

# Using TIF Tarp and Reduced Fumigation Rates for Almond Replanting

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### PROJECT SUMMARY

#### Objectives:

- Demonstrate that the use of total impermeable film (TIF) can improve fumigant distribution in soil for better efficacy and reduce fumigation rates than standard PE tarp.
- Determine if deeper injection can improve nematode control in soil below 3 ft depth.
- Evaluate pest control efficacy, especially on plant parasitic nematodes from different fumigation treatments.
- Monitor almond tree growth or yield 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 and Discussion:

Soil fumigation needs to be both highly effective and have a low environmental impact due to the concerns about exposures from emissions by regulators. Earlier trials showed that under TIF, most fumigated treatments provided 100% kill for plant parasitic nematodes in the soil above 3 ft (~1 m) depth, however, all treatments including the full rate showed survival of nematodes in soil below 1 m depth due to insufficient fumigant delivery. From Dec. 9, 2014 through Jan. 6, 2015, we conducted a field trial in an almond orchard to be replanted and tested if a deeper injection with or without TIF could help improve fumigant (Telone C35<sup>®</sup>) delivery while reducing emissions. The trial was conducted at Littlejohn's Farm in Ballico, Merced County. The soil was Delhi sand. Treatments included two injection depths: regular 18" (~45 cm) injection depth and a deeper injection depth at 28" (~70 cm) with full

rate, 2/3 rates at regular injection depth, and non-fumigated controls, all with three surface sealing methods (bare or no tarp, PE tarp, and TIF) except no 0 rate under TIF. Emissions and gaseous fumigant concentration changes under the tarp and in soil profiles were monitored. Samples from 0 to 150 cm depth were collected four weeks later to determine residual fumigants and survival of parasitic nematodes. After tarp removal, young almond trees were planted in late January. Data show that the deep injection facilitated fumigant movement to soil below 1 m depth. The TIF was confirmed to give the lowest emissions by most effectively retaining fumigants under the tarp. Also from this trial, significantly higher emissions were measured from PE tarped than untarped soils due to higher precipitation received on bare soil during the trial. Except for 1 surface soil sample, all fumigated treatments resulted in no survival of parasitic nematodes down to 5 ft (150 cm) depth in this coarse textured soil. Tree growth is being monitored and nematode recovery will be determined to examine fumigation treatment effects.

Yield from an almond orchard fumigated three years ago was measured in August 2015 with significantly higher yield from all 100% and 66% rates (not 33% rates) than non-fumigated controls. These data agree with tree growth response measured during the first two years. Tree response and nematode recovery will be monitored from the 2014-15 fumigated trial to confirm our findings.

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#### For More Details, Visit

- Poster location 52, Exhibit Hall A + B during the Almond Conference; or on the web (after January 2016) at [Almonds.com/ResearchDatabase](http://Almonds.com/ResearchDatabase)
- 2014 - 2015 Annual Reports CD (14-AIR5-Gao); or on the web (after January 2016) at [Almonds.com/ResearchDatabase](http://Almonds.com/ResearchDatabase)
- Related projects: 15-AIR9-Doll; 15-PATH1-Browne; 15-PATH7-Duncan/Baumgartner