

FACILITATING ADOPTION OF ALTERNATIVES TO METHYL BROMIDE IN CALIFORNIA STRAWBERRIES

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Summary. The goal of this project is to facilitate the adoption of practical alternatives to methyl bromide (MB) for California strawberries. Several approaches to production of strawberry without MB were demonstrated: soilless production, fumigant retention, heat disinfestation, solarization, biofumigants and herbicides. The raised bed trough system is a soilless strawberry production method frequently used in Europe. We are demonstrating strawberry production using a soilless non-fumigated production system. In addition, we tested and demonstrated fumigant retention with barrier films in broadcast applications. Additional work demonstrated non-fumigant methods to control key soil pests by heat (steam, solarization), mustard seed meals and combinations of heat with mustard seed meals or fumigants. The ultimate goal of this research is to develop, assess, and demonstrate alternative fumigant and non-fumigant practices for producing strawberries without MB.

Specific objectives and progress to date:

1. Evaluate methods to produce strawberry using the raised bed trough system. Work here is focused on methods of disinfestation for the soil and substrate including fumigant and nonfumigant methods.

Substrate production field trials were initiated near Camarillo, CA, Santa Maria, CA, and at MBA near Watsonville, CA in fall 2009. The studies were split-plot trials with substrate as the main plot and preplant fertilizer rate (low, medium, high) as the subplot. Treatments were replicated four times. Substrates tested were: 1) 50% field soil amended with 25% rice hulls and 25% coir; 2) 70% peat + 30% perlite; 3) 100% coir; 4) 50% peat + 25% coir + 25% rice hulls; 5) standard strawberry bed fumigated with MB + chloropicrin (Pic). The amended field soil was disinfested with either Pic applied by chemigation or steam. This study was managed by the California Strawberry Commission, collaborating researchers and growers. Our role in the project was to monitor substrate fertility status. Substrates were sampled periodically and analyzed in the lab for pH, electroconductivity (EC), nitrate, and ammonium.

For all samples the pH values were within the range considered favorable for strawberry. Among the three sites, the EC obtained from the MBA samples were generally below the range for satisfactory strawberry growth. However, the Camarillo and Santa Maria sites had EC values within the normal range. The nitrate obtained from all three sites was extremely high especially those from the plots with organic substrates. In general, the amended soils have sufficient nitrate levels and the standard beds have low nitrate. The ammonium level at all three sites at any sampling period was very low.

2. Evaluate and demonstrate promising impermeable films for broadcast fumigation.

This work was conducted by Husein Ajwa and will be reported by him in a separate report.

3. Evaluate and demonstrate promising non-fumigant alternatives in the conventional raised strawberry beds. Alternatives for strawberry will include mustard seed meal or fungicides used with sequential herbicide applications.

Studies to test mustard seed meal were initiated at MBA near Watsonville, at the Spence research station near Salinas, and on a commercial farm near Oxnard in fall 2009. The trials were arranged in a randomized complete block design with four replicates. Mustard seed meal rates tested were 0, 500, 1000, 2000 and 4000 lbs/A. Methyl bromide plus chloropicrin at 350 lbs/A was included as a standard. The trials were evaluated for weed control, plant size and fruit yield. None of the mustard seed meal treatments controlled weeds. At Salinas, fruit yields in the mustard seed meal treatment at 4,000 lbs/A was better than the nontreated control. At Watsonville mustard seed meal did not affect fruit yields.

4. Demonstrate to growers the performance of key alternative treatments so that they can make informed decisions during the transition to alternative treatments.

Grower meetings were held Dec. 4, 2009 in Santa Maria, CA, Feb. 4, 2010 in Watsonville, CA and May 7, 2010 in Ventura, CA. A field day was held at MBA in Santa Cruz County on August 17, 2010 to discuss and demonstrate fumigant and non fumigant alternatives to MB for strawberry.