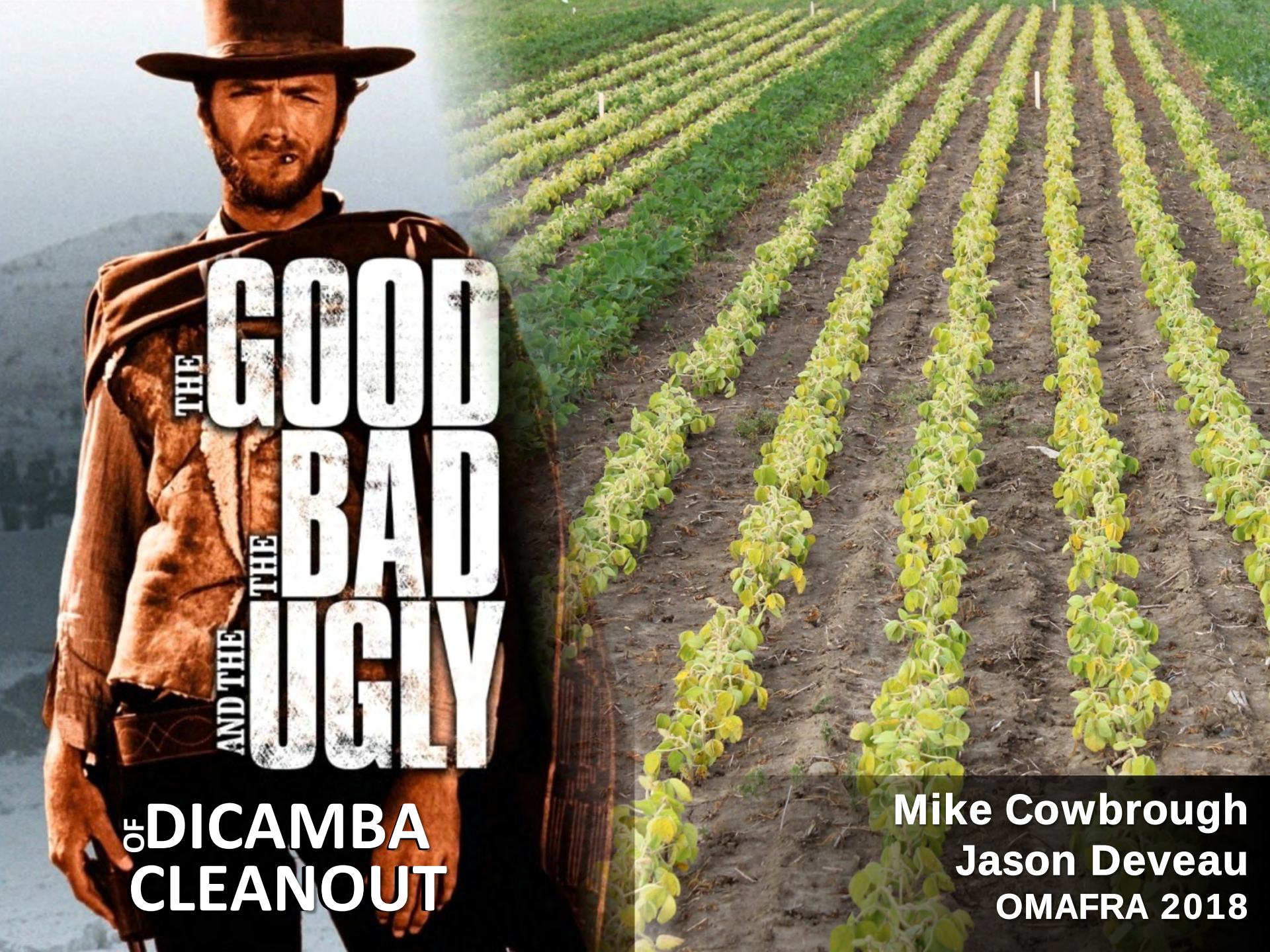
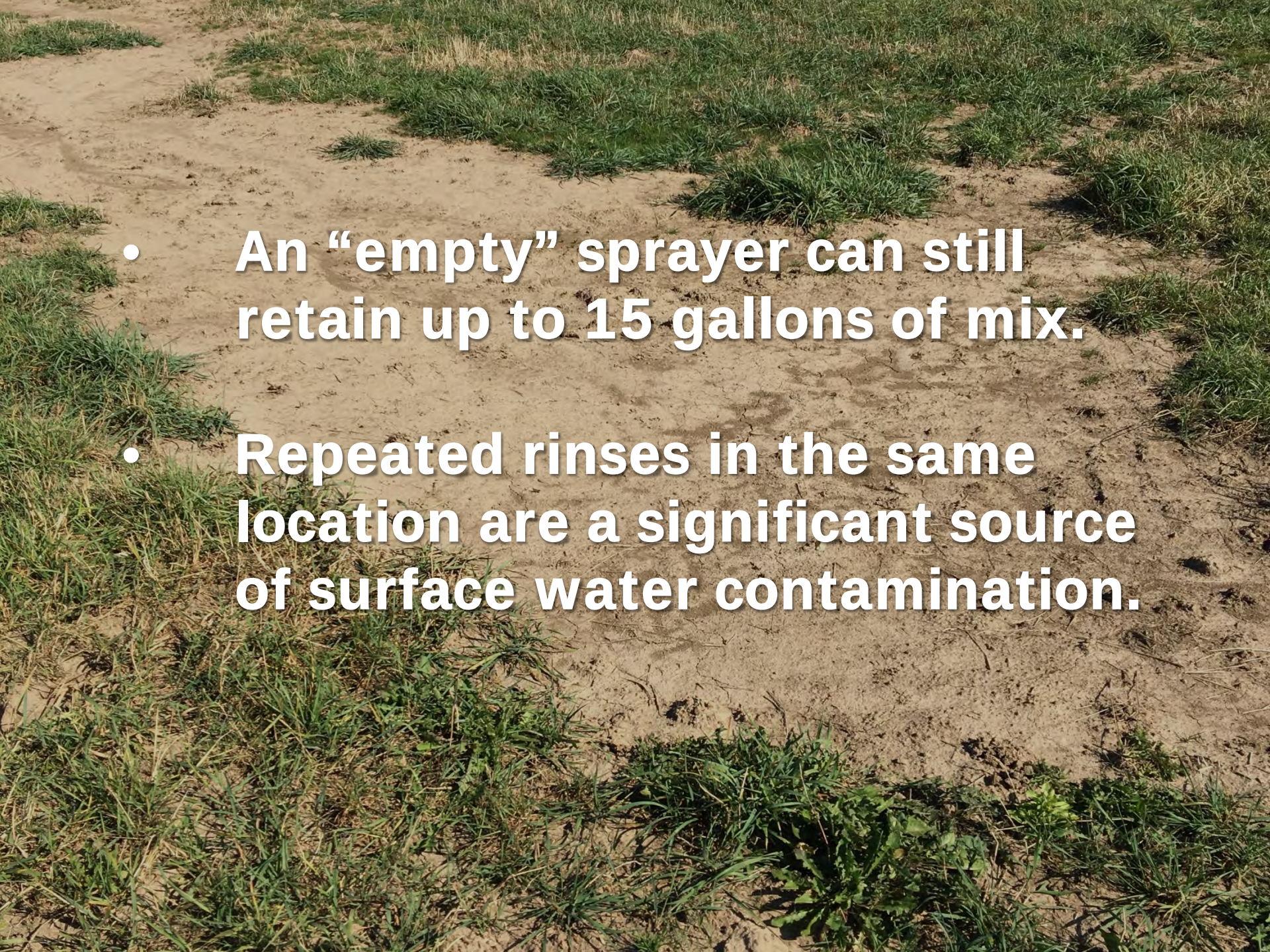


OF DICAMBA CLEANOUT

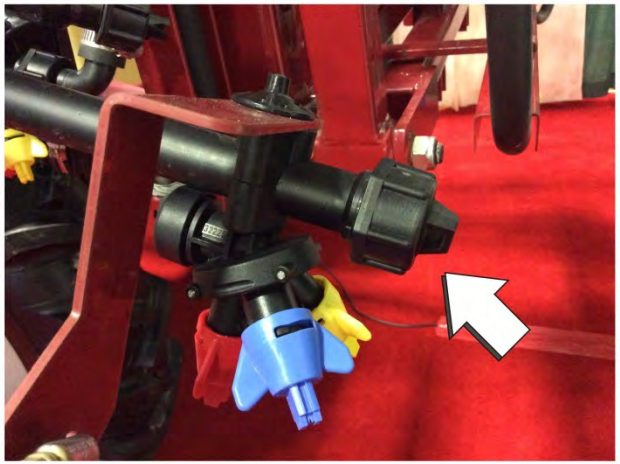
Mike Cowbrough
Jason Deveau
OMAFRA 2018



- An “empty” sprayer can still retain up to 15 gallons of mix.
- Repeated rinses in the same location are a significant source of surface water contamination.

France (2006) and Denmark (2009) legislated that a sprayer cannot leave the field with >1% or 2% (resp.) of the original tank mix concentration...

Even if rinsate at nozzle is 1-2%...



Sprayers can retain ~15% of the original concentration in empty/fill valves, boom ends & filters...

P.G. Anderson *et al.* 2010

Defining CLEANING

- Decontamination performed when changing chemicals, moving into sensitive crops, and before storing sprayer.
- May require a labelled detergent or adjuvant and time to soak.
- Operator must address filters, nozzles and dead-end plumbing.


You’d be amazed at what accumulates in sagging lines…
Photo: HJV Equipment.

...and in section end caps.

Oatmeal was run through this boom to simulate clay-based products.

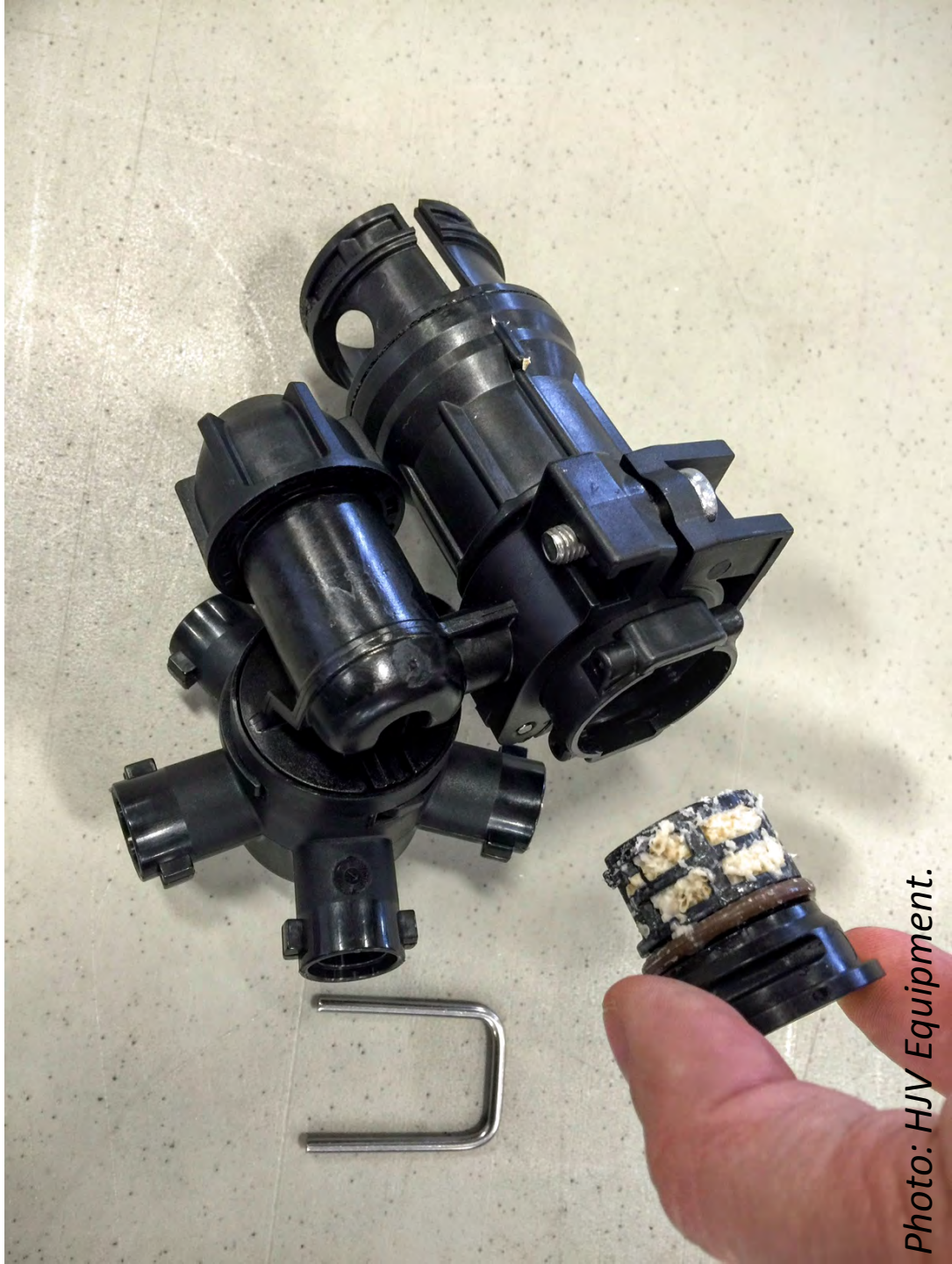


Photo: HJV Equipment.

Each section end can bleed residue into the spray as the boom charges.

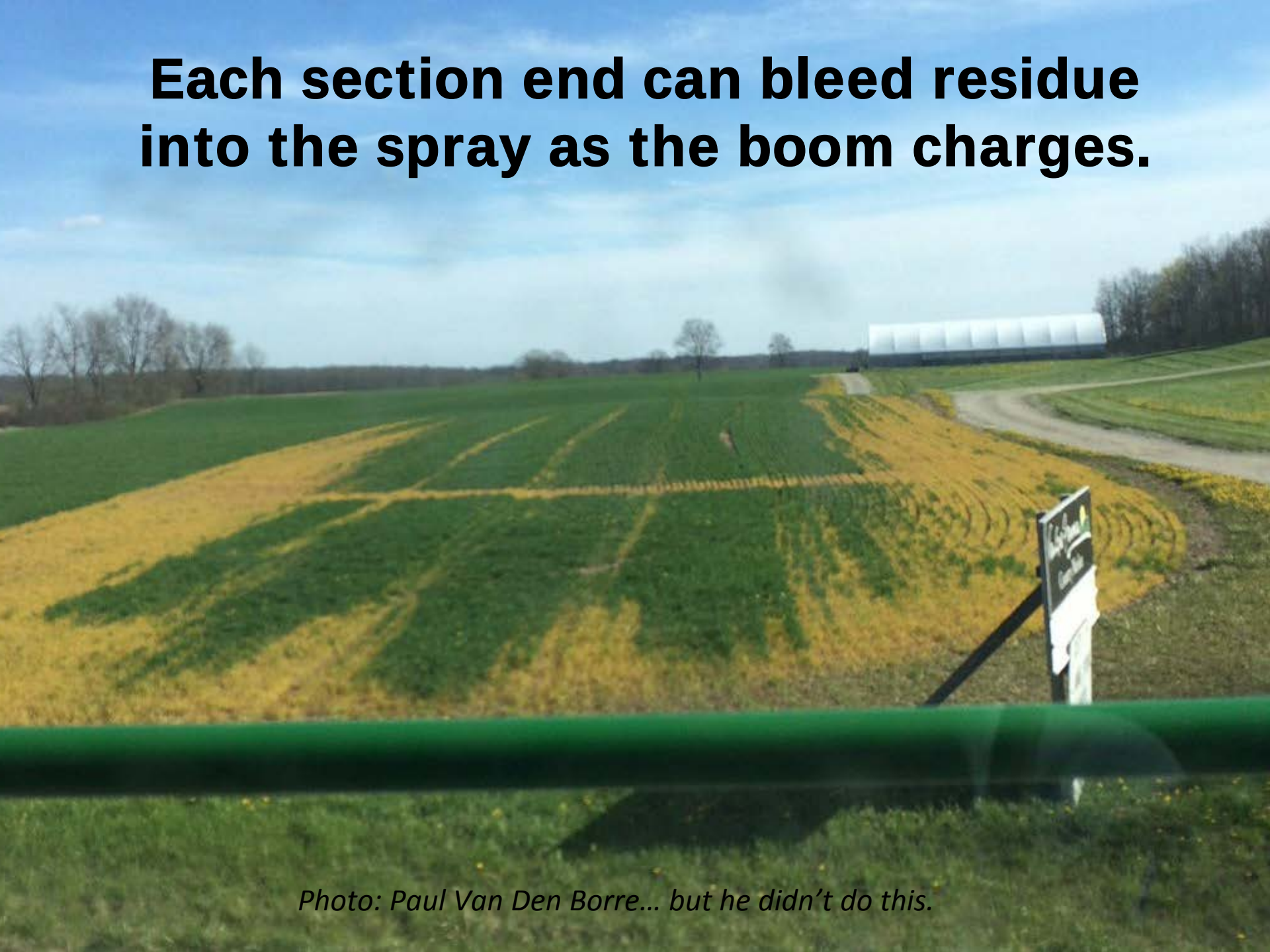
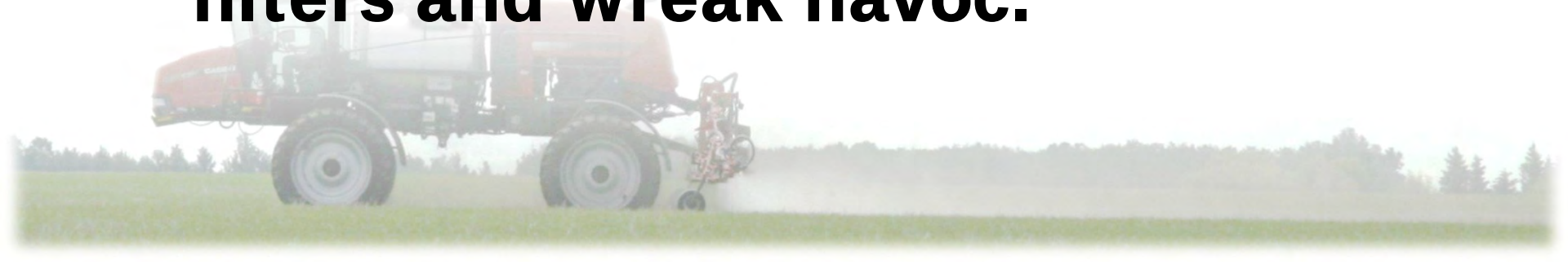


Photo: Paul Van Den Borre… but he didn't do this.

Previous sprays matter

- **Dicamba (by design) binds to clay particles.**
- **Atrazine is hard to clean out.**
- **Even after multiple tanks, dicamba bound to Atrazine (or any DF or WDG formulation) can break loose from filters and wreak havoc.**



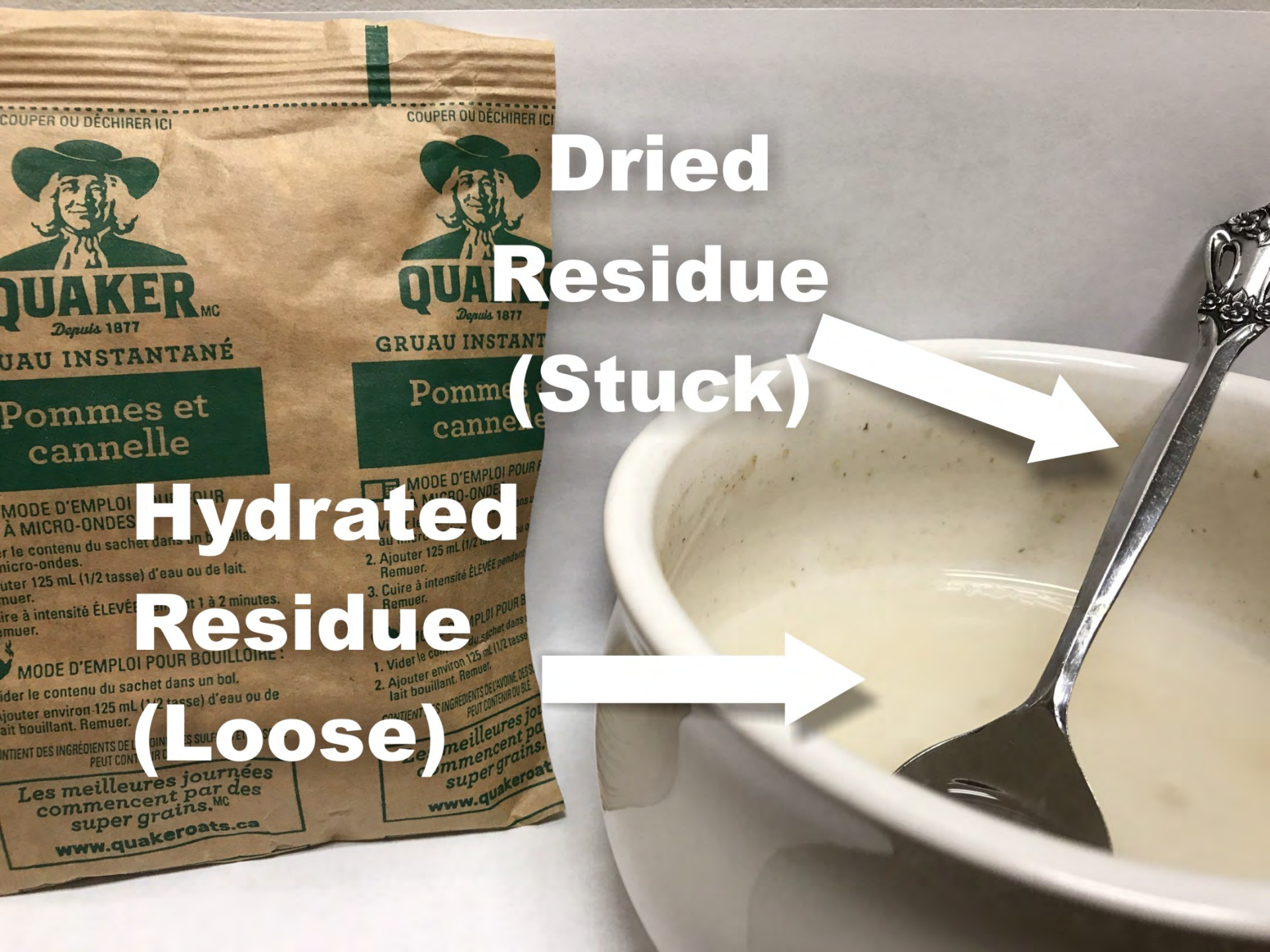
Anyone here ever try this?

“4,500 acres of spraying atrazine without cleaning a strainer yet. You know the drill: #5secondsqueeze”

Allen Meissner (@bigaljack)
03/17

Defining RINSING (FLUSHING)

- **A Serial dilution of residual spray mix that does not address dead-end plumbing.**
- **Performed every few loads, when moving empty sprayer between fields, and at minimum at the end of the day.**


COUPER OU DÉCHIRER ICI
QUAKER MC
Depuis 1877
UAU INSTANTANÉ
Pommes et cannelle
Les meilleures journées commencent par des super grains. MC
www.quakeroats.ca
Dried Residue (Stuck)
Hydrated Residue (Loose)

- **Who wants to do a 30-40 minute serial rinse multiple times a day?**

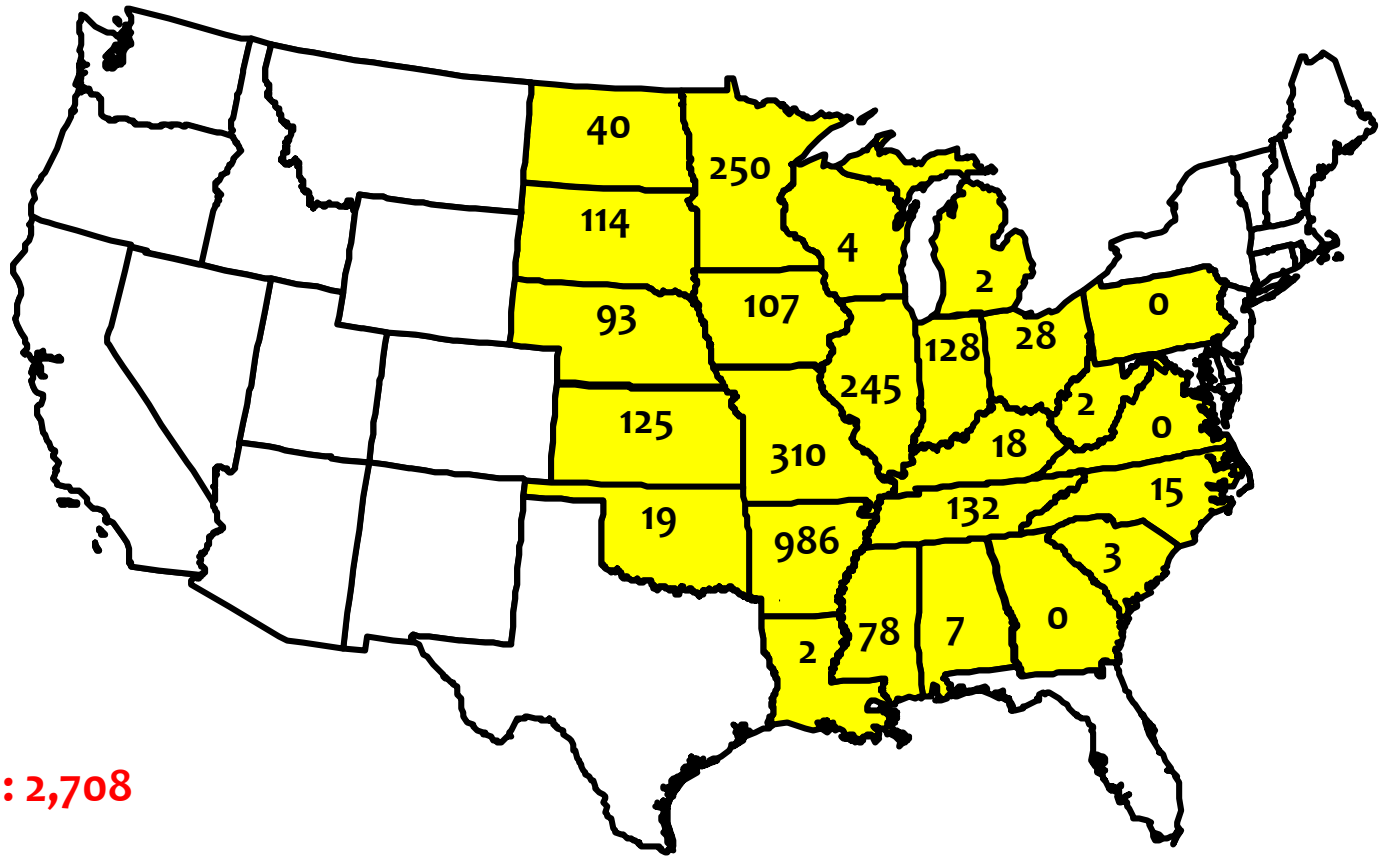
- **No one. But what if there was a faster and easier way?**

Europe developed Continuous Rinsing, which reduced residue at the nozzle to 2% in minutes, without the operator leaving the cab.

We used Xtend to compare Serial Rinsing and Continuous Rinsing.

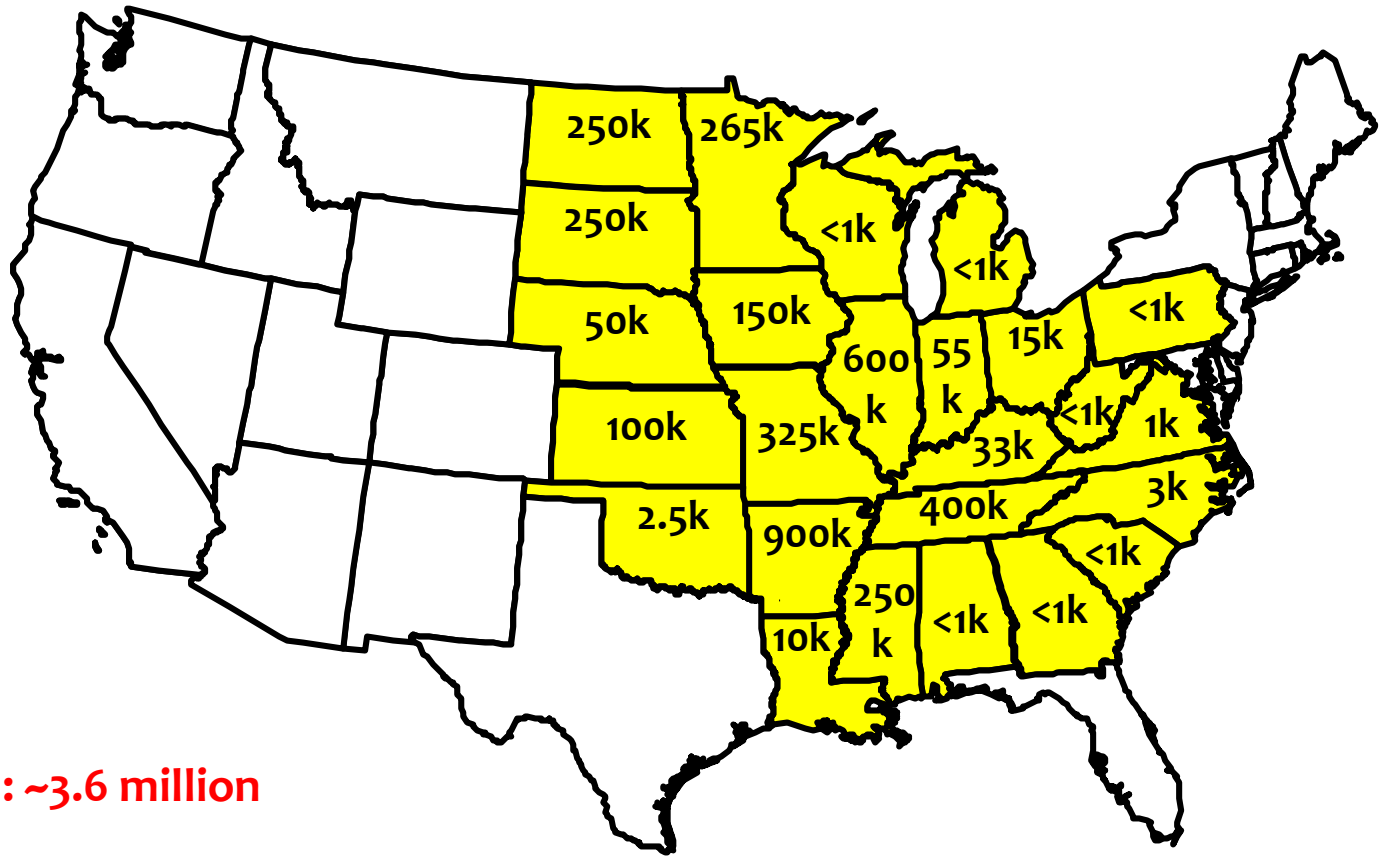
Official Dicamba-related Injury Investigations as Reported by State Departments of Agriculture

(*as of October 15, 2017)



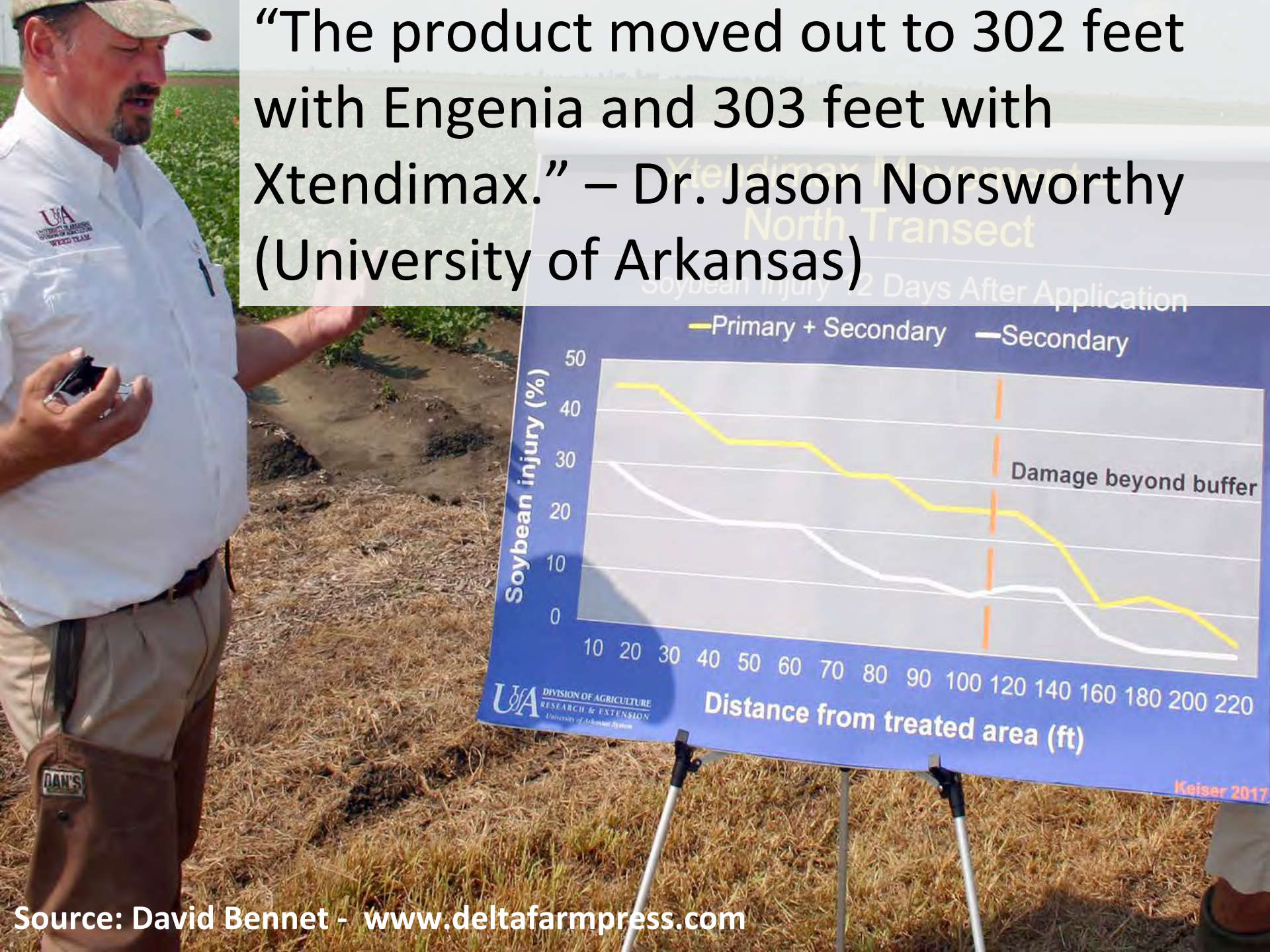
*Total: 2,708

Estimates of Dicamba-injured Soybean Acreage in the U.S. as Reported by State Extension Weed Scientists (*as of October 15, 2017)



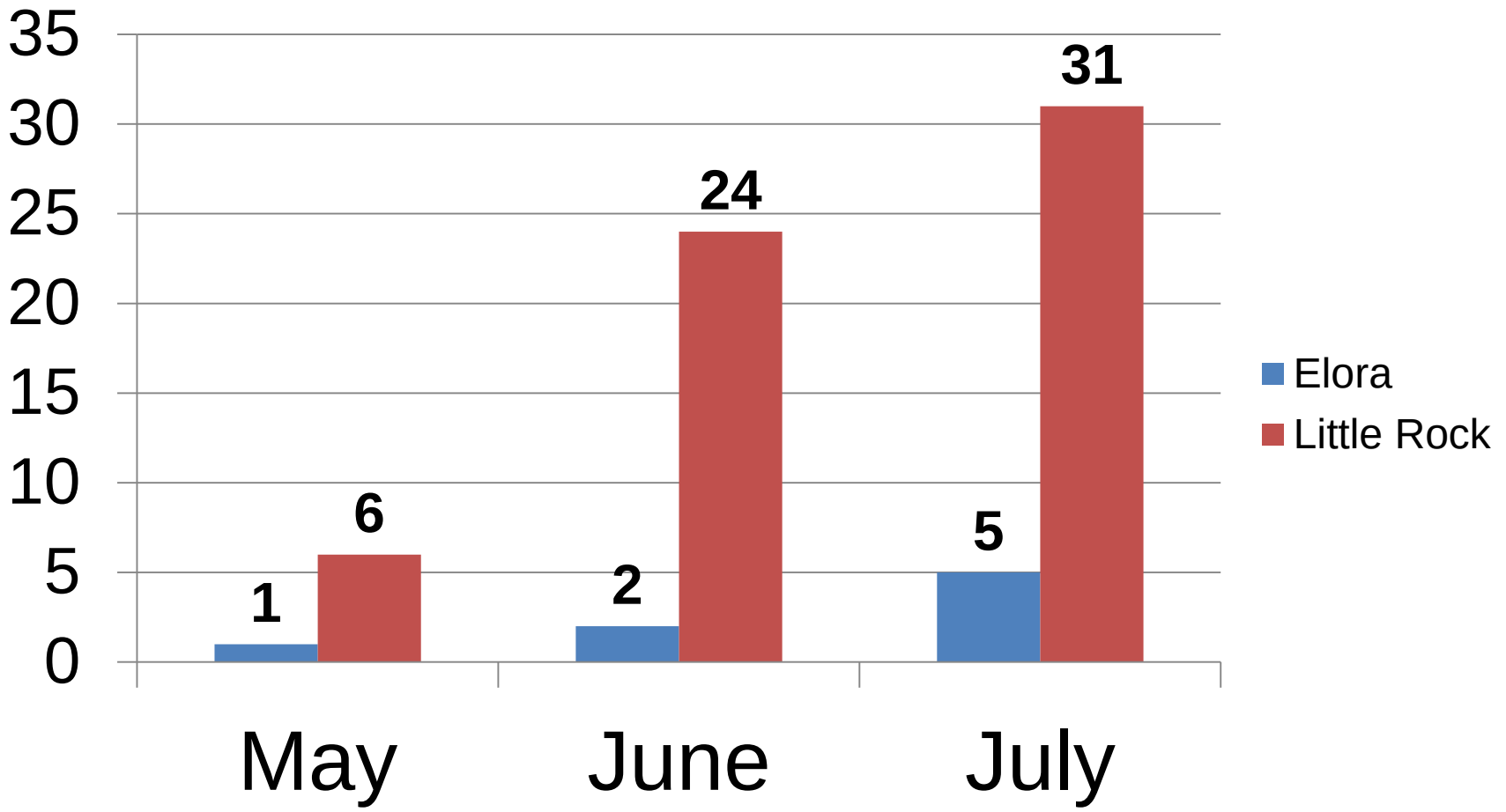
*Total: ~3.6 million

“The product moved out to 302 feet with Engenia and 303 feet with Xtendimax.” – Dr. Jason Norsworthy (University of Arkansas)



Source: David Bennet - www.deltafarmpress.com

Number of days above 30˚C in 2016



Source: Mike Cowbrough - Environment Canada (Elora), Wunderground.com(Little Rock)

0.16% of field rate can cause 10% yield loss in conventional soybean

- **Just 1 cup of spray solution in a 1,200 gal. tank = significant foliar injury to conventional soybean.**

Dr. Kevin Bradley, University of Missouri

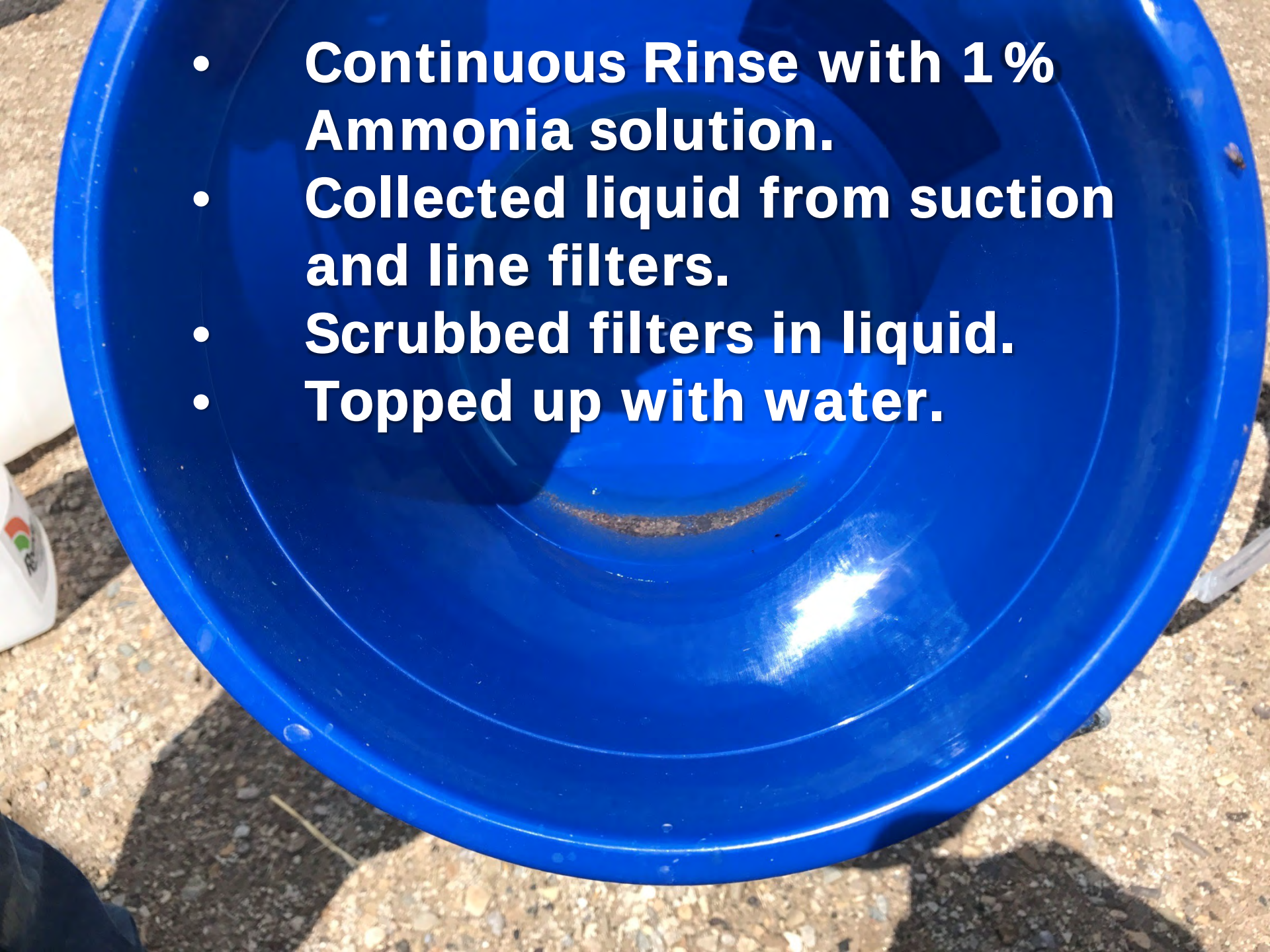
The Spirit Sprayer (Mk II)

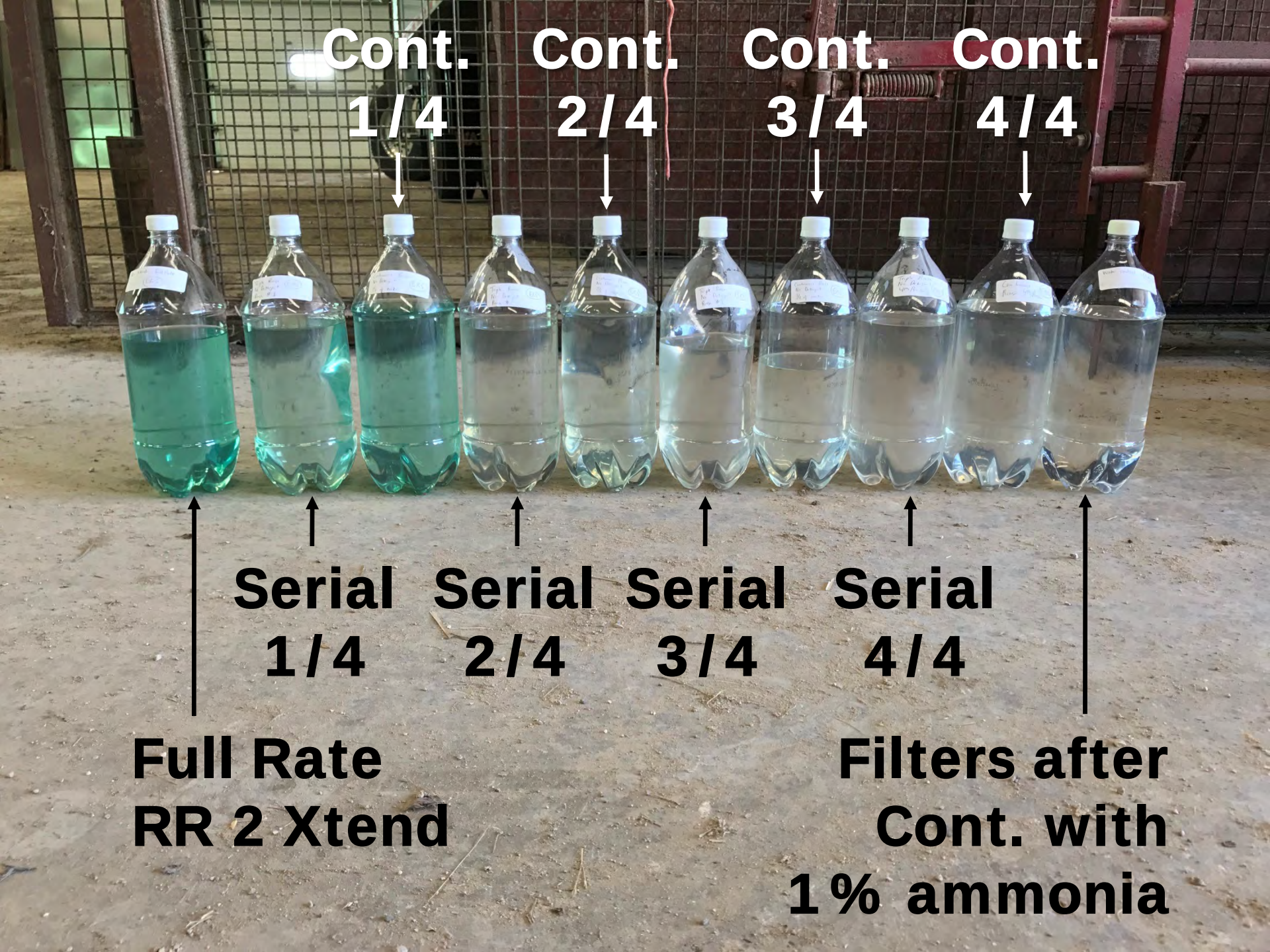

3.5 gpm
DIAPHRAGM PUMP
SHURflo
2088-443-144
3.5 GPM
60 PSI
10 MAX
TRIKOFRUIT Classic
SPB


RoundUp Ready 2 Xtend
Full Rate (2 L/ac or 5 L/ha)

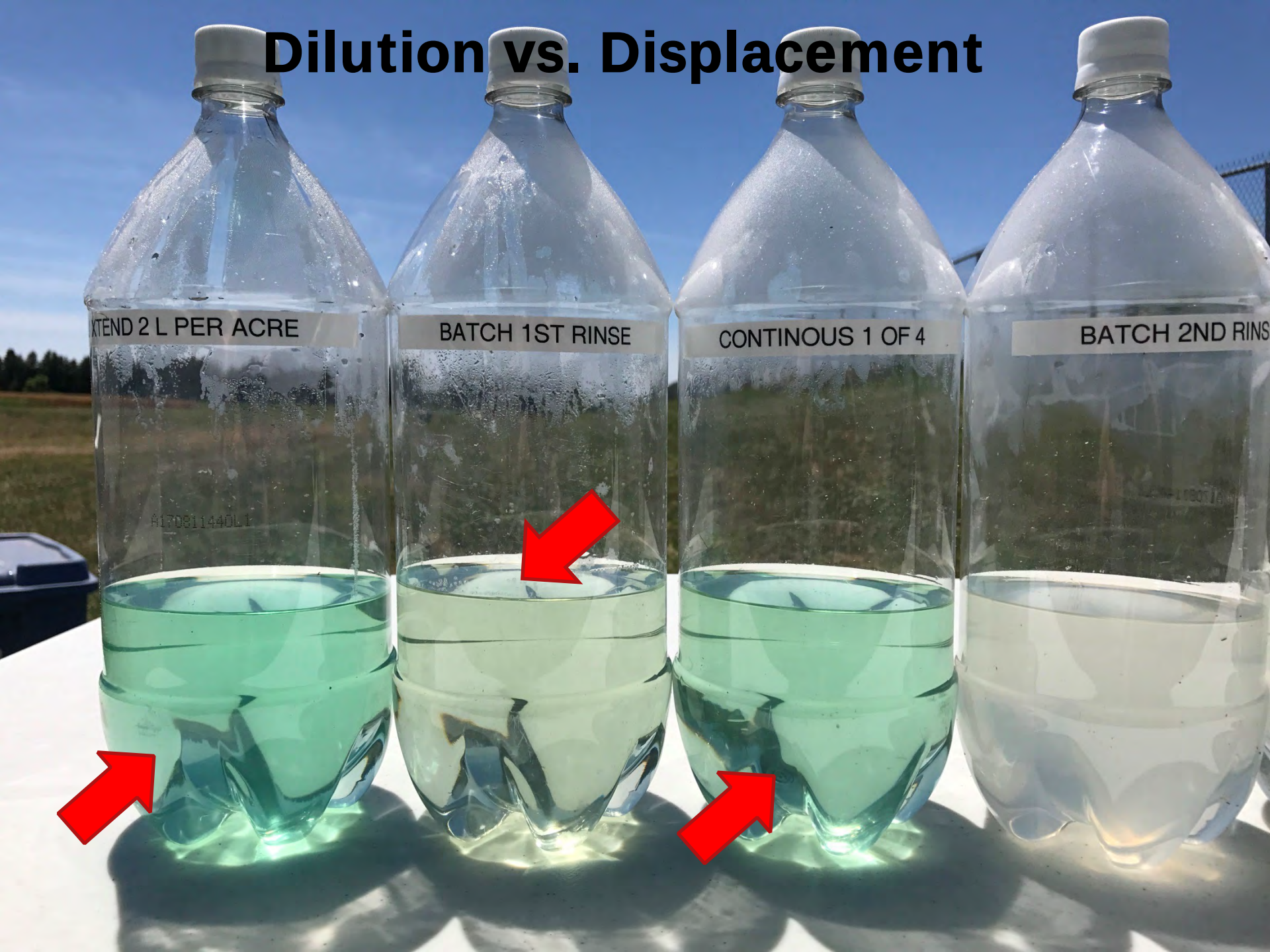

Ontario


Collected rinsate

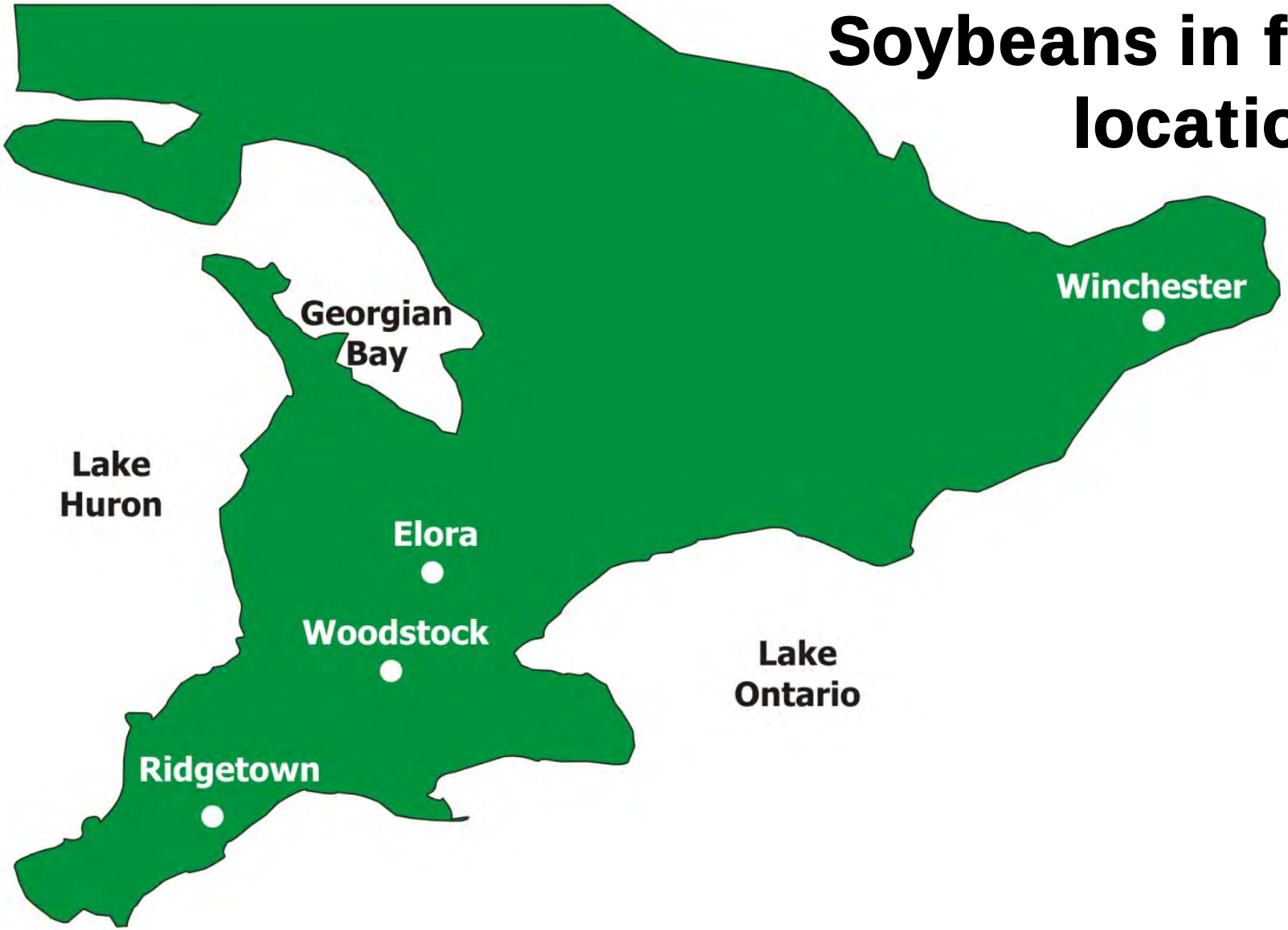

• Continuous Rinse with 1% Ammonia solution.
• Collected liquid from suction and line filters.
• Scrubbed filters in liquid.
• Topped up with water.


Cont. 1/4
Cont. 2/4
Cont. 3/4
Cont. 4/4
Serial 1/4
Serial 2/4
Serial 3/4
Serial 4/4
Full Rate RR 2 Xtend
Filters after Cont. with 1% ammonia

Dilution vs. Displacement



Applied to Conventional Soybeans in four locations.



Ridgetown

- **Full Rate RR 2 Xtend.**
- **First Serial Rinse and First portion of Continuous Rinse looked similar.**

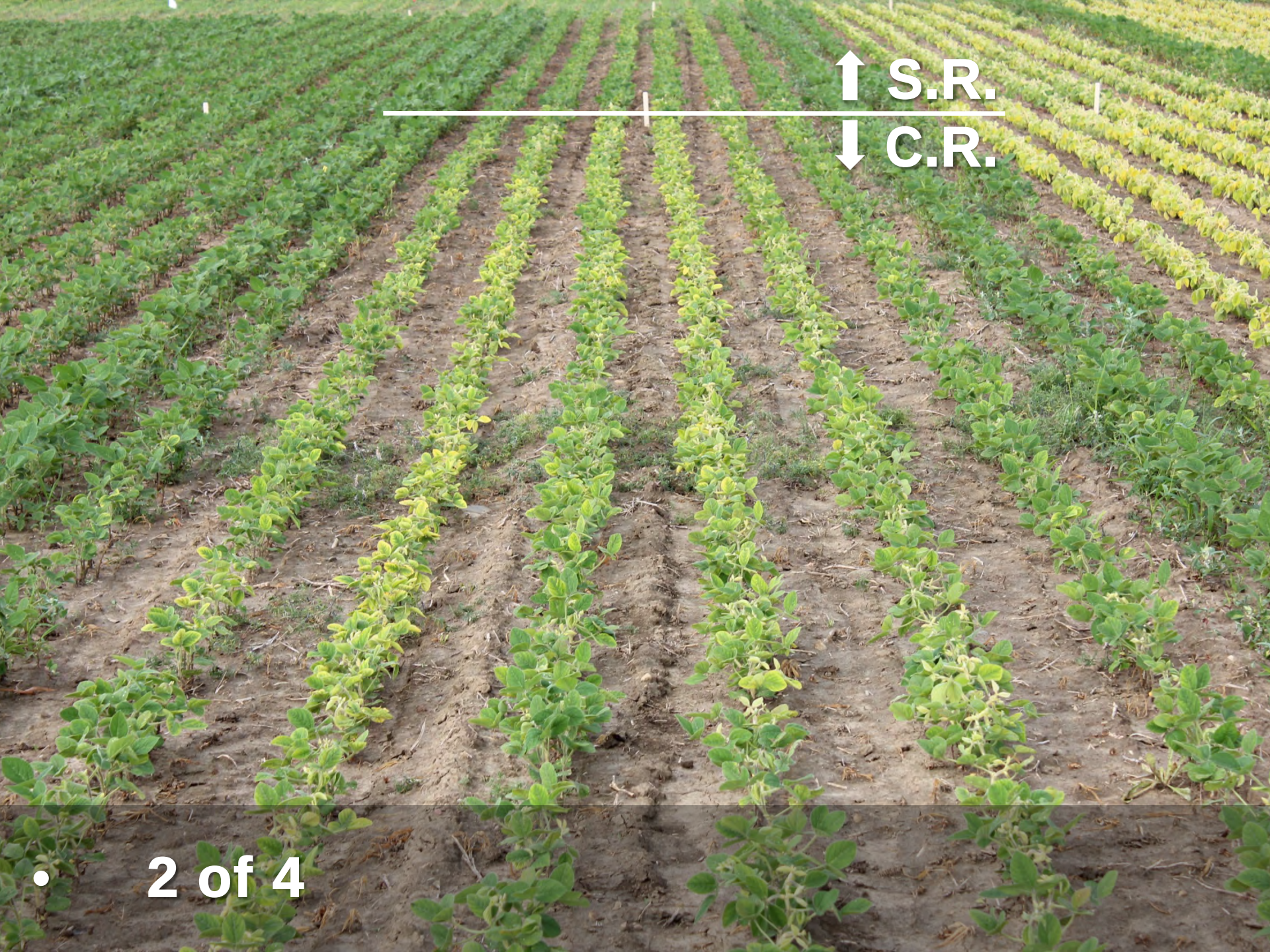
- Cupping and stunting of new internodes after 2nd and 3rd rinses.


After 4 Serial Rinses, or last portion of Continuous Rinse, we still saw minor cupping on new leaves.

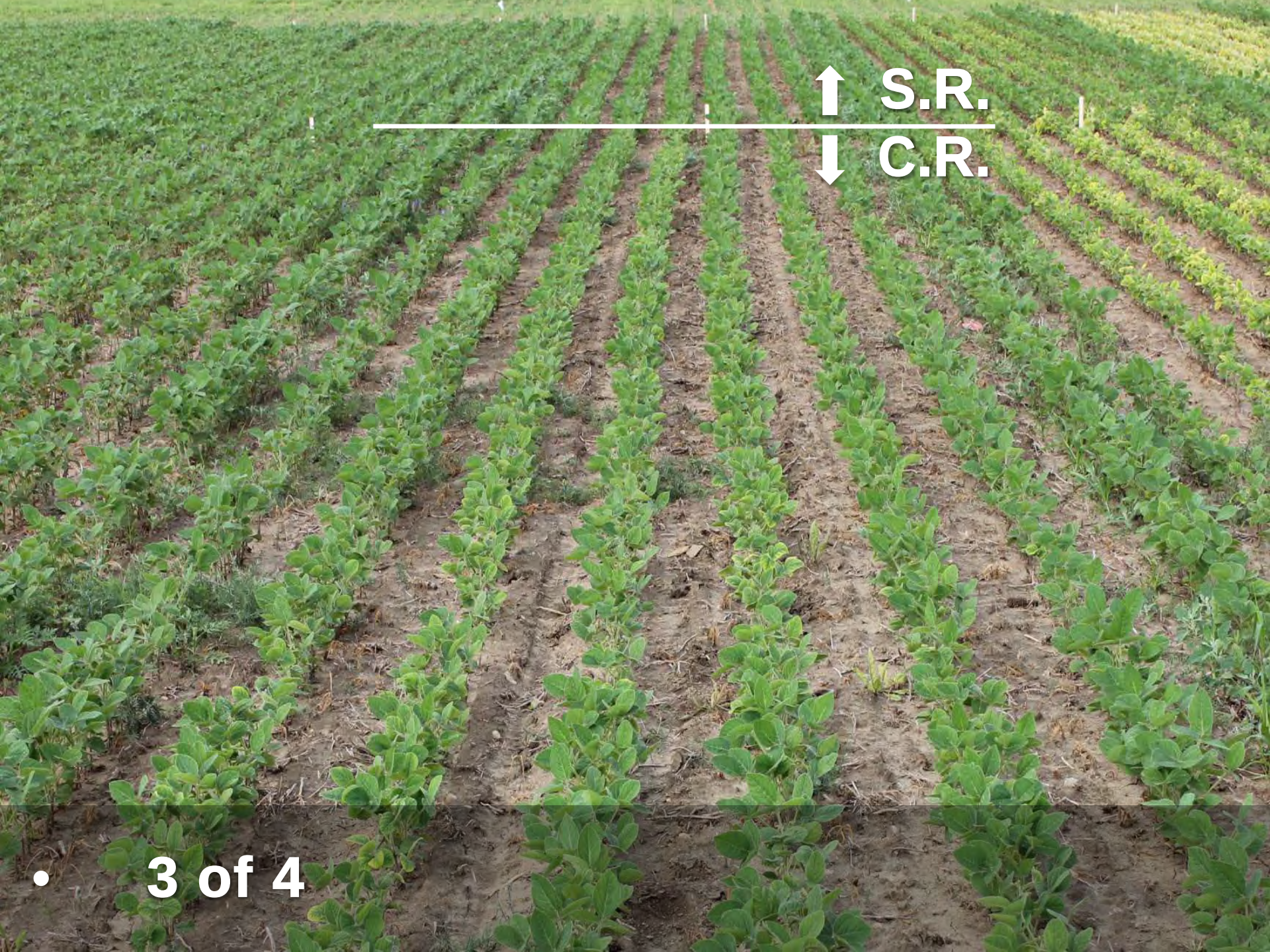

Elora

- Full Rate RR 2 Xtend

- 1 of 4



- 2 of 4

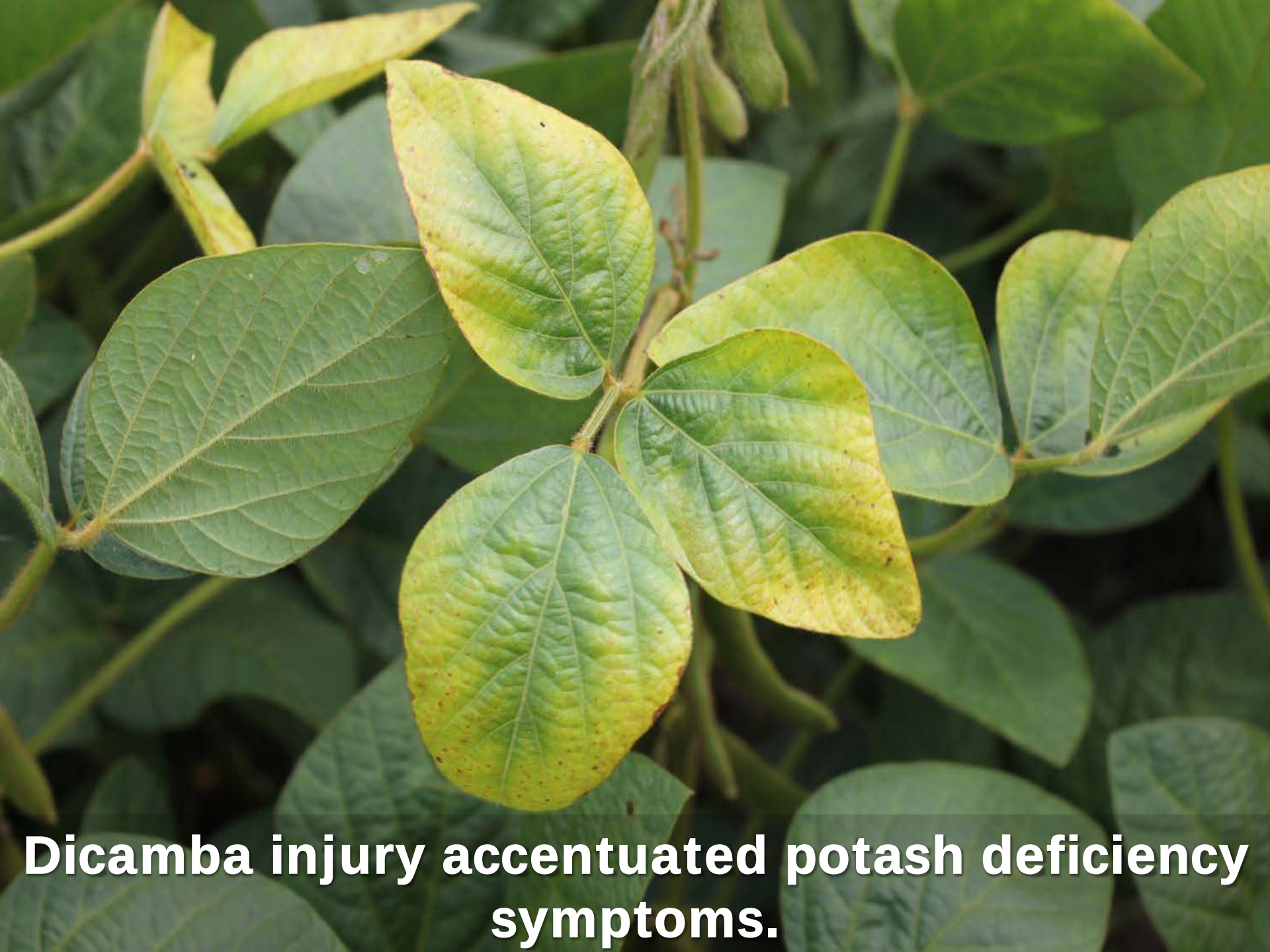


- 3 of 4

- 4 of 4

- **Still, last portion of either rinse caused minor damage to new leaves.**

Dicamba injury accentuated potash deficiency symptoms.



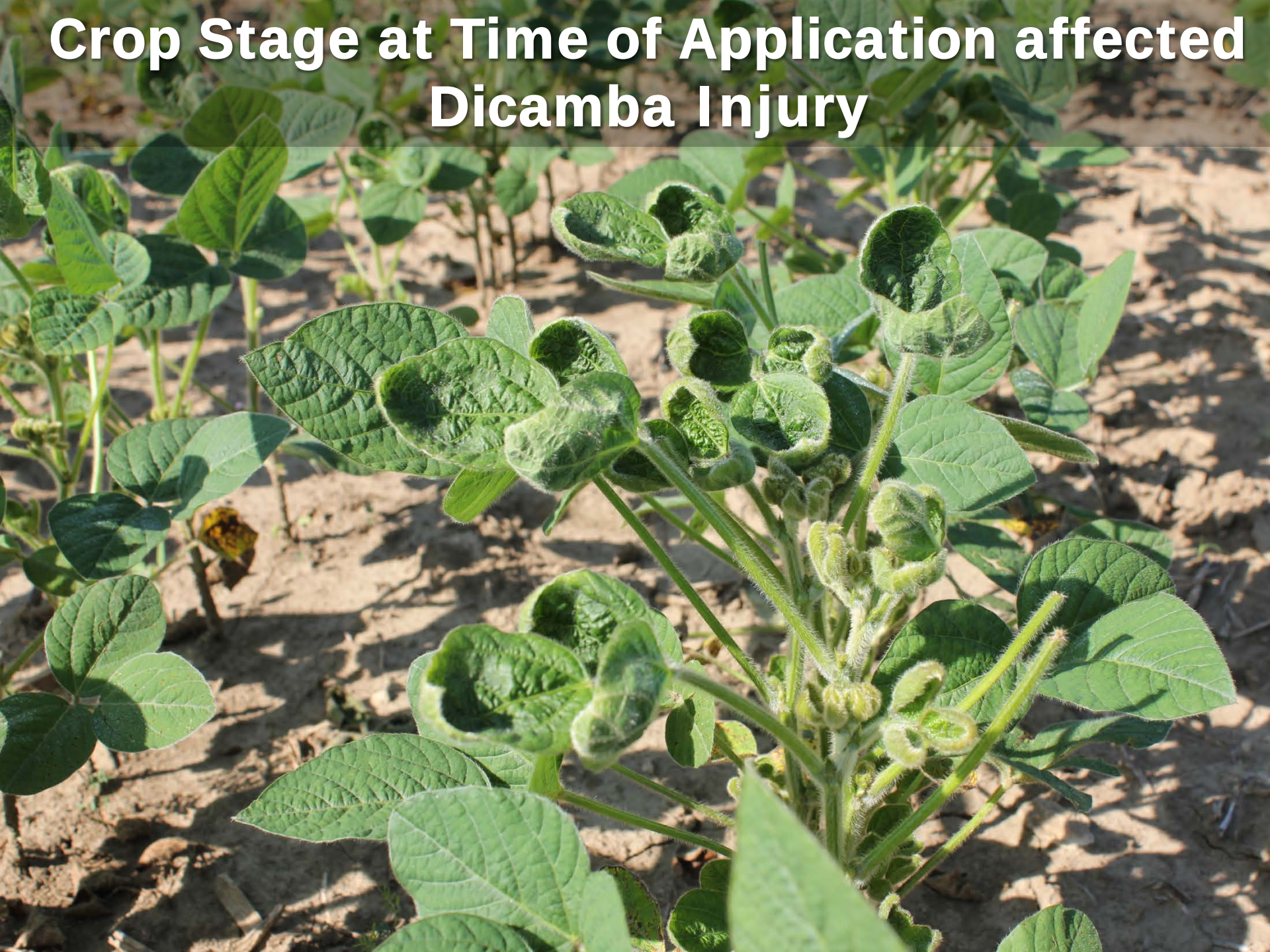
Dicamba injury accentuated potash deficiency symptoms.

- Interesting effect in Winchester…


Rain following treatment caused pooling,
which redistributed dicamba.


Woodstock

Crop Stage at Time of Application affected Dicamba Injury



Serial Rinse #4

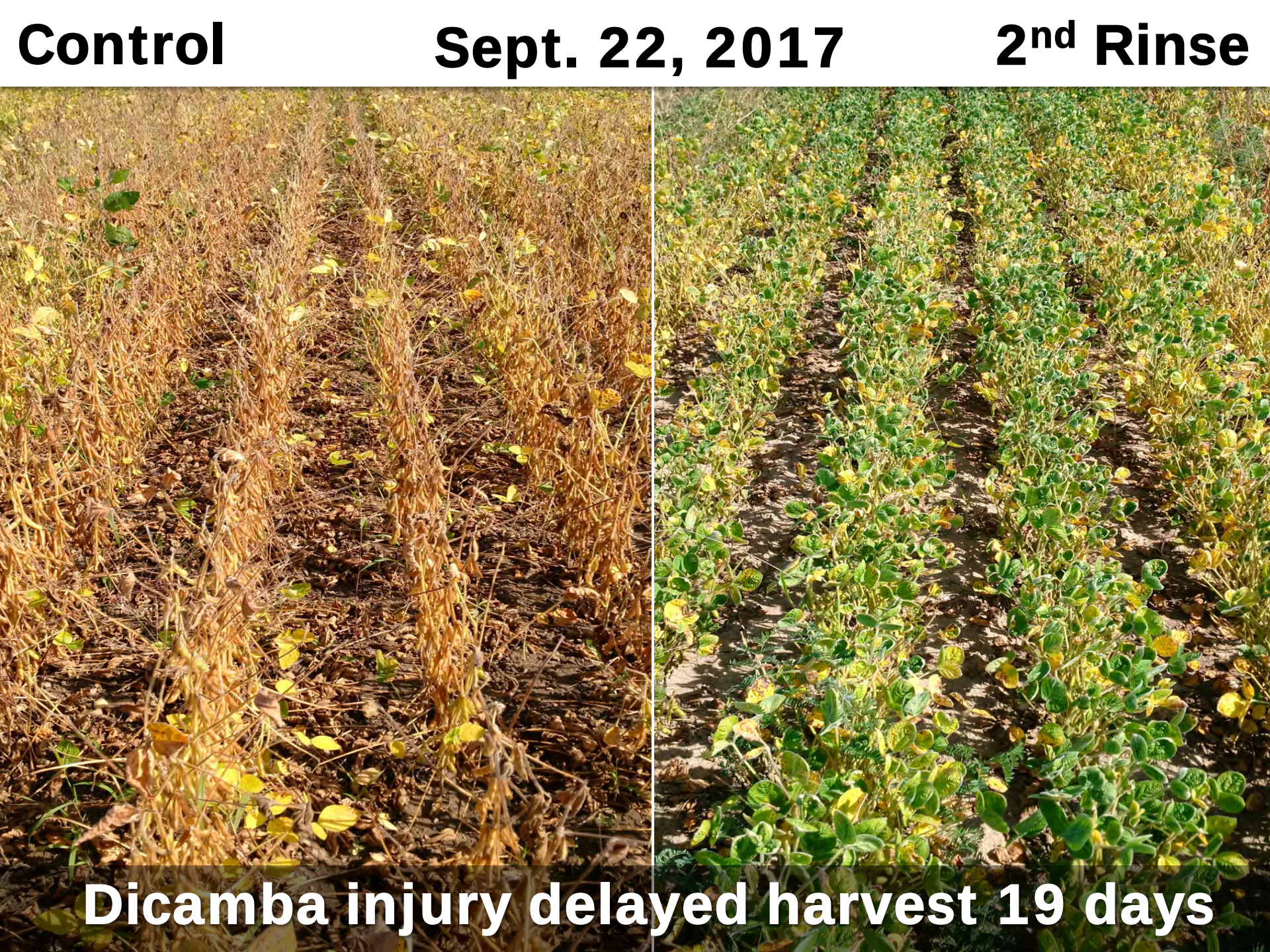
V1 – V2

~10% visual injury

V3 – V5

~25% visual injury


Harvested everywhere but Woodstock


Control
Sept. 22, 2017
2nd Rinse
Dicamba injury delayed harvest 19 days

Soybean Yield
(% of Control – Three Locations)

Rinse #	Continuous	Serial
1	4%	15%
2	28%	36%
3	73%	76%
4	89%	89%
Filters	93%	96%
Filters (1% Ammonia)	85%	-n/a-

THE TAKE-HOME MESSAGE

- **Continuous rinsing as effective as Quadruple rinsing.**
- **Rinsing with water = 11% yield loss.**
- **Filter rinsate (water) = 4-7% yield loss.**
- **Filter rinsate (1% ammonia) = 15% yield loss!**

Triple Rinsing

ROUNDUP READY® XTEND CROP SYSTEM

After spraying, immediately drain sprayer

2. Flush tank, hoses, boom, and nozzles with clean water

1st rinse complete

3. Prepare a cleaning solution with an ammonia based commercial cleaner
4. Remove and soak all strainers, screens and filters in solution (preferably over night)

Fill tank with cleaning solution. Agitate and thoroughly recirculate for at least 15 minutes. Remove all visible deposits from the spraying system

2nd rinse complete

6. Flush hoses, spray lines and nozzles with cleaning solution for at least 1 min.
7. Repeat steps 1 and 2 an additional time

Appropriately dispose of all rinsate in compliance with all applicable laws & regulations

Triple rinse complete

THE TAKE-HOME MESSAGE

- **Continuous rinsing took <1/4 of the time vs. Serial rinsing.**
- **Operator never left the cab.**
- **Rinsate spread evenly over the field.**


DISCHARGE HOSE 150 PSI MAX WP
RINSE
SIGHT GAUGE LIGHT
MIRRORS
$3,500.00
+Labour
(Cheaper DIY)

APPROVED BY THE SPRAYERS CODE AUTHORITY

MICRON WOMAN

GUIDE TO THE WORLD OF SPRAY DROPLETS

Sprayers 101

Tom Wolf

@nozzle_guy

Jason Deveau

@spray_guy