

## APPENDIX A.

### Replicated Fertilizer Rate Trial on Organic Cilantro 2014

#### Materials & Methods

##### *i. Location*

The trial took place on ALBA's demonstration field, which has been certified organic since 1992. The soil type is Hanford gravelly sandy loam. The demonstration field is operated as a student enterprise as part of ALBA's Farmer Education Course where 30 students annually learn about organic production and farm business management. Thus, the students were directly involved in the experiment from treatment application, monitoring, and recording harvest. The results were brought back into the class discussion as part of a field day that was open to all farmers.

##### *ii. Rotation and Ground Preparation*

Following broccoli harvested in late May of 2014, ground (1/4 acre) was prepared with standard methods that included disking, chisel plowing, and listing beds on 40" centers. Irrigation was applied to pre-germinate weeds that were mechanically eliminated with a Lilliston-type cultivator and beds were shaped on the day of planting.

Three beds (250 feet each, double lines) of cilantro ('Leisure' variety) were planted on July 26, 2014 with an Earthways seeder (small bean plate) and irrigated that same day with overhead sprinklers. The seedbed was kept moist with overhead irrigation being applied for approximately 1.5 hours every 2-3 days until the seedlings emerged 10 days later.

##### *iii. Design*

The four fertilizer rate treatments were applied on August 2<sup>nd</sup>, 2014. Three-hundred-sixty bed-feet were divided into 30 foot lengths (thus, 12 experimental units) that received the four treatments in a completely randomized design (3 replicates): 1) (Control) 0 pound of nitrogen per acre, 2) 80 pounds of nitrogen per acre, 3) 160 pounds of nitrogen per acre, and 4) 320 pounds of nitrogen per acre. The fertilizer was top dressed by hand in between the two seedlines and the specific material used was TRUE 851, an organically-approved, dry pelletized material derived from meat and bone meal, chicken manure, and feather meal with 8% nitrogen.

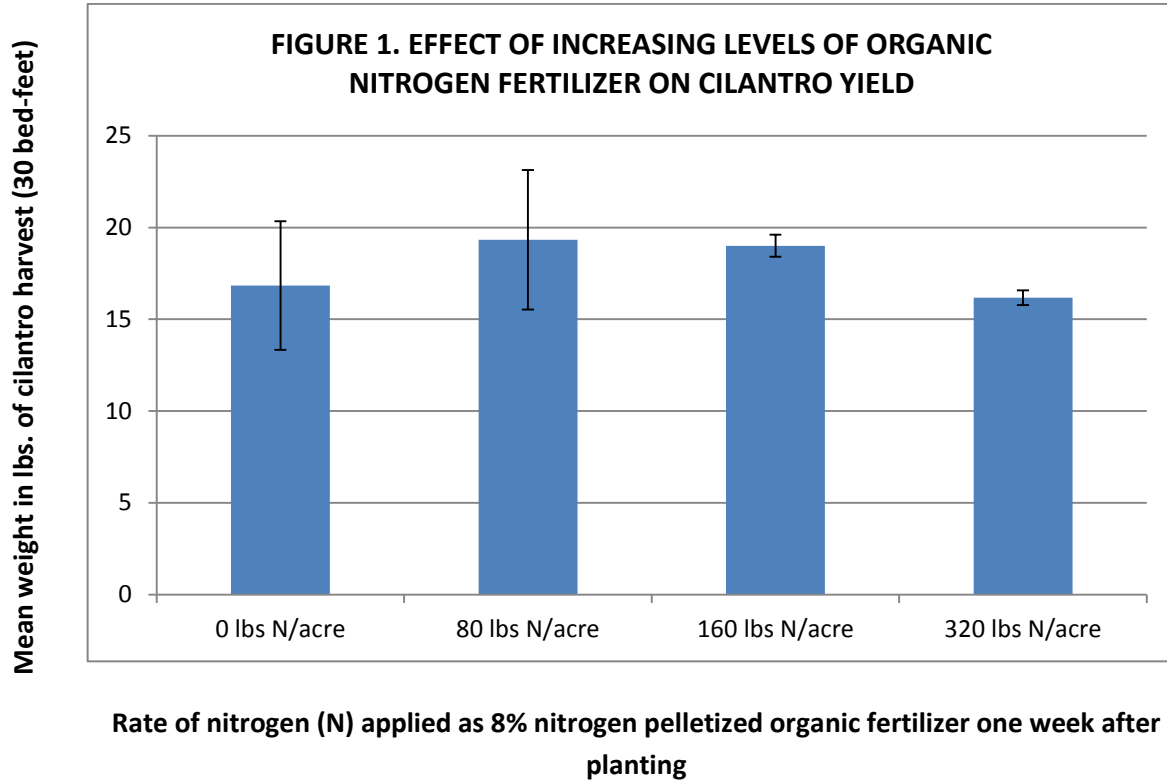
##### *iv. Maintenance*

The moisture in the first 6 inches of soil was kept between 50% field capacity and 100% field capacity throughout the growth of the cilantro. An estimated total 6 inches of irrigation was applied with no precipitation recorded during that period of time. No supplemental fertilizer was applied.

Weeds in the bed tops were managed with an action hoe and hand-weeded twice within the seedline. The weeds in the furrow bottoms were managed with a cultivating toolbar attached to a tractor.

The cilantro was ready for harvest on September 6, 2014. The cilantro was loose packed (5lb boxes) and the weight for each experimental unit was recorded.

### Results & Discussion



There was no noticeable difference in the cilantro yield. A one-way analysis of variance showed no significant differences between treatments of N fertilizer rate in regards to cilantro yield [ $F(3, 8) = .78$ , ns]. The means are presented in Figure 1. Some of the variance in specific treatments may have been due to standing water in a furrow. The mineralization of the residue of the broccoli crop likely provided high amounts of nitrogen to the cilantro crop<sup>1</sup>. It would have been helpful to have taken a soil nitrate quick test before planting to know what was available already in the soil, as well as tissue testing to determine uptake. Also, our irrigation water is very high in nitrates (as high as 200ppm as NO<sub>3</sub>). An estimated 45-60 pounds of nitrogen per acre were applied with the irrigation. Typical nitrogen fertilization application rates for cilantro on the Central Coast of CA are in the range of 100-120 pounds per acre, and cilantro typically takes up 70 pounds of nitrogen per acre<sup>2</sup>. Thus, the nitrogen applied in the irrigation and mineralized from the broccoli residue (and other sources) probably easily met the cilantro crop demand.

<sup>1</sup> Broccoli residue can contain as much as 225 pounds of nitrogen per acre. Personal communication with Richard Smith, UCCE Farm Advisor to Monterey County.

<sup>2</sup> 2016. UC Vegetable Research Cilantro Production in California – ANR Catalog. <http://anrcatalog.ucanr.edu/pdf/7236.pdf>

Our production was estimated to be 4.5 tons/acre, approximately half of what is typical at commercial production levels <sup>2</sup>. This could be due to several factors, such as organic production, and less than optimal plant density. We intended to grow our cilantro for bunching (and thus planted only two lines per bed), but the market that was available at harvest was for loose pack. Our seeder plants a single line, as opposed to scattering the seed in a band. Commercial production often has a higher plant density (e.g., 8+ seedlines on an 80" bed) than what we can achieve at ALBA.