Spot-Steaming of Planting Sites as a Methyl Bromide Alternative to Manage the Almond Replant Disease

Project No.: **09-AIR6-Fennimore**

Project Leader: Steven Fennimore
Department of Plant Sciences
UC Davis
1636 East Alisal Street
Salinas, CA 93905
(831) 755-2896
safennimore@ucdavis.edu

Project Cooperators and Personnel:
Brad Hanson and Jayesh Samtani, UC Davis
Greg Browne, USDA-ARS Crops Pathology and Genetics Res. Unit, Department of Plant Pathology, UC Davis

Objectives:

The overall goal of this project is to develop and optimize steam spot treatments for control of almond replant disease (RD). The specific objectives include:

1. Design and optimize application systems for steam treatments to control almond RD.
2. For pre-plant spot steam treatments applied to tree planting sites, determine the depth of soil that must be treated and the temperatures that must be achieved for control of almond RD.
3. Assess the economic viability of proposed steam application techniques.

Interpretive Summary:

We are building and will test a system to steam pasteurize almond tree planting sites with the goal of controlling replant disease. The steam injection is based on an auger design by researchers in Canada (Moyls and Hocking, 1994) who used steam to control replant disease in apples. The method involves injecting steam into a tree site using a steam generator and an auger equipped with a rotating steam union. The rotating steam union allows steam to be delivered from a stationary steam generator into a rotating shaft. The prototype auger is driven by a hydraulic motor and will be attached to a tractor 3-point hitch and hydraulics to drive the system (**Figure 1**). The drive gearbox is designed to permit use of a hollow shaft so that the steam injected into the rotating steam union will pass through the gearbox and into the hollow auger shaft. At the bottom of the auger flighting, steam will be injected into the soil through a set of orifices. The auger is designed to inject steam into a tree site 36-inch wide by 24-

inches deep. The auger system is not yet complete due to a delay in delivery of the rotating steam union from the manufacturer. We are fabricating the auger in a shop in Salinas, CA and expect to have it completed by November 20, 2009.

We will conduct preliminary testing to verify that the auger works as expected, and to determine how long steam must be injected to reach target temperatures of 158° F. After preliminary tests, we plan two replicated field tests of the system during December 2009 and January 2010 in Central Valley almond orchards.

Figure 1. Auger fabrication as of Oct. 30, 2009. Shown is the auger, gear box and hydraulic drive. Not shown is the rotating steam union and 3-pt. connection.

References:

Moyls, A.L. and R.P. Hocking. 1994. In situ soil steaming for the control of apple replant disease. Appl. Eng. Agric. 10:59-63.