
UCCE Farm Advisor Projects, 2020 (Hort3.Niederholzer)

Establishing a long-term phosphorus trial in almond.

Project No.: HORT3.Niederholzer

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Introduction and Goal:

Almond crop P use was 40-60 lbs P₂O₅/acre in a 2500 kernel lb/acre/year crop in UC research conducted in Kern County between 2008-2012. However, annual P inputs are not recommended in current UC almond production publications.

We propose to test the following hypothesis:

Annual applications of P will result in significantly greater cumulative almond production over a five year period compared to almond not receiving P fertilizer.

Soil variability often delivers more influence on yield across an orchard than does a fertilizer treatment. Pre-trial sampling (fertility and yield) are critical to accurate assessment of the natural differences in productivity across an orchard in order to accurately test the value of a fertilizer to crop production in that field.

An 18 acre almond planting was established in 2017 on low P soil (3-7 ppm soil PO₄). Half the planting is on vigorous rootstock (Titan peach/almond hybrid) and half is on a less vigorous rootstock (Rootpac-R almond/plum hybrid). The orchard is irrigated by double-line drip irrigation. Tree rows are 0.2 acre long (roughly 30 trees at 14' tree spacing x 21' row spacing). Detailed soil mapping using EM-38 equipment prior to plant this orchard showed highly variable soil textures and, potentially, yield potential.

To help evaluate nutrient variability across the test orchard, a detailed leaf and soil sampling program was done between July, 2020 and February, 2021. Each of 20 tree rows (10 for each rootstock) will be split in half (N-S) and all 40 sections sampled using single, composite sample (soil or leaf). Yield (kernel lb/acre) were measured in summer, 2020..

A. Objectives

1. Sample almond leaves and soil as well as take yield data to inform treatment placement for a +/- phosphorus trial at the Nickels Soil Lab in Arbuckle.

B. Materials and Methods, Results and Discussion

- July leaf samples were taken and leaf %P determined for Nonpareil trees in two rootstocks (Titan and Rootpac-R), four tree spacings (12', 14', 16', or 18') and over five replicates for each rootstock and tree spacing.
- One third of the leaf samples from the 40 NP/Titan contained <0.1%P, although all but 2 samples contained 0.09-0.1%P
- All of the samples from the NP/Rootpac-R contained >0.1%P
- Yield of Nonpareil, Kester and Aldrich trees was measured in August and September, 2020 and are reported in the Hort6.2020 report.
- Regression of Leaf P vs kernel yield for each experimental unit for Titan and Rootpac-R showed no significant relationship between yield and leaf P.
- Soil samples were taken in early February, 2021.
- Leaf and soil P results will be used to assign treatments to half of the 80 treatment plots in the orchard.
- Based on crop yield in 2020, the following fertilizer rates, intended to replace P removed in the 2020 crop, will be banded within the drip irrigation zone in March, 2021:
 - 25 lb P₂O₅/acre on all Titan rooted NP, Aldrich and Kester trees.
 - 15 lb P₂O₅/acre on all Rootpac-R rooted NP, Aldrich and Kester trees.
- Yield data will be taken in 2021 and P equal to crop removed P will be applied in fall or winter.
- This trial will continue for 5 harvests.

C. Outreach Activities

1. No outreach activities planned/conducted.
