

# Calibration

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11-20-13



# Calibration

- Why
- Who
- What
- When
- Where

# Why

- Consistency
- Uniformity
- Proper rate
- Legal reasons
- Phytotoxicity

# Some reasons to consider calibration:

- It is estimated that 60% of sprayers have a calibration error greater than + or - 10 %.
- 43% of sprayers have greater than + or - 10% variation in discharge from individual nozzles.
- 32% have inaccurate travel speed.
- 27% have improper boom height for the nozzle spacing and nozzle discharge angle.
- 13% have inaccurate pressure gauges. Many of the gauges indicate too low pressure.
- 8% have inadequate hose size to supply nozzles, causing pressure to drop in the system.

“Streaking” of a golf green from application error.



FDACS

# Who

- Anyone who is applying chemicals
  - Pesticides or fertilizers
- Responsible party

# What

- Equipment
- Employees

# When

- Before the start of your season
- Periodically
- Anytime you suspect the sprayer may be “off”
- When equipment changes
- When repairs are needed

# Where

- If at all possible calibrate in conditions as close to the actual situation as possible



S. Priest, UF/IFAS

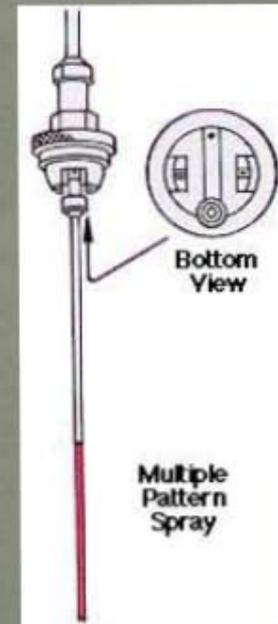
Before you start



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# How

- Speed
  - Pressure
  - RPM
  - Output
  - Area
- 
- Repeat for accuracy and recheck your measurements



Sprayer images from Gemplers.com

Tip photo from pesticidesafety.org



S. Priest, UF/IFAS

# One way is to see how long it takes for a known area

- How many seconds does it take to cover a known  $\text{ft}^2$
- If it takes 95 seconds to cover 1,000 sq ft

- Measure how much your tip will apply in 95 seconds
- Output is 67 oz per 1,000 ft<sup>2</sup>

- $(\text{Oz}/128) / (\text{sq ft}/43,560) = \text{gals per acre}$
- $(67/128) / (1,000/43,560) = 22.8 \text{ gals per acre}$

- My three gallon sprayer will cover 5,731 sq ft. or .13 acres at this rate
- Add enough product to treat this amount.
- If you can maintain the speed that you went when you timed yourself, you will be applying a constant amount wherever you spray

# If the label calls for % or dilution

- To treat 18 crotons:
  - Label rate of insecticide = 3 ounces per gallon
  - 12 seconds to spray 1 croton
  - 10 ounces collected in 12 seconds

- **18 croton x 10 ounces = 180 ounces**
- **$180 \div 128 = 1.4$  gallons**
- **3 ounces x 1.4 gallons = 4.2 ounces**
  
- **This will allow you to spray the plants with no remaining product**



Photo from IFAS Images

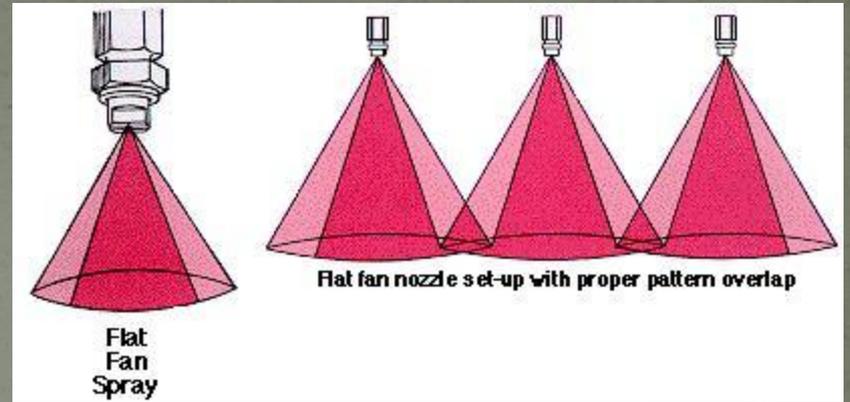


Photo from pesticidesafety.org



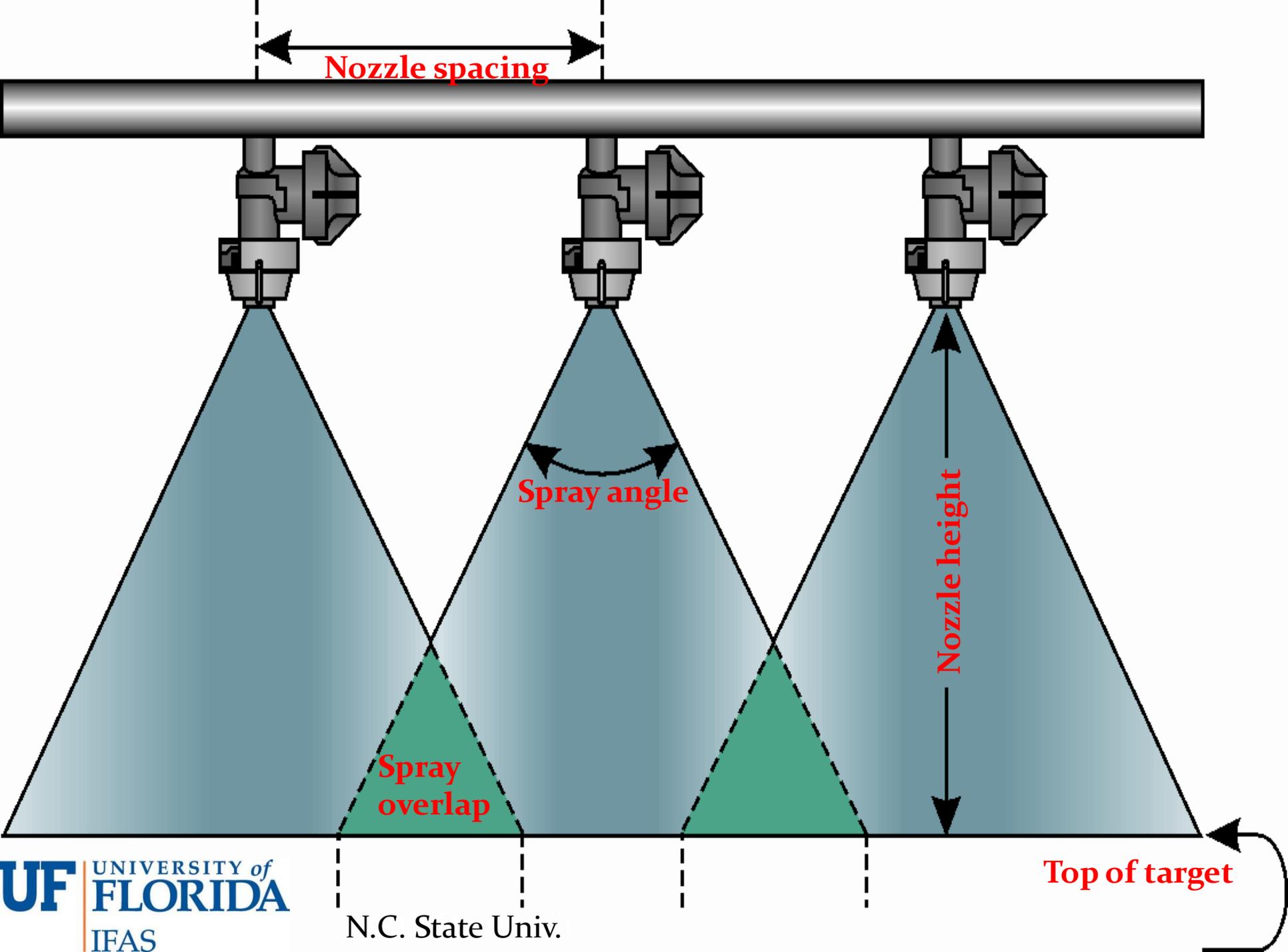
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F.M. Fishel, UF/IFAS



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# The 5940 method

- $GPA = (5940 * GPM) / (MPH * W)$

- GPA – Gallons per acre
- 5940 – Is a constant
- GPM – Gallons per minute (oz / 128) or (ml / 3,786)
- MPH – Miles per hour (distance (ft) \* 60) / (time (sec) \* 88)
- W- Width of one nozzle in inches (inches between tips)

- GPM – Gallons per minute (oz / 128) or (ml / 3,786)
- 45 ounces caught
- $45/128 = .35$  gals

- MPH – Miles per hour  $(\text{distance (ft)} * 60) / (\text{time (sec)} * 88)$
- Distance 300 feet
- Time 81 seconds
- $(300 * 60) / (81 * 88) = 2.53 \text{ MPH}$

- W- Width of one nozzle in inches (inches between tips)
- 20 inches

# The 5940 method

- $GPA = (5940 * GPM) / (MPH * W)$
- $GPA = (5940 * .35) / (2.53 * 20)$
- $GPA = 41.09$

- $GPM = (GPA * MPH * W) / 5940$

- Using the information from the previous example, but we want a 30 GPA rate
- $GPM = (GPA * MPH * W) / 5940$
- $GPM = (30 * 2.53 * 20) / 5940$
- $GPM = .26$
- If I decrease from .35 gals to .26 GPM my rate per acre will go to 30 GPA

# 1/128<sup>th</sup> of an acre method

- This is another way that a lot of people like.
- This procedure is in you material from Bill.

# Helpful information

- <http://edis.ifas.ufl.edu/wg013>
- [http://jefferson.ifas.ufl.edu/agriculture/pocket\\_notebook\\_pdfs/Sprayer\\_Calibration.pdf](http://jefferson.ifas.ufl.edu/agriculture/pocket_notebook_pdfs/Sprayer_Calibration.pdf)
- <http://edis.ifas.ufl.edu/pi015>
- <http://pesticidesafety.org/PES%20Wiki/18%20Equipment.aspx>

# Applying the Correct Amount

- The speed at which the equipment moves through the target site determines the amount applied in any given area
- Measure accurately
- Calibrate often
- Check yourself AND recheck

# Applying the Correct Amount

- Use the least amount required to achieve the desired control
- Application rate
  - **Amount dispersed / Area covered = Application rate per area**
    - Gallons per acre
    - Pounds per acre
    - Ounces per thousand square feet

# Measuring

- Use the closest measuring container to the amount you need to help insure accuracy
- Make sure the container is a liquid measure if you have liquid chemicals and a dry measure if your material is dry
- Use calibrated pumps

# Dilutions

- Follow the label directions for amounts
- Follow the label for diluents to use
- Mix only what you will be able to use

As always read and follow all  
product labels

# Questions

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