

Impact of cultural practices on the accumulation of *Verticillium dahliae* race 2 in southwestern Ontario tomato fields

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Verticillium dahliae race 2 predominates in Leamington area processing tomato fields in which tomatoes have been grown under short (2 to 4 year) rotations, sometimes in rotation with potato. We have also observed variation in virulence between individual race 2 *V. dahliae* isolates collected from these fields, suggesting that there may be distinct subgroups within the race 2 pathotype. The tolerance/resistance of tomato cultivars to these variants may differ, and the efficacy of newly developed disease control methods may depend in part upon the susceptibility of the variants to the disease control agent. The objectives of this study were to: 1) determine if soil inoculum levels of *V. dahliae* and incidence of *Verticillium*-infected plants would be low in processing tomato fields that have not been frequently cropped with tomato or other solanaceous hosts, and 2) assess the genetic differences between the *Verticillium dahliae* isolates collected from the processing tomato fields.

Soil inoculum levels of *V. dahliae* and incidence of *V. dahliae*-infected plants in Dresden processing tomato fields: Soil samples were collected in 1996 and 1997, prior to planting. Soil inoculum levels of *V. dahliae* were measured by the Anderson Sampler method. In August, leaves were collected from 45-50 tomato plants in each field. Growth of the fungus from within leaf petiole cross-sections was used as a measure of *V. dahliae* infection. In contrast with the findings of a previous survey of Leamington processing tomato fields, both *V. dahliae* soil inoculum levels and incidence of *V. dahliae*-infected tomato plants were typically low in Dresden processing tomato fields, where tomato has either not been cultivated previously, or has been cultivated infrequently (Table 1).

DNA fingerprinting of *V. dahliae* isolates: Isolates were obtained from: 1) soil and plant samples collected from Leamington and Dresden area processing tomato fields, and 2) soil samples collected from experimental fields in Dresden and Leamington, in which tomatoes were grown under different crop rotations (soil samples courtesy of R.W. Johnston et al.). More than 100 *V. dahliae* isolates were fingerprinted, using a dispersed, repetitive DNA sequence cloned from an Ontario race 2 *V. dahliae* isolate. The data indicate that although the Ontario race 2 isolates originate from at least two sources, and there is genetic diversity within the race 2 population, strains of one particular genotype are widespread in the Leamington fields. Isolates of this genotype were obtained from only one Dresden field (in which 26% of plants sampled were found to be infected with *V. dahliae*), and only from plant samples collected in that field, which may indicate that it is not prevalent in the soil. This genotype is also commonly found in Ontario potato fields, suggesting that it was introduced into the Leamington area by the cultivation of potato, and has proliferated in this region in part because of the intensive cropping of tomato.

Table 1. *V. dahliae* in Leamington and Dresden processing tomato fields

Leamington (1993-1994)		Dresden (1996-1997)	
cfu/g soil	% infected plants	cfu/g soil	% infected plants
36	67	15	2
16	62	0	0
4	17	8	0
96	28	8	26
4	33	10	0
10	34	0	0
22	27	nd	0
59	37	1	0
30	33	2	6
35	28	1	0
-	-	2	0
-	-	1	2

nd = not determined