# Calibration

Boom

Air Blast

Others

# The Big Three

Output

Speed

Coverage

# Output

- Correct Pressure
  - Deepens on nozzle design
  - To low not enough to make effective spray pattern
  - To high too many fines.
- Correct height
  - Depends on cropping systems
  - Depends on nozzle spacing
- Correct Spacing
  - Overlap needed about 1/3 on each side

# Speed

- Crop or target penetration
  - Slower speeds equals more penetration.
  - To slow equals excessive overspray
- Terrain
  - Boom bounce and rocking
  - Equipment capabilities
- Safety
  - Operator safety
  - Equipment damage

# Coverage

- Minimum volume required.
  - Crop density
  - PPP labels  (point: high concentration may become phototoxic.)
  - Intended purpose
- Maximum volume limit.
  - Run off  ( point: may waste product, or reduce its efficacy)
  - PPP labels
- Spray modifiers
  - Spreaders
  - Stickers
  - Buffers  (Many products have pH limitations, match buffer)

# Things to Assure

Uniformity

No (Minimal) Drift

Crop & Worker safety

# Uniformity

- Nozzles
  - All outputs + or – 5 %  (one ounce up or down in 20)
  - Uniform spray pattern
  - Low fine out put. (you often cannot see the fine particles)
- Boom
  - Correct height
  - Uniform height
- Pressure
  - Correct pressure
  - Uniform pressure  (watch out for pulsing with diaphragm)

# No (or Minimal) Drift

- Weather
  - Correct wind
  - No inversion
  - Temperature and Humidity
- Spray
  - No or very low fines
  - Hood
- Additives
  - Drift agents

# Crop & Worker Safety

- Crop
  - Weather
  - Compatibilities
- Worker
  - Weather
  - PPE

# Things to Think about

Nozzle choice

Filters

Clean up

# Nozzle choice

- Style
  - Flat Fan (herbicide)
  - Hollow Cone (air blast)
  - Special
- Size & angle
  - Coverage vs. drift potential
- Durability
  - Best you can afford
  - Penny wise Pound foolish

# Filters

- In Line
  - 16 to 200 mesh sizes
  - Nylon and aluminum
    - Hint: must be compatible with spray mix
- At nozzle
  - Screen alone (mesh 16 – 200, comes in SS, nylon, brass, aluminum & polypropylene)
  - Screen with Pressure shut off shuts off at 5 psi
    - Hint: remember to add that 5 psi to your pressure setting
- Cleaning
  - Each Tank
  - When spray pattern changes
  - Soft bristle brush

# Clean up

- Water flush
  - Tank
  - Spray line
- Cleaners
  - General
  - Move to a non-labeled crop
- Leaf over Mix
  - Aim for zero (hint last tank maybe a part tank)
  - Safely Store for later use. (hint mark with mix and date with a durable pen)

# Other Considerations

Water

Compatibility

Check Row

# Water

- pH
  - PPP label
  - Buffers
- Hardness
  - Spray modifiers
- Turbidity
  - Tank mix needs
  - Change source

# Compatibility

- Label
  - Check PPP labels
  - Add in correct order (soluble packets, WP's, F, EC's then Oils)
- Jar test
  - Check unfamiliar mixes in a jar before committing to a tank
  - Check how much agitation is required
- Agents
  - Compatibility agents
  - Suspension agents
  - Surfactants add last when tank is nearly full to prevent excessive foaming
  - Anti foaming agent when needed

# Check Row

- How well did I do
  - Were $ spent effectively
  - Did I get the control I wanted
- Crop symptoms
  - Did I hurt my crop
  - Did I need the control

# Useful formulas

GPA

Speed

Nozzle Output

# Speed of Travel

- **Mph = 60/ Seconds to drive 88 Feet**

- **If it takes 24.5 seconds to travel 88 feet then your speed equals 2.25 MPH**

$$\frac{60}{24.5} = 2.25 \text{ MPH}$$

Hint a GPS can also tell you speed of travel

# Nozzle Output

- Catch out put of each nozzle for one minute
- Divide total ounces caught by 128
- to determine the gallons applied per minute.

$$\frac{51.2}{128} = .4 \text{ G/M}$$

Hint an 8004 nozzle should put out .4 gallons/minute at 40 PSI

# Gallons/Acre

- Determine the optimum nozzle based on spray needs.
- Determine the best nozzle pressure.
- Measure the nozzle output, this gives you **Nozzle Gallons**
- Determine the desired **speed** in MPH based on terrain & needs.
- Determine the optimum nozzle height and spacing, this gives you **Nozzle spray width** (in feet)
- **Using the following formula determine G/A**

$$\frac{495 \times \text{Nozzle Gallons}}{\text{Speed} \times \text{Nozzle Width}} =$$

# Gallons/Acre

- Nozzle to be used **XR Teejet 11004VS**
- Nozzle pressure **40 psi** (gage pressure to be 45 psi because screens with check valve used)
- Nozzle Gallons .4
- Speed **2.4 MPH**
- Nozzle spray width **12 inches**

$$\frac{495 \times .4}{2.4 \times 1} = 82.5 \text{ GPA}$$

# Gallons/Acre

- A 100 gallon tank at 82.5 GPA will do 1.2 acres per tank when traveling at 2.4 MPH