Let's Review Tree Row Volume

And Calculate The Number For Your Orchard

Dilute Application

- Applying a spray mixture at a certain volume per acre, where applying a gallon more will result in excess spray material "running off" the leaves and dripping onto the ground

Concentrate Application

Applying a fraction of a particular orchard's calculated dilute water volume requirement

1/2 Volume = 2X
1/3 Volume = 3X
1/4 Volume = 4X

If the dilute rate is 300 GPA, then:

2X Concentration = 150 GPA

3X Concentration = 100 GPA

4X Concentration = 75 GPA

This is the amount of **WATER** we are applying to each acre in our orchard.

We are not talking about spray materials………..yet

Applications at dilute volumes offer at least the hope of 100% physical coverage of all plant surface area in the orchard

Applications at concentrated volumes offer at least the hope of getting some sleep during primary scab season

The trade off is:
coverage
vs
application cost

Alternate Row Middle

Skipping every other row middle so that you finish the acre in half the time. Of course, you are also reducing your total spray volume, water & spray material, by 50% per acre

Tree Row Volume

Adjusting the dilute water volume rate per acre to better match the reduced canopy volume of a high(er) density orchard

23' Width

400 GPA
vs
100 GPA

20'
Height

6' Width

7'
Height

35' Row

13' Row
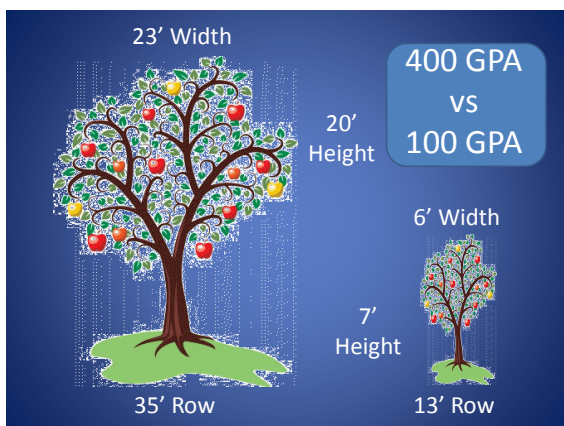
There is a Formula – Part 1

(Tree Diameter X Height)
X
(43560/Between Row Spacing)
=
Canopy Volume/Acre

There is a Formula – Part 2

(Calculated Canopy Volume / 1000)

X

Canopy Density Factor

=

Gallons per Acre Dilute

Canopy Density Factor
(or quality of pruning)

The factor has a range of 0.7 – 1.0

1.0 = an unpruned orchard

0.7 = a well-pruned orchard

There is a Formula – Part 2

(Calculated Canopy Volume / 1000)

X

Canopy Density Factor

=

Gallons per Acre Dilute

A well pruned orchard requires less water volume

What About a Tall Spindle Planting?

- Between-Row Spacing   12'
- Canopy Height   12'
- In-Row Spacing   3.5'
- Canopy Density Factor   0.7

- **Calculated GPA for Dilute is 107 GPA**

According to Tree Row Volume……

- If your sprayer was calibrated to apply 50 GPA, and you are spraying a dilute = 300 gallon orchard, your concentration would be 6X

- If your sprayer was calibrated to apply 50 GPA and you were spraying a tall spindle orchard calculated at dilute = 100 gallons, your concentration would be 2X

How Many Acres per 500 Gallon Tank?

Exactly the same in our two examples

50 GPA, 500 Gallon Tank = 10 acres/tank

The amount of spray chemical we add to the tank is different for each orchard, and depends on our calculated dilute GPA for that orchard, along with the concentration factor

How Much Spray Chem / Acre?

- For a material with a label rate of 1 lb/100 gallons dilute spray, the 300 gallon trees would require 3 lbs of material/acre

- For a material with a label rate of 1 lb/100 gallons dilute spray, the 107 gallon trees in the tall spindle block would require 1 Lb. 1 oz of material/acre

How Much Spray Chemical / Tank

- We're calibrated for 50 GPA, so 10 A/tank

- For the 300 gallon orchard, that's 30 lbs/tank

- For the 107 gallon orchard, that's 10 lbs 10 oz/tank

In Theory at Least, Using TRV Could Lead To:

- Reduced pesticide usage in high density plantings compared to traditional plantings.

- Reduced spray bills

- More acres sprayed per tank (at a given concentration), resulting in increased spraying efficiency and lower labor and machinery costs.

But Then Reality Hits...............

- Does this simple model accurately reflect chemical deposition in the narrow rows and thin canopies of a high density orchard?

- This model was developed a long time ago, chemistries have changed, is it still applicable?

- What about the label?

What are the Complications?

- Tree Shape
- Stage of Seasonal Tree Growth
- Canopy Density as a Function of Tree Age and Pruning Status
- Does the Sprayer Technology Match the Characteristics of the Planting System

Resistance Management

What Does the Pesticide Label Specify?

TRV Recommendations

- Take the time to evaluate the spray coverage in your high-density orchards using water-sensitive paper in the top, center, and bottom of the tree canopy

- Use streamer tape to check and adjust the direction of your sprayer's airflow

TRV Recommendations

- Match your concentration factor to the target pest and the chosen chemistry

- Unless running a hi-tech, completely optimized spray rig, driven slowly, and have tested the **do not drop your dilute basis below 150 GPA in bearing orchards**.

Tree Row Volume Calculation Worksheet

		Enter Your Numbers Below
	Farm Name	
	Block Name	
A	Spacing within row	
B	Tree canopy height	
C	Space between rows	
D	Square fee in an acre (43560)	43560
E	Multiply Lines A x B	
F	Divide 43,560 / Line C	
G	Canopy volume/A - Multiply Lines E x F	
H	Canopy Density Factor (0.7 For well pruned orchard)	0.7
K	Gallons/Acre Dilute (Line G/1000) x 0.7	
	(Actual dilute not, the classic 300 or 400 for full size trees)	

K	Gallons/Acre Dilute (Line G/1000) x 0.7	
	(Actual dilute not, the classic 300 or 400 for full size trees)	
I	Capacity of spray tank (gallons)	
J	Actual gallons of water applied/acre	
L	Acres covered/Tank (Line I/Line J)	
M	What Concentration are You Spraying ? (Line K/Line J)	
N	"Per 100 gallons" Label Rate for the pesticide used	
O	Calculated "dilute" Factor (Line K/100)	
P	How much material/acre (Line N x Line O)	
	Amount Spray Material/Tank (Line L x Line P)	

Notes: