ON-FARM FUMIGANT TRIALS FOR STRAWBERRIES IN THE SOUTHEAST

J.G. Driver[1]*, Phillip Brannen[2], Mark Seitz[3], Cal Schiemann[4], R.M.Welker[1] and F.J. Louws[1]

[1]Dept. of Plant Pathology and Cooperative Extension Services[3], North Carolina State University; [2]Dept. Plant Pathology, University of Georgia; [4]Cooperative Extension, Virginia Tech.

Introduction: Methyl bromide is used in over 85% of the strawberries, and tomatoes, 75% of the cantaloupe, 50% of the watermelon, and 50% of the peppers in the Southeastern States of GA, SC, NC, and VA, with expanding interest in these States and those to the north. Over 2500 acres of strawberries are grown on beds fumigated with methyl bromide. With the current implementation of Critical Use Exemptions and actual MB phase-out, we have seen hightened interest amongst growers to acquire experience with alternatives. Many growers are small to midsize operations and re-equipping their farms or implementing alternative systems can present a challenge.

The expected losses in production due to the expected loss of MB are hard to measure because there is no simple exchange of a new compound for MB. Changes in cultural systems will require changes in scheduling of activities, changes in combination of pest management materials, changes in scouting and target pest delineation. All of these changes will add uncertainty to producers' production systems and are difficult to replicate in small-plot research. Moving our "best" alternative practices to a larger scale through on-farm research (OFR) trials will enable us to test these alternatives within commercial production settings, allow us to show larger groups of growers the pros and cons of each alternative, and enhance the infrastructure of knowledge, experience and testimonials required for implementing alternatives.

We identified growers in NC, GA and VA who were willing to implement a research study in their strawberry production fields. These studies were implemented as true on-farm trials where the growers took the majority of the responsibility for selecting treatments, determining the portion of their crop to treat and managing all components of production and harvest. We facilitated the grower's evaluation by designing the experiments, assisting with application of the fumigants to ensure that the products were applied optimally, by collecting pest and crop performance data and conducting the analysis.

Materials and Methods: The sites used in the 2004-2005 on-farm trials were Larry Ipock in Dover, NC cooperating with NC Extension Agent Mark Seitz where methyl bromide (400 lb/A), Telone C-35 (35 gal/A) and Chloropicrin (100 lb/A) were compared. The second site was in Watkinsville, GA with John Washington cooperating with Phillip Brannen of the University of GA where methyl bromide (400 lb/A) was compared to Vapam HL (75 gal/A) incorporated

in the bed followed by Telone C-35 (35 gal/A). The third site was with Wink Henley in Virginia Beach, VA cooperating with Cal Schiemann with the VA Cooperative Extension. This site compared methyl bromide (400 lb/A), Telone C-35 (35 gal/A) and Chloropicrin (90 lb/A). All of the treatments were put out as a randomized complete block design in the grower's fruiting fields using complete rows (200 to 500 feet long) as treatment units. All treatments were maintained by the grower in the same manner as their entire crop. Whole plants were collected from the treatments four times during the growing season, and the plants were evaluated for root rot severity, number of crowns, leaf area and root and leaf dry weights at NCSU. Fruit harvests were made at least twice a week and the amount of marketable fruit, diseased fruit and cull fruit were recorded locally.

Results: Treatment alternatives at all sites offered similar growth habits in plant development over the growing season. Initially, chloropicrin, when applied as a stand alone, seemed to hold back initial plant growth when compared to MB and Telone C35 treatments but this did not translate into reduced yield. In NC and GA, the alternative products provided marketable yields similar to those of methyl bromide throughout the fruiting period (see Figure 1). All products (MB, Telone-C35 and chloropicrin) evaluated at the VA trial generated near identical plant growth habits based on dry weights of the partitioned plant parts over all four sampling periods. At the VA site, 10 adjacent rows were inadvertently not fumigated and these plants had demonstrable suppressed growth, particularly as determined by the leaf area index and root dry weights. (Fruit yield was not acquired in VA).

These cooperative trials were designed to rely on Cooperative Extension, industry and grower expertise to determine the efficacy of leading alternative systems in commercial settings. Each alternative system evaluated across three States performed similarly (if not exactly) as well as MB. The grower expertise and management was critical and highly appreciated for the successful implementation of this Extension, yet research-based effort.

Figure 1: Impact of alternative fumigants compared to MB in regional on-farm trials