

Guarantee® Hi K Organic and Guarantee® Complex

Improve Yield and Fruit Weight in Coastal Lemons

Guarantee® Hi K and
Guarantee® Complex Seaweed
Extracts Increase Lemon:

- Fruit count
- Fruit weight

CROP

Lemons (cv. Eureka)

STUDY OBJECTIVES

- To determine if treating lemons with Ocean Organics seaweed products (extracts of *Ascophyllum nodosum*), increases overall size by weight, and improves yield of that set crop.

RESULTS

"Very positive improvements in general production were seen with both Ocean Organics programs, particularly when... the increases in summer fruit harvest (anything picked after May-June) were considered." Increases in FOB prices and returns to growers during this period are especially important. "A quarter box improvement per tree yield increase can improve a grower's returns per acre significantly."

- David Holden of Holden Research and Consulting

Fruit Weight

Both Guarantee® Hi K and Guarantee® Complex **statistically improved fruit weight on three of four sampling dates**. The average for the season is shown in **Figure 1** and **Table 1** with statistically significant average fruit weight improvements for both Ocean Organic treatments.



Key Results

Ocean Organics
Seaweed:

Increased fruit weight **9%**

Improved yield **12%**

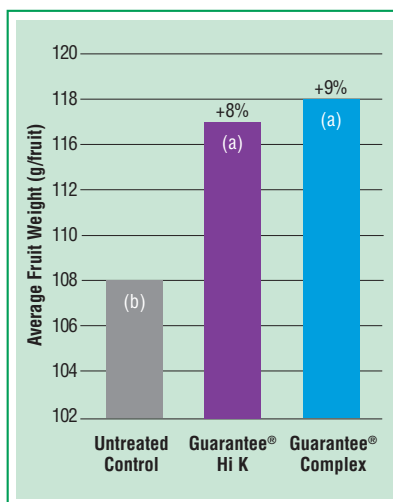


Figure 1: Increased Fruit Weight. Guarantee® Hi K (organic) and Guarantee® Complex statistically improved average fruit weight.

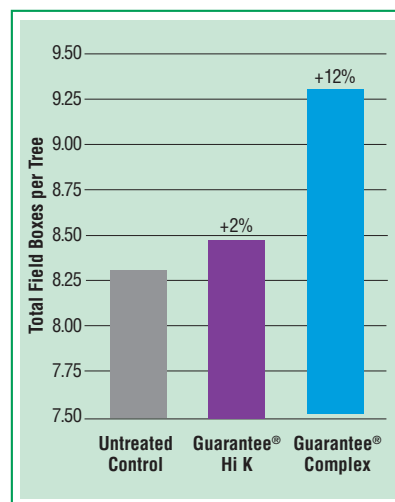


Figure 2: Improved Yield. Treatment with Guarantee® Hi K (organic) and Guarantee® Complex resulted in more fruit per tree over the course of the season (+0.2 and + 1.0 field boxes/tree, respectively).

Table 1: Guarantee® Hi K and Guarantee® Complex statistically increased fruit weight on 3 out of 4 sampling dates and over the course of the season.

	1/28/20 Fruit Weight (g/10 fruit)	4/15/20 Fruit Weight (g/10 fruit)	5/27/20 Fruit Weight (g/10 fruit)	7/27/20 Fruit Weight (g/10 fruit)	Avg. Fruit Weight for Season (g/fruit)
Untreated Control	1057 (c)	1235 (b)	1044 (b)	999 (a)	108 (b)
Guarantee® Hi K	1193 (b)	1304 (a)	1159 (a)	1028 (a)	117 (a) +8%
Guarantee® Complex	1267 (a)	1333 (a)	1087 (ab)	1017 (a)	118 (a) +9%

Table 2: Guarantee® Hi K and Guarantee® Complex statistically increased yield on the last pick date (8/5) and numerically increased the total yield for the season.

	5/11/20 Field Boxes/Tree	6/22/20 Field Boxes/Tree	8/5/20 Field Boxes/Tree	Season Total (Field Boxes/Tree)
Grower Standard	4.13 (a)	3.22 (a)	0.97 (b)	8.32 (a)
Guarantee® Hi K	3.94 (a)	3.44 (a)	1.12 (a)	8.49 (a) +2%
Guarantee® Complex	4.86 (a)	3.24 (a)	1.18 (a)	9.28 (a) +12%

Yield

Both Guarantee Hi K and Guarantee Complex improved total yield over the course of the season (+0.2 and + 1.0 field boxes/tree, respectively) as shown in **Figure 2** and **Table 2**. Yields were collected for three picks during the spring and summer of 2020.

The last pick in August of 2020 produced significantly **more fruit per tree for both Guarantee Hi K (+0.15 boxes/tree) and Guarantee Complex (+0.21 boxes/tree)**. This is important to note because summer fruit production generally yields a **better return**.

Fruit Drop Analysis

On average no significant differences were noted between treatments.

At no time during the course of this trial were any adverse or phytotoxic effects observed to this crop.

LOCATION/SCIENTISTS

Somis, CA

Investigator: David Holden, Holden Research and Consulting

Study Director: Sarah Williams, Ph.D., Ocean Organics

STUDY DESIGN

This trial measured the impact of three treatments on a mature block of lemon trees (cv. Eureka). Treatments consisted of the following:

- Grower standard program (control)
- Grower standard program with Ocean Organics Guarantee Hi K
- Grower standard program with Ocean Organics Guarantee Complex

Guarantee Hi K and Guarantee Complex were foliar-applied during spring and summer of 2019 at a rate of 2 qt/acre at pre-bloom, petal fall, and early-mid summer fruit formation on May 24, June 21, and July 23 of 2019.

Treatments were replicated three times and arranged in a randomized complete block design (RCBD). The study was overlaid on the grower standard. The mix size was 2 liters and the spray volume was 250 gallons/acre. Statistical Analysis was performed at a 90% confidence level.

Yields were collected for three picks during the spring and summer of 2020 (May 11, June 22, and Aug 5).



Bin counts were collected from each of the box row replicates and then reduced to average number of field boxes picked per replicate per tree.

CONCLUSION

Guarantee Hi K and Guarantee Complex seaweed products increased fruit weight and overall yield in this trial on lemons. Both products showed similar statistical improvement in fruit weight. Guarantee Complex showed larger numerical increases in yield. Future work will be performed to confirm these trends. From the report provided by David Holden of Holden Research and Consulting: "Very positive improvements in general production were seen with both Ocean Organics programs, particularly when the improvements were seen in the increases in summer fruit harvest fruit (anything picked after May-June) was considered. FOB prices and returns to growers increase during this period and a quarter box improvement per tree yield increase can improve a grower's returns per acre significantly."



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