



# Sprayer 101

## On-Line Training

### To understand and improve sprayer efficiency

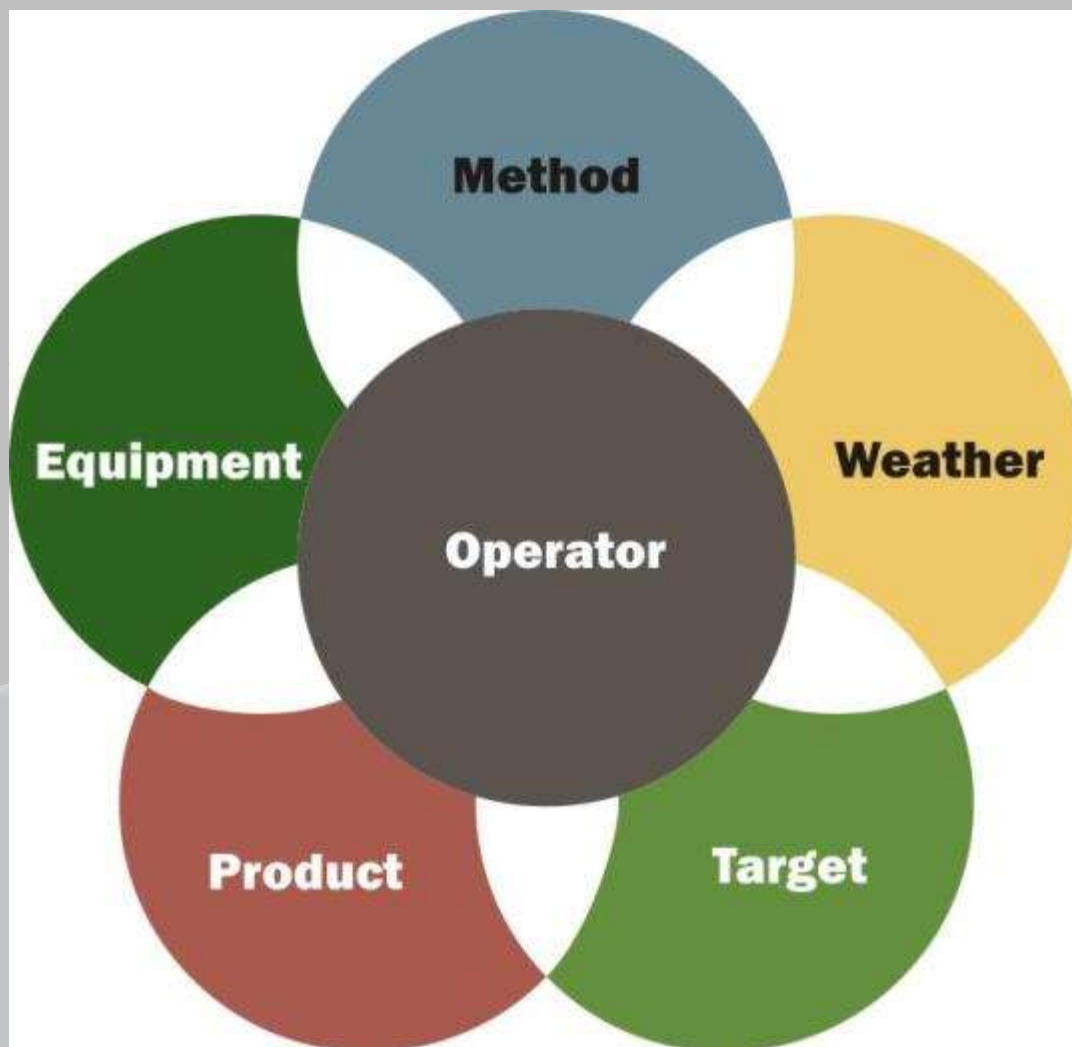




# Air blast Sprayer Efficiency

- Lessons in this chapter
  - When is an application “efficient”?
  - Six elements that affect air blast efficiency





**Six  
elements  
that effect  
air blast  
efficiency**





| Equipment  | Method  | Weather   | Target  | Product  | Operator  |
|--|---|---|---|--|---|
| <b>Sprayer Design</b><br><b>Air - Assist</b><br>Direction<br>Volume<br>Speed<br><b>Deflectors</b><br><b>Spray Quality</b><br>Pattern<br>Droplet Size<br>Nozzle Orientation | <b>Forward Speed</b><br>Work Rate<br><b>Spray Technique</b><br>Alternate Row-Middle Spraying<br><b>Gear-Up, Throttle-Down</b><br><b>Crop-Adapted Spraying</b> | <b>Wind</b><br>Speed<br>Direction<br><b>Temperature</b><br>Relative Humidity<br>Thermal Inversion | <b>Canopy Structure</b><br>Time of Season<br>Density-Area<br>Canopy Management<br><b>Target</b><br>Size<br>Location | <b>Mode of Action</b><br>Timing<br><b>Spray Mix</b><br>Specific Gravity<br>Adjuvants<br>Carrier Volume<br>Application Rate | <b>Aptitude</b><br><b>Attitude</b><br><b>Manager, Boss or Owner</b> |





# Calibration

- **Lessons in this chapter**
  - What is air blast sprayer calibration?
  - Sprayer inspection
  - Sprayer inspection checklist
  - Adjust the direction of the air-stream



# Sprayer Inspection List

## Pump and Hoses

- Leaky pump valves, diaphragms and/or plungers checked/replaced
- All hoses and fittings sound (while under pressure)
- Pump flushed and spray discharge clear
- Pump lubricated

## Filters, Strainers and Nozzles

- All filters (tank basket, suction filter, in-line filters and nozzle strainers) clear and not damaged
- Check valve diaphragms clean and functional
- All nozzles clean and unbroken
- Each nozzle shut-off and/or flip body is working





# Sprayer Inspection List

## Regulators, Gauges and Controls

- All gauges accurate
- Pressure and shut-off valves (ball or solenoid) work smoothly
- Regulator(s) and/or bypass valve(s) move easily
- Pressure gauge defaults to zero and does not bounce or leak

## Belts and Power Take Off

- All belts have proper tension and no wear or cracks
- PTO greased, connection zones checked and guard in place





# Sprayer Inspection List

## Propeller and Agitation

- Propeller has no nicks, cracks or residue, turns freely and has no lateral play
- Mechanical agitation shaft is supported, bearings lubricated and shaft packing suitably tight (no leaks)

## Airflow and Direction

- Ducts or deflectors are residue-free and can be adjusted
- Blade pitch and fan gear can be adjusted







# Sprayer Inspection List

## Spray Pressure Adjustment

- Regulator/bypass adjusted to achieve desired pressure at usual tractor RPM
- Each boom operating at desired pressure for each nozzle combination

## Tires and Tank

- Tires have correct pressure, tight bearings and no cuts
- Drain plug can be removed
- Tank has clear vents, is secure to chassis and has no punctures or damage





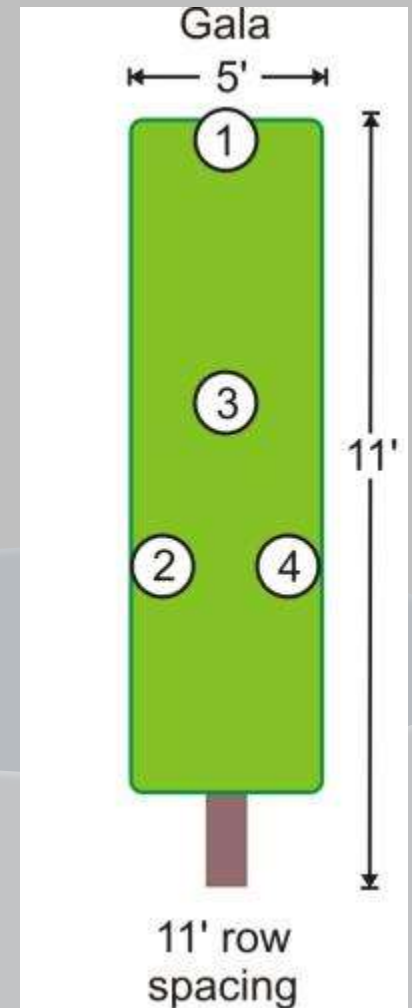
# Confirm Coverage

## Lessons in this chapter

- Confirm coverage with water-sensitive paper
- Other methods to confirm spray coverage



# Confirm Coverage





# Confirm Coverage

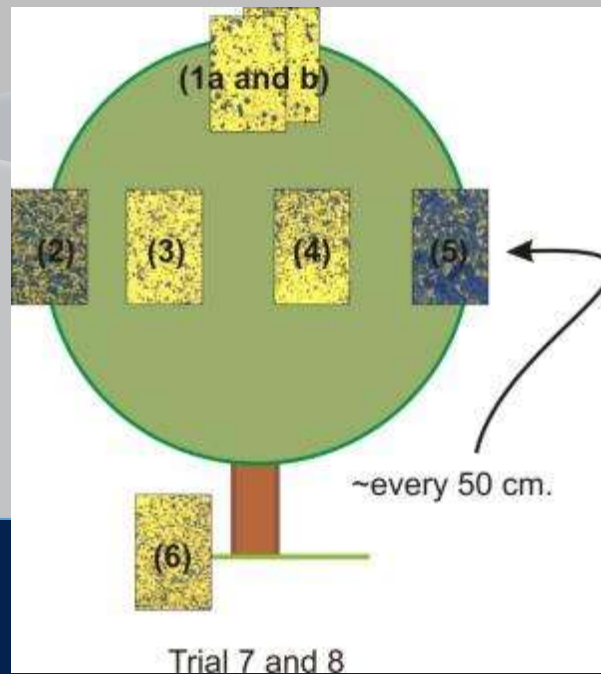
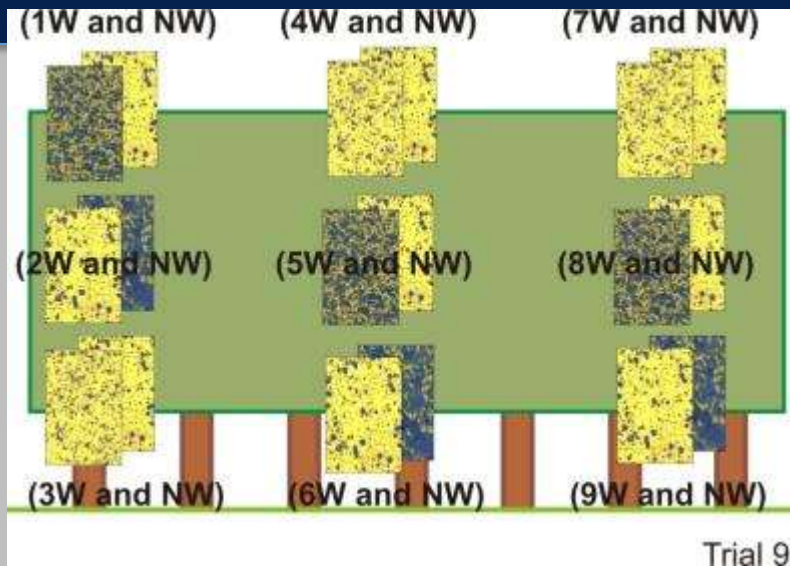
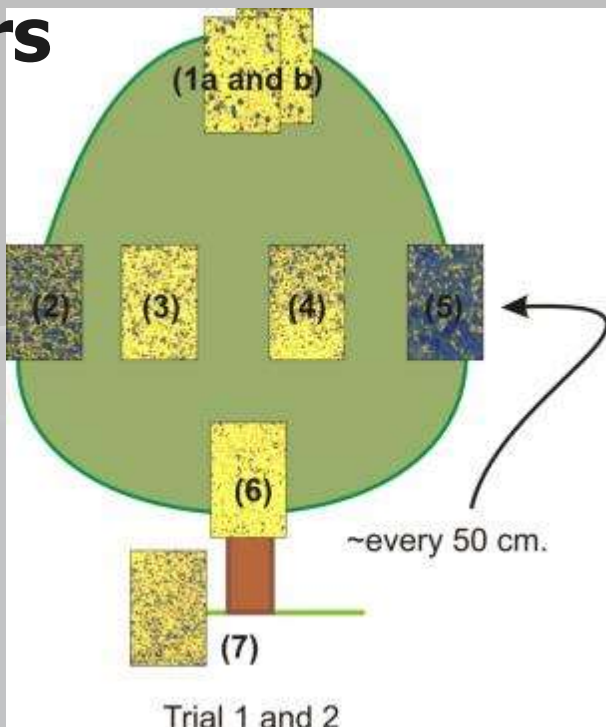
Using water-sensitive paper for air blast coverage diagnostics –

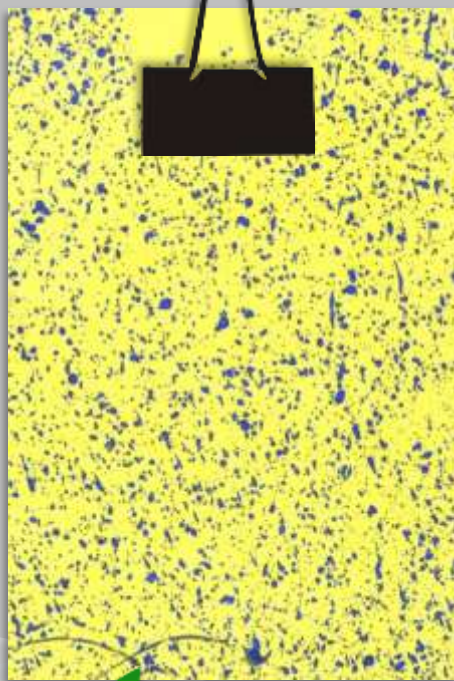
Video thanks to Penn State, Univ. New Hampshire and Chazzbo Media (2014)





# Approximate locations of water-sensitive papers





**Research suggests ~85 medium sized droplets per cm<sup>2</sup>  
and a total area of 10-15% coverage  
is sufficient for most foliar insecticides / fungicides**





# Calibration (continued)

- **Lessons in this chapter**
  - Confirm pressure gauge accuracy
  - Confirm sprayer pressure
  - Calibrate ground speed
  - How fast is too fast?





# Calibration (continued)

- **Lessons in this chapter**
  - Calculate sprayer output for each side
  - Determine spray distribution
  - Selecting nozzles
  - Confirm nozzle and sprayer output







# Calibration (continued)

- **Lessons in this chapter**
  - Helpful conversions for determining nozzle output





# Nozzle Choice

- **Lessons in this chapter**
  - Nozzle materials and wear
  - Moulded nozzles
  - Venturi nozzles
  - Nozzle Bodies





# Troubleshooting Coverage

- **Lessons in this chapter**
  - Canopy management and alley spacing
  - Spray coverage diagnostics
  - Alternate row-middle spraying
  - Wind really affects coverage





# Tank Mixes

- **Lessons in this chapter**
  - What can I tank mix safely?
  - Should I use adjuvants?
  - Water quality
  - Agitation





# Spray Drift

- **Lessons in this chapter**
  - Equipment to reduce drift
  - Surface inversions
  - Three methods to reduce drift from a boom





# Maintenance & Cleaning

- **Lessons in this chapter**
  - Pre-season maintenance inspection
  - Air blast sprayer wheel maintenance
  - Pumps





# Maintenance & Cleaning

- **Lessons in this chapter**
  - Pressure gauge spikes – problems and solutions
  - Cleaning an air blast sprayer





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