Management and Benefits of Cover Crops in Almond Orchards

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PROJECT SUMMARY

Objectives for current year:

- Compile knowledge on the use, management, and barriers for adoption of cover crops in irrigated almond orchards.
- Quantify the benefits and tradeoffs of winter cover crops and resident vegetation compared to fallow on soil water balance and water use efficiency in three different geographical regions differing in average annual rainfall
- Determine the host status of various cover crops species and mixes to key plant-parasitic nematodes.

Background:

Planted or natural vegetation cover crop during the fall/winter impact various aspects of soil quality regulating N, water, and C dynamics which may be of benefit to the sustainability and resilience of almond industry. Previous projects and farmers experience show that this practice is compatible with large scale almond production and California growers recognize the theoretical benefits that might come from implementing cover cropping. However, we lack concrete information to guide cost-benefit analyses of implementing cover crop and address concerns about potential increase in water usage. Over the course of this project, we will determine benefits and trade-offs associated with winter cover cropping in terms of soil water availability, nitrogen capture, pest suppression, and carbon sequestration in different rainfall zones.

Discussion:

We will first conduct an extensive review of literature and survey growers, their advisors, and researchers on the current practice and knowledge of growing and managing cover crops (single species, cover crop mixtures or natural vegetation) in Almond orchards across California. We will provide both online and paper survey support to identify incentives and barrier for adoption and further define our research agenda.

Given the current restriction and uncertainties in irrigation water supplies, we will focus our work this year on studying the impact of fall/winter orchard floor management on water balance and use. We will use orchards with either (T1) winter planted cover crops, (T2) winter resident vegetation, and (T3) bare ground across three rainfall regions. We will monitor shifts in soil hydraulic properties (water retention and release, crusting, compaction, aggregation, total C and infiltration) and water use efficiency (upward and downward water flows, cover crop ET, tree water status in the spring and overall water balance). Impact on other ecosystem services such as N and C retention, temperature and pest control will be investigated in the following years.

Finally, we will conduct greenhouse studies to evaluate parasitic nematode host status of a collection of cover crop species and mixtures selected for their agronomic characteristics and answers from the survey. This will include ability to suppress root-knot, ring and/or lesion nematodes.

We hope that a better understanding of the benefits and tradeoffs associated with winter soil cover in various rainfall zones will help design locally-adapted and practical floor management strategies that do not interfere with imperatives of intensive almond production while maximizing benefits obtained from cover crops. This project will also assist the development of integrated pest and water/fertility management strategies necessary to meet the future needs of the California almond industry.

Project Cooperators and Personnel: D. Doll, D. Lightle, B. Holtz, UCCE.

For More Details, Visit

- Poster location 65, Exhibit Hall A + B during the Almond Conference; or on the web (after January 2017) at Almonds.com/ResearchDatabase
- Related projects: 16-STEWCROP5-Gaudin, 16-PREC5-Volder, 16-PREC3-Holtz, 16-PREC7-Brown/Khalsa; 15-DDOLL-01-AIM