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Spraying is Easy, Doing It Right Isn't: Tips for Better Herbicide Applications

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Endangered Species Act

Mitigation Picklist

- No preemergence applications (to the crop)
- Greater than or equal to 30 ft vegetative filter strips on A and B hydrologic group soils[9]
- Greater than or equal to 100 ft vegetative filter strips on C and D hydrologic group soils
- Grassed waterway
- Field border
- Irrigation water management
- Cover crop
- Contour buffer strips
- Contour farming
- Terrace farming
- Strip cropping
- Soil incorporation to a depth of 2.5 cm (1 in)
- No tillage/ reduced tillage

Future Concerns

- Atrazine
- Glyphosate
- Paraquat
- Metribuzin
- Desiccants
- Many residual herbicides
- Aerial applications

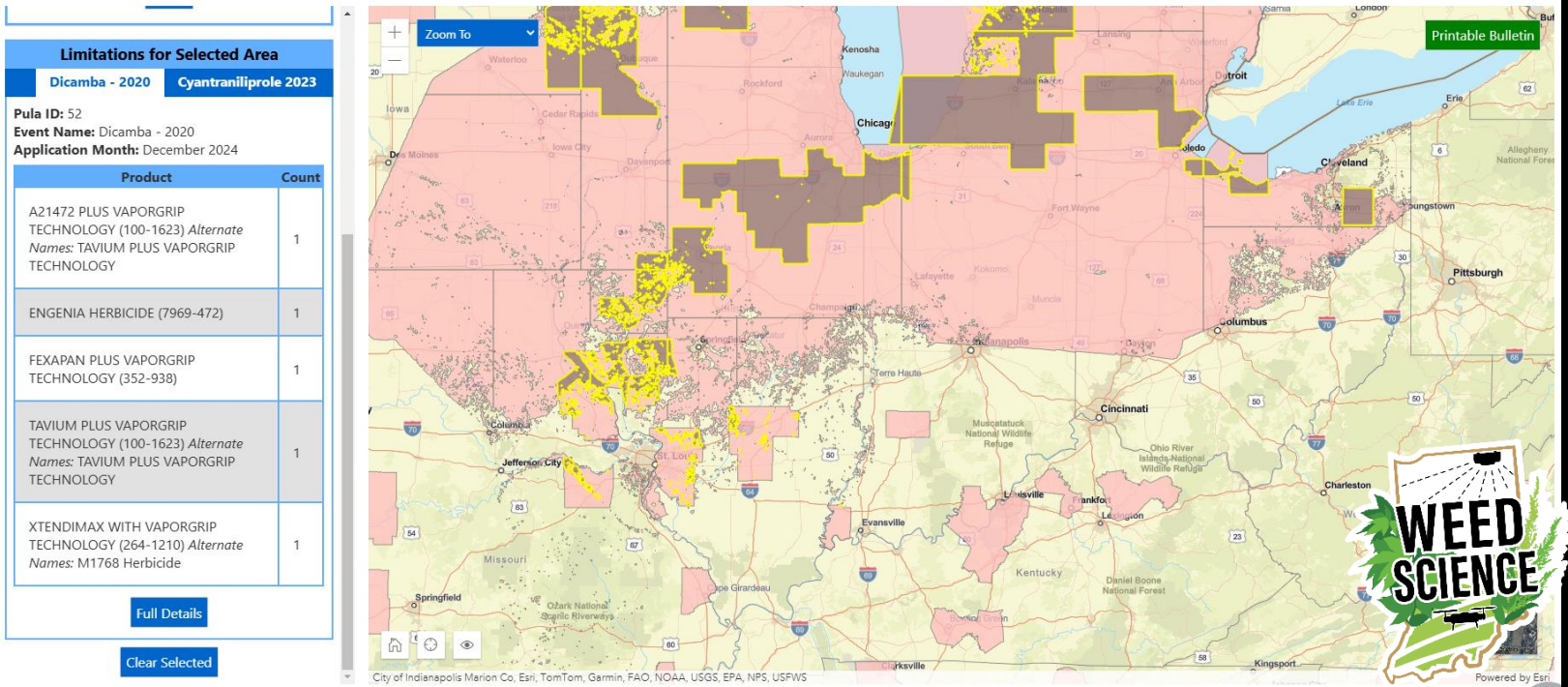
Directions for Use

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.
Read all Directions for Use carefully before applying.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your state or tribe, consult the agency responsible for pesticide regulation.

Endangered Species
It is a Federal offense to use any pesticide in a manner that results in an unauthorized "take" (e.g., kill or otherwise harm) of an endangered species and certain threatened species, under the Endangered Species Act section 9. When using this product, you must follow the measures contained in the Endangered Species Protection Bulletin for the area in which you are applying the product. You must obtain a Bulletin no earlier than six months before using this product. To obtain Bulletins, consult http://www.epa.gov/espp/, call 1-844-447-3813, or email ESPP@epa.gov. You must use the Bulletin valid for the month in which you will apply the product.

Report ecological incidents: To report ecological incidents, including mortality, injury, or harm to non-target plants and animals call 1-855-ENLIST-1 (1-855-365-4781).



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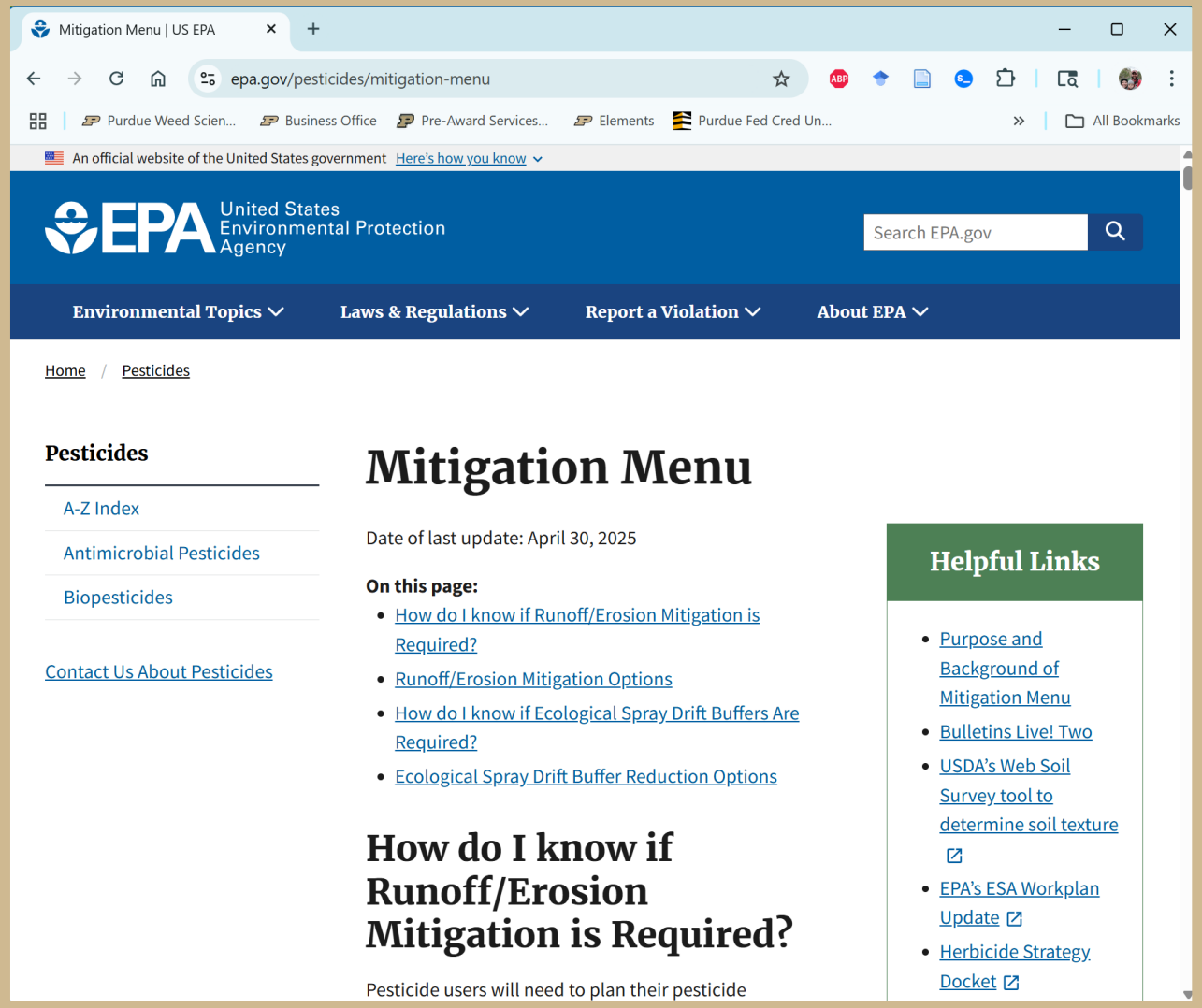
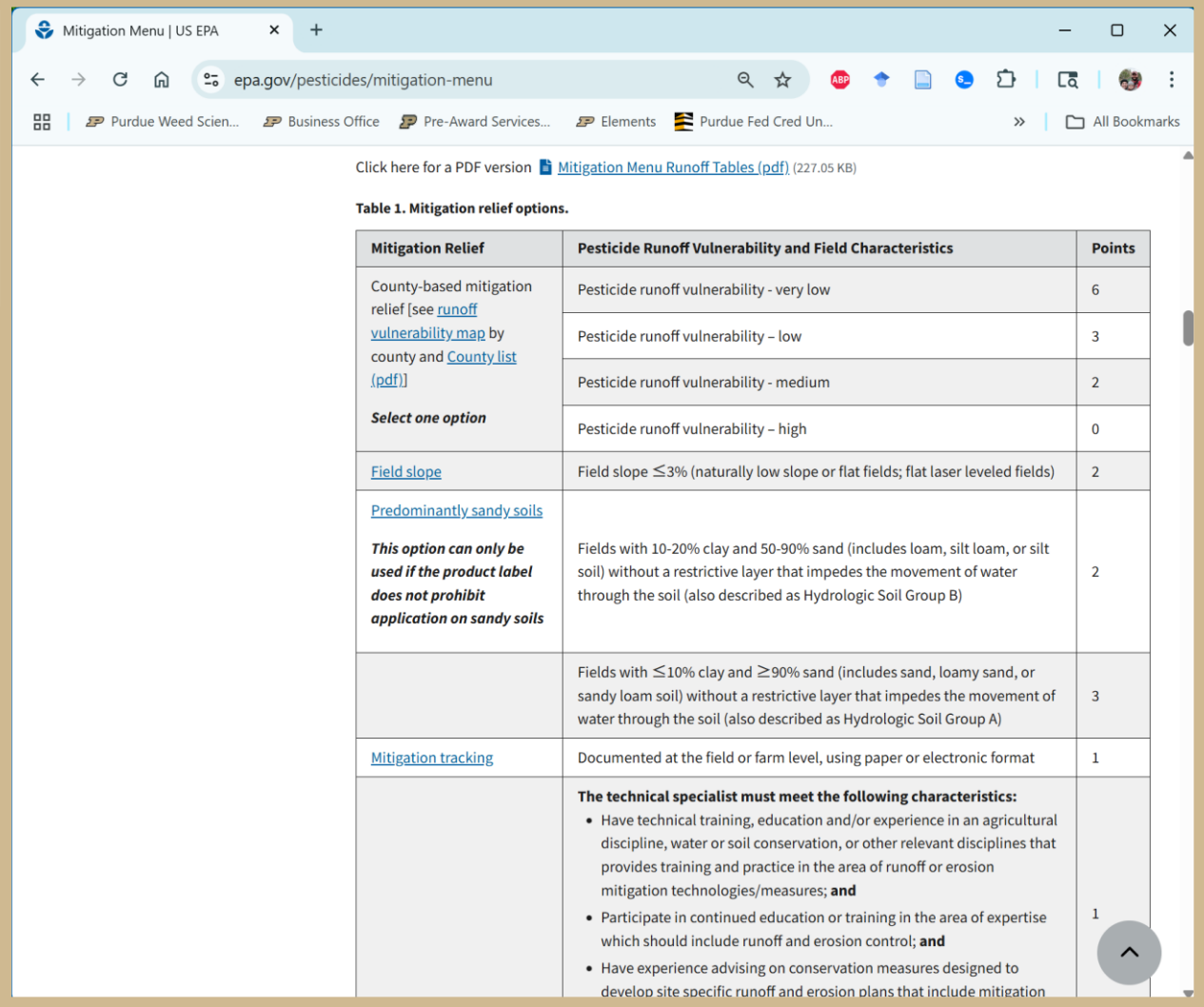
Endangered Species Act

Runoff Mitigation





NOZZLES

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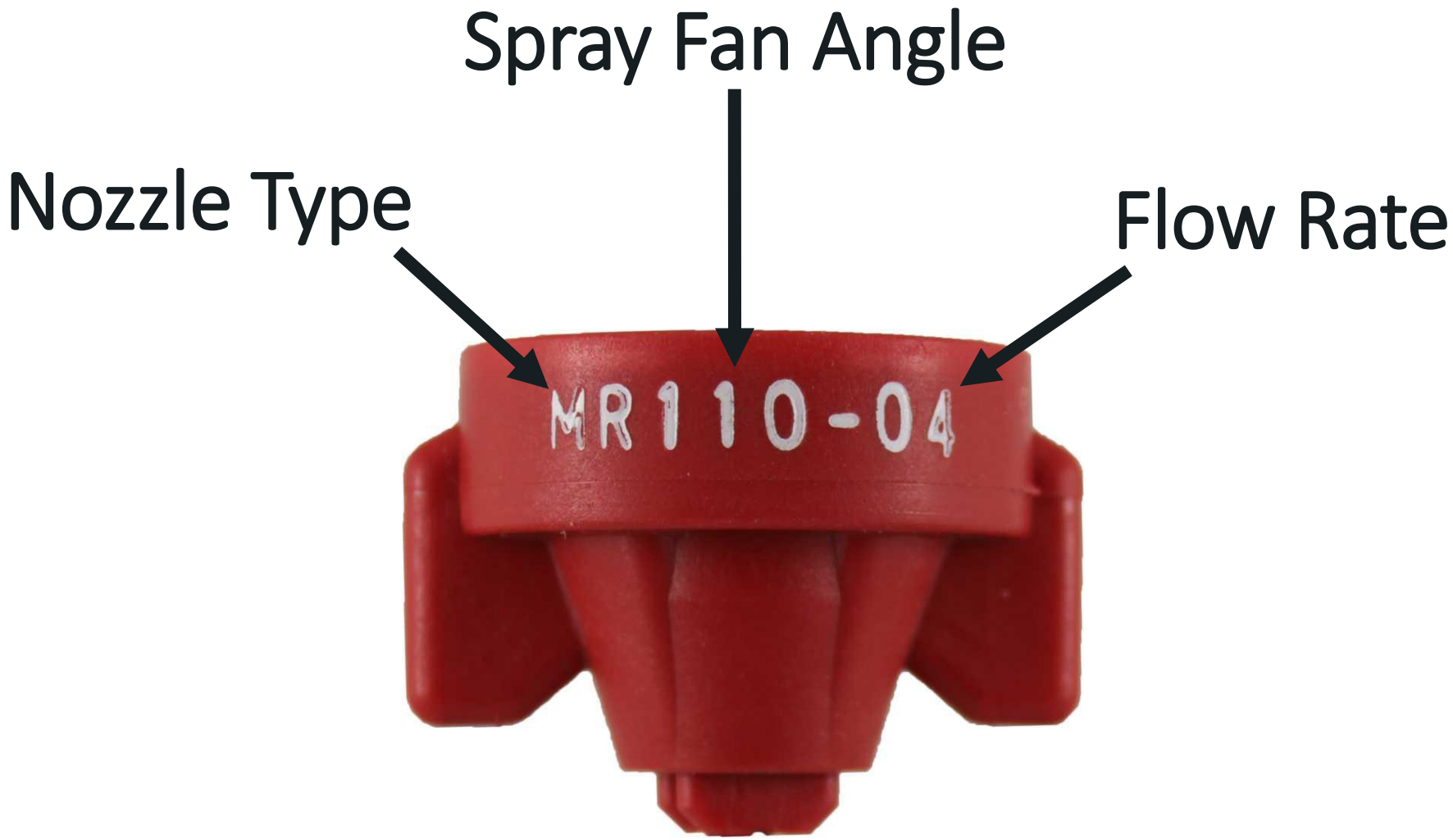
Nozzle Information



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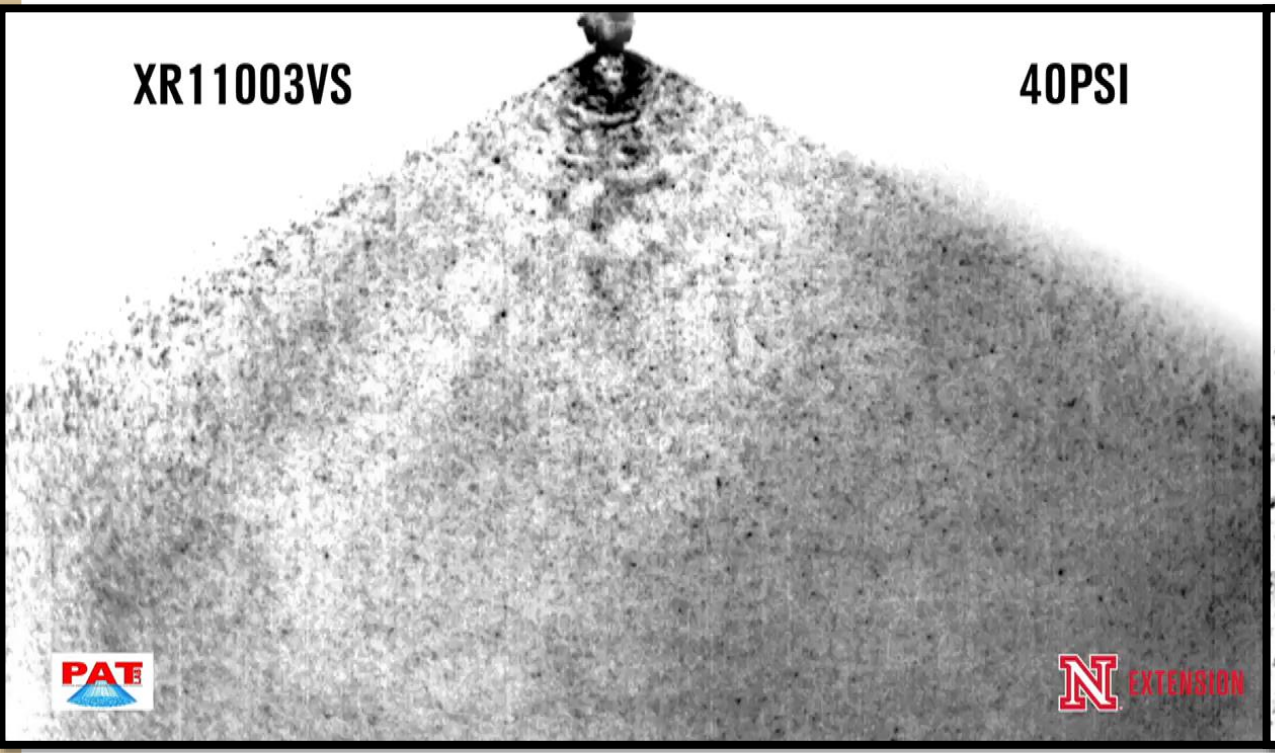
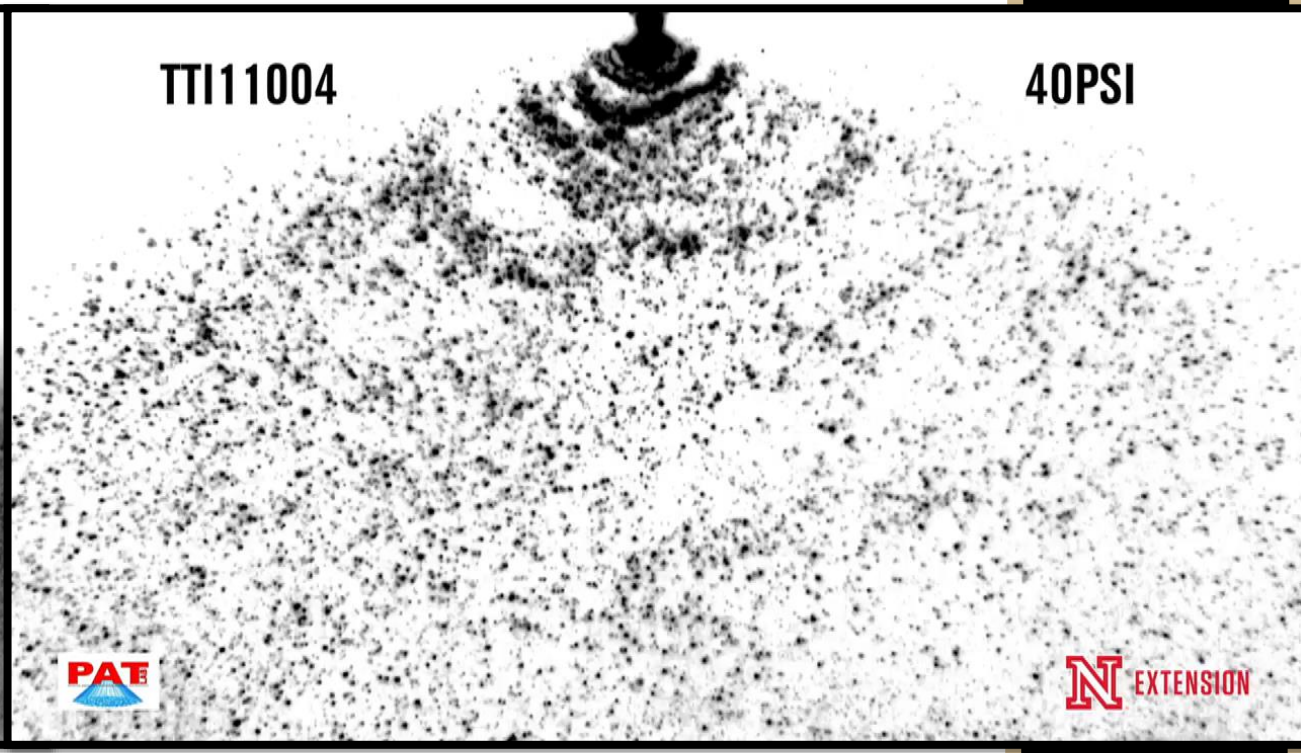
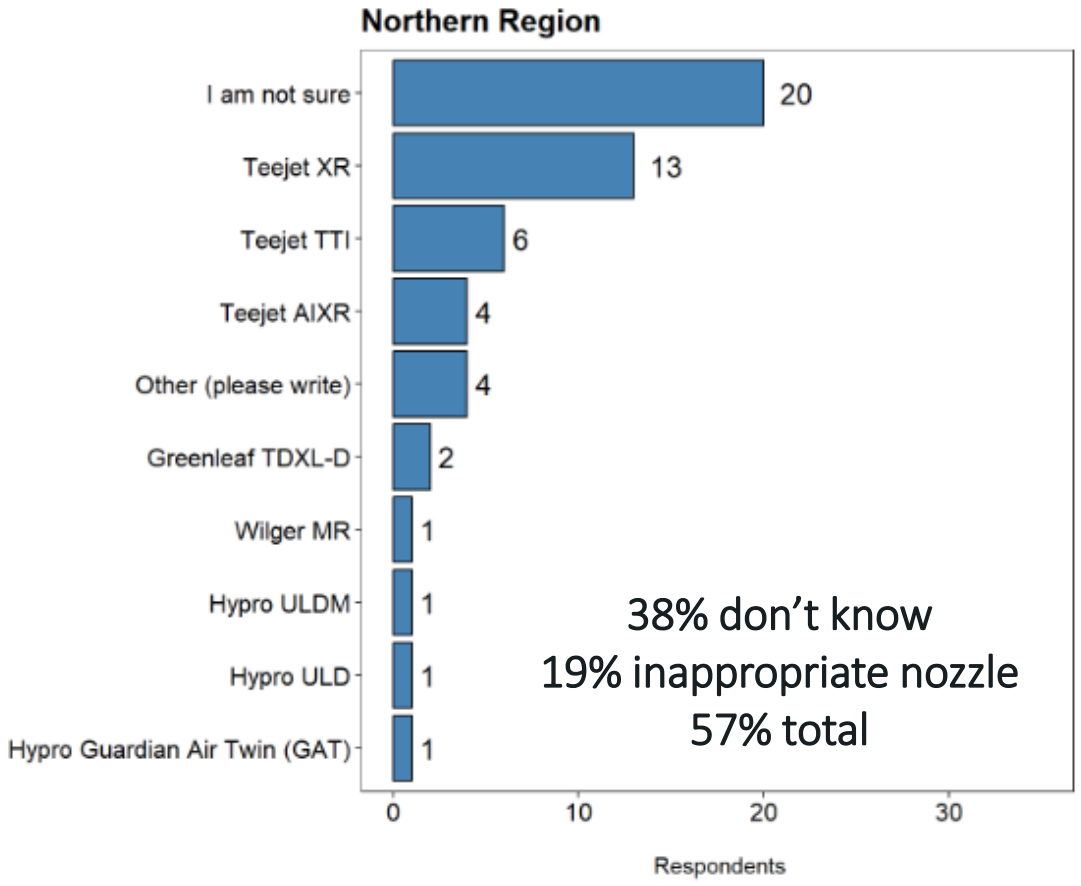
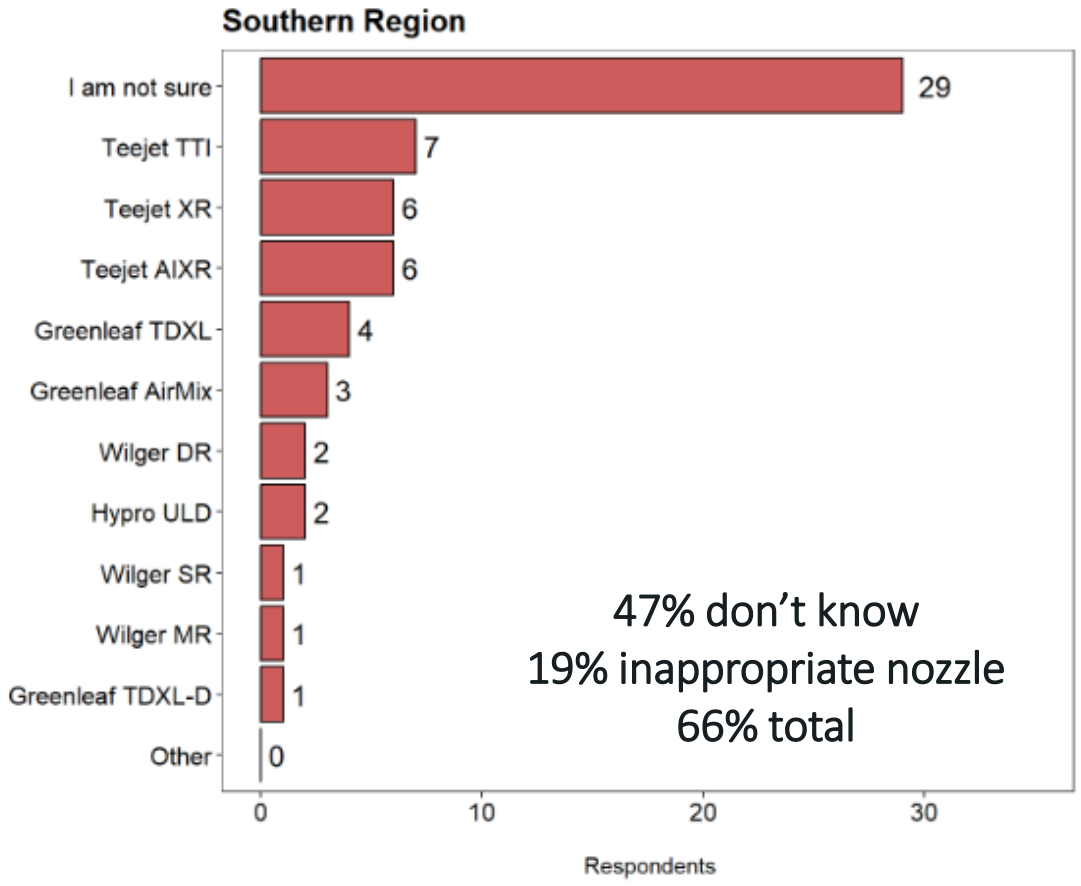
Changing Nozzles -> Droplet Size





Glufosinate (Liberty) Usage Survey Results





Figures courtesy of: Nikola Arsenijevic and Dr. Rodrigo Werle, UW-Madison

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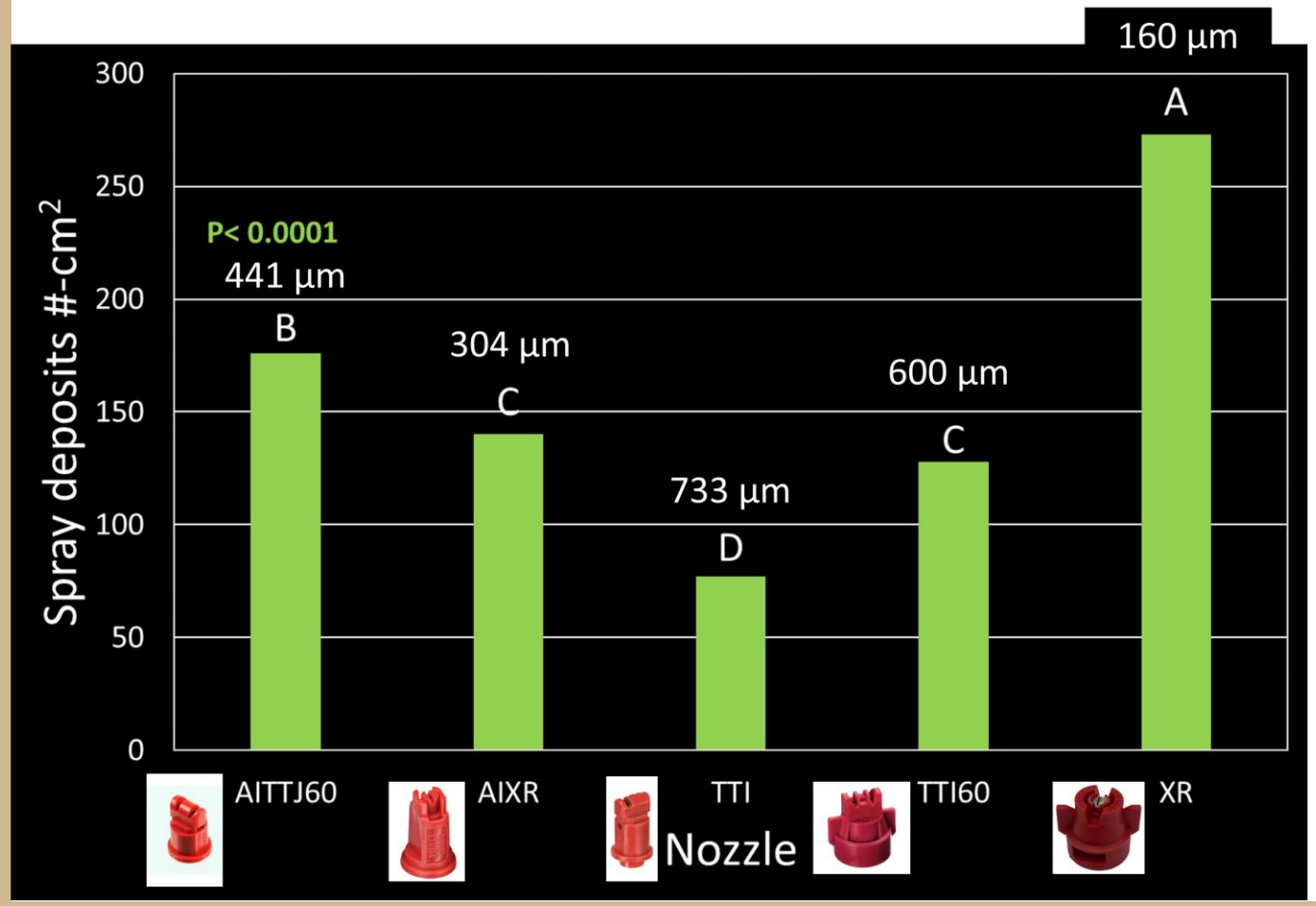
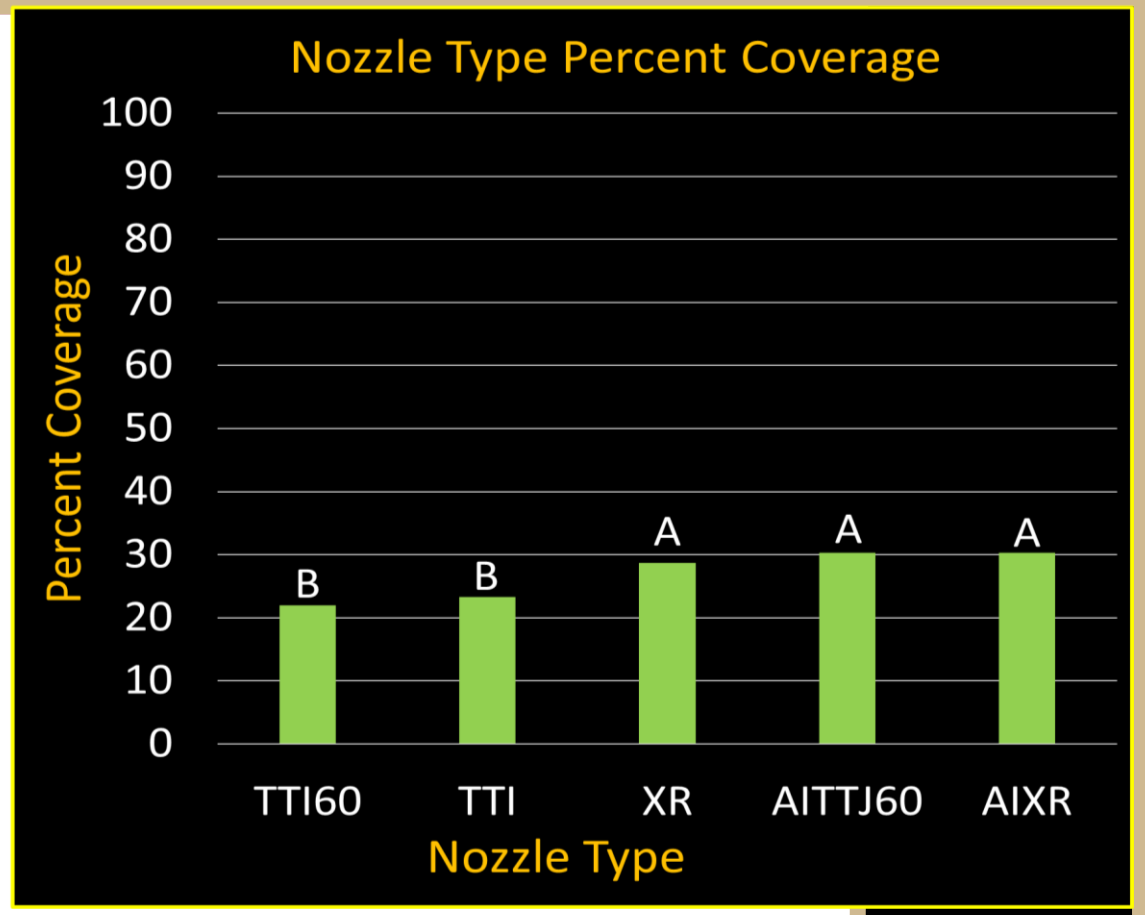
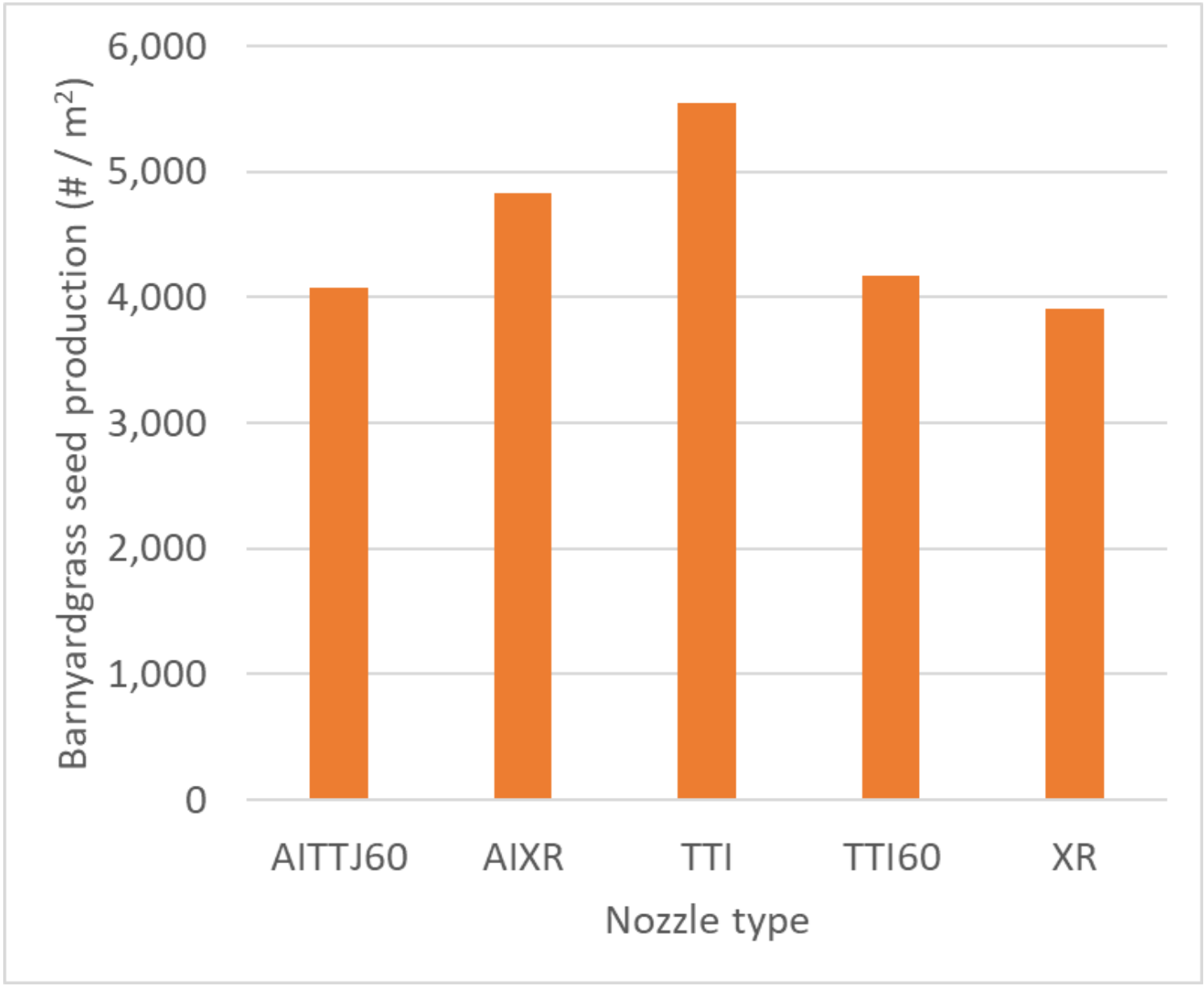
Spray Coverage & Deposition





Barnyardgrass Seed Production



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Barnyardgrass Seed Production

*Dual-fans may aid in improving long-term suppression of weeds.

Dual-Fans do not **always mean better coverage & weed control.

***Often more expensive!

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Importance & How To's of Nozzle Sizing

Example Calculation:

→ (10 GPA x 20 inch x 20 mph)/5,940

↓

→ 0.67 GPM

54 PSI

31 PSI

→ PWM (operated at ~70% duty cycle)

= 40 PSI

$$GPM = \frac{GPA \times w \times mph}{5{,}940}$$

Where:

GPM	=	gallons per minute
GPA	=	gallons per acre
w	=	nozzle width/spacing (in inches)
mph	=	sprayer speed (in mph)

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Importance & How To's of Nozzle Sizing

Example Calculation:

→ (10 GPA x 20 inch x *12 mph*) /5,940

↓

→ 0.40 GPM

18 PSI

10 PSI

→ PWM (operated at ~40% duty cycle)

= 40 PSI

$$GPM = \frac{GPA \times w \times mph}{5{,}940}$$

Where:

GPM	=	gallons per minute
GPA	=	gallons per acre
w	=	nozzle width/spacing (in inches)
mph	=	sprayer speed (in mph)

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Importance & How To's of Nozzle Sizing

Example Calculation:

→ (10 GPA x 20 inch x *12 mph*) /5,940

Moral of the story:

When sizing nozzles, need to consider the **RANGE** of speeds operated, not just the maximum.

= 40 PSI

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Nozzle Decisions are Key!

Nozzle decisions will impact the following:

→Droplet size

→Spray drift potential

→Flow rate

→Spray pattern

→Compatibility with adjuvants/formulations

→Spray coverage/deposition

Last opportunity to control an application before it's in Mother Nature's hands!

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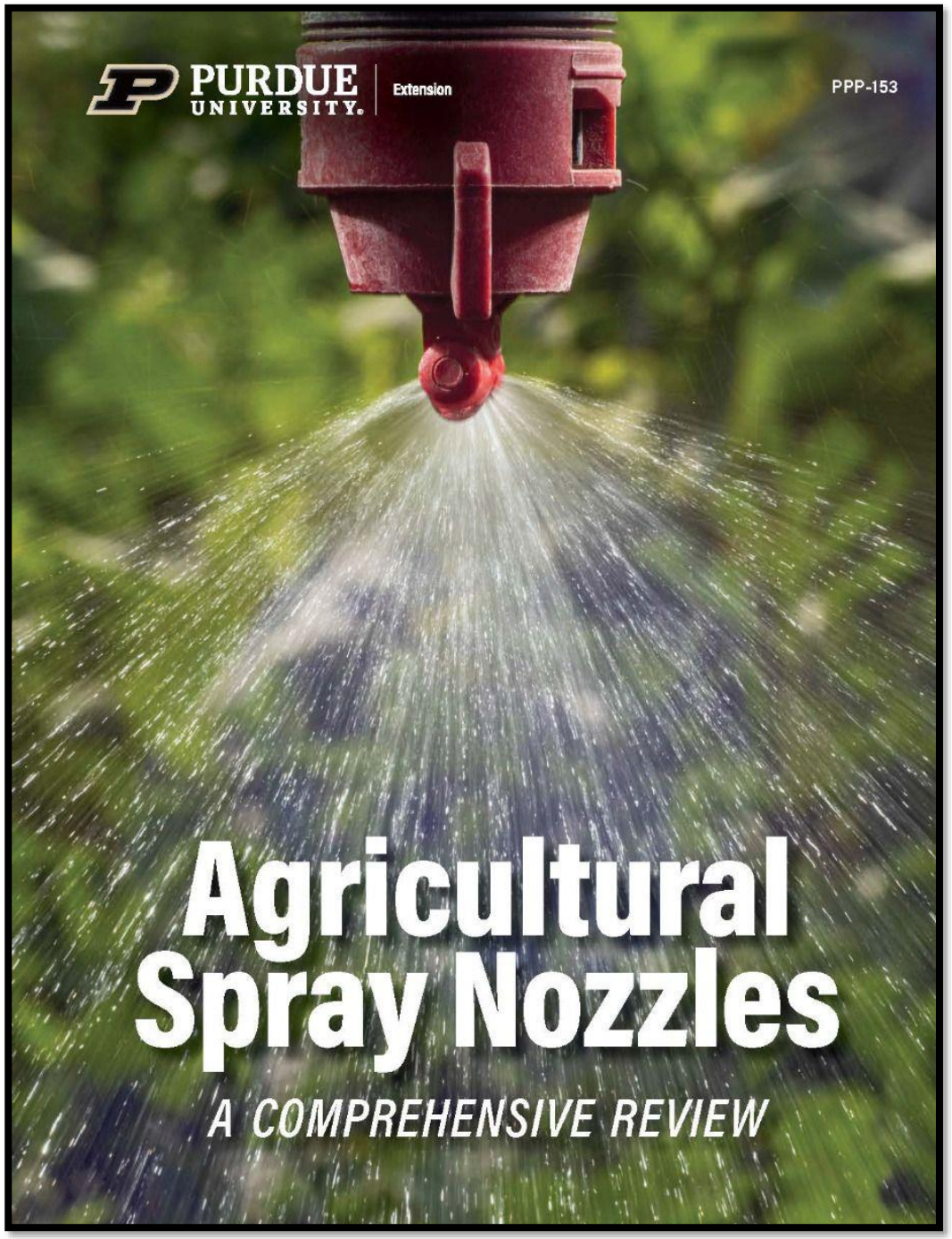
Company Man

SCAN ME

https://edustore.purdue.edu/ppp-153.html



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Where can PWM help?

- **Around field borders**
  - Reduce speed
  - Don’t have to change nozzles
  - Assist with drift reduction strategies
- **Site-specific applications**
  - Maintain precise droplet size (reduce drift but maintain efficacy)
  - Minimize overlap and output errors
- **Application flexibility**

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With all this pulsing wouldn't PWM leave skips?

Blended Pulse

Calculation:

→ 20 mph = 29.3 ft/s

→ 10 Hz (10 pulses per second)

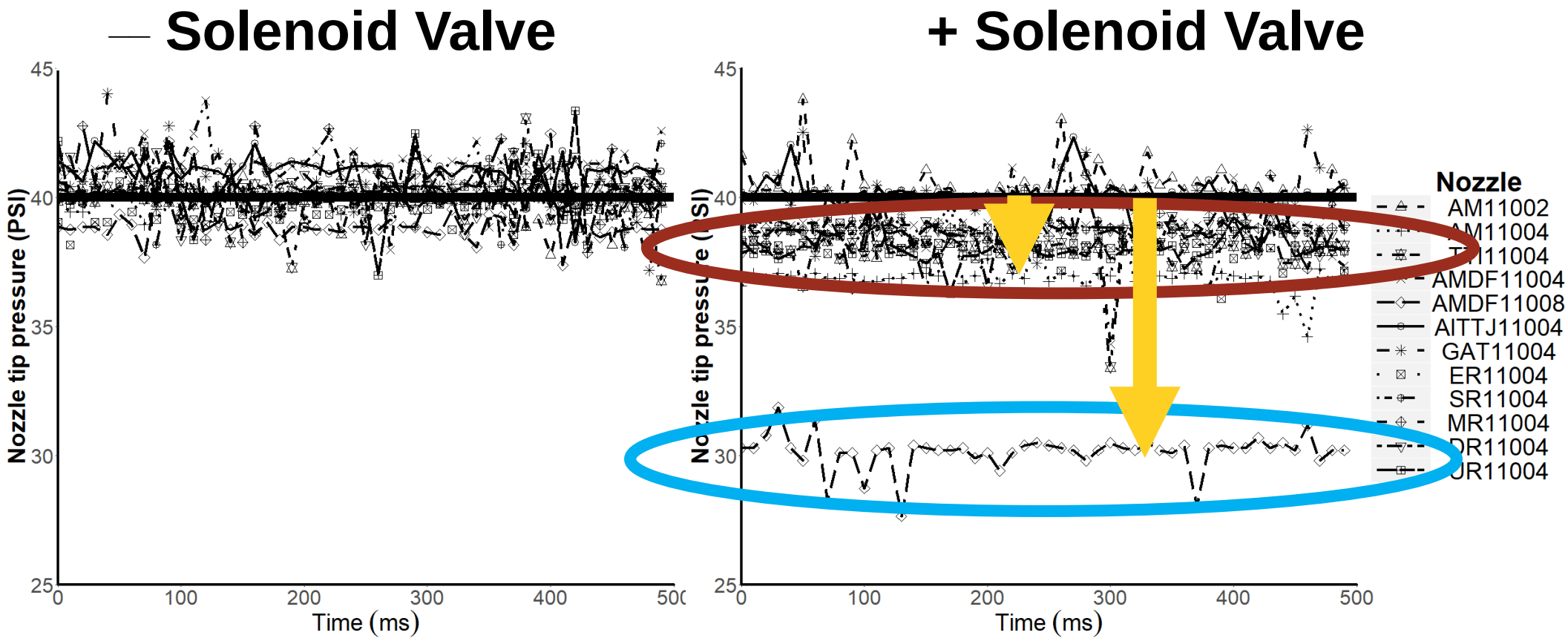
→ ~3 feet between every pulse

→ If operating at a 50% duty cycle, this means 1.5 feet distance traveled before nozzle is back on again

→ If operating at a 50% duty cycle, adjacent nozzles are never off at the same time

PWM Best Use Practices

40 PSI



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PWM Best Use Practices

- Use only non-venturi (non-air induction) type nozzles
- Optimal duty cycle range is 50 – 100%
  - Best recommendation to stay between 70 – 90%
- If drift mitigation can still be maintained, use higher application pressures (≥ 40 psi)
- Be aware of pressure loss through the solenoid valves

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OTHER CONSIDERATIONS

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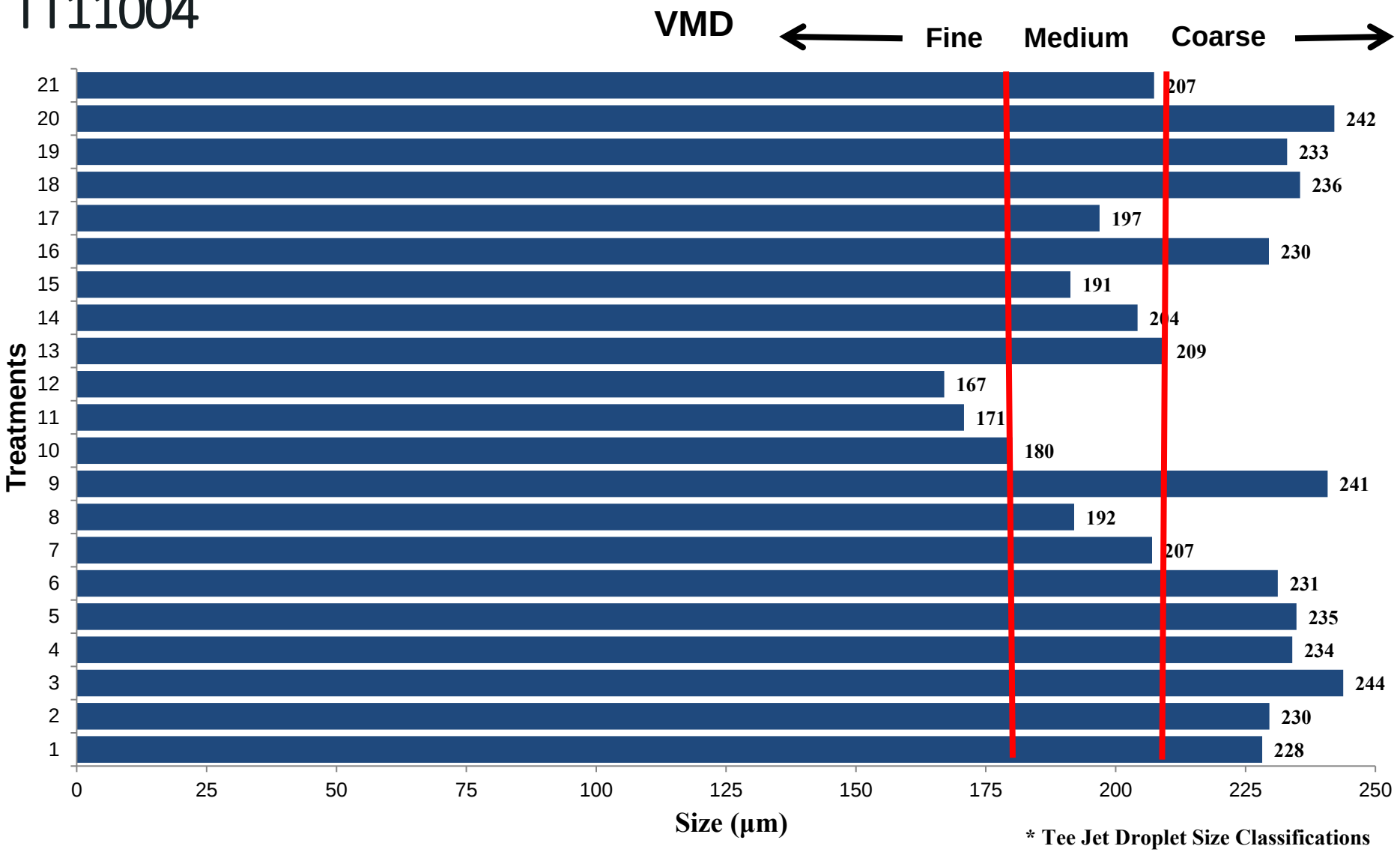
Effect of Various Adjuvants on a “Medium” Spray Quality

TT11004



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Proper Mixing

- → The old “Fill the tank 50 to 75% full, then add the herbicides” may not be so advisable anymore…
- → If using induction tanks (right), DO NOT mix concentrated herbicides together…
  - → Add 1 herbicide, flush with water
  - → Add second herbicide, flush with water, etc.
- → As a result, maybe start with tank 25% full to allow for extra system flushing.

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Thank you! Questions?

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