

Using TIF Tarp and Reduced Soil Fumigation Rates for Almond Replanting

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PROJECT SUMMARY

Objectives:

- Demonstrate that the use of TIF tarp can improve fumigant distribution in soil and increase fumigant concentration-time exposure indices for better pest control than standard PE tarp.
- Evaluate pest control efficacy (e.g., nematodes) under TIF tarp and reduced fumigation rates.
- Monitor almond tree vigor and growth from different fumigation treatments in growers' fields.
- Determine the effective field fumigation rates under TIF tarp with regards to soil-borne pest control and almond tree performance.

Background:

Almond growers rely on pre-plant soil fumigation to control soil-borne parasitic nematodes, replant disease, and deeply dwelling plant pathogens to establish new productive orchard when replanting. Soil fumigant use has been facing tremendous regulatory pressure because of exposure risks and contribution to VOC emissions; thus fumigation methods with high use efficiency of fumigant for pest control and low environmental impact are greatly needed in order to increase sustainable production of almonds. Using low permeability tarps such as totally impermeable film (TIF) has shown the potential to achieve this purpose because of its ability to retain fumigants under the tarp, increase fumigant concentration, improve distribution to increase fumigation efficiency, reduce emissions, and the possibility of using reduced rates.

In late fall of 2012, a fumigation field trial was conducted in an almond orchard for replanting at Braden's Farm in Merced County. The field had a high nematode population. This trial was

designed to test if TIF can improve efficacy and reduce emissions while using reduced rates. Fumigation treatments included non-fumigated control, three rates (full or maximum allowed label rate, 2/3, 1/3) of Telone® C-35 plus a non-fumigated control, and three surface sealing methods (bare, standard polyethylene (PE) tarp, and TIF). A total of 12 treatments with six replicates were tested in the trial. Emissions, gaseous fumigant concentration under the tarp, and fumigant concentrations in soil profile were measured for about five weeks. The emission data showed again that TIF tarp can significantly reduce emissions compared to the standard PE tarp. All full rate and the 2/3 rate treatments under TIF provided 100% kill for residential nematodes in soil above 1 m depth. In soil below 1 m, however, all treatments including the full rate under TIF showed survival of nematodes. Thus controlling nematodes at deep soil depths continues to be a challenging task in replanting orchards.

Current work is assessing tree response to fumigation treatment and nematode recovery from the treated field. Research continues on how to improve fumigant dispersion in deeper soil depths to achieve satisfactory pest control and tree response. The effort will provide essential information on effective use of soil fumigants while minimizing environmental impact from soil fumigation under perennial replanting situations, especially in the Central Valley.

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For More Details, Visit

- Poster location 58, Exhibit Hall A and B during conference; or on the web (after January 2014) at www.almondboard.com/researchreports
- 2012.2013 Annual Report CD (12-AIR5-Gao); or on the web (after January 2014) at www.almondboard.com/researchreports
- Related Projects: 13-AIR9-Doll, 13-PATH1-Browne