University of California
Agriculture and Natural Resources
Making a Difference for California

Organic Almond Production System

Nickels Soil Lab Project

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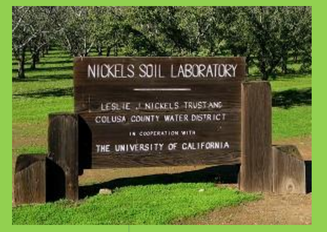

Objectives:

Evaluate the economics and productivity of USDA and CCOF compliant organic almond production methods suitable for the Sacramento Valley Region in comparison to standard production methods.

Conventional trees, Nov 22, 2013 →

Organic trees Nov 22, 2013 ←

Field Test Results - eight years experience

- Trees were planted in 2006 on Lovell rootstock. 75% Non-pariel, 25% Fritz. Every fourth tree in every row is a Fritz, the rest are Non-pareil. Transitional trees were farmed conventionally for three years and then shifted to organic production. Irrigation is through double-lined, buried drip tubing.
- Organic tree canopies are well developed but less dense than conventional(see photos @ lower left).
- Biggest challenges:
  - Weed control - propane is expensive and multiple passes are required per season.
  - Nitrogen nutrition is very expensive (see last point below and costs in the table at right).
  - Disease control – especially rust and, perhaps, brown rot.
- Aggressive sulfur program (4x after petal fall) reduced leaf loss from rust.
- Yields in the organic block doubled in 2013 over 2012, but still were only two-thirds of those in conventional section (8th leaf). Increases may be due to Ph-D fungicide at full bloom, less leaf loss from rust (and some mites), and/or improved nutritional program.
- Percent nut set was not different between conventional and organic trees. (Measured in 2013)
- Production costs were $1148/acre higher (246%) for organic vs. conventional practices/materials. Seventy (70%) of the cost of producing almonds organically in this demonstration s in the cost of nitrogen (primarily) and some potassium (included in the 4-0-2 material) fertilizer.

Organic vs. conventional production: Yield and summer leaf nitrogen (N) levels, 2013

System	Yield lbs/Ac*	Kernels/oz	% leaf N
Standard	3,301	26	2.73
Transitional	2,478	28	2.38
Organic	2,217	28	2.44
Org & weed cloth	2,319	28	

*Yields in this report are calculated from small lots. They do not include deduction from huller/cracker loss and assume solid orchards with no missing trees. Therefore, the numbers are approximately 5-10% higher than expected commercial block yields.

Production Cost Comparison

Conventional	Notes	Cost/acre of trees	Organic	Notes	Cost/acre of trees
Nutrition			**Nutrition**		
225# N/acre as UN-32		149.89	50# N/acre Sodium nitrate	June	143.75
150#K_2O as 0-0-12 (KCl)		117.19	125# N/acre and 62.5# K_2O (4-0-2 liquid)	March (50# N) April (50#N) Oct (25#N)	1,328.12
5#/acre zinc sulfate 35.5%		4.08	Solubor (2.5#/acre)		3.75
Solubor (2.5#/acre)		3.75			
Weed Control			**Weed Control**		
Chateau (12 oz/acre)	Feb 20	44.59	propane	8 flamings	240.00
Prowl H20 (8 qts/acre)	Feb 20	54.48	labor for flaming		100.00
Generic glyphosate) (1 qt/acre	Feb 20	2.65			
Ammonium sulfate (AMS) (10#/100 gal)	Feb 20	0.92			
Poast (24 oz/acre)	July 22	10.74			
Treevix (1 oz/acre)	July 22	9.78			
Mod Seed Oil (MSO) (16 oz/100 gal)	July 22	0.63			
Generic glyphosate) (3 pints/acre)	Aug 5	7.29			
Treevix (1 oz/acre)	Aug 5	17.91			
AMS	Aug 5	1.34			
mowing	5 times	30.00	mowing	5 times	30.00
Insects/Mites			**Insects/Mites**		
Intrepid (16 oz/acre)	Mid May (PTB & NOW)	33.52	Entrust (Aug 1, 3rd gen NOW egg hatch)	3 oz/acre	36.56
Onager (20 oz/acre)	mid-June	71.62			
Altacor (4 oz/acre)	Initial hull split (June 30)	46.26			
Altacor (4 oz/acre)	2 wks after initial hull split (July 16)	46.26			
BifentureEC (12.8 oz/acre)	Aug 1, 3rd gen NOW egg hatch	14.03			
Disease			**Disease**		
Vanguard (2.5 oz/acre) Tilt (4 oz/acre)	Pink, every other row	15.71			
Quadris Top (14 oz/acre)	Full bloom, every row	36.99	Ph-D fungicide * at full bloom	6.2 oz/acre	35.88
Bravo (4 pt/acre)	2 WAPF, every row	21.23	Sulfur-DF mid-March	20 lb/acre	17.00
ziram (8#/acre)	4 WAPF, every row	36.32	Sulfur-DF early April	20 lb/acre	17.00
Quash (3.5 oz/acre)	Early April, every row	31.08	Sulfur-DF early May	20 lb/acre	17.00
Quadris Top (14 oz/acre)	Late June, every row	36.99	Sulfur-DF late June	20 lb/acre	17.00
Total costs	Does not include application costs	**808.26**		Does not include application costs	**1986.060**

*Ph-D Fungicide is not an certified organic fungicide, but it is exempt from tolerance and an organic label request has been submitted. All almonds grown at Nickels Soil Lab are marketed as conventional nuts, not certified organic, regardless of orchard practices.

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