

Field Assessment of Impact of Bacterial Speck Incidence on Yield of Processing Tomato, Woodland Area, California: A 2005 Progress Report

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ABSTRACT

Two field tests initiated in 2005 indicated that bacterial speck incidence reduces processing tomato yield at relatively low disease levels and continues at a linear rate. Disease incidence was measured by visually assessing both percent leaf area diseased and percent leaves diseased at multiple periods during the season.

INTRODUCTION

Bacterial speck, caused by *Pseudomonas syringae* p.v. *tomato*, is the most important springtime disease of California tomatoes. When rainy conditions persist, crop losses as high as 25% have been documented (G. Miyao, 1995, unpublished). In areas with high disease pressure, multiple applications of copper and other chemicals are commonly applied.

Copper products have limited success in keeping the disease under control. Copper resistance is reported worldwide (1,2). Various control strategies have been effective in reducing disease incidence and impact on yield (3).

MATERIALS AND METHODS

Early bacterial speck incidence was identified in 2 commercial tomato fields near Woodland, California in the southern Sacramento Valley in the spring of 2005. Both fields were flagged to allow repeat visits to the same plant location areas to follow disease progression especially during the spring when rainy weather conditions persisted. In one of the fields, forty 5' x 5' square plots were established in a direct seeded field with double seed lines per 5' centered bed. In a second field established with transplants, 150 individual plants were flagged. In both fields, the intent was to monitor a broad range of disease levels to assess impact on crop yield. The visual rating scale was pre-transformed with ratings of 0, 2.5, 10, 21, 35, 50, 65, 79, 90, 97.5 or 100%. One measure of disease level was on a percent of leaf area diseased. Another measure was on percent diseased leaves (with any disease present).

At harvest, fruit were hand picked and sorted into categories of marketable red, pink, green, sun-damaged and rots on a weight basis and converted to percent. Correlations were used to compare disease level with yield outcome.

RESULTS AND DISCUSSION

The best fit was measured between leaf area diseased at an early plant growth stage and marketable yield (figure 1). The disease reduced marketable yield linearly. As a conversion from pounds per plot to tons per acre basis, marketable yields were reduced 0.66 tons per acre for each 10% increase in leaf area diseased. If price was \$50 per ton,

the calculated cost of a 10% leaf area diseased level would be a gross revenue decline of \$33 per acre. Total fruit biomass was not reduced.

Both of the field harvest results were similar although yield levels were different between the two fields.

While the results of the tests are preliminary, it appears that relatively low disease levels reduce yields when they occur at an early plant growth stage prior to early flowering. The impact on yield appears to be from sun damaged fruit and culls rather than a reduction in total fruit produced. The results suggest that low disease levels can impact crop yield suggesting that control programs are needed at first sign of the disease. Further tests are needed to confirm the year 2005 results.

LITERATURE CITED

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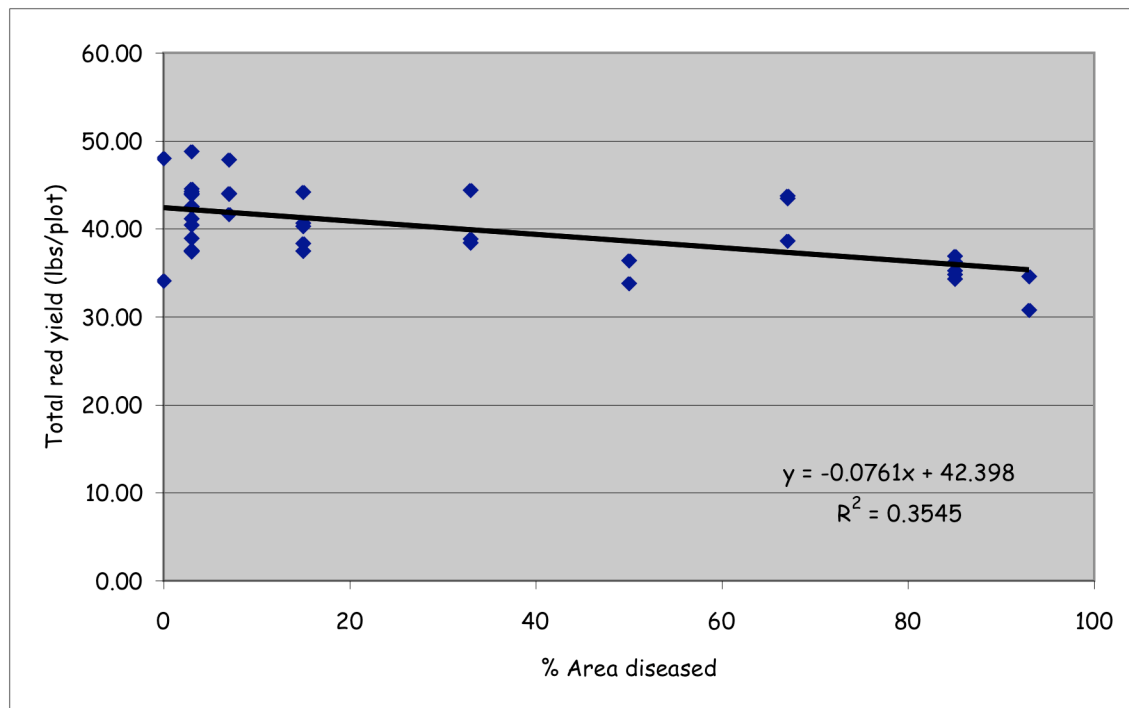


Figure 1. Impact of percent leaf area diseased on marketable fruit yield from 19 May 2005 rating (early bloom stage), Field 2, Woodland, CA.

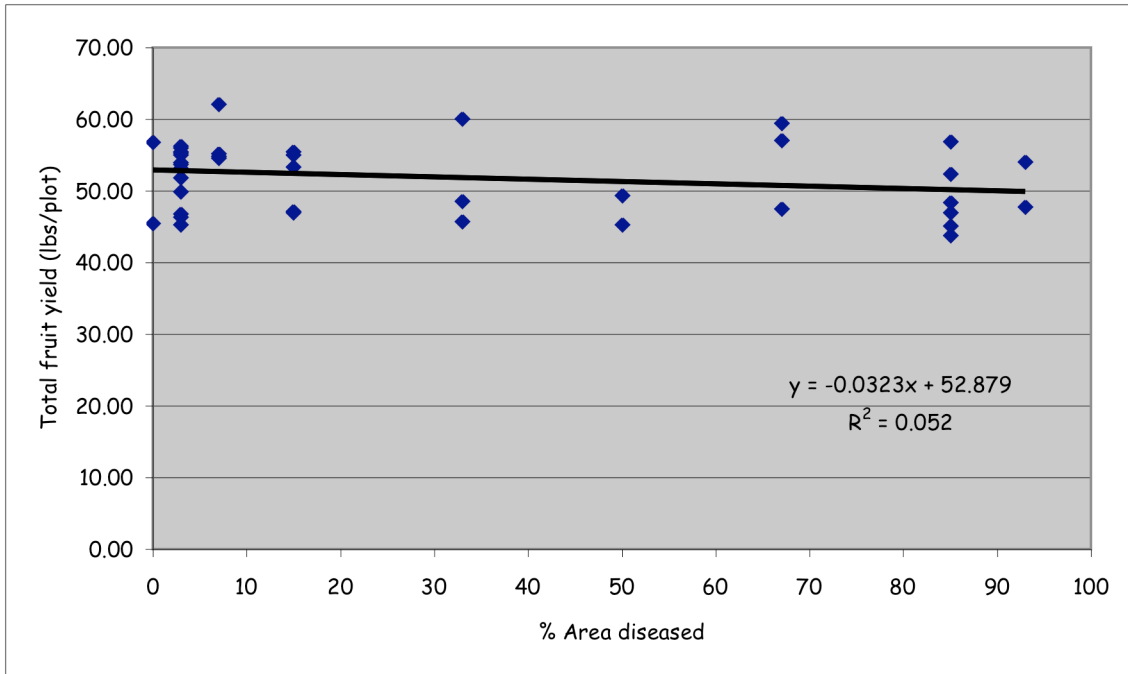


Figure 2. Impact of percent leaf area diseased on total fruit biomass yield from 19 May, 2005 rating (early bloom stage), Field 2, Woodland, CA.