

## Cercospora Leaf Mold of Tomato

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Florida Agricultural Experiment Station Journal Series Paper No. 5072.

Accepted for publication 13 September 1973.

### ABSTRACT

A new leaf disease of tomato not previously reported in the United States is described. The disease is caused by *Cercospora fuligena* and produces indistinct leaf

discoloration coalescing in advanced stages and defoliating susceptible tomato plants.

Phytopathology 64:443-445.

*Additional key words:* resistance, susceptibility, foliar spot.

### ABSTRACTO

Se anota una nueva enfermedad foliar del tomate no antes encontrada en los Estados Unidos. La enfermedad causada por *Cercospora fuligena* produce manchas

descoloridas reuniéndose en estado avanzado y deshojando variedades susceptibles.

*Palabras claves adicionales:* resistencia, susceptibilidad, mancha foliar.

*Cercospora* leaf mold of tomato (*Lycopersicon esculentum* Mill.) caused by *Cercospora fuligena* Roldan was first described by Roldan (7) from The Philippines. The first record of a *Cercospora* leaf spot on tomato was reported by Solheim and Stevens (9) in 1931, who considered a *Cercospora* sp. from tomato stems to be *C. canescens* Ellis and Martin. A second report of a *Cercospora* sp. on tomato was made by Roger (6) in 1936, who found it on tomato leaves at La Me, Ivory Coast. He also considered the *Cercospora* sp. involved to be *C. canescens*, but gave no description of the symptoms; however, he also reported *Corynespora cassicola* growing in the *Cercospora* lesions. Yamada in 1951 (10) reported a new leaf spot of tomato in Japan caused by a *Cercospora* sp.

Previous reports in the U.S. literature of *Cercospora* leaf spots on tomato were considered doubtful by Chupp (1). Reports from other countries have attributed the indistinct leaf discolorations of tomato leaves to other *Cercospora* such as *C. diffusa* (3), *C. canescens* (9), and *C. cruenta* (2). Chupp (1) in his "Monograph of the Genus *Cercospora*" considered the reported *Cercospora* spp. to be erroneous and indicated that the indistinct leaf spots were most likely caused by *C. fuligena* since the principal difference between symptoms caused by *C. fuligena* and other *Cercospora* spp. is the indistinct discolorations of the lesions of *C. fuligena* as opposed to the definite formation of spots by other *Cercospora* spp. (1).

Although *Cercospora* leaf mold was first observed by the authors in 1970 on leaves of a 'Tip-Top' tomato plant grown near Tampa, it was not detected in fields of 'Walter' and 'Florida MH-1' cultivars in Collier County, Florida, until October 1971.

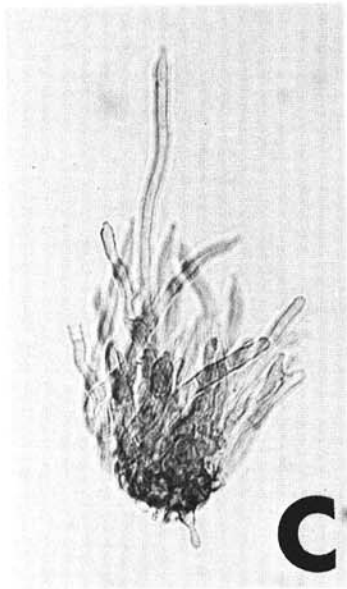
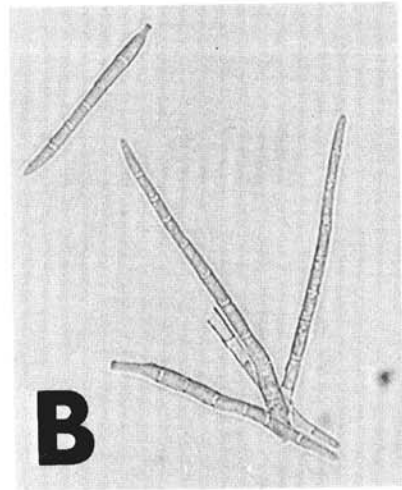
This paper reports for the first time the occurrence of *Cercospora* leaf mold of tomato in the

U.S. and summarizes a series of observations and inoculations on tomato cultivars.

**MATERIALS AND METHODS.** — Naturally infected tomato leaves were sterilized with 5% Clorox (5.25% sodium hypochlorite) for 1-2 minutes and plated on potato-dextrose agar (PDA) and V-8 juice agar (V-8A). Inoculum was prepared from pure 14 to 21-day old cultures of *C. fuligena*. Culture surfaces were scraped with a sterile scalpel and sterile deionized water was added to form a concentrated mycelium-spore suspension which was filtered through two layers of cheese cloth and applied to tomato plants with a DeVilbiss atomizer. Four groups of four greenhouse-grown tomato plants of the cultivars 'Homestead', Walter, Florida MH-1, and 'Floradel' were covered with plastic bags 24 h before inoculation.

Three groups of four plants were sprayed with a spore suspension of *C. fuligena* (20 conidia per  $\mu$ liter). One group was sprayed only with deionized water and served as an inoculated control. All plants, including the controls, were kept under plastic bags for 48 h to insure conditions of adequate moisture suitable for infection.

**RESULTS.** — *Pathogenicity.* — *C. fuligena* produced an indistinct leaf discoloration on Florida MH-1 plants during the first 7 days after inoculation (Fig. 1). Lesions had no definite margins on either upper or lower leaf surfaces. Fourteen days after inoculation, typical lesions showed an indefinite discolored halo surrounding dead tissue on both the upper and lower leaf blade tissues (Fig. 1). These advanced symptoms were infrequently observed in the field, as lesions generally occur in groups rather than individually. Under humid conditions, conidial production could be observed mostly on the lower leaf surface. The cultivars Walter and Florida MH-1 were equally susceptible to the disease, while



**Fig. 1-(A to D).** Early and advanced symptoms of *Cercospora fuligena* on the surfaces of a 'Walter' tomato leaflet. **A)** Faint depressed, chlorotic discolorations of early symptoms. **B)** Typical conidia varying in length from 25-70  $\mu\text{m}$  in length and 3.6-5  $\mu\text{m}$  in width ( $\times 600$  magnification). **C)** Fasciculate conidiophores ( $\times 600$  magnification). **D)** Advanced symptoms on the adaxial surface.

'Homestead' was mildly susceptible and Floradel appeared to be resistant (Table 1).

*The pathogen.* — Macroscopic (X80 magnification) and microscopic (X600 magnification) examinations of indistinct and advanced *C. fuligena* lesions established the presence of typical fasciculate conidiophores of the genus *Cercospora* (Fig. 1). The conidia produced were 26 to 70  $\mu$ m long and 3.6 to 5  $\mu$ m wide and were produced mostly on the abaxial surface of the lesion. The size of the conidia fitted Roldan's (8) description of *C. fuligena* (Fig. 1). Identification of the pathogen was confirmed by M. B. Ellis of the Commonwealth Mycological Institute, Kew, England (3): the assigned plant specimen accession number in that institution's collection is IMI 160637.

**DISCUSSION.** — *Cercospora* leaf mold of tomato first reported by Solheim and Stevens (9) in 1931 and Roger (6) in 1936 was not accurately described until 1938 by Roldan (7). Since then, many reports have been made by workers in other parts of the world attributing the disease to other *Cercospora* spp. (2, 3, 4) and even describing a new *Cercospora* sp. (8). Chupp (1) in 1953 considered all species of *Cercospora* on tomato to be *C. fuligena* and reported that all other *Cercospora* species reported on tomato were probably erroneous. Mohanty and Mohanty (5) in 1955 found that *C. fuligena* was severe on the native tomato cultivar grown in India and that it also attacked the U.S. cultivar 'Red Ball' and 'Marglobe'. The reported susceptibility of Marglobe suggests that Chupp (1) was correct in his assumption that the reports of other *Cercospora* spp. on tomato were erroneous since none of the previous U.S. reports described the indistinct discoloration caused by *C. fuligena* on Marglobe foliage as described by Mohanty and Mohanty in India (5). The U.S. reports instead described the definite formation of spots atypical of *C. fuligena*.

*Cercospora* leaf mold may become an economically important disease in Florida since an increasing number of growers are planting the susceptible cultivars Walter and Florida MH-1. Preliminary pathogenicity tests indicate that growers planting Homestead in all likelihood will not encounter problems with this disease since that cultivar is not as susceptible as Walter or Florida MH-1. Screening tests are being carried out to

TABLE 1. Tomato cultivar response to *Cercospora fuligena* inoculations

Cultivar	Disease <sup>a</sup> (%)
Florida MH-1	20.15
Walter	50.23 <sup>b</sup>
Homestead	2.22
Floradel	0.00

<sup>a</sup>Based on a scale from 0% (no infection) to 100% (all leaves with lesions). Each estimate is an average of 12 plants per cultivar.

<sup>b</sup>Lesions on stems.

determine the susceptibility of all available Florida breeding and commercial lines.

Fungicide tests are currently in progress to determine what chemicals will best control the disease.

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