

HOW TO INFUSE AVOCADO TREES

Jonathan H. Crane, Tropical Fruit Crop Specialist
UF/IFAS TREC, Homestead

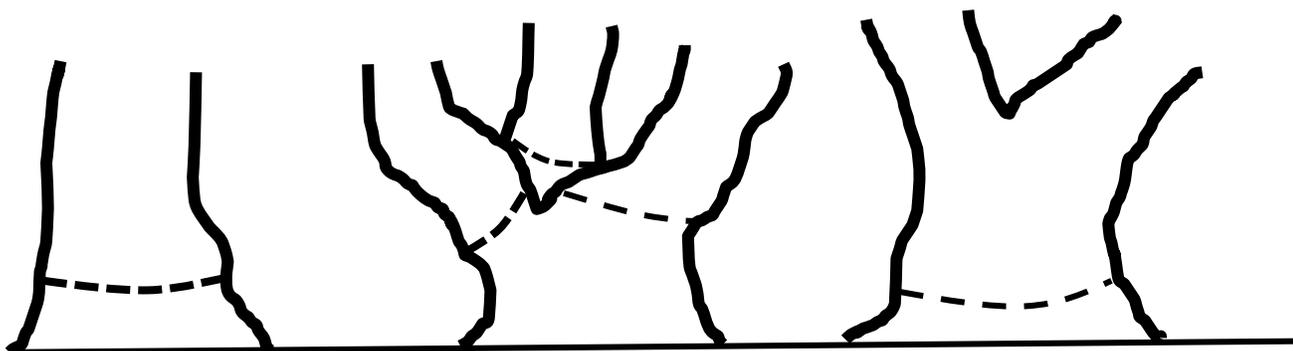
Equipment

Buy and/or build passive or pressure infusion kits and necessary equipment.

Calculating the rate of pesticide

1. Read pesticide label for guidance.
2. Determine the average or typical tree diameter. Arborists typically measure trunk diameters at about 4 ½ ft from the ground (called diameter at breast height/DBH) – this is not practical for avocado trees. Mature avocado trees may have 1 major trunk, a low split trunk (2 or more major trunks) or higher split trunk (2 or more, 1 or more large trunks, 1 or more smaller diameter trunks).

Suggested strategy to determine an average trunk diameter includes measuring a few trees with basically 1 trunk, several with a split trunk, and several complicated trunk configurations and calculating the average.



- - - = where to measure trunk

- a. Measure the circumference of 6 or more typical trees in the grove and calculate the average circumference.
- b. Divide mean circumference by pi (3.14) to get average diameter. So for example: average circumference/3.14 = average diameter

Tree no.	Measured circumferences (inches)
1	34.2
2	(multi-trunked) 15.2+13.5+20.1= 48.8
3	40.3
4	37.5
5	(multi-trunked) 14.2+17.9+18.3= 50.4
6	41.7
Total	252.9
Calculation	Average diameter = $252.9 \div 6 = 42.15$ inches <u>then</u> divide $42.15 \div 3.14 = 13.4$ inch diameter

- c. Follow pesticide label instructions on rate per inch of trunk diameter.
For example: Tilt (propiconazole) fungicide for laurel wilt:
- i. 0.25 oz product/inch (7.4 ml product/inch) of trunk diameter
 - ii. 0.25 oz product/inch diameter x 13.4 inches = 3.4 oz product (99.16 ml product)
 - iii. Consult the label as the amount of water (if any) to be mixed with the fungicide product. The amount of water to mix with the product may be reduced in many cases without negatively affecting performance however, this is currently under investigation.
 - iv. Through experience 30 to 40 oz of water for passive infusion systems and 1 gallon of fungicide solution mix for pressurized systems appear to be adequate.

Infusion steps

1. Calculate the average trunk diameter.
2. Calculate the amount of pesticide product.
3. Excavate soil and clean (brush) soil off of the flare roots at base of tree. The area where holes are drilled needs to be clean otherwise the soil grit may dull the drill bit, the grit may enter the hole and disrupt a snug fit of the infusion ports, and/or plant pathogens may be introduced into the xylem of the flare root. **DO NOT DAMAGE THE FLARE ROOTS WHEN CLEANING AS LEAKAGE MAY OCCUR IN THOSE AREAS DURING INFUSION.**
4. Unscrew the nylon coupling and place infusion tubing around the base of the tree and reconnect nylon coupling.
5. Load battery operated drill with manufacturers recommended drill bit size so the infusion ports fit snugly.
 - a. In general for large trees 8-18 infusion sites are recommended per tree to improve product uptake and distribution.
 - b. The process of drilling should be smooth i.e., push the drill in to the desired depth (1.5-2.5 inches) and remove smoothly, do not wobble the drill bit to make the hole larger or repeatedly move the drill in and out. This reduces the infusion port's snug fit and may cause enough damage to the xylem sapwood to slow uptake of the solution.
6. Insert infusion ports and tap them (rubber hammer) in to fit snugly. If you are using the passive infusion-bag system hang the bag on a nail 3-5 ft above the base of the tree (gravity feed).
7. Wear eye protection and chemical resistant gloves and pour the fungicide and water into the tank or bag and shake to mix.
8. Make sure the stopcock nearest the tank or the large binder clip nearest the passive bag and at the end of the plastic tubing (farthest end) on the infusion equipment are closed.
9. Load infusion tank or bag with water and pesticide; mix/shake.
10. To get the air trapped in the plastic tubing out - this next part works easier with two people: one person to open the stopcock nearest the infusion tank (close-end) or passive bag and the other person at the stopcock located on the plastic tubing at the far-end to allow air trapped in the system to be vented.

Steps to turning on your system to infuse:	
Pressurized tank infusion system	Passive bag infusion system
Pressurize tank to ~15 psi	Hang onto nail
<ul style="list-style-type: none"> • Have a flask, cylinder or cup on hand to catch pesticide mix at the far-end • Open far-end stopcock and place container to catch mix (if it comes out) • Open tank stopcock (pressurized system) or undo the binder clip (passive bag system) and the liquid will push air in the tubing out • When all (as much as possible) trapped air is vented close the far end stopcock • If any mix came out, shut-off stopcock nearest the tank (pressurized system) or re-apply binder clip to close the plastic tubing near the passive bag • Open tank or bag at the top and pour in the mix caught from the far-end during venting the air trapped in the tubing • <u>If</u> pressurizes system: Close lid and re-pressurize and re-open close-end stopcock to resume pressurized infusion (maintain ~15 psi during infusion process) • <u>If</u> passive system: Open lid and re-open close-end stopcock to allow gravity feed of the pesticide mix (make sure hose from bag is hanging downward) 	

What to do if any of the infusion ports leak or come out of the flare roots.

1. Turn off the stopcock nearest the tank or bag to stop the flow of solution.
2. Slightly hammer-in the infusion ports or reset infusion port(s).
3. Re-initiate infusion process, steps 7-9.

Disinfection: Spray macro-infusion Ts and drill-bit with disinfectant between uses i.e., spray Ts with disinfectant before use for each tree.

Depending upon tree growth stage and weather conditions infusion may take from 20 min. to overnight. To take down the system close the stopcocks and disassemble. To store the system run clean water through the entire system three times to flush residues from the tanks/bags and tubing and infusion ports; hang to drain and dry.

(c://ext/handouts/2014/RAB-LW/how to infuse 6-17-14.doc)