

Title of Project: EPIDEMIOLOGY, PRELIMINARY CONTROL MEASURES AND CHARACTERIZATION OF ISOLATES OF *PHYTOPHTHORA CAPSICI* FROM PEPPER, TOMATO AND CUCURBIT FIELDS IN SOUTHERN ONTARIO

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Objective

Determine the extent of occurrence of *P. capsici* in processing tomato and pepper fields, and later in processing cucumber fields in southern Ontario, initiate field trials for chemical and non-chemical control of phytophthora blight and selected sites where the disease has been identified previously, and investigate the pathogenic, morphologic and genetic variation among isolates of fungus.

Results

Field plots: Phytophthora blight was not observed on any pepper, cucumber or tomato plants in the plots at the Huffman site, throughout the growing season.

There was no significant ($P = 0.05$) difference among fungicide treatments for marketable number or yield of pepper fruit, although the Gavel treatment resulted in the greatest number weight of pepper fruit (Table 1).

There were no significant differences among treatments for marketable number and yield of cucumber fruit (Table 2). Highest marketable yield and number of fruit was with Kocide + Acrobat and with Pristine.

There was no significant difference among fungicide treatments for marketable number or yield of tomato fruit, although the Acrobat treatment alone resulted in the greatest number of fruit while the Agrifos treatment had the greatest weight of tomato fruit (Table 3).

Survey: Phytophthora blight was observed in one cucumber field in Haldimand-Norfolk county in September 2006. The report was confirmed and one isolate of *P. capsici* was obtained from M. Celetti (OMAFRA). *P. capsici* was also located in two pepper fields in the Harrow area at the end of September and early October. The first field was about one acre of hot pepper. The seed had been saved and was originally obtained from material brought in from Hungary. About 80 to 85% of the plants in the field had stem cankers and crown rot, and many of the plants were wilted and/or dead. The second field, surveyed on October 24, was about 50 acres of bell peppers, with several "hot spots" where stem cankers and crown rot were evident. These were sometimes associated with low spots or areas where water movement had occurred in several areas of the field. Some of the plants in this field were severely affected. One other field in the

Harrow area may have *P. capsici* based on conversations with one of the growers who indicated problems with pepper plants during the growing season. Unfortunately, all plants were removed and the field was ploughed by the time that the grower mentioned the problem. One additional sample with possible *P. capsici* development was obtained from a commercial greenhouse pepper operation located in the Leamington area. However, microscopic observation and several isolation attempts did not demonstrate any *P. capsici*. Further investigations concerning the latter two sites are ongoing.

Discussion

Weather conditions during the 2006 growing season were conducive to development of phytophthora blight although the disease was only observed in a few scattered sites in southern Ontario that did not have a history of this disease. However, the field plot where the disease had been reported in 2004 and where any symptom development due to phytophthora blight was monitored did not have plants with any signs of symptoms of the disease on pepper, cucumber or tomato plants. Work is underway to characterize the isolates that have been obtained and to investigate the other two sites, one a greenhouse in the Leamington area and the other a field south of Harrow to determine if *P. capsici* is present in these sites as well. Research in collaboration with Dr. T.C. Wang of AVRDC-The World Vegetable Centre in Taiwan to use molecular methods to characterize the isolates should begin in the near future.

Phytophthora blight remains a major disease problem in neighbouring U.S. states. It is somewhat surprising that the disease did not develop to any significant extent in south-western Ontario during the 2006 growing season when good environmental conditions prevailed for this disease to develop. Probably, inoculum levels of *P. capsici* are still low in southern Ontario and the disease poses a threat to vegetable production only at specific sites. However, further field research under conducive environmental conditions and at high levels of inoculum is required. Fungicide spray treatments for control of the disease will be evaluated in 2007 in a protected field plot at the AAFC-Greenhouse & Processing Crops Research Centre into which *P. capsici* inoculum, obtained from original isolates from southern Ontario, has been introduced. Another field plot will be set up in one of the commercial fields near Harrow. The inclusion of these two field plots, one at a commercial site where the disease was observed in 2006, and the other where fungus inoculum is introduced will ensure a successful evaluation of the treatments. These experiments will be undertaken pending approval of research funding for 2007.