DRIP APPLIED ACROLEIN WITH AND WITHOUT VIF MULCH AS A METHYL BROMIDE ALTERNATIVE IN TOMATOES

R. M. Welker*, J. G. Driver and F. J. Louws
Department of Plant Pathology, North Carolina State Univ., Raleigh, NC 27695

Introduction: Fumigation for tomatoes in Western North Carolina (WNC) and surrounding areas is standard practice in order to suppress Verticillium wilt (race 2; VW) and weed pressure. Verticillium race 2 has been prevalent throughout the WNC production region and no commercial sources of resistance have been identified. Fumigation kills inoculum to a depth sufficient to produce an economical harvest, although the disease invariably affects tomatoes toward the end of harvest, even with fumigation. We have evaluated Acrolein as a pre-plant fumigant treatment as an alternative to methyl bromide for several years, and this study is an extension of that work. Weed control, disease pressure and crop yields were evaluated for this study.

Materials and Methods: The study was conducted at the Horticultural Crops Research Station in Mills River, NC using the tomato variety *Mountain Fresh*, a commercial line that is common in the region. Acrolein plots were formed on 6 May 2008 with two drip tapes to facilitate the drip application of the product. Along with different rates of Acrolein in this study, the effect of mulch type on those rates was evaluated. All Acrolein treatments were applied under a standard 1.25 mil. Pliant Corporation embossed mulch and a Cadillac Corporation virtually impenetrable film (VIF). After the beds were formed, the drip irrigation system was hooked up to the trial and the beds were irrigated for 3 hours after which the beds were allowed to stand untouched for two weeks. This was done in the hopes of causing weed seeds in the beds to germinate prior to Acrolein treatments. Fumigation was done on 4 June 2008 by injecting the chemical directly into the irrigation system at four rates over a period of 2.5 hours. This injection time, along with the two drip tapes per bed, allowed the beds to be adequately treated without excessive water application. Acrolein was applied at rates of 100, 200, 300 and 400 lbs/A broadcast under each plastic mulch type. Fumigation with methyl bromide (50/50) as a standard treatment was also done on 4 June 2008 using 350 lbs/A broadcast rate under VIF. Transplants were set into the field on 18 June 2008 which corresponded to 14 days after the Acrolein treatments. Standard management practices were used in the trial including foliar disease and insect management, fertilizer recommendations and staking and stringing of plots. Tomato fruit were harvested weekly. Harvest data were sorted as marketable categories (jumbo, extra large, large, medium, small) or cull fruit (misshapen or diseased fruit). Total marketable yields and VW incidence were assessed weekly, as well as weed incidence during the first five weeks. The experiment was designed as a randomized complete block design with 4 replications per

treatment. The internal section of each treated plot (50 ft) was planted to 12 plants spaced 18 in between plants and the 8 in raised beds were 24 in wide with the center spaced at 5 ft intervals.

Results: To date, harvests are still in progress and a complete analysis of the data has not been conducted, but full results will be available in November. Tomato transplants showed no signs of phytotoxicity from any treatments and tomato growth habits did not seem to differ between plastic mulch types within a chemical rate. Weed data were collected by counting the number of plant holes that contained weeds, and then quantifying the number of broadleaves and grasses which were present. Data does not seem to show a difference in weed control for a chemical rate under different plastic types.

Summary: Data will continue to be collected for this study through the middle to end of October, 2008. Disease pressure appears to be high this year, and the non-fumigated control plots are suffering from heavy VW pressure. This should allow us to quantify the effectiveness of Acrolein on VW. Data will continue to be collected and analyzed and the final results will be presented.