

Herbicide Application Pointers



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Invest in Application Equipment

- Herbicide application rigs for orchards or vineyards are inexpensive
- Herbicide sprayer must be able to
 - Maintain a constant speed
 - Maintain a constant pressure
 - Pressure gauge is a must!
 - Provide agitation to the tank



ATV mounted sprayers cannot meet these expectations

Calibration



- Application accuracy
 - Environmental issues
 - Cost
- Ohio State University Study
 - Most farmers are applying 23% more than they think
 - 70% of farmers who calibrate yearly are within 5% accuracy range
- Over, as well as under, applications can cost you money.

Calibration

- My Definition
 - Determining sprayer output over a known area
 - The process of varying speed, pressure, and nozzle size to deliver a certain amount of material per unit of area



Factors Impacting Sprayer Output

- Nozzle flow rate
 - Orifice size (large changes in output)
 - Pressure (small changes in output and droplet size)
- Ground speed
 - Inversely related to flow rate
- Optimum volume
 - 20 gal. per acre
 - Provides good coverage for contact herbicides
 - Does not dilute systemic herbicide

Backpack Sprayers Need Calibrating Too!

THE NOZZLE TIP DETERMINES

- the flow rate
- size and pattern of droplets
- uniformity of the application
- coverage on the target surface
- spray drift potential

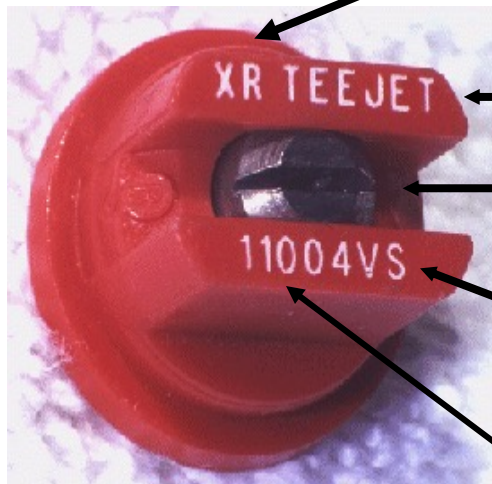
All things that “make” or “break” a pesticide application



NOZZLE

“CODE”

Nozzle type: XR=Extended Range



Trade name: TeeJet Spraying Systems

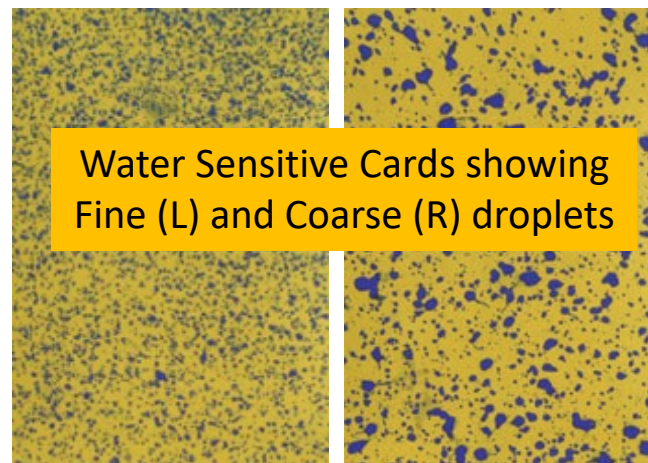
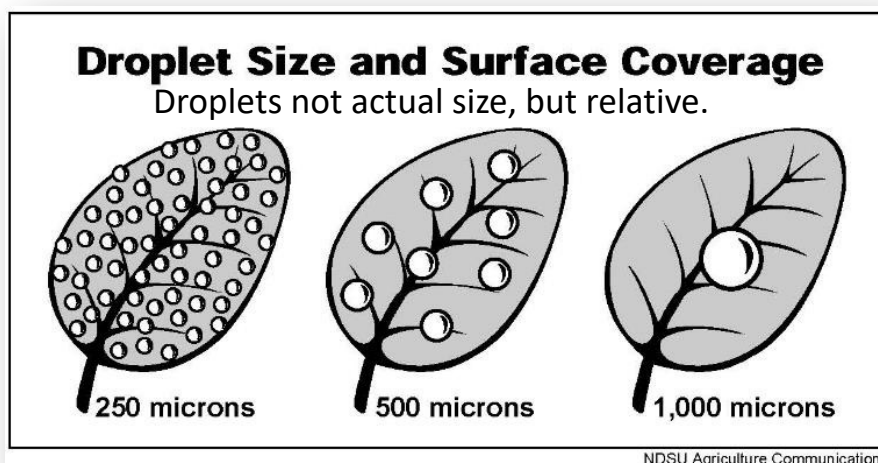
Stainless steel insert orifice

V=VisiFlo Color Coding and
Material: S=Stainless

Spray angle (110 degrees) and flow rate
(0.4 gallons per minute) = 'orifice size'

RIGHT DROPLET SIZE FOR THE TARGET

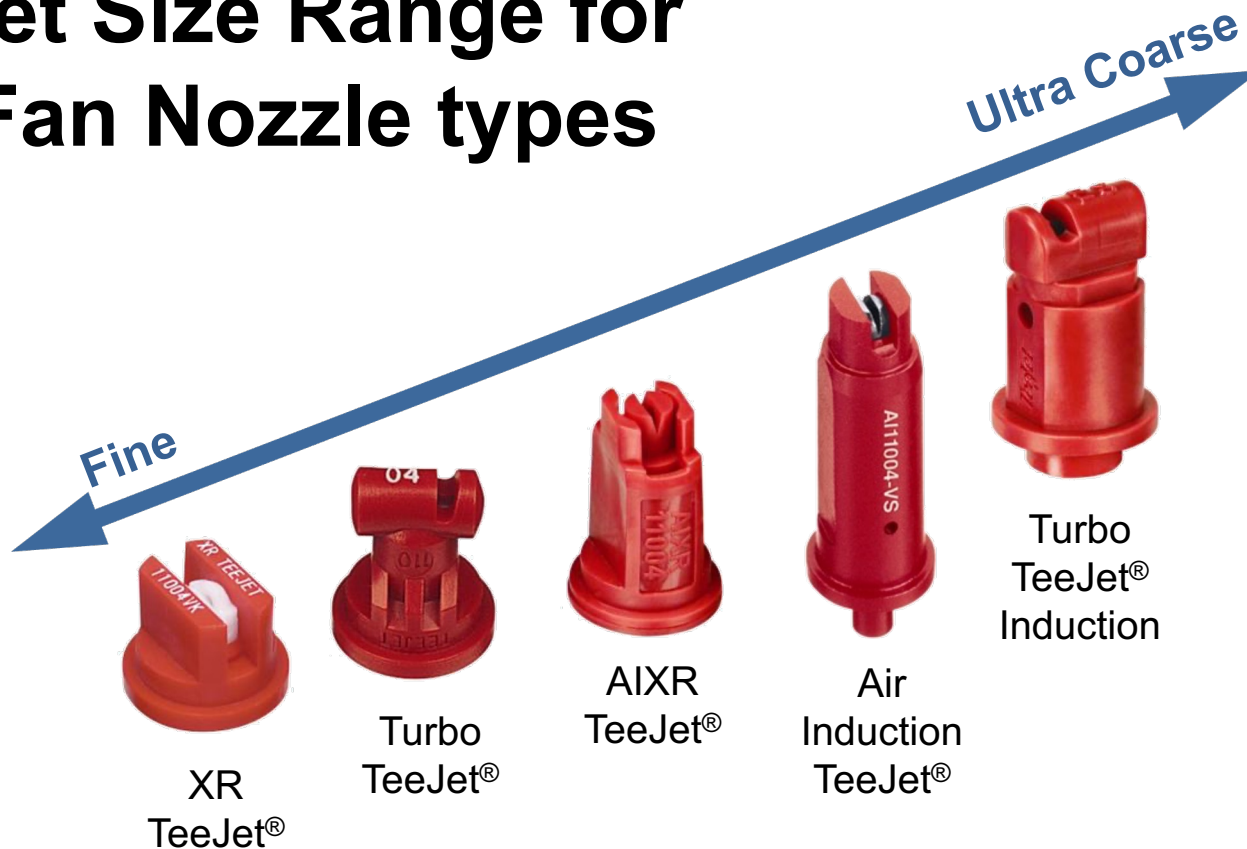
- Fine droplets for insecticides and fungicides
- Medium droplets for contact herbicides (e.g., Gramoxone)
- Coarse to Ultra coarse droplets for systemic herbicides (e.g., Roundup)



DROPLET SIZE AFFECTS SPRAY DRIFT

- Small droplets often result from
 - High spray pressure
 - Small nozzle tips
 - Wind shear across the nozzles
- Large droplets
 - Fall more quickly
 - Evaporate slower
 - Are less affected by wind

Droplet Size Range for Flat Fan Nozzle types



Impact of pressure and spray angle on droplet size



Green tips flow rate
=0.15 GPM

Blue tips flow rate
=0.3 GPM

Increasing the operating pressure or spray angle of the nozzle decreases droplet size

Nozzle Selection

- Follow the label!

TI1100	PSI	DROP SIZE	CAPACITY ONE NOZZLE IN GPM	CAPACITY ONE NOZZLE IN OZ./MIN.	GPA				
					4 MPH	5 MPH	6 MPH	8 MPH	10 MPH
					15	VC	0.18	23	13.4
20	VC	0.21	27	15.6	12.5	10.4	7.8	6.2	
30	C	0.26	33	19.3	15.4	12.9	9.7	7.7	
					17.8	14.9	11.1	8.9	
					20	16.8	12.6	10.1	
					22	18.3	13.7	11.0	
					24	20	15.2	12.2	
					27	22	16.7	13.4	
					14.3	11.9	8.9	7.1	
					16.6	13.9	10.4	8.3	
					21	17.3	13.0	10.4	
					24	19.8	14.9	11.9	
					27	22	16.7	13.4	
					29	24	18.2	14.6	
					33	27	20	16.3	
					36	30	22	17.8	
					18.4	15.3	11.5	9.2	
					21	17.3	13.0	10.4	

MANAGEMENT OF SPRAY DRIFT

- Use coarse sprays (volume median diameter of 400 microns or more) to avoid potential herbicide drift. Select nozzles that are designed to produce minimal amounts of fine spray particles (less than 200 microns). Examples of nozzles designed to produce coarse sprays via ground applications are Delavan® Raindrops, Spraying Systems XR (excluding 110° tips) flat fans, Turbo Teejets®, Turbo Floodjets® or large capacity flood nozzles such as D10, TK10 or greater capacity tips.
- Keep the spray pressure at or below 20 psi and the spray volume at or above 20 gallons per acre (for ground broadcast applications), unless otherwise required by the manufacturer of drift-reducing nozzles. Consult your spray nozzle supplier concerning the choice of drift-reducing nozzles.
- Agriculturally approved drift-reducing additives may be used.

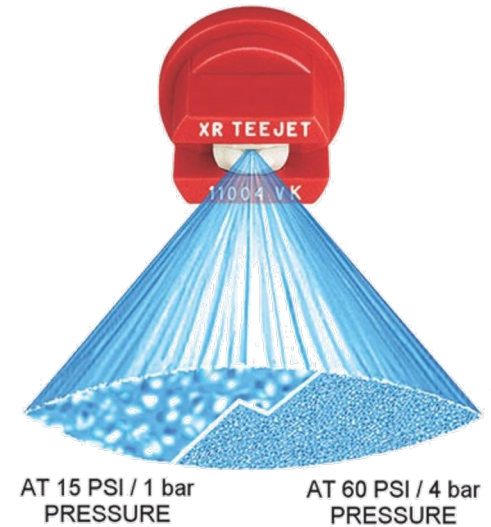
- Match nozzle to the application
 - Pressure, rate, and speed
 - Coverage and droplet size
- Time and type of application
 - PRE or POST, Broadcast or band



Image from American Veg. Grower

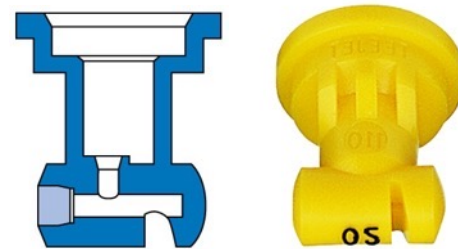
EXTENDED-RANGE FLAT-FAN

- 15-30 psi for soil applications
- 30-60 psi for foliar applications
- Fair drift control operated at less than 30 psi
- For uniform distribution of a flat fan nozzle and lower operating pressure
- Can be used with sprayers equipped with flow controllers



TURBULENCE CHAMBER NOZZLES

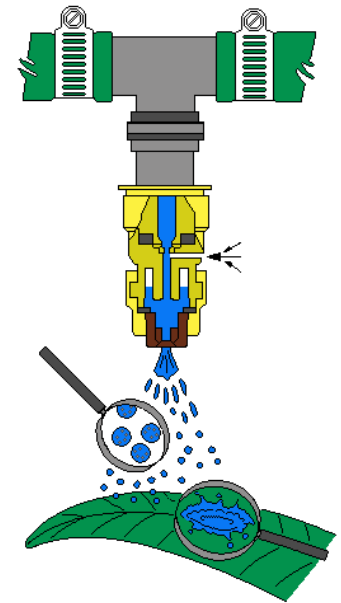
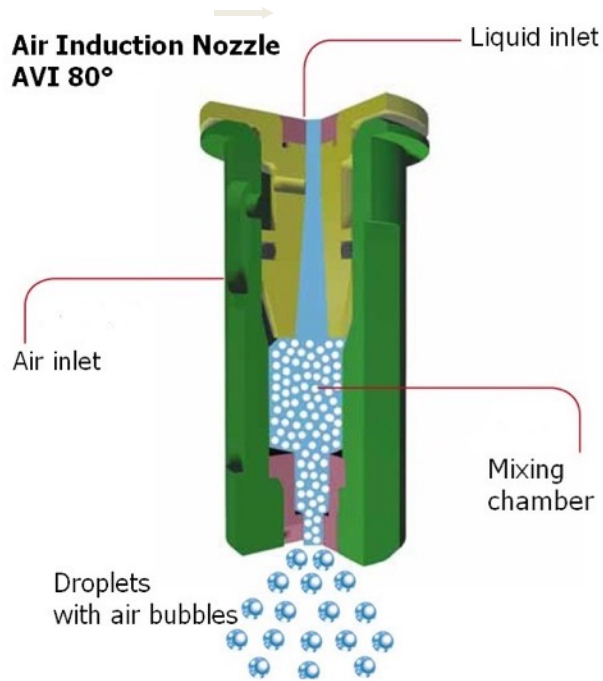
- Designed with a pre-orifice and turbulence chamber
- Increase in droplet size: 200-300 microns with fewer fine droplets
- Wide pressure range: 15-90 psi
- Wide pattern: 150°
- Post-emergence herbicides



Turbo TeeJet

AIR INDUCTION [VENTURI NOZZLE]

- Use of a pre-orifice chamber to reduce pressure, which draws air through inlet by venturi action
- Produce large (400 microns), air-filled drops
- Wide pressure range (40 - 100 psi), but best operation at higher end of range



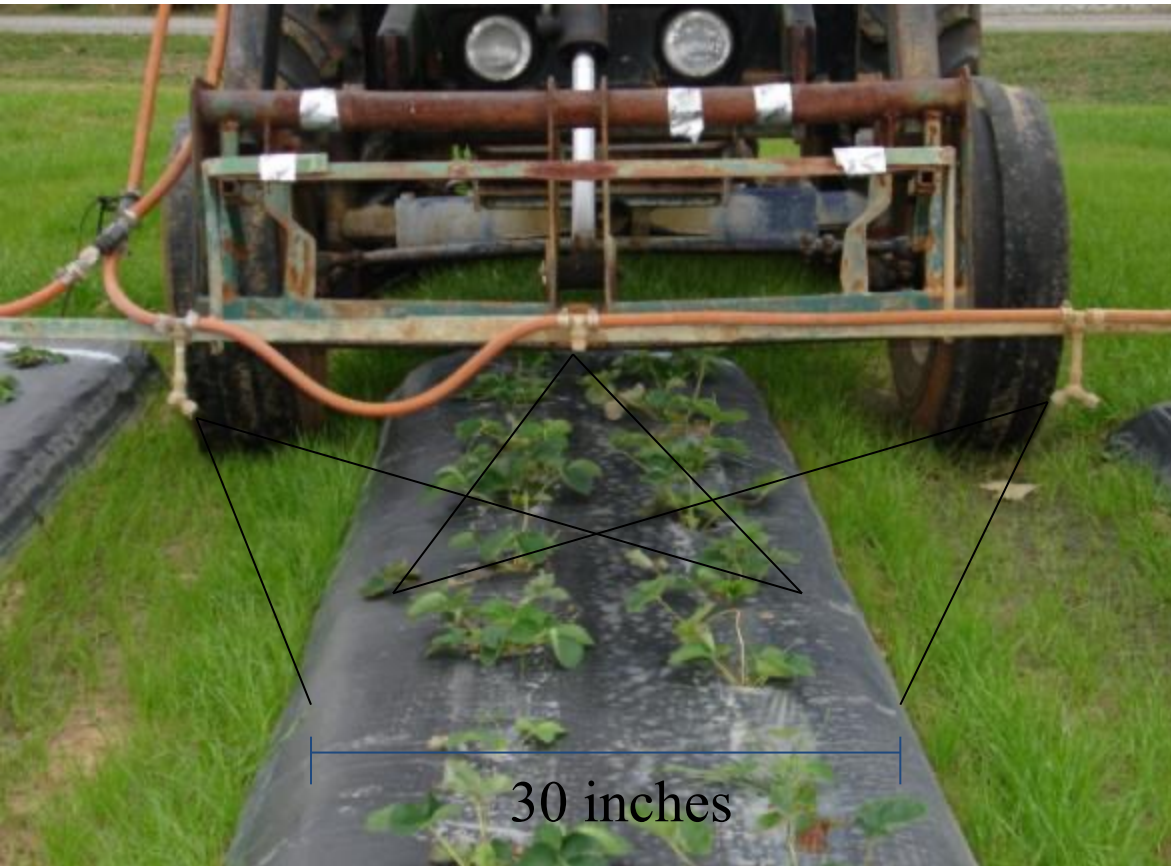
Directed Foliar Sprays: Broadcast or Band?



Is this a band or broadcast applicaton?

What do I use for nozzle spacing?

Banded Directed Spray



Is this a band or broadcast application? *This is a band application if applying a herbicide (Stinger)*

Broadcast Directed Spray



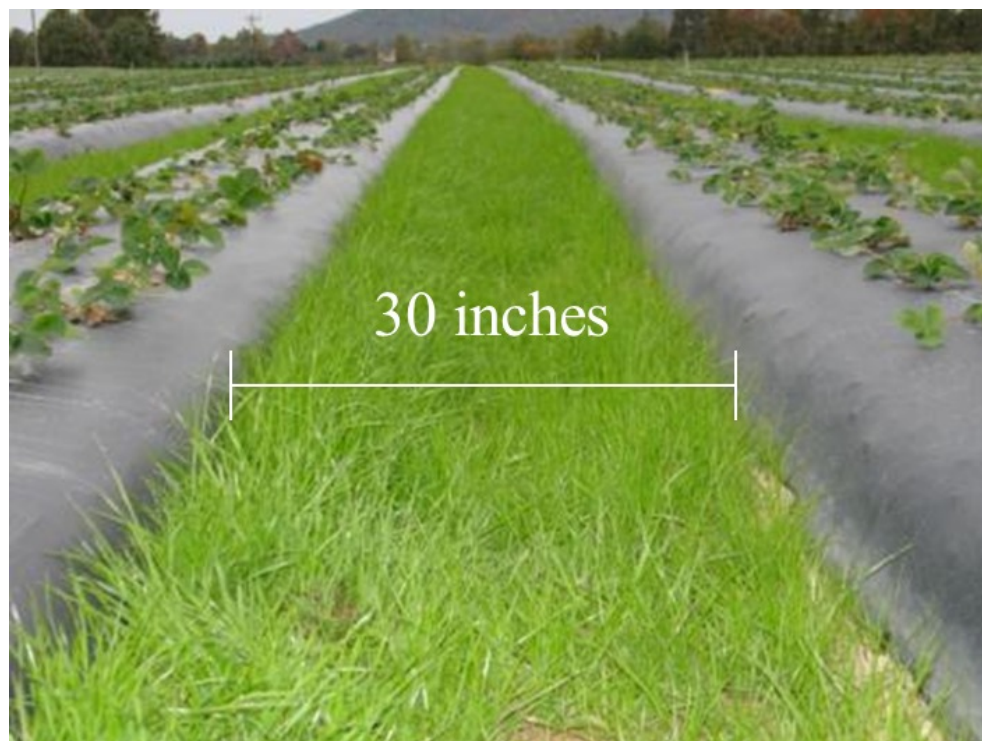
Is this a band or broadcast application? *When applying foliar fungicides, insecticides or miticides it is a broadcast application.*

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Be Cautious with Row Middle Sprays



- Minimize contact with plastic
- Herbicide contact with bed shoulder can cause crop injury
- Don't have too much faith in hooded equipment



Blackberry and Blueberry Plant Protection

- Use wax coated beverage cartons
 - Place over plant after transplanting
 - Use short stake beside plant to hold carton in place
 - Cut bamboo
- Herbicides must be directed
 - Injury can still occur
 - Spraying when windy
 - Incorrect nozzle height
 - Using high pressure



Herbicide Control Failure?.....



Or Herbicide Placement and Soil Conditions



Spray Additives

- Let the label be your guide
- Surfactants
 - Non-ionic reduce surface tension enabling better coverage with spray droplets
 - Cationic are binding agents and cleaning compounds....Joy dish detergent should **not** be used
- Oil based adjuvants
 - Slow drying time for increased absorption
 - Assist with penetration through the leaves
 - Crop Oil Concentrates (COC); 85% oil with a small % of NIS
 - Vegetable Oil Concentrates (VOC); cotton, linseed, or soybean oil with a small % of NIS
 - Methylated seed oil
- Spray Utility Agents
 - Buffering agents to lower pH to stabilize herbicides (except for SU herbicides)
 - Drift control agents
 - Nitrogen fertilizers (UAN or AMS) to improve herbicide absorption



Be Timely

- Application time (calendar) can be important
 - For PRE herbicides in perennial crops this is critical
- PRE herbicides need rainfall for activation
 - At least 0.5” within.....hours, days, weeks (depends on the herbicide)
- Weed size is very important for effective POST weed control
 - 1 to 2” tall weeds are easier to control than 4”+ tall weeds
 - Certain chemistries and herbicides within chemistries work on small weeds
 - Sulfonylurea herbicides are very specific
 - Aim is good on weeds 2” tall and smaller weeds
- Weed growth stage
 - Spot treating with glyphosate for controlling perennial weeds
- Weeds need to be actively growing for POST control (not stressed)
 - Freeze
 - Soil moisture But be careful

