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## ORGANIC ROMAINE HEARTS

LATE SUMMER 2017 | SALINAS, CA



# EXECUTIVE SUMMARY

Responsive Drip Irrigation (RDI) worked with a Commercial Grower in Salinas, CA to perform a field trial comparison of RDI's plant-responsive drip tape system versus standard drip tape irrigation to produce Organic Romaine Hearts. The trial ran from August to October of 2017. The standard practice for the Commercial Grower for this crop in this field requires two fertilizer applications: the first is pelletized organic chicken manure mixed into the soil prior to planting. The second application is equal in amount; however, it is applied to the surface approximately two weeks after planting the transplants. The Grower's focus was to eliminate the need for a second fertilizer application, which would reduce their labor and material cost. The performance metric for RDI's responsive irrigation system to achieve in this comparative field trial required that RDI's system produce a high-quality crop while reducing the amount of the grower's standard organic fertilizer application.

The well water that serves the trial field is high in nitrogen. RDI's unique water delivery can reduce the total water required, but also more effectively utilizes the available nitrogen found in the water. For this trial RDI did NOT receive the second application of fertilizer. In this comparative trial, a similarly sized grower control plot also did not receive the second fertilizer application, referenced as Control Group 1 (CG1). The remainder of the field received the standard practice of two fertilizer applications, referenced as Control Group 2 (CG2).

For irrigation of this crop, the standard practice is to apply 4 acre-inches with sprinklers for stand establishment. Another 10 acre-inches is then applied with surface drip tape for the remainder of the crop, for a total of 14 acre inches. The crop was harvested at 42 days. The RDI plant-responsive drip tape system significantly reduced fertilizer use by 50% and water use by 14%. RDI produced an excellent crop with comparable yield and generally taller plants compared to the Commercial Grower's standard practice (CG2). Due to logistical constraints, the RDI trial area received all the standard sprinkler water applications. Sprinkler water applications are not required to establish transplants with RDI's system, so additional water savings would be evidenced without the use of sprinkler events.

In summary, this trial demonstrated that the RDI plant-responsive drip tape system exceeded the grower's expectations, producing a higher quality crop compared to **both** of the grower's control groups while reducing fertilizer and water use.

## OVERVIEW

Location: Salinas, CA  
Environment: Outside  
Temperatures: Average low / high = 51 / 74° F (notable heatwave in Sept)  
Rainfall: 0.04"  
Plant Life: Organic Romaine Hearts  
Planting: Transplant  
Duration: 42 Days (Aug - Oct)  
Soil: Chualar Loam  
Planting Size: Three beds, average 225 ft each. Total of 10.3% Acre  
Plant Spacing: 80" beds. 6 plant rows per bed  
Injection Method: Tractor and Injection Implement. Single bed, three lines  
Fertilization: Certified Organic chicken manure  
RDI Version: 5/8" Single Sided Responsive



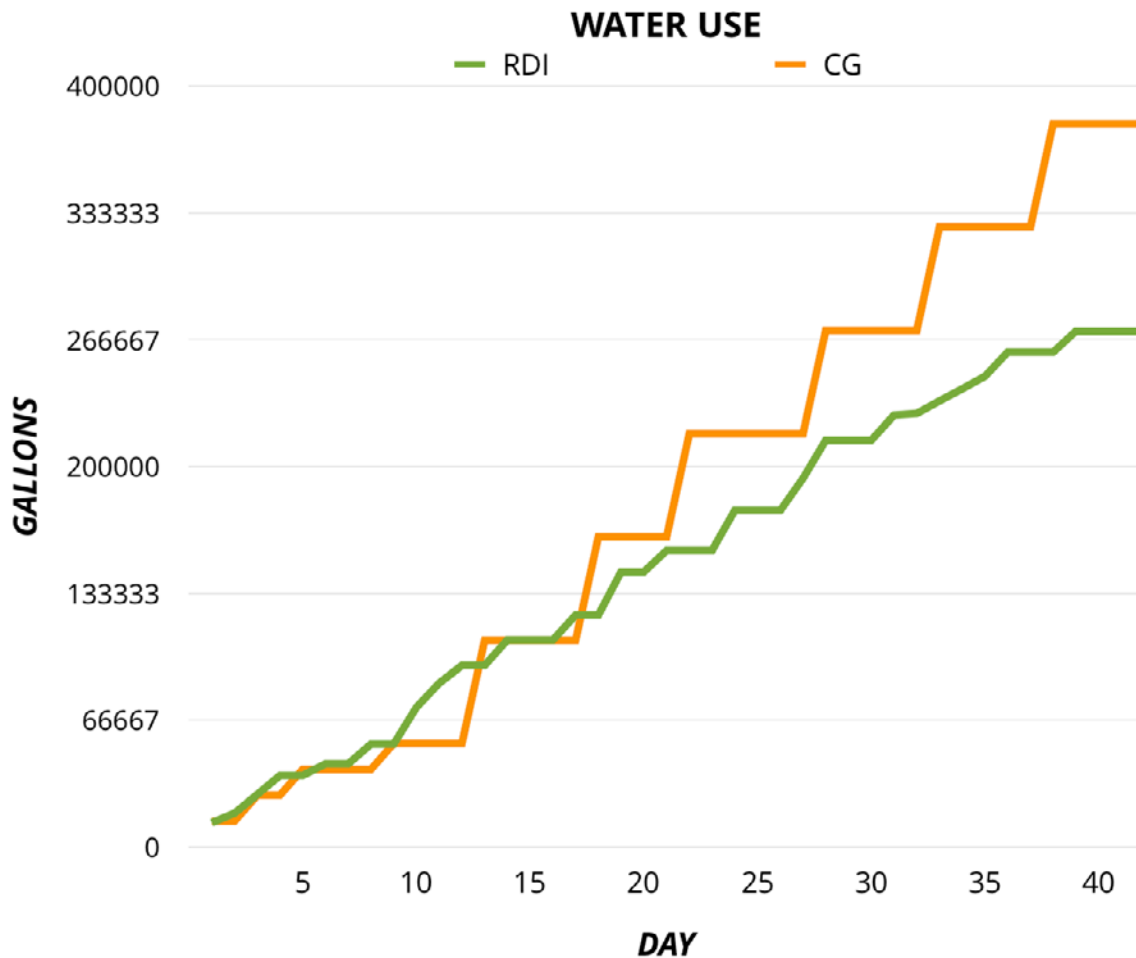
## SIGNIFICANT FERTILIZER AND WATER SAVINGS

In Control Group 2 (CG2) the Commercial Grower made the standard second application of chicken manure fertilizer. A truck filled the three large "hoppers". The operator then traveled the length of the beds with a tractor, and applied on the surface between each pair of plant lines.



Photo shows CG2 and typical surface application of chicken manure fertilizer. RDI and CG1 were excluded from this second application.

The second application is 50% of the total fertilizer typically used by the Commercial Grower.



RDI used just under 12 acre-inches per acre vs. 14 acre-inches for the standard application, a 15% savings. RDI's water usage during the first 10-14 days was higher than the Control Groups due to the additional water applied to RDI's trial beds from the grower's sprinkler applications. Because of the zones and area size of sprinkler coverage, it was not possible to exclude RDI's trial beds from receiving the 4 acre-inches of sprinkler events. This excessive water from the sprinklers causes leeching of the existing nutrients in the soil that were applied pre-plant.

RDI's plant-responsive system is designed to function without the need for sprinkler use. RDI system's initial 10-14 day water delivery is sufficient to meet the needs of both transplant establishment and seed germination.

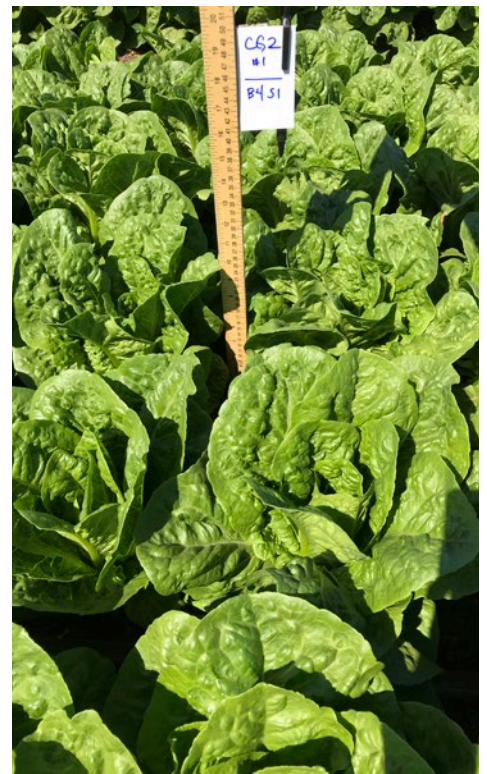
Thus, compared to the standard application of 14 acre-inches, the 8 acre-inches applied via RDI drip tape would show **a total water savings of 43%.**



## TRIAL IMAGES



Day 5. RDI's three beds are center of photo. Each bed has 6 plant lines. CG1 has three beds to the left, and the remainder of the field is CG2. Grower is using sprinklers for stand establishment. Due to sprinkler spacing requirements, RDI could not be excluded from sprinkler irrigation events.



Day 33. Comparative photos and measurements of AVERAGE PLANT HEIGHT:  
CG1: 10.4" (left), RDI: 12" (center), CG2: 10.8" (right)



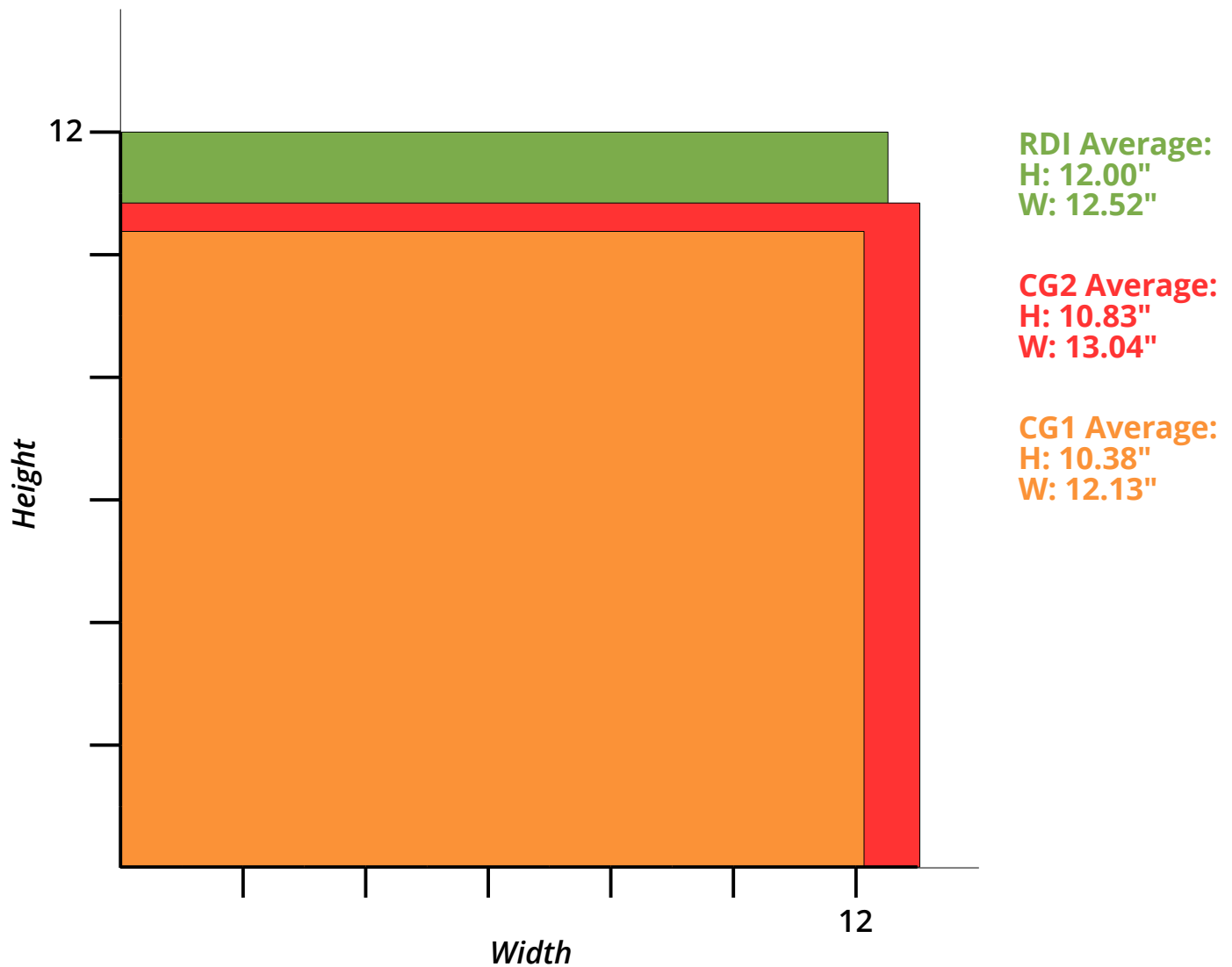


Day 40. Harvest has begun at the south end of field. RDI trial section shows excellent growth and development, and continues to be the tallest section in the field.



Day 42: Harvest. Multiple sample plants were cut from comparable sections. The largest plant in each section was cut, the outer leaves removed, and then sliced in half to view plant growth and development. RDI's crop showed taller growth compared to CG1 and CG2, despite receiving half the fertilizer of CG2 and using less water.





Day 42: Plant sizes prior to harvest: Samples from each of the sections were measured for height and width. CG2 was wider than RDI by a slight margin of 0.52". The RDI plants were substantially taller than both CG1 and CG2, 1.62" and 1.17", respectively.