Chocolate Spot of Corn in Minnesota

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ABSTRACT

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In July 1981, dent corn (*Zea mays*) plants in two commercial fields in Lyon County and one in Dakota County, MN, showed symptoms of chocolate spot caused by *Pseudomonas syringae* pv. *coronafaciens*. The disease incidence and severity were low, but this is the first report of chocolate spot of corn outside of Wisconsin.

Chocolate spot caused by *Pseudomonas syringae* pv. *coronafaciens* (Elliott 1920) Young, Dye & Wilkie 1978 (ISPP List, 1980) (1) is a minor leaf spot disease of corn (*Zea mays* L.) that has been reported only from Wisconsin (6). The pathogen causing chocolate spot differs from that causing holcus spot (*P. syringae* pv. *syringae* van Hall 1902) in host range, symptomatology, serology, utilization of lactate and trigonelline, ability to hydrolyze tyrosine, and production of toxins (2,6–8).

In July 1981, in a survey of more than 140 dent corn fields for the Minnesota Cooperative Disease Surveillance Information System, plants were found with typical chocolate spot symptoms. Lesions were translucent, dark brown, nearly elliptic, about 5 mm long by 2 mm wide, and surrounded by a yellow halo. Lesions were limited to the lower leaves and were concentrated at the leaf tips. The disease was found in two commercial fields in Lyon County and one field in Dakota County, MN. In each case, disease incidence (percentage of plants infected) and severity (percentage of leaf area affected) were less than 1%.

Lesions were macerated in a drop of sterile distilled water, diluted approximately 1,000-fold, and streaked on King's medium B (3). Suspensions (approximately 10^7 colony-forming units per milliliter) of pure cultures of five isolates were injected into the leaves of two seedlings (four-leaf stage) of the dent corn hybrid MN7301 using a 2-ml syringe fitted at the tip with a 2.5-cm section of rubber tubing (i.d. = 8 mm, o.d. = 14 mm). Plants used as uninoculated controls were similarly injected with sterile distilled water. All plants were incubated at 30–50% relative humidity with 20 C night and 30 C day temperatures in a 14-hr photoperiod. Translucent, dark brown lesions with distinct yellow halos were produced in leaves 3–5 days after inoculation, and the pathogen was reisolated from lesion margins. Uninoculated control plants remained symptomless.

Isolates were tested for fluorescence, presence of oxidase, and ability to hydrolyze esculin and produce levan (7). Utilization of *meso*-erythritol, D(−)quinate, L(+)lactate, and trigonelline were tested at 0.1% (w/v) concentrations in a basal medium (5). Tyrosine hydrolysis was determined by the method of Lelliott et al (4). The presence of syringomycin was determined by bioassay on potato-dextrose agar (Difco) with *Geotrichum candidum* Link ex Pers. (2). Two isolates of *P. syringae* pv. *coronafaciens* from corn and rye (*Secale cereale* L.) supplied by Dr. B. M. Cunfer and one isolate of *P. syringae* pv. *syringae* from corn provided by the junior author served as controls.

Minnesota chocolate spot pathogen isolates were fluorescent, oxidase-negative, produced levan, hydrolyzed esculin and tyrosine, and utilized erythritol and quinate but not lactate or trigonelline. None produced detectable levels of syringomycin. The reference isolate of *P. syringae* pv. *syringae* differed with respect to syringomycin production, hydrolysis of tyrosine, and utilization of lactate and trigonelline. These characteristics were consistent with those of *P. syringae* pv. *coronafaciens* and distinguished it from *P. syringae* pv. *syringae* strains that cause holcus spot (6–8). Based on symptomatology and biochemical tests, the Minnesota chocolate spot isolates were identified as *P. syringae* pv. *coronafaciens*.

Although the disease was of minor importance in 1981, this is the first report of chocolate spot of corn outside of Wisconsin.

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