

Observations of Adding Humic and Fulvic Acids (Homigreen Barak) to the Fertilizing Interface - Interim Report

Background

Humic and Fulvic acids - molecules naturally occurring in the soil (a decomposition product of peat and white charcoal) make a useful contribution by making minerals accessible to plant roots, bacteria, fungi and more.

Humic acid contributes to the availability of minerals to a plant through two pathways:

1. The direct pathway - humic acid serves as an organic “chelate” (binder), which binds nutrients in the soil and prevents their adsorption into clay. This is owing to the molecule’s surface being covered by a negative charge that “attracts” minerals in the root vicinity (with a positive charge), neutralizing their charge. When the humic acid complex bound to a nutrient reaches a root, the root reduces (breaks down) the humic acid and releases the nutrient from it. The humic acid is now free to be reused, as long as it remains deep in the rooting space.
2. The indirect pathway - enrichment of the root environment and microorganisms living in it. Studies conducted around the world have proved that adding humus (organic matter that has a high concentration of humic and fulvic acids) to soil helps enhance the soil and form a microorganism rich root environment.

The Purpose of the Observations

Examining the contribution of adding **Homigreen Barak** (15% humic and fulvic acids and 3% potassium) to the fertilization interface, increasing the availability level and uptake of nutrients in the soil and its effect on parameters such as: perennial yield, fruit size, leaf chlorophyll concentration.

Method

During 2018, treatment and control observations were conducted on various crops (avocados, citrus fruit, almonds and mangoes). In the observations, the number of treatments using **Homigreen Barak** were examined against control plots that did not have this treatment.

The rest of the treatment of the various plots was identical.

In October - November, leaf specimens were taken (30 leaves from each treatment / control plot, a mature leaf from last growth) and the chlorophyll levels were measured in the leaf using an Apogee Instruments Inc. MC-100 Chlorophyll Meter.

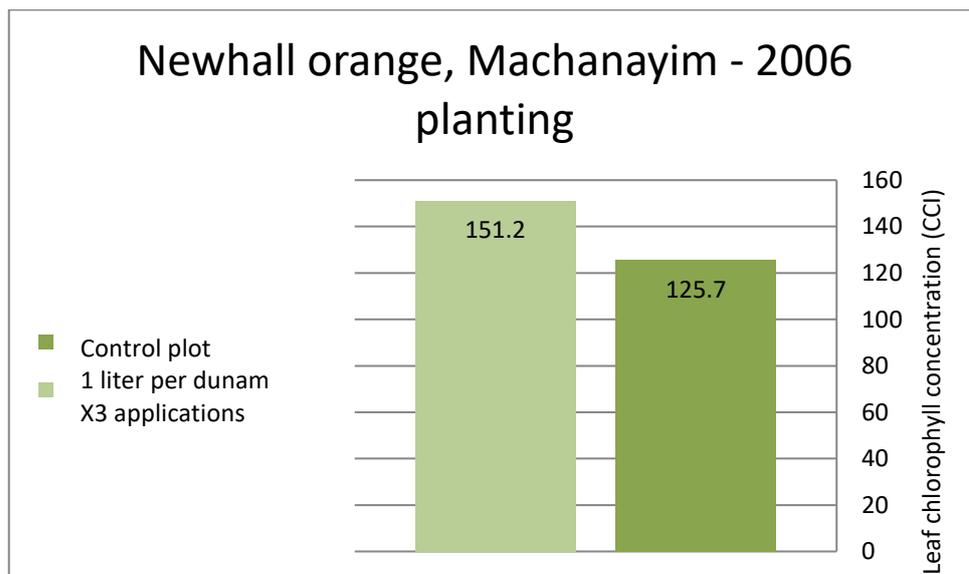
Chlorophyll – A key player in the photosynthesis process, as it absorbs solar energy, which is used by the plant to transform carbon dioxide and water into sugar, and oxygen molecules. The minerals that are directly or indirectly responsible for the production and functioning of chlorophyll are: nitrogen, iron, magnesium, zinc, manganese and others, so chlorophyll concentration in a leaf serves as an important parameter for the plant’s health and vitality. The chlorophyll molecule is what gives a plant its green color, meaning that when there is a deficiency in one of the minerals, yellow spots and discoloration appear on leaves.

Results

Newhall orange, Machanayim - 2006 planting:

Treatment: 1 liter of **Homigreen Barak** per dunam (thousand m²), applied by irrigation X 3 applications during the season.

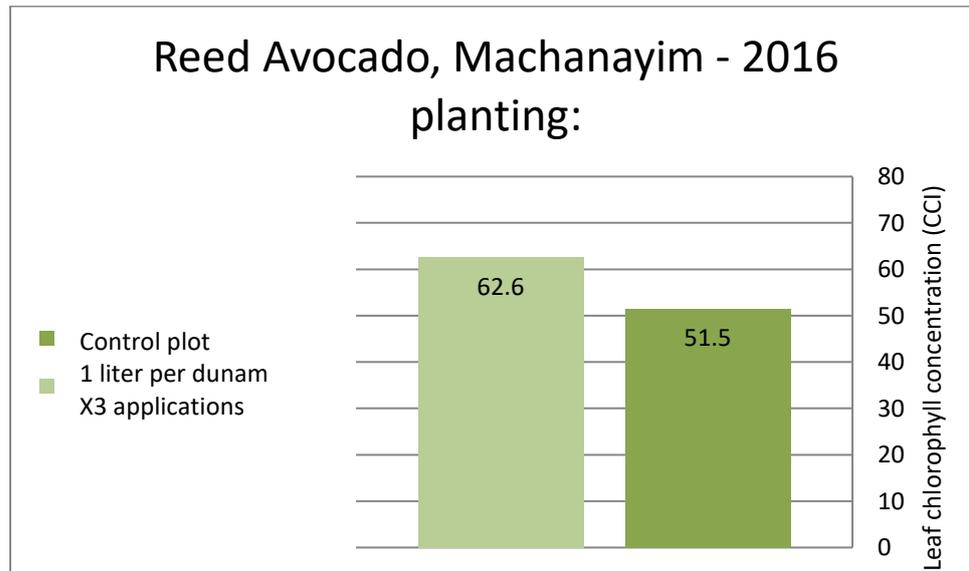
Finding: an addition of 20% (statistically significant) in the treatment plot.



Young reed avocado, Machanayim - 2016 planting:

Treatment: 1 liter of **Homigreen Barak** per dunam (thousand m²), applied by irrigation X 3 applications during the season.

Finding: an addition of 21.5% (statistically significant) in the treatment plot.



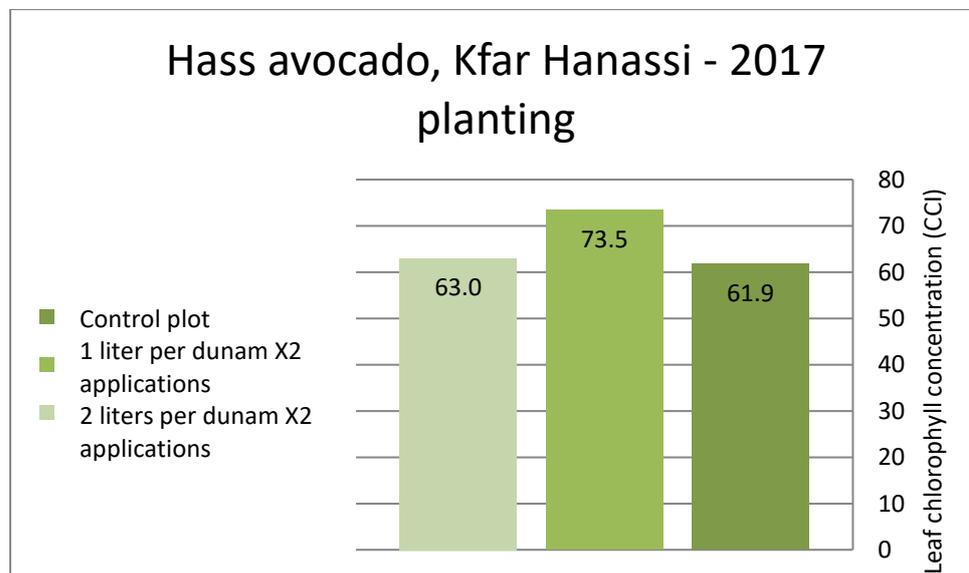
Hass avocado, Kfar Hanassi - 2017 planting:

Treatment 1: 1 liter of **Homigreen Barak** per dunam (thousand m²), applied by irrigation X 2 applications during the season.

Treatment 2: 2 liters of **Homigreen Barak** per dunam (thousand m²), applied by irrigation X 2 applications during the season.

Findings:

1. An addition of 19% between treatment 1 and the control plot, statistically significant.
2. Application of 2 liters per dunam did not yield an advantage, most probably because of the small volume of rooting space.



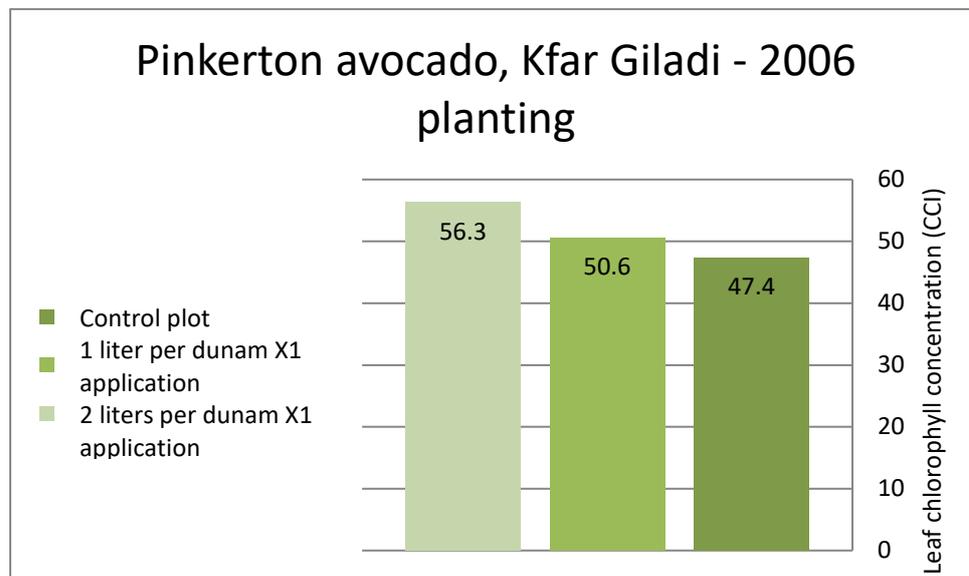
Pinkerton avocado, Kfar Giladi - 2006 planting:

Treatment 1: 1 liter of **Homigreen Barak** per dunam (thousand m²), applied by irrigation X 1 applications during the season.

Treatment 2: 2 liters of **Homigreen Barak** per dunam (thousand m²), applied by irrigation X 1 application during the season.

Findings:

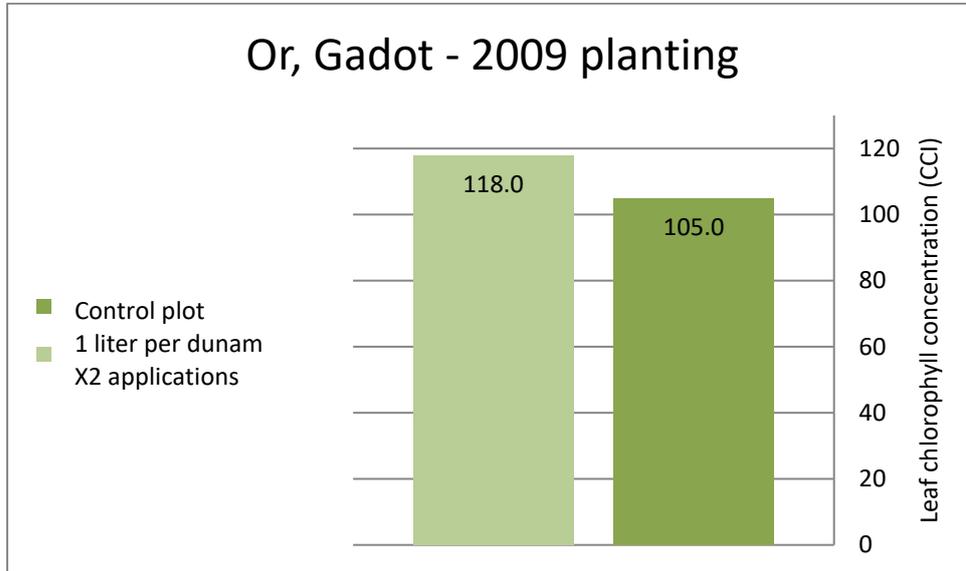
1. An addition of 6.8% between treatment 1 and the control plot, no statistical significance.
2. An addition of 19.8% between treatment 2 and the control plot, no statistical significance.



Or, Gadot - 2009 planting:

Treatment: 1 liter of **Homigreen Barak** per dunam (thousand m²), applied by irrigation X 2 applications during the season.

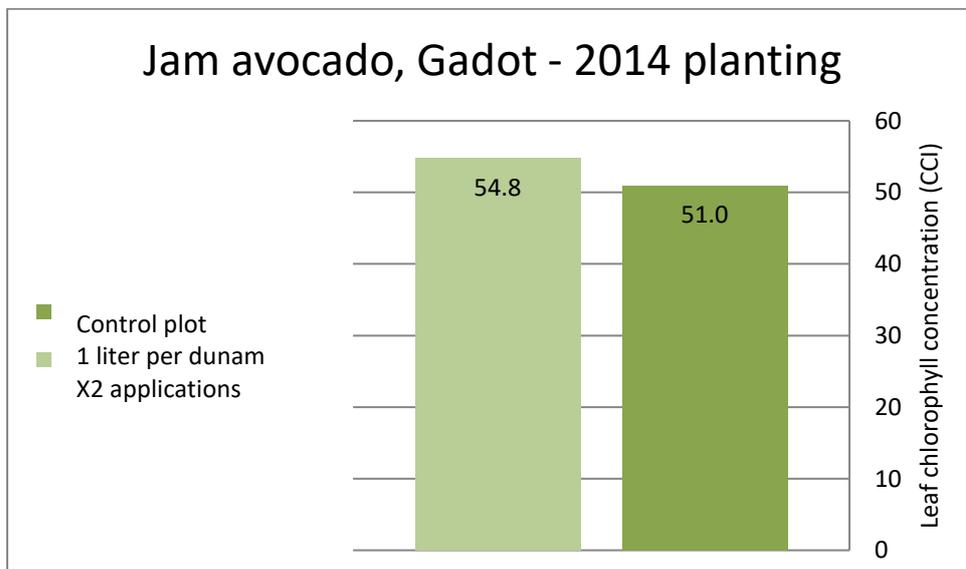
Finding: an addition of 12.4% in the treatment plot, no statistical significance.



Jam avocado, Gadot - 2014 planting:

Treatment: 1 liter of **Homigreen Barak** per dunam (thousand m²), applied by irrigation X 2 applications during the season.

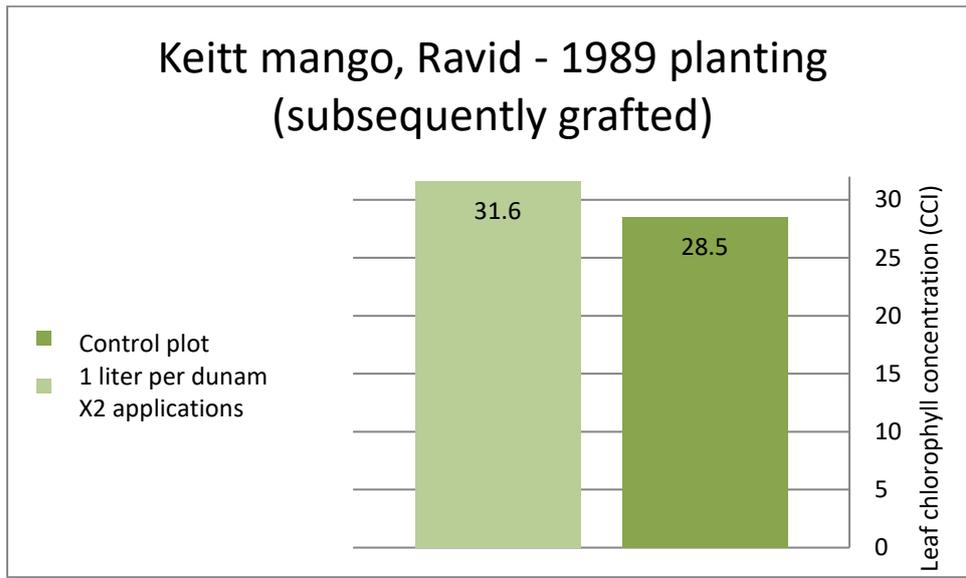
Finding: an addition of 7.4% in the treatment plot, no statistical significance.



Keitt mango, Ravid - 1989 planting (subsequently grafted):

Treatment: 1 liter of **Homigreen Barak** per dunam (thousand m²), applied by irrigation X 3 applications during the season.

Finding: an addition of 11% in the treatment plot**.



Initial Conclusions:

1. **In all observation plots that received a supplement of Homigreen Barak, an increase in chlorophyll concentration relative to the control plots was measured.**
2. In young avocado plots, better results were received by irrigating with 1 liter/ dunam of Homigreen Barak compared to 2 liters / dunam (most probably owing to the relatively small root volume).
3. In mature (yielding) plots, better results were received by irrigating with 2 liter/ dunam of Homigreen Barak compared to 1 liter / dunam.
4. The recommended application quantity will vary with the plot's age.
5. **These results show an improvement in tree vitality and ability to photosynthesize by adding humic and fulvic acids - Homigreen Barak.**

* Because it is still early to determine a perennial effect on parameters such as harvest yield and fruit size, controls and observations must be continued for two more years.

** Two comprehensive observations are now being done on almond orchards. Because the leaves' chlorophyll values have not been measured yet, their results will be published in the next season.

*** Observations, data gathering and analysis were done by Deshen Hatzafon agronomists in full partnership with the farmers.

**** **We are grateful for all the farmers who contributed plots from their land for this important study.**

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SHEFFA by Deshen Hatzafon