Sprayer Calibration for Pecans

Michael Smith and Phil Mulder
Oklahoma State University

1. Determine the average tree size in the orchard by measuring either the trunk diameter or circumference at breast height (about 4.5 feet) of about 20 trees.
2. Check and clean as needed all nozzles and filters on the sprayer.
3. Park the sprayer on a level site then fill the sprayer's tank completely with water.
4. Measure a distance of 500 feet. Spray the 500 feet under the same conditions used to spray the orchard, i.e. same speed, pressure settings, etc. Do not turn-off the sprayer for the entire 500 feet.
5. Return the sprayer to the exact position where it was filled. Measure the amount of water required to refill the tank completely.
6. Find the average tree size in the table, as determined in step 1. Multiply the gallons of water used, as determined in step 5, by the conversion factor for the average tree size to ascertain the sprayer delivery rate in gallons per acre. *This assumes trees are sprayed from two sides. It is strongly recommended that trees be sprayed from two sides – single sided spraying is usually inadequate.*

Trunk diameter (inches)	Trunk circumference (inches)	Conversion factor to gal/acre
5	16	12.8
6	19	10.7
7	22	9.1
8	25	8.0
9	28	7.1
10	31	6.4
11	35	5.8
12	38	5.3
13	41	4.9
14	44	4.6
15	47	4.3
16	50	4.0
17	53	3.8
18	57	3.6
19	60	3.4
20	63	3.2
21	66	3.0
22	69	2.9
23	72	2.8
24	75	2.7
25	79	2.6
26	82	2.5
27	85	2.4
28	88	2.3
29	91	2.2
30	94	2.1
31	97	2.1
32	101	2.0
33	104	1.9
34	107	1.9
35	110	1.8
36	113	1.8

Example 1: The average *diameter* of 20 trees was 17 inches. The sprayer delivered 35 gallons in 500 feet. The conversion factor in the table for trees that average 17 inches in *diameter* is 3.8.
Thus: 35 gallons x 3.8 = **133 gallons / acre**.

Example 2: How much Abound should be added to 300 gallons to apply the labeled rate for pecan scab of 8 fluid ounces/acre using the sprayer in Example 1? Surfactants are normally included with fungicides to improve coverage of the leaf and shuck surface. The rate for SurfKing Plus (surfactant) is 4 fluid ounces/100 gallons. How much SurfKing Plus should be added to 300 gallons?

Abound
300 gal. tank ÷ 133 gal. per acre = 2.25 acres per 300 gal. tank
2.25 acres per tank x 8 fl. oz per acre = **18 fl. oz. of Abound / 300 gal.**

SurfKing Plus (note the rate on the surfactant is per 100 gal. rather than per acre)
300 gal. tank x 4 fl. oz ÷ 100 gal = **12 fl. oz. of SurfKing Plus / 300 gal.**

Example 3: The average *circumference* of 20 trees was 75 inches. The sprayer delivered 31 gallons in 500 feet. The conversion factor in the table for trees that average 75 inches in *circumference* is 2.7.
Thus: 31 gallons x 2.7 = **84 gallons / acre.**

Example 4: How much Sevin 80S should be added to 500 gallons to apply the labeled rate for pecan weevil of 5 lbs/acre using the sprayer in Example 3?

Sevin 80S
500 gal. tank ÷ 84 gal per acre = 5.95 acres per 500 gal. tank
5.95 acres per tank x 5 lbs. per acre = **30 lbs of Sevin 80S / 500 gal.**

Useful Conversions

1 gallon = 4 quarts = 8 pints = 16 cups = 128 fluid ounces = 3.785 Liters = 3,785 milliliters

1 mile = 1,760 yards = 5,280 feet = 63,360 inches = 1.6093 kilometers = 1,609.3 meters

1 acre = 4,840 square yards = 43,560 square feet = 0.40468 hectare = 4,047 square meters

1 pound = 16 ounces = 0.45359 kilograms =453.59 grams = 256 drams = 7000 grains

1 acre-foot = 43,560 cubic feet = 325,851 gallons = 1,233.5 cubic meters

Useful Formulas

Circumference of a circle	= diameter x 3.1416 = radius x 6.2832
Radius of a circle	= circumference x 0.159155
Diameter of a circle	= circumference x 0.31831
Area of a circle	= $radius^2$ x 3.1416 = $diameter^2$ x 0.7854 = $circumference^2$ x 0.07958
Area of a rectangle	= base x altitude
Area of a triangle	= base x ½ altitude
Degrees centigrade	= 5/9 (degrees F – 32)
Degrees Fahrenheit	= (9/5 x degrees C) + 32