

Incidence and Severity of Bacterial Speck of Tomato in Southwestern Ontario in 1979

W. G. BONN, Research Scientist, Research Station, Agriculture Canada, Harrow, Ontario N0R 1G0

ABSTRACT

BONN, W. G. 1980. Incidence and severity of bacterial speck of tomato in southwestern Ontario in 1979. *Plant Disease* 64:586-587.

Bacterial speck of tomato has become a serious problem in tomatoes grown in southwestern Ontario in recent years. It was not a problem in local greenhouse-produced transplants in 1979. Surveys indicated that in 1979 field incidence of this disease was higher and more severe on plants that were raised in the greenhouse than on those grown in the southern United States and transplanted.

In recent years bacterial speck of tomato, caused by *Pseudomonas tomat* (Okabe) Alstatt, has become a serious problem on both fresh market and processing tomatoes in southwestern Ontario. The disease is most severe during the cool and wet periods following planting, but it may cause damage to both the foliage and fruit throughout the growing season. Economic losses in processing tomatoes have been reported in California from early infections (3).

Schneider and Grogan (2) showed the bacterial speck organism to be ubiquitous, occurring in the rhizosphere of many weed hosts in California; it overwinters in infected tomato debris in the soil. *P. tomat* survives as an epiphyte on tomato leaves for several weeks under adverse weather conditions, and when temperature and moisture conditions are favorable, the resident population multiplies and infects the host.

Transplants from local greenhouses and from fields in the southern United States have been suspected to be sources of inoculum in southwestern Ontario tomato fields. Tomato transplants produced in greenhouses in Essex and Kent counties, Ontario, were surveyed in 1979 for bacterial speck. The survey was extended to determine if field outbreaks of bacterial speck were related to greenhouse-grown transplants, to transplants from Georgia, or to both.

MATERIALS AND METHODS

Surveys for bacterial speck disease in locally grown tomato transplants were conducted in 14 greenhouses on 30 April 1979, before southern-grown transplants were imported and again on 23 May after southern transplants were imported and when local transplants were being lifted from the groundbeds for field planting.

During inspection of the greenhouses, plants found to be infected with bacterial speck were carefully lifted out of the groundbed, placed in plastic bags, and transported to the laboratory for isolation and identification of the causal organism. Isolates from tomato lesions were tested for fluorescence on King's medium Bagar plates (1) and cytochrome oxidase (4); isolates that were fluorescent-positive and oxidase-negative were tested

for pathogenicity on young tomato (cv. Bonny Best) plants in the greenhouse.

Surveys for bacterial speck were conducted during 3 wk in late June and early July 1979 in fields planted to local and southern-grown tomato transplants in Essex and Kent counties. Fields ranged from 0.6 to 26 ha. At five locations in each field 30 plants were rated for disease on a 0-5 scale. Diseased plants were collected and tested in the laboratory for *P. tomat*.

RESULTS AND DISCUSSION

Greenhouse survey. According to survey questionnaires, 13.6 million tomato transplants, worth an estimated \$245,000 Canadian, were grown in Essex and Kent counties in 1979. This was 35% less than the number grown in 1978. The reduction was attributed to competition from the southern-grown tomato transplants and the threat of bacterial speck, which was severe in local greenhouses in 1978. The survey showed that bacterial speck symptoms were present on tomato transplants in three of 13 greenhouses on 23 May 1979. This represented 23% of the greenhouse operations but only 17% of the tomato transplants grown in the area. In contrast, 42% of the greenhouses (64% of the transplants) were affected in 1978.

Table 1. Presence or absence of bacterial speck in the tomato transplant crop in the greenhouse and in field plantings in Essex and Kent counties, Ontario, Canada

Operator	No. of plants	Greenhouse		Field ^a
		April 30	May 23	
1	850,000	-	-	NA
2	500,000	-	+	+
3	200,000	-	-	+
4	2,500,000	-	-	NA
5	5,000,000	-	-	+
6	250,000	-	-	-
7	800,000	-	+	-
8	500,000	-	-	+
9	1,000,000	-	+	+
10	450,000	-	-	NA
11	700,000	-	-	+
12	600,000	-	-	NA
13	250,000	-	-	+

^aNA indicates that the operator did not grow tomatoes in the field from his transplant operation.

Bacterial speck was not observed in the greenhouses on 30 April 1979, which was about 4-5 wk after plants were transplanted to the groundbeds from flats (Table 1). During the next 2-3 wk large numbers of tomato transplants were imported from the southern United States, where bacterial speck had been a serious problem in 1978 (S. M. McCarter, *personal communication*). The imported plants were planted throughout Essex and Kent counties. There were many opportunities for cross-contamination of the greenhouse transplants with those imported from the south as well as for contamination from blowing soil and debris from surrounding fields that had been planted with tomatoes in previous years. Only symptomless plants from the three greenhouse operations where bacterial speck was observed 23 May were transplanted.

Field survey. Bacterial speck symptoms were observed in seven of nine fields planted with locally produced tomato transplants (Table 1). Fields with healthy tomatoes were only observed in two cases; in one, plants came from a greenhouse free of bacterial speck, and in the other, transplants came from a greenhouse with some incidence of bacterial speck, although affected plants were not used for field transplanting. Despite the small sample size, there does not appear to be a direct relationship between disease occurrences in the greenhouse and in the field. Symptomless transplants were used in all field

Table 2. Relationship between bacterial speck in Essex and Kent county tomato fields and transplants from local greenhouses and from the southern United States in 1979

Transplant source	No. of fields		% Infection in surveyed area of field ^a	Disease rating ^b
	Observed	With disease		
Local	26	16	28	0.38
Southern	65	24	19	0.23

^a Each field was observed at five locations where 30 plants were rated for disease.

^b Disease rating = (score for symptoms × plants) / total plants. The score was based on a scale of: 0 = no symptoms, 1 = few lesions on several leaves, 2 = few lesions on most leaves, 3 = many lesions on several leaves, 4 = many lesions on most leaves, and 5 = many lesions on most leaves and chlorosis and necrosis of tissue.

plantings, but typical symptoms developed on plants in seven of nine tomato fields. The possibility exists that *P. tomato* was an inhabitant of the plant surfaces in the greenhouse and that infection and symptoms developed in the fields (2).

Inspection of many fields of local transplants suggested that the greenhouse-grown plants were more susceptible to the disease, perhaps because of their succulent growth, compared with the hardened plants imported from the southern United States. Bacterial speck was found on 16 of 26 farms growing local transplants and on 24 of 65 farms growing southern transplants (Table 2). Infection of local transplants was greater (28%) than that for the southern transplants (19%). In addition, field severity ratings were 0.38 and 0.23 for local and southern transplants, respectively. Southern transplants appeared to be more hardy and less susceptible to

bacterial speck than the local transplants.

Further work on the ecology of *P. tomato* in the local greenhouse and field tomato crops is in progress.

ACKNOWLEDGMENTS

I thank Ken Slingsby and also Doug Wren and his Youth Job Corp Program personnel for help in conducting greenhouse and field surveys.

LITERATURE CITED

- KING, E. D., M. K. WARD, and D. E. RANEY. 1954. Two simple media for the demonstration of pycocyanin and fluorescein. *J. Lab. Clin. Med.* 44:301-307.
- SCHNEIDER, R. W., and R. G. GROGAN. 1977. Bacterial speck of tomato: sources of inoculum and establishment of a resident population. *Phytopathology* 67:388-394.
- SCHNEIDER, R. W., D. H. HALL, and R. G. GROGAN. 1975. Effect of bacterial speck on tomato yield and maturity. (Abstr.) *Proc. Am. Phytopathol. Soc.* 2:118.
- STANIER, R. Y., H. J. PALLERONI, and M. DOUDOROFF. 1966. The aerobic pseudomonads: A taxonomic study. *J. Gen. Microbiol.* 43:159-271.