

DEVELOPING A DAMAGE THRESHOLD FOR THE PERSEA MITE ON AVOCADO

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Oligonychus perseae

- *Oligonychus perseae* was first described on avocado foliage from Mexico in 1975 while crossing the border to the US.
- It has been recorded from various host plants, but is a pest primarily on avocado, especially on the Hass cultivar.
- It is on the alert list of the European & Mediterranean Plant Protection Organization (EPPO).
http://www.eppo.org/QUARANTINE/Alert_List



Present



Present



Present only in some areas



Present only in some areas

Biology and Damage

- The mite colonizes the bottom of the leaf spinning densely woven nests along the leaf veins.
- The damage of *O. perseae* on the avocado trees occurs due to feeding on the parenchyma cells of the leaf causing destruction of the tissue.
- The damage is characterized by necrotic spots clearly visible on the top side of the leaves.

Oligonychus perseae nests



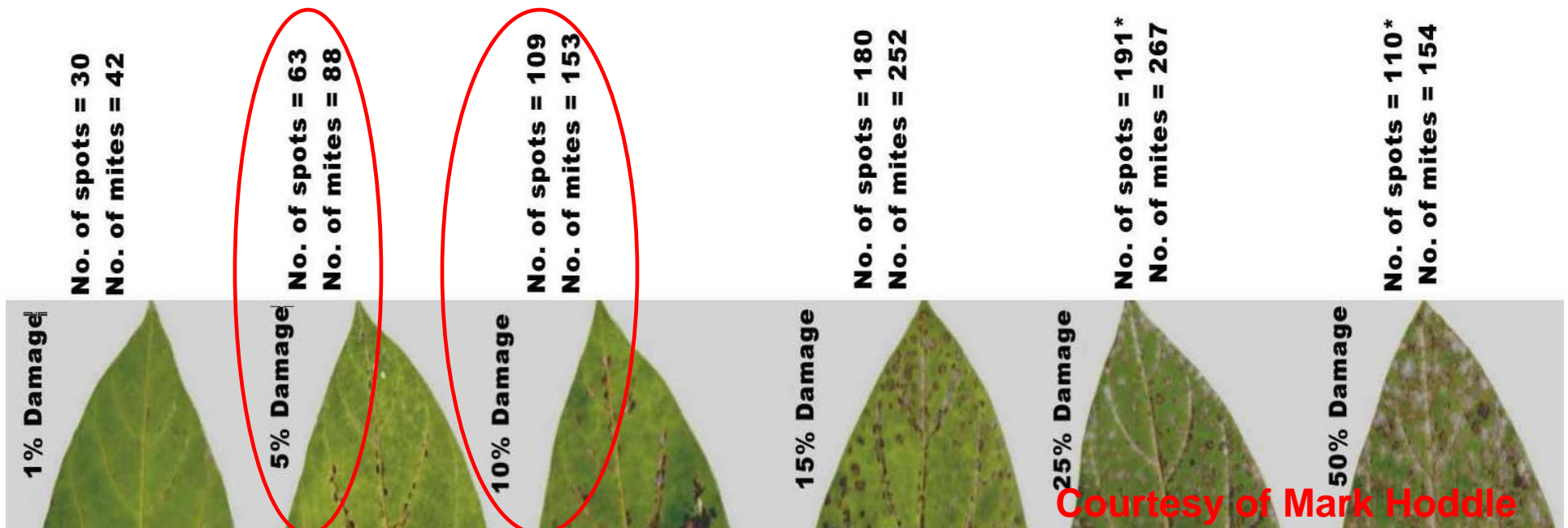
Courtesy of Mark Hoddle

Oligonychus perseae in Israel

- *O. perseae* was first discovered in Israel in the fall of 2001 in several avocado orchards located in the Western and Upper Galilee.
- Since, it has spread to almost all the growing areas in the country, causing extensive foliar damage and leaf drop in most of these regions.

Relationship between leaf drop and perseia mite levels

Kerguelen and Hoddle (1999) observed that the percent of leaf area damage in leaf drop was equal to or above 7 %, suggesting that leaves were more prone to drop if leaf damage reached or exceeded this level.



Reference point for a damage threshold

As no other information was available in the literature we decided to use this 7 % leaf damage level, approximately equal to 120 mites/leaf, as a reference point for evaluating yield damage.

Accordingly we set three thresholds:

- 50 and 100 mites/leaf, both lower than the 7% leaf area damage level, as lower thresholds.
- And 250 mites/leaf (more than twice the 7% level) as a higher threshold.

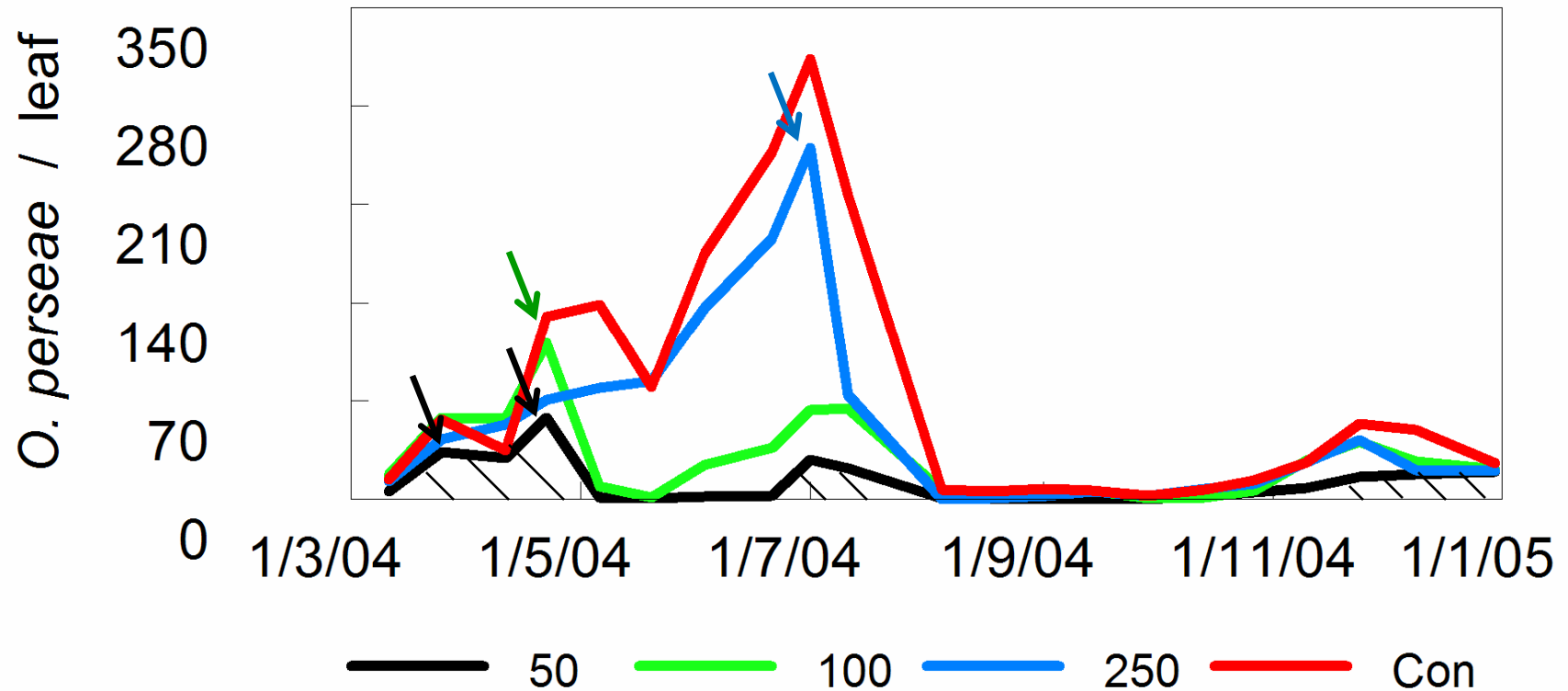
Research Objectives/Questions

1. Determine the effect of varying levels of the perseia mite on yield. To answer the question, does the perseia mite affect yield?
2. Assuming the a certain level of mites does affect yield, what would be the corresponding percent of leaf area damage (PLAD)? To be used in future studies to evaluate control efficacy.
3. Determine an action threshold.

Methods and Materials

- The different pest levels were created by applying acaricides (spirodiclofen and abamectin) at the 50, 100 and 250 mites/leaf levels. Additionally a non sprayed control was included. The experiment was conducted in a replicated block design for three consecutive years (2004-2006) on Hass.
- The effect of Cumulative Mite Days (CMDs) of all motile stages on **yields** and **percentage of leaf area damaged at harvest** were evaluated for 2005-2007.

How was the experiment conducted and what are CMDs



Annual mite days accumulated (CMDs) in the four treatments

Cumulative Mite Days



50

100

250

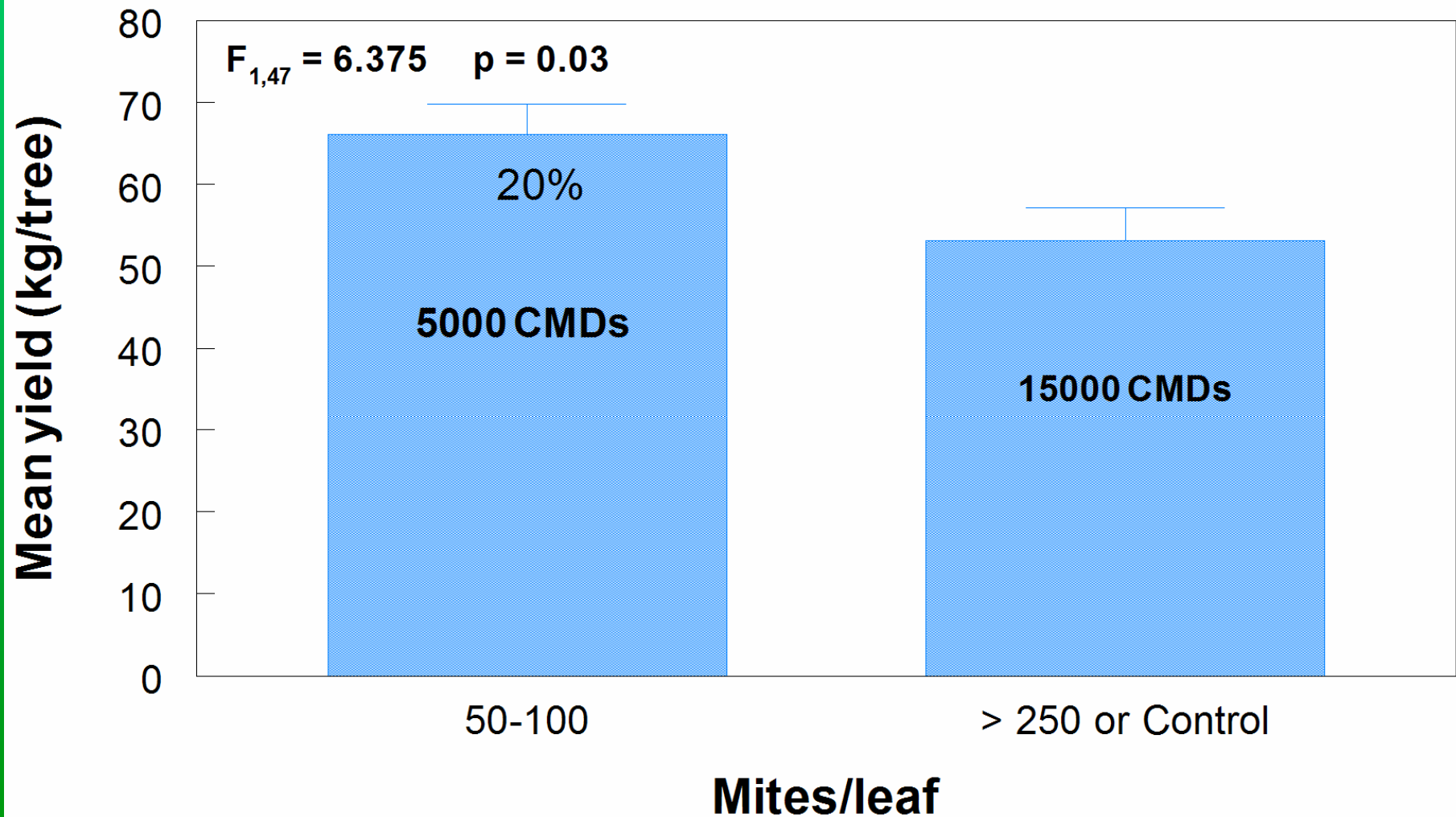
Control

Spray Threshold

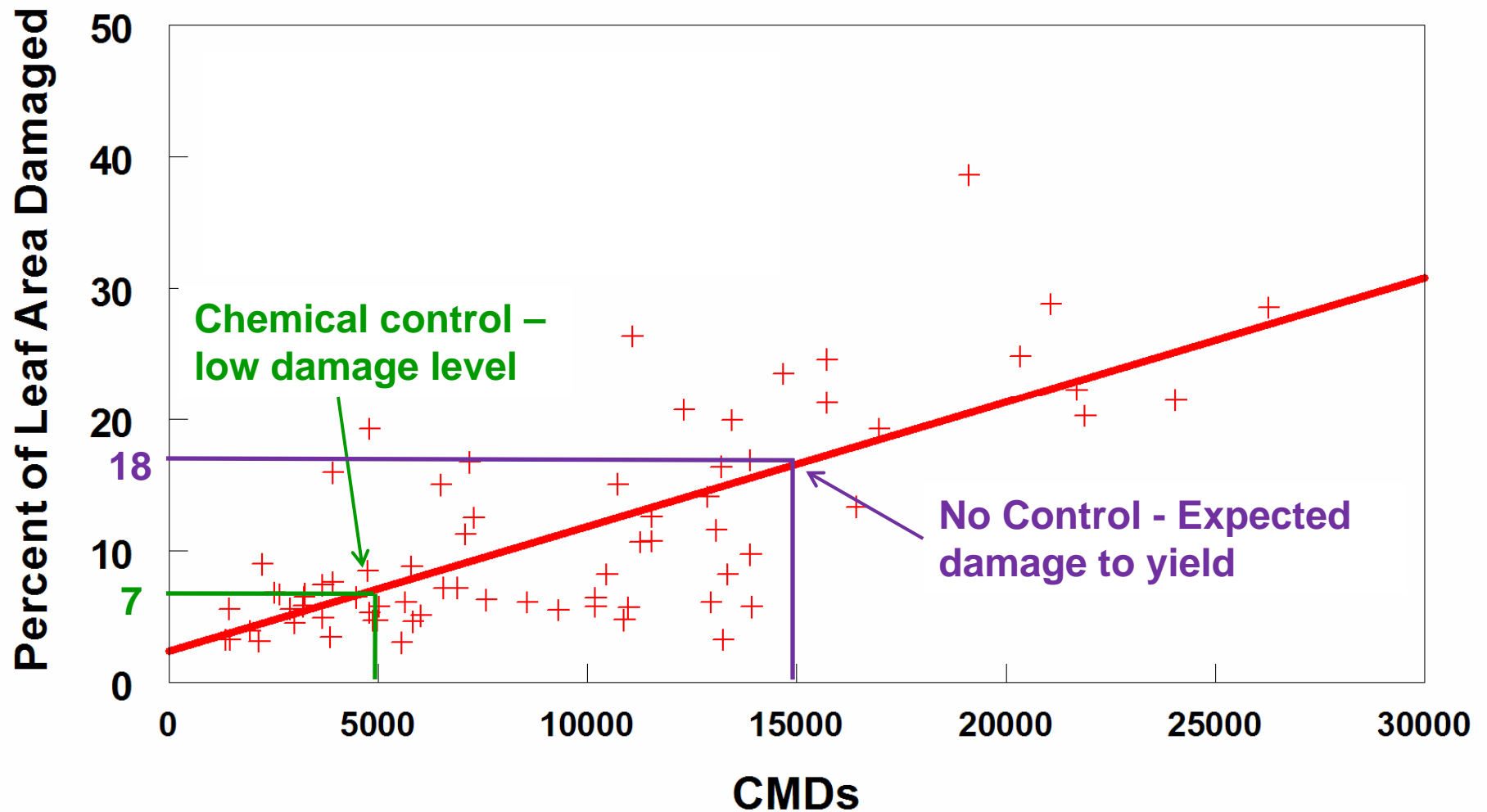
Effect of two levels of CMDs on annual mean yield 2005-2007



Effect of two levels of CMDs on mean yield for 2005-2007 – repeated measures analysis



Effect of CMDs on leaf damage linear correlation



Take home message - 1

- The perseia mite can cause significant losses to yield.
- If a level of 18 % leaf damage or higher is observed we can assume that yield loss can be expected.
- We can start with a 100 mite/leaf action threshold but we anticipate that refining this threshold will be problematic.
- While it is clear that chemical treatments can mitigate yield loss, we do not feel comfortable with this solution.

Take home message - 2

- Continuous use of acaricides is expensive and will inevitably lead to resistance development.
- The use of acaricides is likely to harm natural enemies now efficiently controlling other pests in Israeli avocado orchards.
- Clearly the sustainable solution to mite control is the use of natural enemies whether they be exotic or indigenous.
- In my next talk (in 40 minutes) I will present our work on the potential of exotic and indigenous predators for perseas mite control.

Acknowledgements

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- Chief Scientist of Agriculture and to the Plant Production and Marketing Board of Israel for funding this project.

Research team



ICIBC



MOAG

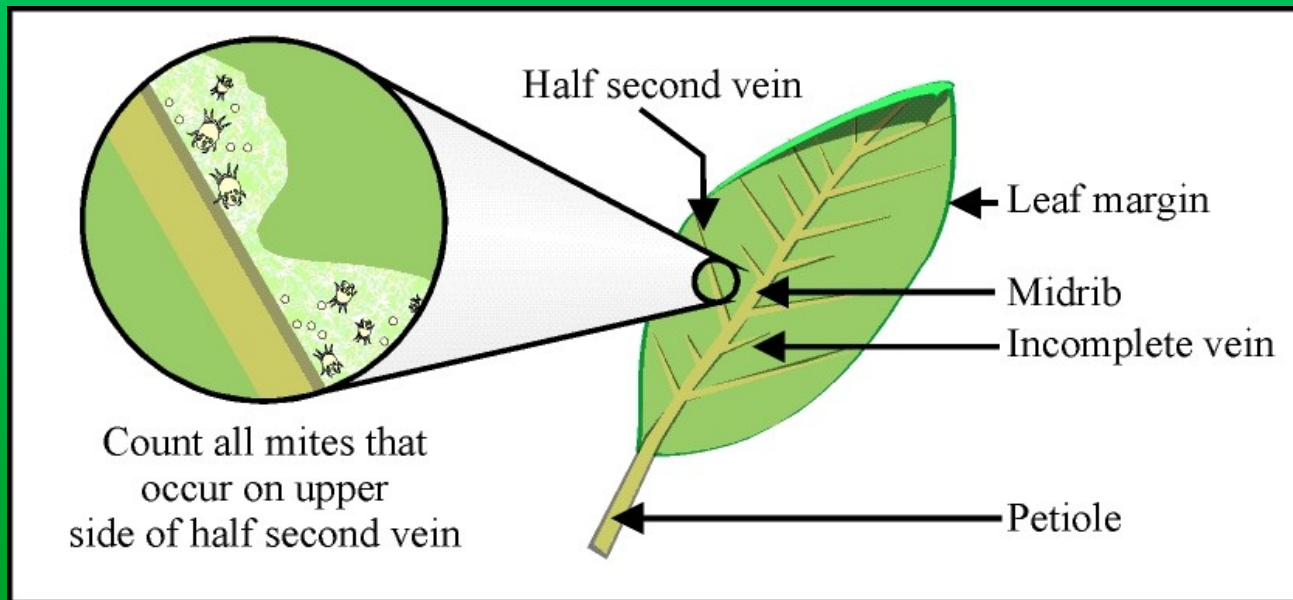


BB

WG

Questions ??

How were the mites monitored? Counting mites can be a lot of work!!



Multiply the number of mites on the half vein by 12

http://www.avocado.org/growers/pdf/avoresearch_persea_mite_new.pdf

Machlitt, D. 1998. Persea mite on avocados: quick field counting method. Subtropical fruit 6: 1-4.

Questions - ?? 1

- We have a tentative threshold, we are spraying once per season. We have happily adopted the monitoring method in California. Why should we not be happy with chemical control?
- For reasons still unclear to us the mite can appear once in a season but also a number of times within one season.
- Clearly numerous chemical applications will need to be applied to control the latter situation, which will enhance the development of resistance.