Calibrating your Sprayer

Wine Grape Integrated Pest Management Workshop

March 19, 2013
Why do I have disease and pest problems in my vineyard?

A complex problem
Need to place the proper amount of pesticide on the target

How do you adjust the amount of spray reaching the target?

1. Tractor speed

2. Output of sprayer
Double your speed and half the spray reaches a given area.

Lower speeds increase uniformity in spray deposition.

speed usually 3 – 4 mph
What is your forward speed?

Do not rely on the tractor speedometer.
Determining speed of tractor

1. set up a measured course – at least 100 feet
2. timing course should be similar to vineyard same slope, terrain, etc.
3. attach sprayer and have half filled with water run sprayer while on course
4. measure in seconds how long it takes to travel course run the course more than once
5. use an accurate stopwatch – check at www.time.gov
6. tractor must be up to speed at start of course
7. record gear and tractor pto rpm use tachometer to measure pto rpm
8. can use a GPS unit to determine speed
Determining speed of tractor

Calculate speed

Speed (mph) = distance (feet) \times 60 / time (sec) \times 88
Sprayer Output

Modify sprayer output with

- nozzles

- pressure
Nozzles

Size of orifice helps determine flow rate

Determines shape of spray pattern

Forms the spray droplets – partly responsible for size
Nozzles

Many types and construction materials

Materials
- Plastic
- Brass
- Stainless steel
- Ceramic

Types
- Solid cone
- Hollow cone
- Air induction
- Air shear
- Rotary
- Electrostatic
Pressure

- Higher pressure increases output of sprayer
  increase pressure 4 times – flow rate doubles

- Higher pressure decreases droplet size

- Higher pressure increases nozzle tip wear

- Higher pressure might increase spray angle
  depends on type

- Reducing pto rpm will reduce pressure

- Need accurate gauge on sprayer
Calculating Sprayer Output

- Gallons/minute  GPM
- Recommended application volume  gallons/acre from pesticide label  GPA
- Speed of tractor  miles/hour  MPH
- Row width in feet  W

\[
GPM = \frac{GPA \times MPH \times W}{495}
\]

Divide GPM by the number of nozzles

Determine pressure required to deliver GPM per nozzle use nozzle chart
# Nozzle Chart

## Hollow Cone Type Spray Tips

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*Note: Values are provided in gallons per minute (GPM) at different pressure levels.*
Set the Pressure

- Sprayer should be half filled with water
- Make sure all nozzle discs are the same
- Operate sprayer and set desired pressure
- Use same pto rpm for all tests - use tachometer
- CHECK FOR LEAKS
Measuring Sprayer Output
Measuring Sprayer Output

- Connect hoses or containers to nozzles
- Operate tractor at same rpm used for tractor speed
- Collect water output of each nozzle for 1 minute
- Every nozzle should be close to desired GPM
- If not, reset pressure and test again
- If GPM is + or – 10% off average – replace nozzle
- If 2 nozzles or more are off – replace all nozzles tips
Measuring Sprayer Output

Penn State Pesticide Education program has purchased a tester to measure sprayer output.

Cost to grower is $50 for first sprayer & $30 for each additional sprayer.
Positioning Nozzles

Use a patternator