Herbicides

- Restricted vs. Non-restricted
  - Toxicity & risk to water

- Non-selective vs. Selective
  - Selective = 2,4-D Amine/Dicamba
    - Crossbow - brush
  - Non-selective = Glyphosate
    - (Roundup)

Kyle Whittaker
County Engagement Specialist
Agriculture & Environment
Webster, Wright & Texas County

MU Extension
University of Missouri

Timing is everything

Summer Annuals – (usually spring) when the plants are young & actively growing
Cocklebur, Smartweed, Pigweed, Jimsonweed, Lambsquarter, Ragweed

Winter Annuals – (Fall or early spring) when plants young and actively growing
Henbit, Horseweed, Deadnettle, Chickweed, Shepherdspurse

Biennials – Rosette stage (fall or early spring)
Wild Carrot, Thistles, Poison Hemlock, Spotted Knapweed

Perennials – pre-bloom to bloom stage
Curly Dock, Goldenrod, Chicory, Pokeweed, Milkweed

Selecting the Right Herbicide

- IDENTIFY THE WEEDS
- What stage of growth are they in?
- Is a mixture of different herbicides needed for broad spectrum control?
- Are legumes present? Planning to overseed?
- Read the herbicide label & follow directions
- Do you have appropriate protective wear?

Herbicide	Price	Size	"Standard" Rate per Acre	Cost per Acre
2,4-D Amine	44.95	2.5 gal	1-1.5 qts	$8.02
Dicamba DMA	147.95	2.5 gal	2-4 ounces	$11.38
Chaparral	149.95	1.25 lbs.	2 oz	$14.99
Cimarron Max	159.43	10 oz	2 oz	$31.86
Crossbow	29.95	1 gal	2 qts	$14.97
GrazonNext HL	204.9	4 gal	2 pts	$12.62
Grazon P+D	92	2.5 gal	1.5 pts	$6.92
Milestone	94.95	1 qt	4-7 oz	$11.77
PastureGard HL	138.03	1 gal	1.5 pts	$25.88
Remedy Ultra	79.95	1 gal	2 pts	$19.98
Outrider	364.85	20 oz	1 oz	$18.24
Pastora	360	20 oz	1 oz	$18
Panoramic	153	1 gal	2 oz	$19.13

Surfactant add $1.50 per acre

Surfactants are compounds that lower the surface tension (or interfacial tension) between two liquids.

between a gas and a liquid, or between a liquid and a solid.

Surfactants may act as detergents, wetting agents, emulsifiers, foaming agents, and dispersants

Weeds / Woody plants
How to control them

Sericea Lespedeza

Remedy
Cimarron
PastureGard

- Apply when sericea is 12” or taller
- Or, from bud to flowering

Burning in Sept. and applying a Pre-emergent herbicide the following April. Or spray June – Sept.

Blackberry

(flowering)
Remedy
PastureGard
Surmount

(post flowering)
Cimarron

Best time to spray is late spring

Poison Hemlock

Tordon

Grazon

Best time to spray
is when plants are young
in the rosette stage.

Cedar

Fire

Chain Saw

Tordon < 4 cedars

Multiflora Rose

Grazon
Tordon
PastureGard
Remedy
(full bloom)

Locust

Grazon

Surmount

For larger trees
Pathfinder II
or cut and treat
stump with
Tordon RTU

Ironweed

Tordon
Grazon
Surmount
Remedy
PastureGard

Horsenettle

Grazon
Tordon
Milestone

Oak

Remedy

Sumac

2,4-D early

Remedy

Crossbow

Osage Orange

Remedy

Cut stump
And treat with Tordon

Basal bark treatment of PathfinderII

Broomsedge

Lime
Phosphorus
Glyphosate
through a wiper

Perilla Mint

2,4-D

Grazon

Remedy

Johnson Grass

Glyphosate

Ragweed

2,4-D

Grazon

Spiny Pigweed

2,4-D early

Grazon

Buckbrush

2,4-D early

Grazon

Marijuana

Call Sheriff's Department

Steps to Applying a Pesticide

1. Calibrating your equipment

2. Calculating pesticide amount

3. Calculating water volume

Step 1: Calibrating your equipment

1. Mark off the **area** to be used in calibration

Your calibration area does not have to be the same area that you plan to spray. It just needs to be a *known* area

2. Record the time taken to spray the calibration area – only when spraying (using only water). Calculate distance traveled per unit time **(speed)**

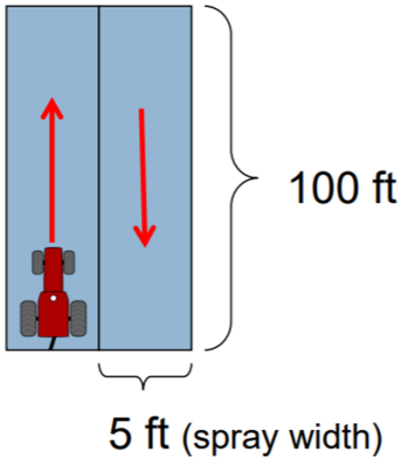
3. Collect in a graduated container and measure the output from the sprayer per unit time **(flow rate)**

Step 2: Calculating Pesticide Amount

1. Mark your calibration **area** = 1000 sqft

2. Time to spray the area = 50 s to cover 1000 sqft
   - Distance traveled = 200 ft
   - **Speed** = 200 ft/50 s = <u>4 ft/s</u>

3. How much water came out = 0.75 gal
   - **Flow rate** = 0.75 gal/50 s = <u>0.015 gal/s</u>



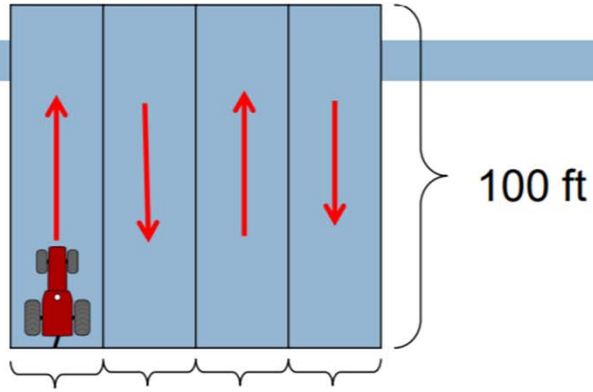
Sprayer application rate = 0.75 gallons per 1000 sqft

OR

(43,560 sqft/acre x 0.75 gal/1000 sqft) gallons/acre

= <u>32.67 gallons/acre</u>

Example: calculating Pesticide Amount



1 acre = 43,560 ft^2

1. Determine your area
   - 100 ft x (5 ft x 4) = 2000 sqft
   - 2000 sqrt / 43,560 sqft = 0.046 acres

     (**treatment area in acres**)

2. Pesticide: Malathion 5EC
   - Rate for potato leafhopper on beans:

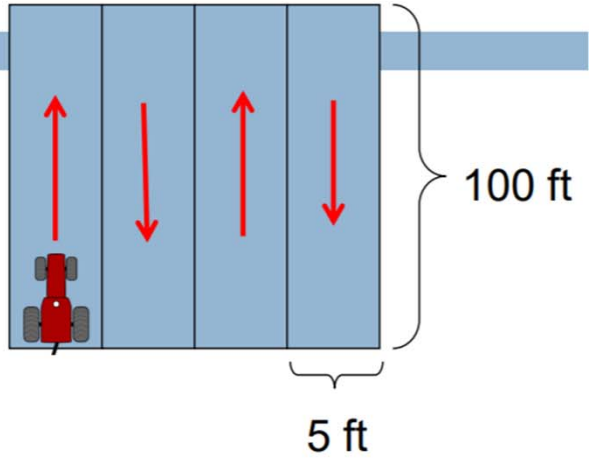
     2 pints/acre (**application rate**)

3. How much pesticide for your area?
   - 2 pints/acre x 0.046 acres = 0.092 pints of Malathion 5EC
   - 473 ml/pint x 0.092 pints = 43.4 ml of Malathion 5EC for 2000 sqft (**pesticide amount**)

Step 3: Calculating Your Water Volume

1. Determine the distance you have to travel to cover your spray area
   - Based on your spray width
2. Determine the time to cover your spray area
3. Calculate your water volume

Example: Calculating your water volume



1. Determine **travel distance**
   - 100 ft x 4 = <u>400 ft</u>

2. Speed = 4 ft/s (from calibration)
   - 400 ft / (4 ft/s) = <u>100 s</u> (**travel time**)

3. Flow Rate (sprayer output) = 0.015 gallon/s (from calibration)
   - 0.015 gal/s x 100 s = 1.5 gal
   - 1.5 gal x 3.785 L/gal = <u>5.7 L</u> (**water volume**)

1 gallon = 3.785 L

Pesticide calculation Results

- To treat 2000 ft^2 with Malathion 5EC you need:

43.4 ml Malathion 5EC

in

5.7 L water

If your tank holds 2 L, you would need to re-fill approximately 3 times to cover your area

Good YouTube video for using calibration cup

https://extension.psu.edu/calibration-how-tos-easy-way-to-sprayer-calibration

Pesticide Calculations

Pints/quarts/gallons per acre

$$\frac{\text{Gallons in tank}}{\text{Gallons applied per acre}} = \text{acres sprayed per tankfull}$$

Acres sprayed per tank x Amount formulation per acre = Amount for needed in tank

Your sprayer applies 22 gallons per acre and your tank holds 400 gallons. The labeling rate is 1 ½ quarts per acre. How much pesticide formulation should you add to make a full tank?

Hint: 22 gallons per acre will treat just uder 5 acres with 100 gallons, so 400 gallons will treat just under 20 acres. Therefore, your answer should be less than 20 acres X 1 ½ quarts per acre, or less than 30 quarts.

Answer

$$\frac{\text{Gallons in tank (400)}}{\text{Gallons per acre (22)}} = \text{Acres sprayed per tankful}$$

400 ÷ 22 = 18.2 acres sprayed per tankful

Acres per tankful (18.2) x Amount of form per acre (1.5 quarts)= amount needed in tank (27.3 qts)

18.2 x 1.5 = 27.3 quarts (27 quarts plus 9.6 ounces) per acre

(1 qt = 32 oz., therefore, 32 oz. x .3 = 9.6 oz.)

Questions
Or Comments