



# The Effect of Adjuvants and Spray Nozzles on Droplets Size

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*Pesticide Application Technology Specialist.*

*Researched adjuvants, spray nozzles and techniques for drift mitigation.*

*+10 years of experience with field and research trials as well as laboratory equipment.*

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SPECIAL THANKS

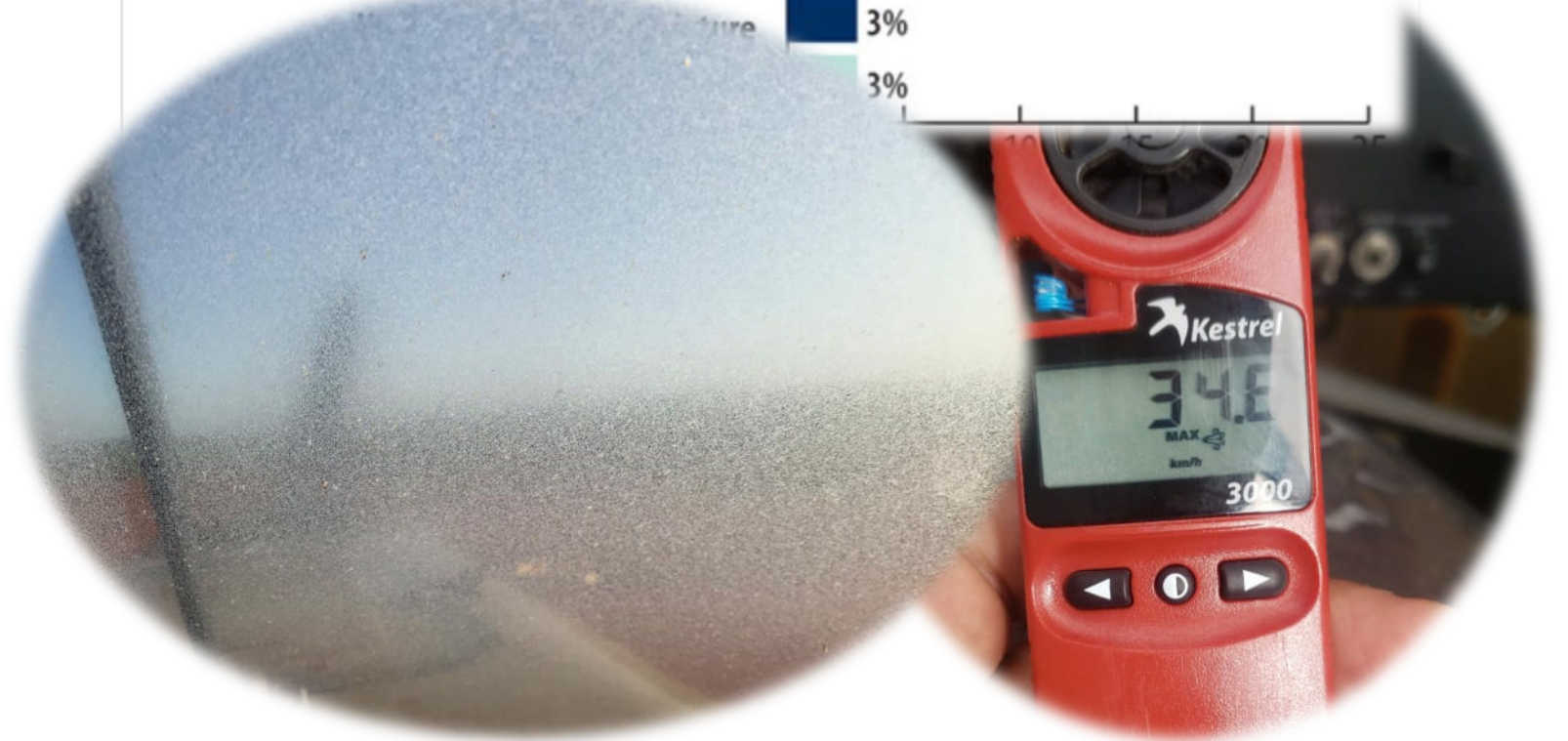
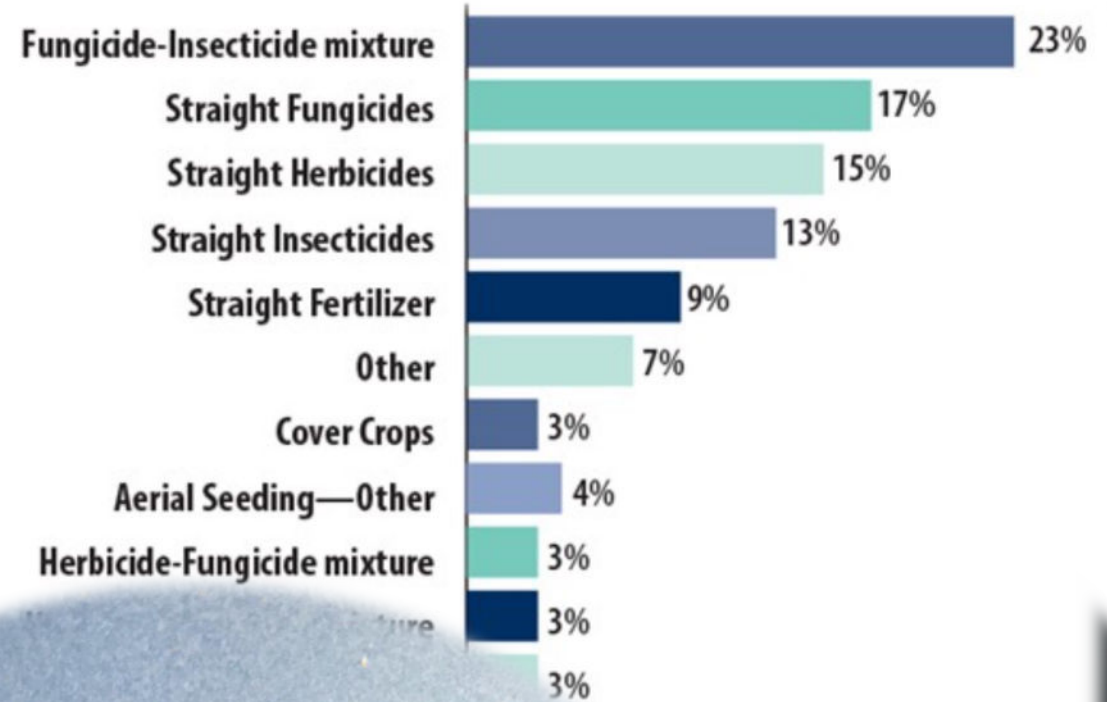
UNL - LINCOLN

ARS - USDA



# Challenges

- ✓ Extreme weather conditions
- ✓ Tank mixture
- ✓ Drift mitigation

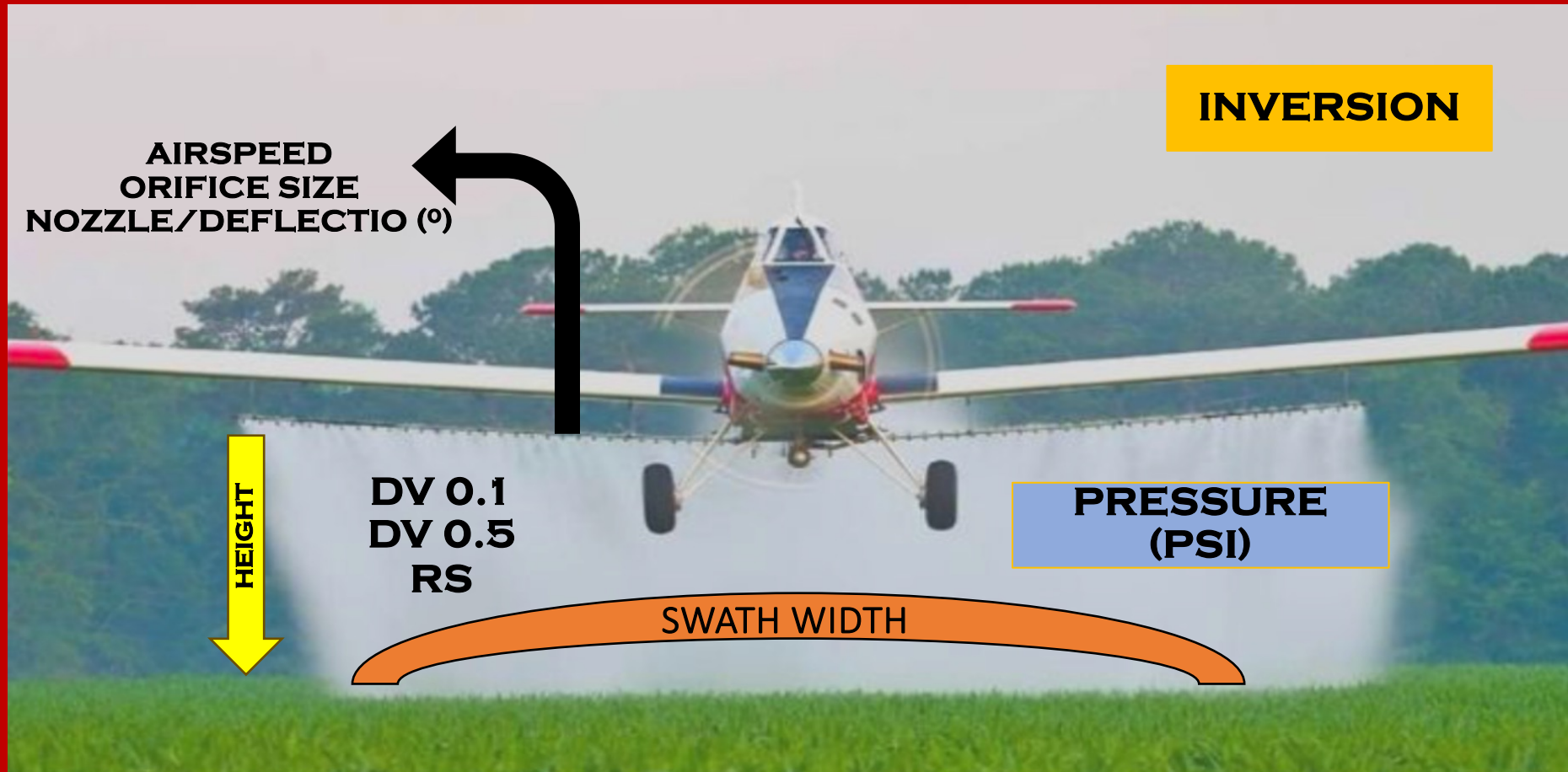


# DO NOT USE ADJUVANTS IF...



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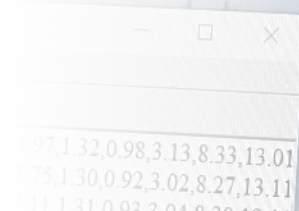
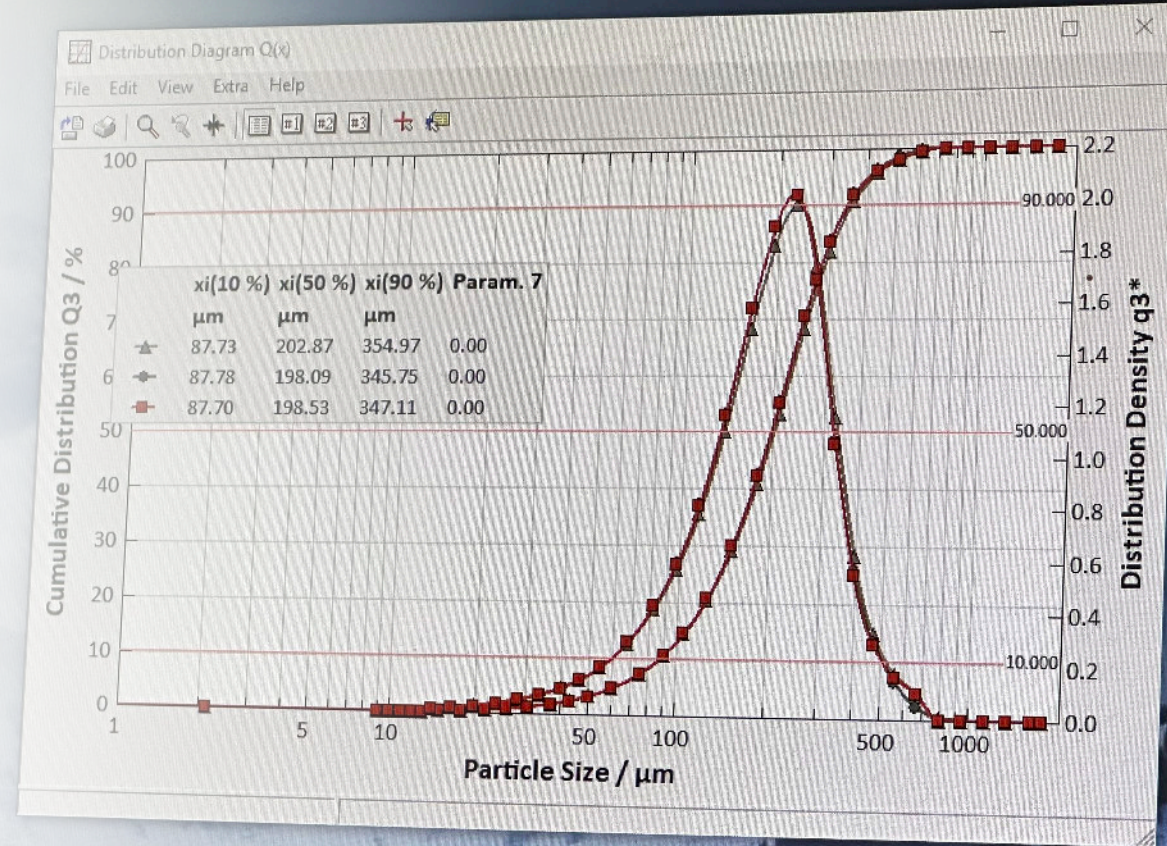
*YOU DO NOT UNDERSTRAND THE PARAMETERS:*





# OBJECTIVE:

## The Effect of Adjuvants and Spray Nozzles on Droplets Size



# MATERIAL AND METHODS

- High speed tunnel:  
110 to 150 mph
- Droplet size spectrum:  
Laser diffraction instrument
- CP11TT nozzles
- ROTARY nozzles



# Material and Methods

**+** Picloram: 0.3 kg ae ha  
**+** 2,4-D: 1.12 kg ae ha

*(Grazon P+D<sup>TM</sup> at rate 4.68 l ha<sup>-1</sup>)*

Polymers	Rates
P 1	10.8 g l <sup>-1</sup>
P 2	2.5% v <sup>-1</sup> v <sup>-1</sup>
P 3	7.9 g l <sup>-1</sup>
P 4	0.3 ml l <sup>-1</sup>
P 5	0.3 ml l <sup>-1</sup>



# RESULTS CP11TT

TREATMENTS	VMD	RS	<100%
P 1	220.97 <b>a</b>	2.483 <b>a</b>	26.02 <b>a</b>
P 2	217.57 <b>a</b>	2.02 <b>b</b>	21.66 <b>b</b>
P 3	214.83 <b>a</b>	1.73 <b>c</b>	19.37 <b>c</b>
P 4	205.71 <b>b</b>	2.04 <b>b</b>	22.38 <b>b</b>
P 5	201.48 <b>b</b>	2.05 <b>b</b>	23.56 <b>ab</b>
Picloram + 2,4-D	196.35 <b>c</b>	1.37 <b>d</b>	15.94 <b>d</b>

**Size Categories (VMD)**

- Extremely Fine: 0 to 61 µm
- Very Fine: 61 to 105 µm
- Fine: 105 to 236 µm
- Medium: 236 to 341 µm
- Coarse: 341 to 404 µm
- Very Coarse: 404 to 503 µm
- Extremely Coarse: 503 to 665 µm
- Ultra Coarse: Over 665 µm

ASABE Standard S572.1



# Material and Methods

Spray volume of 50 l ha<sup>-1</sup>

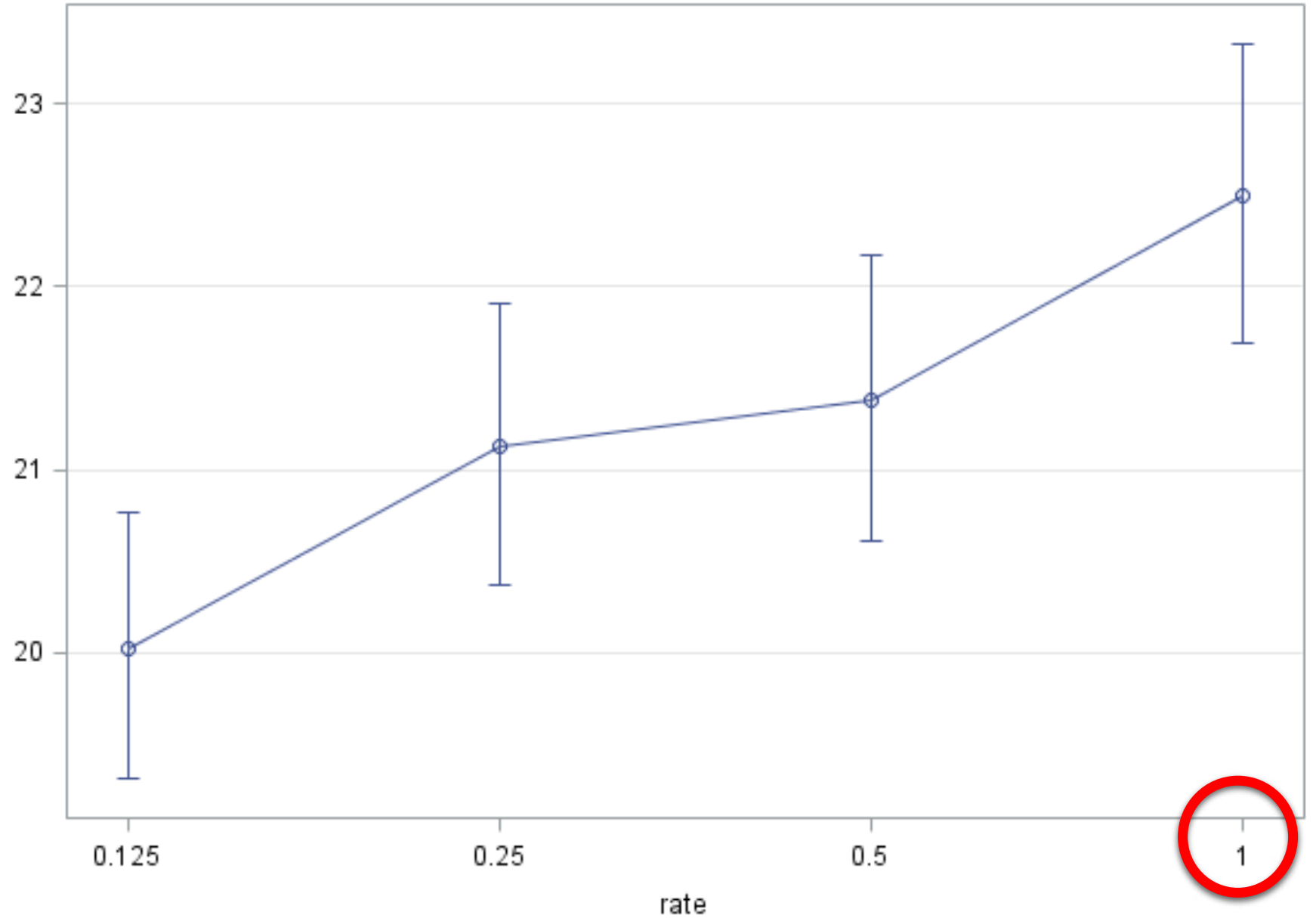
Treatments	0.125%	0.25%	0.5%	1%
P 1	2,69 g	5,38 g	10,77 g	21,55 g
P 2	6,25 ml	12,5 ml	25 ml	50 ml
P 3	0,19 g	0,39 g	0,78 g	1,57 g
P 4	0,07 ml	0,15 ml	0,31 ml	0,62 ml
P 5	0,07 ml	0,15 ml	0,31 ml	0,62 ml

**N**

Picloram + 2,4-D

0.375 l

% < 100  $\mu\text{m}$



**N**

# RESULTS ROTARY NOZZLES



Nozzle	Solution	Orifice	Airspeed	Dv10	Dv50	Dv90	RS
402 Rotary	Polymer D	2	110	68,20	151,47	238,63	1,12
			150	36,63	90,68	147,42	1,22
402 Rotary	water + NIS	2	110	67	169	277	1,2
			150	38	105	177	1,3

# CONCLUSIONS

- Adding adjuvants may not change droplet size categories
- Adjuvants associated to spray nozzles may help drift mitigation





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