

## Considerations on Foliar Applications and Volume of Pesticides

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## Presentation Outline

- Quick sprayer review
  - Discussion on some of the most common sprayers used with vegetable crops- small & large
  - Checklist for operation and maintenance
  - Water volume for complete coverage
- Considerations
- Systemic products vs contact
  - Impact of nozzle pressure
  - Two approaches for adjusting spray volume due to plant size
  - How much to apply given a range (e.g. 5 to 9 oz/acre)

## Most veggie sprayers are...

- Hydraulic sprayers
- Low pressure
- High pressure
- Droplet size
- Fine- better coverage
- Large- better penetration



## Parts of a hydraulic sprayer

- Tank
- Agitator
- Pump
- Gauge
- Strainer
- Pressure regulators
- Hose



## Nozzles

- Regular flat- I&H, low p
- Flooding flat- common\*
- Hollow cone- good p\*
- Rain drop- p varies
- Nozzle material-
  - Brass
  - Stainless steel (SS)
  - Plastic
  - Nylon
  - Ceramic
  - Hardened SS



\* Greater risk of drift, esp. at high pressure

## Air assist/air blast sprayers

- Fan aides distribution
- Used in fruit production
- Compatible for low volume spraying
- Pros
  - Reduced runoff
  - Reduced use of pesticide and water
- Cons
  - Need constant ground speed
  - Extra care for calibration
  - Application errors easier because less total gallonage applied



## On pressure and volume

- Low pressure- 5 to 60 psi
- High pressure- greater than 100
- Volume required for complete coverage varies greatly by crop, and its size
- 50 gallons per acre is common
- 100 g/acre may be required for upright crops (e.g. tomatoes).
- Tree fruit may take 300 g/acre

## Shielded sprayers

### Pesticide Drift Management Equipment Modifications

- ♦ shielded spray boom
- ♦ covered boom
- ♦ hooded-sprayers
- ♦ air-assist systems
- ♦ electrostatic spraying



## Sprayers for small areas



## Sprayers for small areas



## Modified ATVs Sprayers

- Available as a kit
- Small tank for stability
- Good for spot spraying or small areas
- Can add a hose and gun



## Operation and maintenance

### Before

- Fill & pressurize
- Check for leaks
- Review nozzle type, size & angle
- Check strainers and screens
- Look at boom height/nozzles for uniform application
- Calibrate!!

### During and after

- Pressure should stay same- check
- Adjust speed to limit swaying/bouncing
- Avoid in field repairs if possible
- Flush after use
- Thoroughly clean when switching between pesticides and/or when doing repairs or maintenance

## Systemic product or contact?

### Systemic

- Translaminar
- Localized systemic
- Systemic-distribution in plant is (usually) less with foliar application than when soil applied (e.g. drench)

### Contact/protectant

- Many of the most common products
- Only effective where lands
- Complete/uniform coverage very important, esp. for diseases & pests like aphids/mites

## Implications of nozzle type and pressure

- Study from 97 to 99 at Purdue looked at chlorothalonil on melons
- Used flat or hollow cone nozzles and 3 spray pressures
- No differences between treatments
- Conclusion- emphasize the timing of fungicide applications and choice of chemicals over how those fungicides should be applied
- Good uniform coverage is essential

## Implications of nozzle type and pressure....comments

- Nozzle angle
- May not be the same with other products
- Other factors can influence, e.g. environmental & crop stature



## Adjusting spray volume for smaller plants/lesser area

### Reducing area of application

- When plants are small, pesticide could be banded over the plants
- Less area is treated (less product)
- Pesticide 'strength' is the same on a given area
- Example- using one 1 nozzle for an 18 inch wide band. If rows were on 6-ft. centers, spraying an 18-inch strip over the row would mean that for every acre of field sprayed, only 1/4 acre (1.5 ft. / 6 ft.) would actually be treated

## Adjusting spray volume for smaller plants/lesser area

### Volume based recommendation

- First determine the maximum spray volume per acre for your sprayer for fully-grown plants
- Then mix the acre rate for a given product in the maximum spray volume that it takes to cover an acre.
- Much less 'volume' will be used on smaller plants
- For example, mancozeb products (Dithane DF, Manzate, Penncozeb, etc.) are labeled at 3 lbs per acre. If the maximum spray volume is 100 gallons per acre for your sprayer when plants are full grown, then mix the mancozeb product at the rate of 3 lbs per 100 gallons of spray. At the start of the season, it may take only 25 to 30 gallons per acre to obtain full coverage. The volume of spray per acre is then increased as plants grow and spray nozzles are added until the maximum 100-gallon volume per acre is reached at full plant growth.

## The recommended range of pesticide on the label- apply the high, middle or lower amount?

- Can vary greatly- examples (cucumber beetles on cucurbits)
  - Asana- 5.8 to 9 fl oz/acre
  - Capture- 2.6 to 6.4 fl oz/acre
- What rate to use?
- Higher/lower depending on pest pressure?
- Depending on the pest?
- Experience?
- Or always use the max?



