

Adventures in Testing New Products Are they Worthwhile ? (thoughts from a suspicious farm advisor)

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“There are no miracle cures”

- “In trying to solve problems that are difficult in horticulture (root rot and salinity for instance) people sometimes turn to products that are purported to:
 - Cure, revitalize, invigorate, stimulate, or enhance the growth of their plants
 - “These are known as **Snake Oils**
 - They don’t have any referenced research reports from Universities
 - They always have numerous testimonials
 - Marketing materials have some biological or chemical jargon
 - **Sometimes they “work on a new principle not known to science”**
 - **They sometimes have a “secret ingredient”**
- (See Jim Downer, Literature Cited at the end)

And Yet:

- We have a lot of smart people in this world
- And we have a constant flow of new ideas
- So I tried to listen patiently to their sales pitch. Maybe somebody actually does have a good idea
- But most of the time it boiled down to something like this:
 - ***There is no research on this because it is too expensive, or the snooty University professor won't listen to me, or there was some secret research done in Russia on this product***

So why are you coming to the farm advisor with this product?

- **I always had the feeling that if they thought if the farm advisor liked this product, then that is gold!**
- **They were often disappointed to learn that the farm advisor is part of the University of California, and we follow scientific principles in order to recommend something**
- **Be that as it may, I still liked listening to the sales pitch (if it wasn't too annoying) in order to see what the grower will be dealing with**

Why is Research on Avocados so Expensive?

Here is some actual yield data (lbs per tree) from the high density pruning trial

- **2016 Pruning Method #2**

- 84, 54, 69.5, 10, 77.5, 38.5, 62, 2.5, 58.5, 75, 96, 68.5, 70, 0, 57, 66, 81.5, 84.5, 87, 59, 82, 69.5, 97, 75, 81.5, 75.5, 78.5, 74.5, 71.5

- 1 tree has no fruit

- **2017 Pruning Method #2**

- 6.5, 0, 6, 55.5, 50.5, 0, 98, 105, 4, 0, 0, 3, 7.5, 67, 0, 0, 0, 6, 0, 0, 0, 0, 0.5, 1.5, 21, 0, 0, 0

- 14 trees have no fruit

- **Bottom line: you have to get yield from multiple trees and for several years**

What can you do as a grower?

- Call the farm advisor or extension specialist
- Ask if there is any research on this product
- If not try it on your own grove
- **Make sure it is registered if a pesticide**
- Treat one block, leave one block as a control
- **Do not treat the whole grove!!!**
- And repeat your trial for several years
- **And call the farm advisor to discuss your trial and your results**
- **I would like to you to do research like I did on the previous slide, but most growers cannot do that**

- *The following slides show a few of the products that I had to deal with during my career*
- *Some of these were involved in research trials in San Diego County*

*Section 1. “A little bit of magic
and whole lot of mystery”:*

Box that will inactivate salt in your irrigation water

- **The claim:** You can buy this box, hook it up to your irrigation system, and it will “inactivate” the salt in your irrigation water. This will allow you to use your saline water from your wells.

This sure sounds good. But does it really work?

- **OK This is easy.** All we have to do to check this out is to measure the salinity in the water before the box and after the box. We did this and it was the same.
- **But no!! The company said the salt is there, it is just “inactivated”**
- They sent me 40 pages of explanation how this is supposed to work and I forwarded it to a soils professor and a physics professor at UC Riverside and they both said the same thing. “This doesn’t work.”

- Soil professor mentions this at avocado meeting.
- Soils professor get threatened by company's lawyer.
- One grower told me "It works, see the lights flashing!" (after I told him not to buy it)
- **Evidence for this working?**
- **If it really worked, the company could have said "you can irrigate from the ocean".**



“Essence of Bones” dissolved in water

- **The claim: Spray this on your avocado trees and it will double yield and the trees will use half as much water.**
- By the way, “double the yield and trees use half the water” seems to be a common theme for many products
- What is this stuff? Company says it consists of water that bones have been soaked in.
- **Any research on this stuff? “No. We expect you to do that Dr. Bender!”**

Section 2. *“There’s a small kernel of truth (maybe) but it wasn’t thought out very well.”*

Polyacryimide granules that absorb water

- This is used sometimes in the nursery industry to prolong between watering times.
- **The claim: company thinks this might also work in avocado groves to prolong times between irrigations.**
- and here is how it works:
 - Place granules in 12 holes under each avocado tree.
 - Cover with leaf mulch
 - They swell up with water and supply water to your tree for an extra week (maybe) between irrigations
- This intrigued me so I set up a trial with 12 treated trees and 12 control trees.
- What happened?

Trial was stopped

- Granules swelled up with water and oozed out of the holes
- But this was under the leaf mulch
- Pickers were slipping and sliding and complaining they were going to get hurt
- **My conclusion:**
 - **How did I get myself sucked into this?**



Heavy leaf wax plugs up stomates

- **The claim: since water is leaving the stomates in leaves constantly, why not plug up the stomates with wax and reduce the water coming out of the leaves?**
- Again, they had no research on avocado trees, but they had a very pervasive salesman
- Farm advisor Guy Witney and I set up a trial, 10 treated and 10 controls
- Of course, now the trees cannot cool themselves so the leaves overheated and then all of the leaves fell off
- **Our grower/cooperator was not happy. I learned a lesson on this one!**

Garlic oil and Cinnamon oil to kill avocado thrips

- **The claim: these oils are used in organic vegetable production so they should work in avocado production for controlling thrips.**
- We were in the middle of a thrips crisis in the late 1990s and we were doing spray trials with pesticides. But our organic growers couldn't use most of them.
- A company rep brought me 3 gallons of garlic oil and 3 gallons of cinnamon oil
- We sprayed some avocado trees in Valley Center.
- **The result: I didn't see any thrips control but the plot with the garlic sprayed trees smelled like an Italian restaurant, and the cinnamon sprayed trees smelled like pumpkin pie.**

Section 3. It seemed like a good idea at the time....but then this happened:

:

Sticky polybutenes mixed with copper

- **The claim: this can be used to block ants and snails crawling up the trunks of citrus trees**
- This is brilliant! We are going to kill “two birds with one stone”!
- A UC professor from UCR set up this trial. But instead of trying it on one tree first to look for toxicity, he treated 10 trees in my county.
- **The mixture was toxic to the bark and trees died.**



Injectable bacteria into irrigation systems to control Phytophthora

- **The claim:** beneficial bacteria for control of *Phytophthora cinnamomi* have been isolated at UCR. Why not brew them up in large quantities and inject them into irrigation systems to control root rot?
- **The truth:** *Pseudomonas putida* was isolated by Dr. John Menge and he showed it would control root rot in pots in the greenhouse.
- All of a sudden, many, many different products popped up with this supposed bacteria.
- I inspected one “factory” and the owner was mixing bacteria into garbage cans in his garage

- Dr. Menge was checking the bacteria content in some of these products. All of them at the time were contaminated and he couldn't recover the correct bacteria.
- **Dr. Menge also conducted trials in the field and he could not show a reduction in root rot or Phytophthora concentrations in the soil.**



*Section 4. Ideas from growers and
a certain farm advisor*

Pollen from Susan and Zutano avocados sprayed onto Hass flowers

- **The claim: spray male pollen on Hass flowers and fruit set will increase**
- Not sure if this works. The concept is good (I think) because Hass flowers in the morning are female and they need male pollen
- I wanted to do some research with this but the PCA wasn't interested
- Why was he not interested?

Ducks to eat snails

- One citrus grower in Pauma Valley had a big problem with snails
- He bought and released 30 ducks in the middle of his 10 acre grove.
- **The first night half wandered out into Highway 76 and were hit by cars**
- **The other half were eaten by coyotes**



Used carpet under Persimmon trees to control weeds

- The carpets block the light to stop weed growth
- Carpets eventually break down into the soil
- Carpet companies don't have to haul the carpets to the dump
- **Sounds like a win win for everybody!**

- **But it turned out to be a haven for gophers. And gophers killed the trees.**

Red apple planted underneath avocado trees

- **The idea is to increase the population of bees flying around and underneath the avocado trees. Hopefully this would result in increases pollination and fruit set**
- **We observed the bees only flying around the red apple flowers and back to the hive.**
- **Bees did not fly higher and work the avocado flowers**

Parachutes under macadamia trees to collect nuts

- **I hate to admit it, but this is one of my own wacko ideas, and it didn't work.**
- The problem: we have a small macadamia industry in San Diego County. Harvesting is done by picking up nuts from the ground which is very labor intensive.
- Somebody gave me a bunch of old parachutes.
- I tied them under the trees so that nuts would fall off, roll to the center near the trunk and fall into a bucket.
- Then next day a windstorm came through and blew all the parachutes out into the Pacific Ocean.
- **Ugh!**

Mini-sprinkler raised high in the tree to kill Persea mites

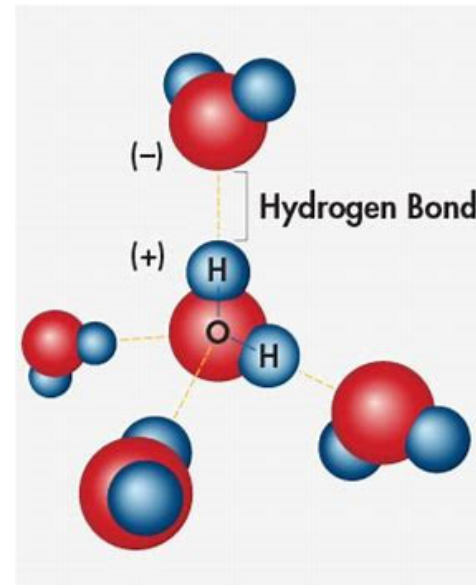
- **My own wacko idea, that actually works!!!**
- **Persea mites don't like wet leaves**
- **But it never got published.**



*Section 5: Let's cheat the water
company*

Strong Magnet in the irrigation line to reduce water flow to fool the water meter

- The idea is that the magnet lines up all the water molecules so they condense. The condensed water flows through the water meter indicating, say, 10 gallons flowing through when there was actually 11 gallons flowing through



Section 6: A few more ideas from companies that just needed some research

Kelp extract from the Atlantic ocean off the coast of Maine

- Supposed to increase fruit set in avocados
- This might work, and here's why:
 - This particular kelp is reported to be high in cytokinins, a plant growth regulator
 - It makes cells divide faster
 - If sprayed on the flowers when fruit set occurs, fruit stick and don't drop

- **The result: inconclusive**
- **I had 100% increase in yield two years in a row, but could not repeat that in year 3 and 4 (see next slide)**

An Example of a Bloom Spray Trial (one year of data)

Number of fruit per tree

• Granettos Gro Getter	94
• Phos acid high rate	83
• Nutrient Technology complete	79
• Zinc	79
• Cal Bor	76
• Water control	73
• Phos acid low rate	70
• Supertron	43
• Non-sprayed control	42

Lemon Scent sprayed on avocado trees to attract bees

- **The claim: Lemon scent would attract bees to avocado flowers**
- Students with Hula Hoops were stationed next to 10 sprayed trees and 10 control trees
- Bees flying through Hula Hoops were counted for 10 minutes
- The bees did have a significant increase flying through the Lemon Scent Hula Hoops compared to the control Hula Hoops
- **But bees flying around the flowers of the treated trees did not increase fruit set. They seemed to be confused!**
- **(I'm suspicious. This stuff smelled just like Lemon Pledge!)**

And the coup de gras: (the final blow to my sanity)
Magic Sand from Nipton, CA

- **The claim: Put it under your trees and it will double your yield and reduce your water requirement by half**
- **Of course it will!!!** But there is no evidence it works
- And this went straight into my **Snake Oil file**



- **But now I have 25 lbs of Magic Sand in my garage I have to get rid of.**

Conclusion

- **Don't assume anything is true unless there is some reliable research to back it up**
- **Do your own research.**
- **Don't believe testimonials!!!**
- **Be careful. Don't treat a lot of trees in case you kill some trees**
- **And call the farm advisor!**
- **And have non-treated controls!!!!**
- **And please randomize and replicate (if you can()) because variable soils can give variable results**
- **And keep thinking! There might be some good ideas out there!**

Literature Cited

- Downer, Jim. 2011. Snake oil, horticultural myths, horticultural urban legends and persuaders in our industry. Topics in Subtropics vol. 9 (1): pp 4-8. University of California Cooperative Extension.
from: [Avocado, Citrus, Minor Subtropicals - Science-Based Solutions for Ventura County's Communities, Farms and Environment \(ucanr.edu\)](#)