

Guarantee® Hi K

Seaweed Extract

Increases Yield and Net Returns in Raspberries

Ocean Organics *Guarantee® Hi K* Produces Increases in Raspberry:

- Marketable production
- Marketable production net returns
- Bud break
- Fruit per foot of cane

Guarantee® Hi K is approved for organic use.

Guarantee® Hi K Seaweed Extract increased marketable production net return by \$4,244 per acre.

CROP

Red Raspberry, *Rubus idaeus* Variety: Carmina

STUDY OBJECTIVES

- To evaluate *Guarantee® Hi K* Seaweed Extract on cut back Floracane raspberries during winter production.
- To measure impact on total and marketable yield.
- To measure impact on bud break and BRIX when possible.
- To observe disease and mite development over time.

LOCATION/SCIENTISTS

Ventura County, CA

Investigator: David Holden, Holden Research and Consulting

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

STUDY DESIGN

- Ocean Organics' seaweed treatment was compared to a grower standard (G.S.) that did not receive seaweed extract applications.
- Starting after fall cut back, *Guarantee® Hi K* was applied every 2 weeks in the drip system at 2 quarts/acre.

The proprietary block of raspberries used for this trial was grown in a commercial manner. This trial was set up as a completely randomized block trial with six replicates maintained during the growing season. The Ocean Organics program was overlaid on a grower standard (G.S.) and compared to a grower standard without seaweed extract. All treatments received the same in-season applications of N-P-K. All materials were applied through the grower's in-field drip irrigation system.



Photo above from 2017 field trial.

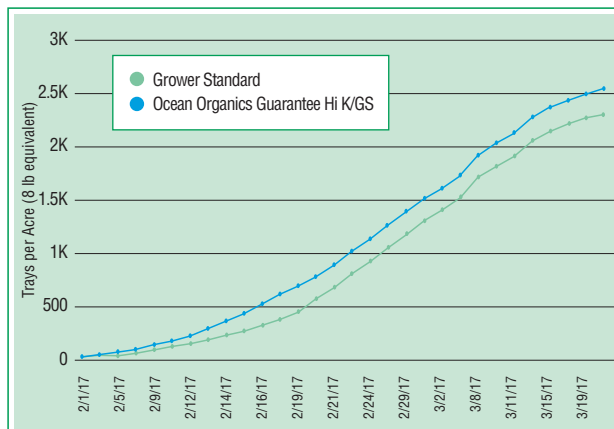
RESULTS

The following charts track all marketable production for all picks commencing on February 1, 2017 and ending March 20, 2017, with statistically significant differences noted between treatments for the first 12 picks.

Marketable Production

Chart 2 shows that *Guarantee® Hi K* produced numerically more flats of raspberries during the trial period at 2543 flats per acre, compared to 2315 flats for the grower standard (**a 10% increase in flats/acre with application of *Guarantee® Hi K***).

Chart 2: Cumulative Marketable Production by Pick Day



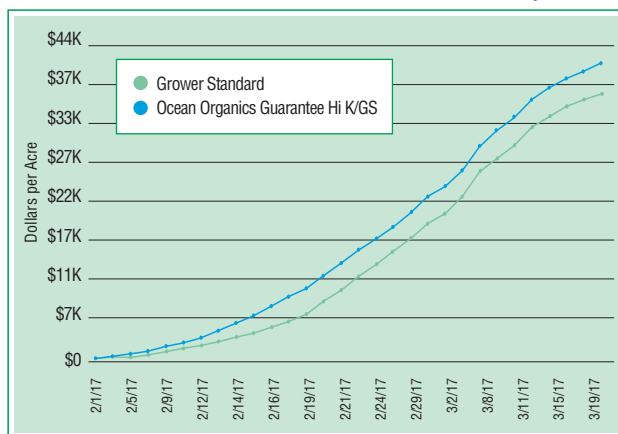
Guarantee® Hi K increased marketable yield by 228 trays per acre or 10%

Continued

Marketable Production Net Returns

Chart 4 shows the daily marketable returns based on USDA Shipping Point Market Prices found at [HTTP://marketnews.usda.gov/portal](http://marketnews.usda.gov/portal) for each pick day. This data is represented as the net back to grower after costs of approximately \$6.00 per tray were removed that would represent picking labor, carton and tray costs, transportation to the cooler, and cooling costs associated with picking the raspberries. Based on this data, numerically cumulative seasonal increase to the grower's return was seen by the use of Guarantee® Hi K over the grower standard, with a nice numerical return noted with a cumulative total for Guarantee® Hi K of \$41,336 per acre for this program per acre as compared to \$37,092 per acre for the grower standard (**an increase of \$4244/acre with application of Guarantee® Hi K**).

Chart 4: Cumulative Marketable Production Net Return by Pick Day

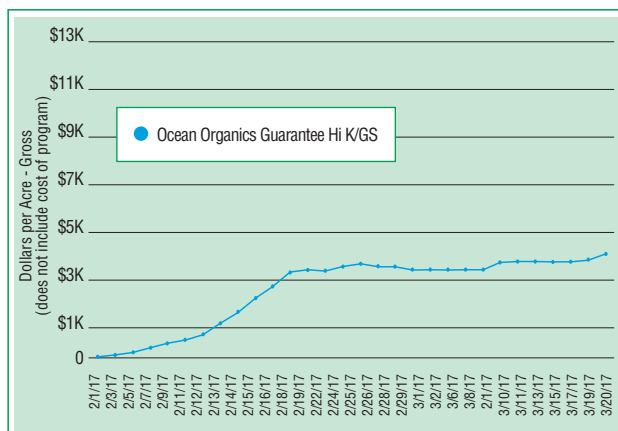


Guarantee® Hi K increased marketable production net return by \$4,244 per acre.*

Cumulative Differential from Grower Standard Return

Chart 5 shows the net cumulative differential in returns to the farm for each pick day for the treatment programs over the grower standard, which in this case **was \$4,244 per acre more for the season for the Guarantee® Hi K program**.

Chart 5: Cumulative Differential from Grower Standard Return



* Quote from final report written by David Holden. Graphs and data analysis also based on information presented in his report.

Increase in Bud Break

Bud break was counted twice at the beginning of re-growth after the canes had been stripped of old leaves and pruned.

A significant increase in bud break was noted for the Guarantee® Hi K treatment after the second analysis (a mean of 10.7 for the Guarantee® Hi K treatment vs 8.9 for the Grower Standard).

Internode Spacing

A final reading to attempt to quantify the differential in production between the two treatments was taken on March 21. This rating was based on counting the number of bloom, fruit, and harvested fruit to be found on the last foot of cane to see if higher production might be found due to tighter internode spacing of the flowers and fruit. The Guarantee® Hi K-treated vines showed **significantly more fruit per foot of cane** than the grower standard alone (mean of 22.5 for Guarantee® Hi K vs 16.2 for the grower standard).

Additional Data

No significant mite populations developed during this trial. BRIX readings were taken once on the marketable fruit, with the readings showing no significant differences between treatments. Fruit quality assessments were performed twice, based on a 0-2 rating scale, with 0 indicating un-marketable and 2 being first-grade marketable. All fruit analyzed was of highest quality.

Conclusions

“Based on the data collected in this trial, the use of the Ocean Organics Guarantee® Hi K had significantly positive effects for the production and financial return for this raspberry crop. It would appear that the influence on production occurs in producing more flowers and thus fruit per floral cane and possibly higher bud production as shown with the early bud break counts. Further research would be necessary to confirm this conclusion.”*

Ocean Organics has been processing seaweed and formulating fertilizers for 40 years. Our innovative processing technology yields products richer than others yet with fewer solids and lower viscosity. This means our extracts can be used with a broader range of materials with better blending, mixing and stability characteristics. Our seaweed-based fertilizers, plant health materials and soil conditioners lead the industry in quality, effectiveness, cost efficiency and environmental sustainability.



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