from Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba and British Columbia (4). *Phomopsis* spp. have recently gained recognition as producers of hepatotoxins injurious to farm animals (8).

Phomopsis cinerescens has not been reported on *Ficus benjamina*, and not at all from Canada; of 201 references to *Phomopsis* spp. between 1970 and 1978, none referred to *P. cinerescens*. *P. cinerescens* has been isolated from *Ficus carica* in Europe where it is responsible for fig branch and twig canker; in North America the fig is chiefly cultivated in California, Louisiana and Texas (1). It is concluded, therefore, that *P. cinerescens* has a limited distribution, and was probably imported into Newfoundland with the host trees, as was surmised for *P. juniperovora* (15).

Tattar (16) emphasized stress and vigor in the etiology of tree diseases. In acclimatization work (5, 6, 10) with *F. benjamina*, it was demonstrated that shade (duration, intensity), fertilizer, rooting medium, and watering influenced leaf density and drop, root/leaf carbohydrate ratios and tissue mineral levels. Considering the stresses applied to the affected trees through transport, mechanical injury and environmental factors, it is highly likely that the trees were predisposed to infection. For example, at noon on a clear day (July 31), 5% of the foliage was sunstruck and registered 43 klx, 2.4 m away the light registered 1 klx; this must be compared with Conover and Poole's (6) reading of 30 klx for 30% sunlight on experimental trees. *Phomopsis* spp. are wound invaders (7, 11). Since *P. cinerescens* is an introduced species and the hosts appear to have suffered

laceration damage, it is suggested the fungus was present at time of original shipment, entered through wounds, and developed under a stress syndrome.

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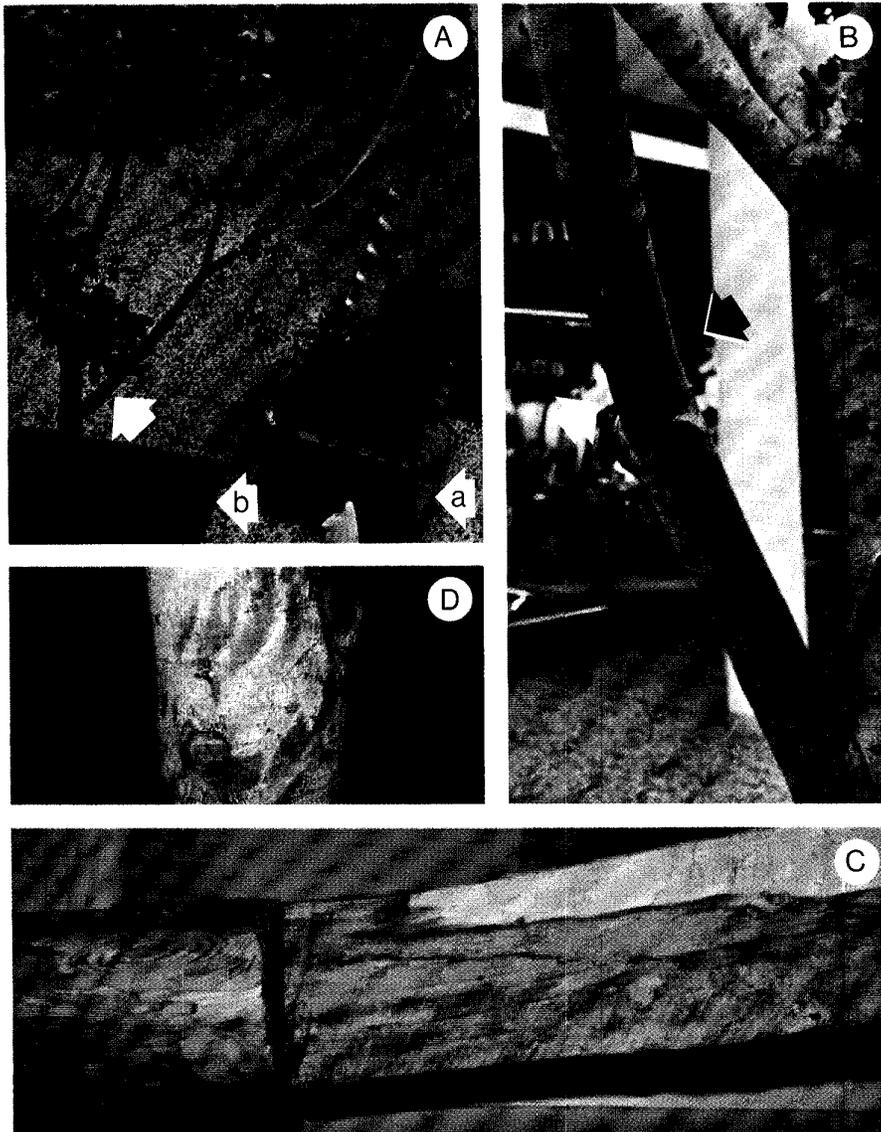


Figure 1. (A), *F. benjamina* branch exhibits wilt and foliar dessication. General view of large potted tree, a - 1 m³ container, b - grill-work. (B), Large, 40 X 10 cm, canker at base of branch exhibiting wilt. (C), Cross and longitudinal sections of branch displaying extent of internal discoloration. (D), An excised canker displaying further growth, 2-3 cm, two months after excision.

