

Orchard Removal Carbon Recycling and Replant Disease

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PROJECT SUMMARY

Objectives:

- Compare effect of grinding of whole trees and soil incorporation as a pre-plant soil treatment with burning and incorporation on young tree growth
- Compare the two treatments with and without soil fumigation (Inline) on young tree growth.
- Assess the effects of the soil treatments on plant pathogen presence, disease incidence, and soil characteristics.

Background:

With more growers switching to grinding up of tree removals upon orchard replant, there is a question of what is the best use of the ground up trees. Burning is no longer an option in the San Joaquin Valley for air quality reasons.

Almond orchard soil is traditionally very low in organic matter, though higher organic matter is generally associated with better water holding capacity, better mix of soil microbial communities, etc. This project is assessing whether incorporating the biomass of the removed trees into the soil prior to replanting is a net benefit/detriment to establishing a new orchard, as well as whether carbon can be sequestered in the soil.

Discussion:

Soil biomass treatments were completed in early 2008; soil fumigations in fall 2008, and Nonpareil, Butte and Carmel on a Nemaguard rootstock were planted in replicated blocks early 2009.

Results from the first 6 months indicate that young tree growth is not different whether ground trees were incorporated or burned, but that soil fumigation helped increase tree size.

Despite the very high levels of soil C when chips are incorporated, no slowed growth due to a nutrient (N:C ratio) imbalance was observed.

To date no significant differences in plant pathogens have been detected in the tree removal treatments. Though a fungi complex that included *Cylindrocarpon* sp., which has been associated with replant disease (10-PATH1-Browne), was more frequently detected in the unfumigated treatments.

Tree growth, disease incidence, and soil characteristics will continue to be monitored for 2 more years to assess whether soil incorporation of chipped tree removal can sequester carbon without detrimental effects on young tree growth.

Project Cooperators and Personnel Greg Browne, USDA/ARS, Davis; David Doll, UCCE Merced County; Amanda Hodson, UC Davis; Kevin Brooks, CSU-Fresno

For More Details, Visit

- Poster location 21, Exhibit Hall, Session 3; or on the web (after January 2011) at AlmondBoard.com/AICposters
- 2009-10 Annual Report CD (09-PREC3-Holtz); or on the web (after January 2011) at AlmondBoard.com/ResearchReports
- Related Projects: 10-PATH1-Browne; 10-STEW CROP4-Kimmelshue