

Seeking Synchrony with Integrated Soil Fertility Management: Establishing a reference gradient of nitrogen need and availability in Processing Tomatoes

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Overview

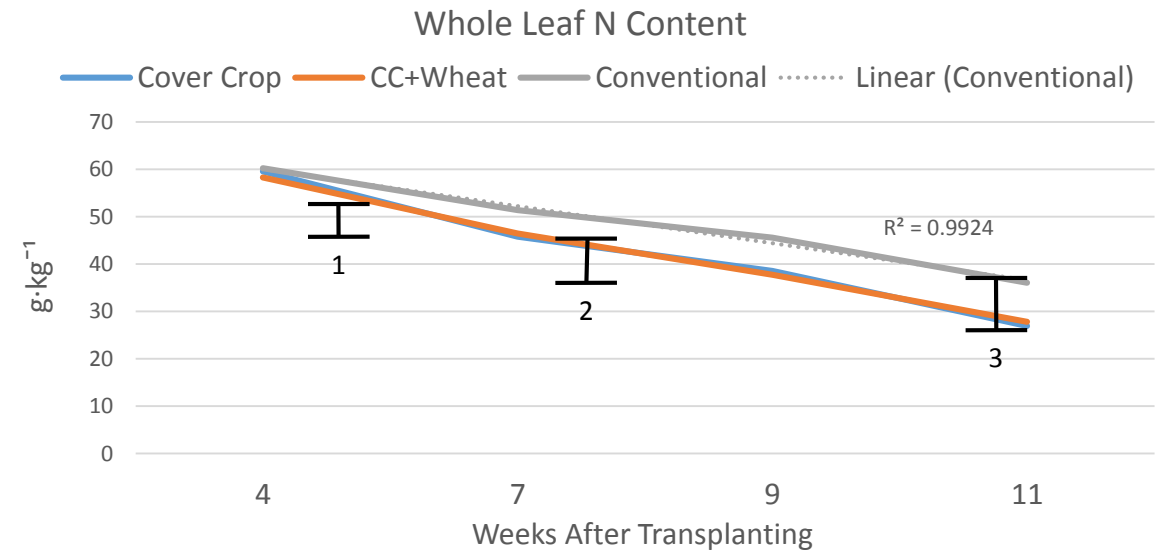
The potential of hybrid production systems utilizing both organic matter- and fertilizer-derived nutrients is well established in academic literature and, increasingly, in farmer practice. Our team established a field trial examining two variables - cover crop mix (with a low C:N treatment and moderate C:N treatment) and sidedress fertilizer rates (ranging from 0 lbs·acre⁻¹ to 160 lbs·acre⁻¹). The initial cover crop mix was 80% leguminous. Half the treatments had 50 percent of their biomass replaced with young wheat. Project goal was to examine the effects of these gradients temporally on levels of Plant Available Nitrogen (PAN) and its relation to uptake demands of processing tomatoes.

Soil nitrate and ammonium levels were monitored throughout the season, as was whole leaf N content. Harvest measurements included fruit yield, fruit N content, vine yield, and vine N content.

Microplot (Land Cover Tst)	Sidedress Rate
Cover Crop	160
50% Cover Crop 50% Wheat	
Cover Crop	80
50% Cover Crop 50% Wheat	
Cover Crop	0
50% Cover Crop 50% Wheat	
Cover Crop	120
50% Cover Crop 50% Wheat	
Cover Crop	40
50% Cover Crop 50% Wheat	

Results

Cover crop alteration with young wheat did not have significant effect, likely due to incorporation at such an early growth stage. Yield of tomatoes at various sidedress treatments did not demonstrate any significant differences despite large disparities in applied rates (up to 160 lbs·acre⁻¹). Soil nitrate tests prior to sidedress application demonstrate NO_3^- levels at or above established thresholds for nutrient response (Krusekopf et al., 2002).



Whole-leaf N content was compared against recommendations for foliar N content at three growth stages 1) First Bloom 2) Full Bloom and 3) 10% fruits showing red color (Hartz et al., 1998). In stages 1 and 2 all treatments were at or above optimum N content. In stage 3, averages of all land cover treatments were within optimum range. Fertility treatments did not demonstrate significant differences in these measures.

What's Next?

Undertake a historical review of Russell Ranch data to investigate potential over-fertilization. The ISFM project is continuing through the 2014 growing season.

