

EVALUATION OF BRASSICA CROP RESIDUE ON VERTICILLIUM WILT AND PHYTOPHTHORA ROOT ROT IN CHILE

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INTRODUCTION:

Chile is a major crop in New Mexico which constitutes (excluding hay crops) 31.75% of the general crop values. Gross receipts for 2000 and 2001 were 48.91 and 44.25 million dollars respectively (New Mexico Agricultural Statistics 2001). Chile production in Southern New Mexico is often decreased by soil borne pathogens which include *Verticillium dahlia* and *Phytophthora capsici*. From 2000 to 2001 planted chile acreage was fairly constant, however, harvested acreage decreased by 6.8% due to a combination of disease and weather (New Mexico Agricultural Statistics 2001).

Verticillium wilt is a common pathogen that occurs in many major crop production areas in the United States and world wide. *Verticillium* survives in the soil as microsclerotia for over 14 years. Controlling this pathogen in high cash crops is dependent on fumigant applications of methyl-bromide. However, it is not cost justified in pepper crops. Currently, in New Mexico, there are no effective management tools for Verticillium wilt on chile.

Phytophthora root rot is common in heavier soils where water stands for extended periods. Because chile plants infected with this pathogen die very rapidly, it is detected more often than Verticillium wilt. *Phytophthora* spreads rapidly and can not be controlled after infection has occurred. Management of *Phytophthora* in chile is dependent solely on cultural practices.



Figure 1: a) chile plant infected with *Verticillium dahlia*, b) chile plants infected with *Phytophthora capsici*, c) Brassica crops, d) broccoli plant

OBJECTIVE:

To evaluate broccoli, cabbage, and mustard residues as management options for *Phytophthora capsici* and *Verticillium dahlia* in chile.

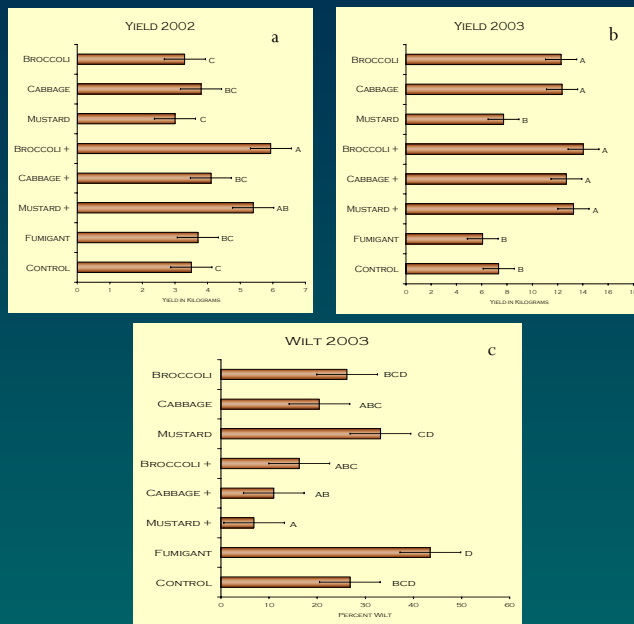


Figure 2: a) yield data from 2002, b) yield data 2003, c) wilt data 2003

MATERIALS & METHODS:

This research was conducted in a field with a history of both *Phytophthora capsici* and *Verticillium dahlia* in North Mesilla Valley. There were eight treatments including 1) Control, 2) Fumigant, 3) Broccoli, 4) Broccoli + Fumigant, 5) Cabbage, 6) Cabbage + Fumigant, 7) Mustard, and 8) Mustard + Fumigant. The plots were arranged in a completely randomized design which contained four replications each year. All Brassica treatments were planted in late January and were allowed to grow for 70 to 80 days before plow down. Within one week of the Brassica treatment plow down date, Telone C-35 was applied to all fumigant treated plots according to the label. After the plant back interval, chile (AZ-20) was transplanted into all plots. The chile field was maintained with normal cultural practices until harvest.

Variables analyzed in this study were percent disease and yield. Quantifying disease by *Verticillium* and *Phytophthora* independent of each other is not possible in this study because *Phytophthora* has the ability to kill chile plants rapidly and mask plants that might have been infected with *Verticillium*. Therefore, disease is one variable and is measured under a wilt factor. In 2002 wilt was analyzed on a 20 foot sample that consisted of approximately 20 plants. In 2003 wilt was analyzed by census of all chile plants in each treatment plot. Yield was analyzed based on thirteen plants in each plot in both 2002 and 2003.

PRELIMINARY RESULTS & DISCUSSION:

Data in both 2002 and 2003 followed similar trends in yield and percent wilt. Data collected in 2003 was more representative of the population due to census and sampling methods. In addition there were more drastic differences between treatments. Broccoli + fumigant and mustard + fumigant treated plots statistically produced more yield than the control or the fumigant treated plots in 2002 (Fig. 2 a). Percent wilt followed similar trends although the differences were not as drastic.

In 2003 with the exception of the mustard only treated plots all Brassica treatments statistically yielded more than the control and the fumigant only treated plots (Fig. 2 b). Percent wilt followed similar trends, with fumigant and control having the highest percent wilt at 46% and 27% respectively (Fig. 2 c). Brassica plus fumigant treated plots had significantly less wilt.

Results from both years demonstrated that Brassica crop residues have the potential to reduce wilt caused by *Verticillium dahlia* and *Phytophthora capsici*, and therefore increase yield, in pepper crops grown in southern New Mexico. This study is being repeated in 2004.



Figure 3: a) chile transplanter, b) transplanting crew, c) chile harvest, d) irrigation following transplanting, e) mature chile plants

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