

# Prescribing the RIGHT surfactants

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Western US, HI & AK  
Area Manager

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Creating value, growing together

## Quote

“The most expensive spray is the one you have to do twice.....”

# Protect the investment in your Herbicide inputs.



## Show me the label

DAWN or any other  
Dish soap is not on  
ANY PESTICIDE LABEL



**IS YOUR  
HIGH-PERFORMANCE  
PESTICIDE RIDING ON A  
CHEAP ADJUVANT?**

# Are Adjuvants Registered like pesticides?

**No,** by the Feds  
EPA Exempt CFR 40 statement

**YES,** by 9 States (thus far)  
Arkansas, California, Idaho,  
Kentucky, Mississippi, Tennessee,  
Utah, Wyoming and Washington.

**WHO** do we answer to? **ASTM**

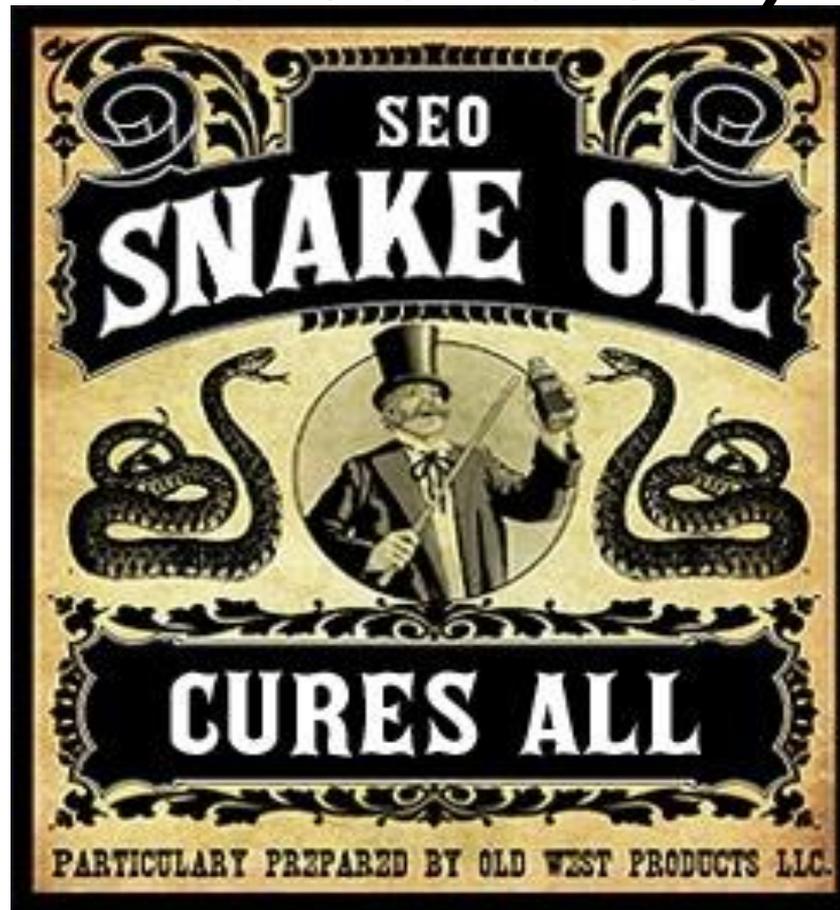
# What is ASTM?

American Society for Testing and Materials  
(think Underwriters laboratories)



ASTM  
INTERNATIONAL

**Adjuvants have had a bad rap in the past. Sometimes they deserve it.**  
(Versions of NIS, MSO, Silicone, Diesel etc.  
WA and CA labels?)



# Adjuvants Continue Upward Trend



Minimizing off-target spray drift and spray volatilization is one of an applicator's most important — many would argue **THE MOST IMPORTANT** — aspects of their day-to-day operations.

## Spray applications are affected by many physical variables

- **UV Protection**
- **Mixing**
- **Pesticide Stability**
- **Solubility**
- **Compatibility**
- **Foaming**
- **Suspension**
- **Spreading**
- **Buffer**
- **Droplet Size**
- **Deposition**
- **Drift**
- **Volatilization**
- **Coverage**
- **Sticking**
- **Penetration**

- **Surfactants**

**(also called spreaders or wetting agents)**

- An adjuvant that reduces surface tension between the spray solution droplets and the pest target's surface, thus providing greater coverage.

- **Methylated or Ethylated Seed Oils**

- An emulsified methylated or ethylated seed oil. Act as penetrants, **spreader (limited)**, humectants, etc.

- **Deposition Aids**

- Reduces the amount of fine spray particles that carry pesticide out of target areas. (polyacrylamides, encapsulators, others)
- Reduces evaporation of the spray droplet; Used during high temperature, low humidity and low spray volume situations.

- **Drift Control Agents**

- Reduces the amount of fine spray particles that carry pesticide out of target areas. (polyacrylamides, encapsulators, others).

# How to tell differences in surfactants?

## Football

How strong (Bench press)

Able to cover (40 yd dash)

Athletic ability (Vertical Jump)

## Adjuvants

How strong – Surface Tension

Able to cover – Contact Angle

Athletic ability – Draves Wetting



# SURFACE TENSION



How Strong



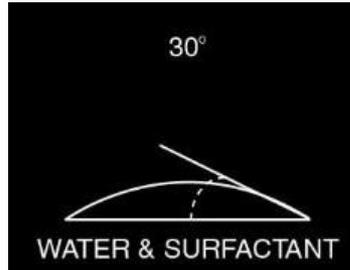
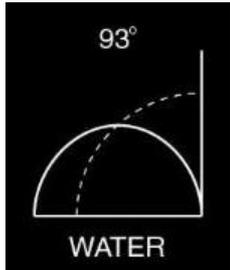
“Surface tension” is a condition that exists at the free surface of a solution. The dynes per centimeter (dynes/cm) measurement in the test determines the amount of “force” required to pull a floating ring off the surface of the solution. The higher the dynes/cm, the more force is applied.

Since surfactants affect tension, the lower the dynes/cm the better the coverage. Conversely, the higher the dynes/cm of the solution, the greater the impact on coverage.

The surface tension of water is approximately **74 dynes/cm**. Typical **wetting agents will reduce surface tension to 30-50 dynes/cm**, while super wetters reduce this figure to 10-30 dynes/cm.



# CONTACT ANGLE



Ability to Cover



**Contact angle" (CA) is a profile measurement of a drop of water in contact with a solid surface. When a surfactant (wetting agent) is introduced into the solution, the surface tension is reduced and the water droplet becomes flatter.**

**The lower the CA produced by the surfactant, the greater the spreading and coverage properties of that spray solution.**

**Water has a CA of 93 degrees**

**A typical surfactant has CA of 30-45 degrees**

**A "super wetter" surfactant CA of 15 degrees or less.**

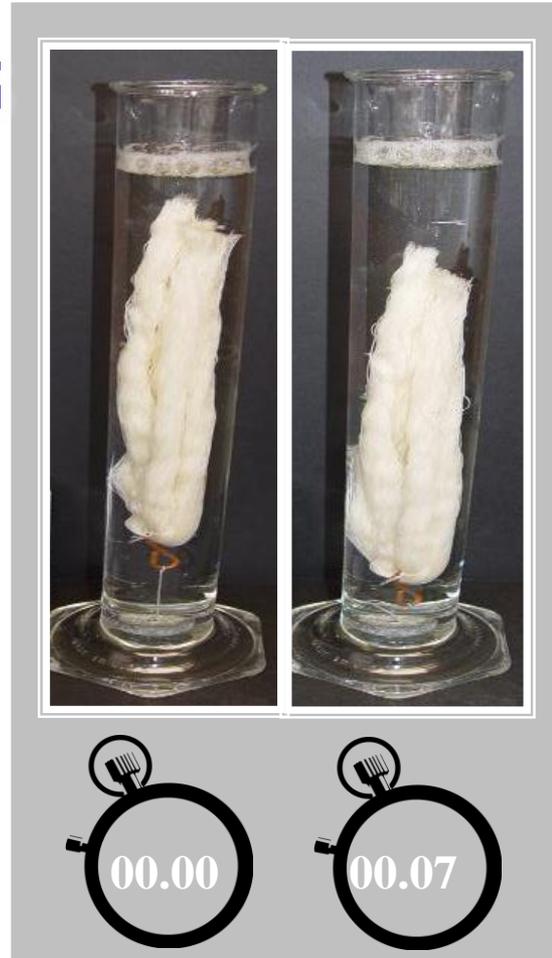
# DRAVES WETTING TEST

## Athletic ability -performance

t Draves wetting correlates to how well a pesticide solution will wet and spread on a solid surface (i.e.: plant, weed, etc.). This standard method test measures the time (seconds) it take to wet a woven cotton skein.

t A superior wetting agent at a 0.25% v/v concentration will require less than 20 seconds for wetting to occur. (Untreated Water measures at >300 seconds.)

t **The lower the score on this test the better and faster wetting characteristics the adjuvant treatment.**



Initial

Elapsed Time

## **(Hydrophilic: Lipophilic Balance)**

- **HLB is the relationship between the nature of the hydrophilic and lipophilic portions of the surfactant molecule. The range of HLB is 1-20. The higher the value the more hydrophilic the surfactant. Most effective surfactants have a value between 10-18. The HLB is not measured, it is calculated. Research has shown that there is significant herbicide/HLB/weed interactions.**

# So, What does all this mean?

- Adjuvants aren't snake oil.
- Adjuvants are on the label and the **Pesticide label is the LAW.**
- Adjuvants help increase herbicide performance.
- Basics are not supporting claims without recommended adjuvants.

# FOCUS TANK MIX

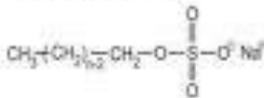


A common tank mix for forestry would be 4 qts. of RUPC (Roundup Pro Concentrate) +2oz. of Detail +20 oz. Arsenal AC + 1% Elite Supreme (12 oz. if 10 GPA or 19 oz. if 15 GPA) and 2-4 oz. of RRSI Elite Velocity surfactant per acre.

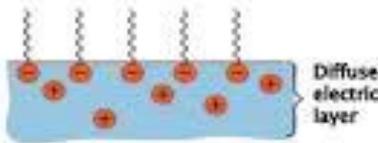
# WHAT DOES THE HERBICIDE LABELS SAY ABOUT SURFACTANTS AND ADJUVANTS?

## 2. Ionic surfactants

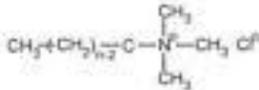
(a) Anionic



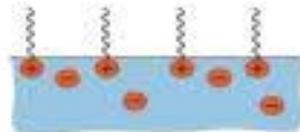
sodium dodecyl sulfate



(b) Cationic



dodecyl trimethyl ammonium chloride





No additional surfactant required.  
Contains 13% Surfactant Load.  
Can add Drift Reduction Agent.  
What about adding additional Products like pre-emergent pesticides with this loaded Roundup?

**ARSENAL**<sup>®</sup>  
herbicide  
APPLICATORS CONCENTRATE

Methylated Seed Oil or Vegetable Oil Concentrate. Aquatic labeled surfactants where required.

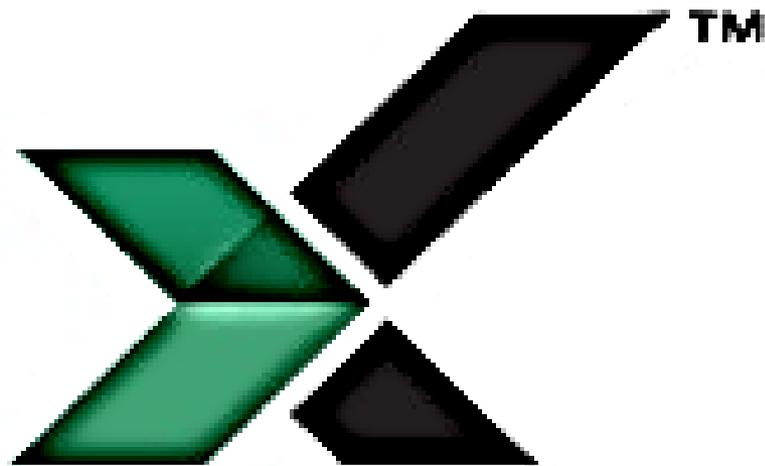
Instead of a surfactant, **a methylated seed oil (MSO) or vegetable-based seed oil concentrate may be used at the rate of 1.5 to 2 pints per acre.** When using spray volumes greater than 30 gallons per acre, methylated seed oil or vegetable-based seed oil concentrates should be mixed at a rate of 1% of the total spray volume, or alternatively use a nonionic surfactant as described above. Research indicates that these oils may aid in Arsenal herbicide Applicators Concentrate deposition and uptake by plants under moisture or temperature stress.

# Silicone-based Surfactants

See manufacturer's label for specific rates. Silicone-based surfactants may reduce the surface tension of the spray droplet allowing greater spreading on the leaf surface as compared to conventional nonionic surfactants..

MSO – MVO with Silicone for hard to wet and late season applications when desirable and nuisance plants aren't respirating and are dusty/dirty.

**DETAIL**™ ™  
POWERED BY **KIXOR**® HERBICIDE



BASF Professional Vegetation Management

# Surfactant / Adjuvant Recommendations

For optimum burndown activity with Detail and to achieve consistent broadleaf weed control in post emergence use patterns, an adjuvant system must be used that includes the following:

1. The use of ammonium sulfate (AMS) fertilizer at 8.5 to 17lbs. (1% to 2% weight/volume) or urea ammonium nitrate (UAN) at 1.25 to 2.5 gals/100 gals (1.25% to 2.5% v/v) is highly recommended when mixing Detail with glyphosate-based herbicides.
2. MSO-based adjuvant **MUST contain at least 60% methylated seed oil**. Poor performance may occur with adjuvants containing less than 60% methylated seed oil. (RRSI Supreme and S-172 are MSO plus Silicone).
3. DO NOT use less than 1 pint/A of MSO with low-volume (< 12.5 gallons per acre) aerial or ground applications.

**DO NOT use a nonionic surfactant (NIS) or a crop oil concentrate (COC) as a substitute for MSO, or poor performance on broadleaf weeds will occur. (Claims).**

# What's it really cost to add the right surfactant to your tank mix?

- \$10.00 per gallon vs \$40.00 per gallon surfactants. May cost you the same \$.
- Rates determine the actual cost per acre.
- 1:100 vv(1 gallon) or .25:100 vv(1 quart).

Elite

# Supreme

premium oil adjuvant

### PRINCIPAL FUNCTIONING AGENTS:

Modified vegetable oil, and a blend of organosilicone and nonionic emulsifiers.....	99%
Constituents ineffective as adjuvant.....	1%
<b>TOTAL.....</b>	<b>100%</b>

Contains 84% Modified Vegetable Oil



## KEEP OUT OF REACH OF CHILDREN WARNING

Do not take internally. Avoid skin and eye contact. Read and follow all label directions and cautions on all products used.

SEE BACK SIDE OF CONTAINER FOR GENERAL INFORMATION AND DIRECTIONS FOR USE.

### NET CONTENTS: 2.5 U.S. Gallons (9.46 L)

### FIRST AID

**Call a poison control center or doctor immediately for treatment advice.** Have the product container with you when calling a poison control center or doctor, or going for treatment.

**IF IN EYES:** Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do then continue rinsing. If eye irritation persists: Get medical advice or attention.

**IF ON SKIN OR CLOTHING:** Take off contaminated clothing and wash it before reuse. Wash with plenty of soap and water for several minutes. If skin irritation occurs: Get medical advice or attention.

**IF SWALLOWED:** Unless advised otherwise by a poison control center or doctor, have person rinse mouth with water, if able. Do not give anything by mouth to an unconscious person

**IF INHALED:** Remove victim to fresh air and keep at rest in a position comfortable for breathing. If person is not breathing, call 911 or an ambulance, and then give artificial respiration, preferably mouth to mouth if possible.

### Tech Matrix

Active Ingredients	100%
Organosilicone Load	16%
Contains Antifoam	<input checked="" type="checkbox"/>
Oil load	84%
Oil type	MSO

Manufactured for:



1324 N. Hearne Ave., Ste 120 Shreveport, LA 71107  
1-800-256-3344



**Water**

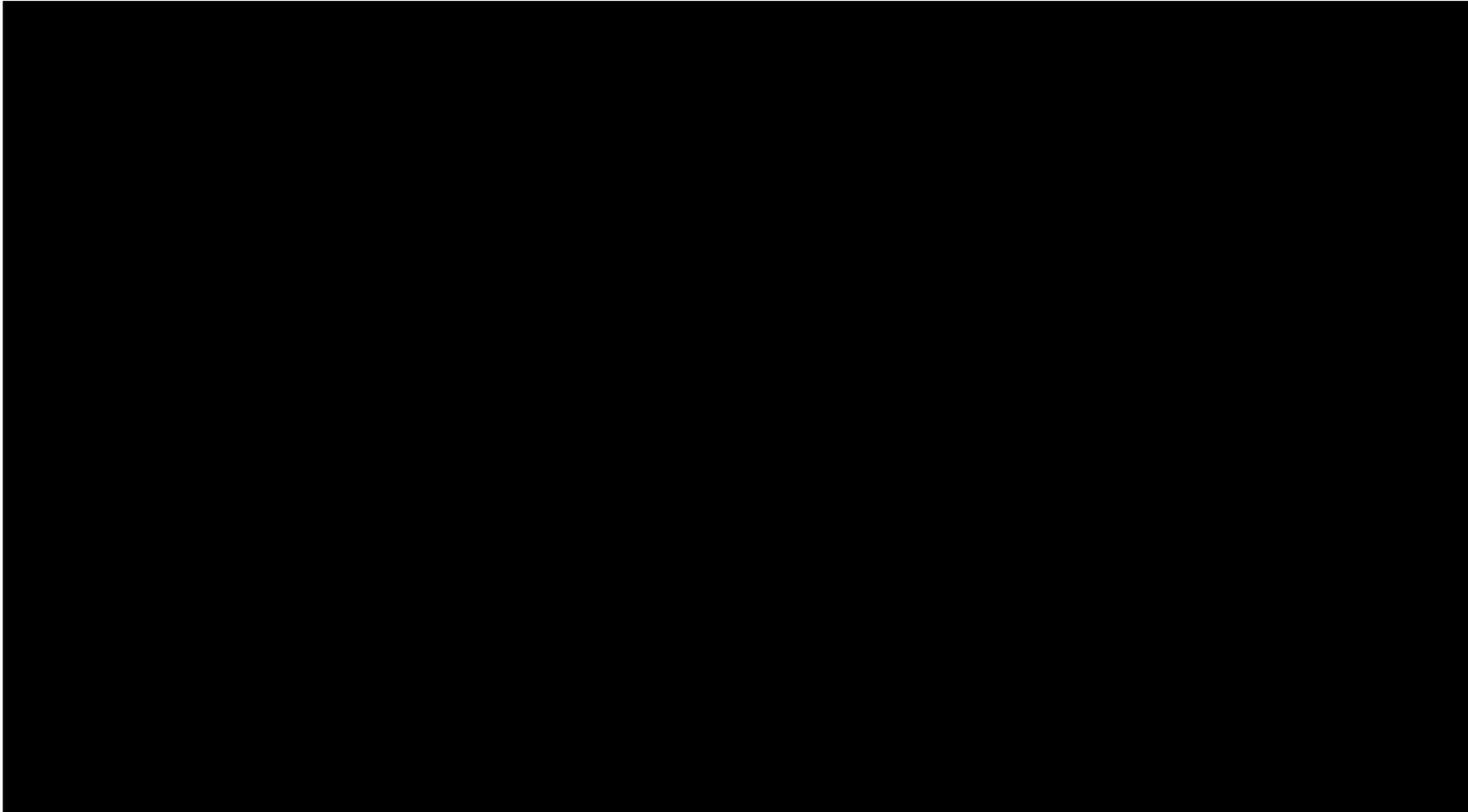
**Elite Supreme**

# DRT (Drift Reduction Technology) Additives

## **Brief History**



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# WHY DRIFT REDUCTION AND DEPOSITION AGENTS ARE IMPORTANT



## ASTM Definitions DRT

**drift reduction agent,  $n$** —a material used in liquid spray mixtures to reduce driftable fines.

**deposition aid,  $n$** —a material that improves the ability of agrichemical sprays to deposit on targeted surfaces.

**driftable fines,  $n$** —the percent volume of spray droplet size distribution that is under 105 microns.

## Protection

- **Chemical trespass complaint settlements**
- **Litigation**
- **Company image**
- **Protect SMZs**

## Expanded application restrictions

- **Set back regulations being developed (EPA & USDA)**
- **Distance from adjacent crops, water bodies, housing/schools etc.**

## Better performance

- **Up to 25% more product on target pests.**
- **Deposition and coverage for insecticides, fungicides & contact herbicides.**



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Sheriff: Farmer killed dur...

www.thv11.com/news/local/sheriff-farmer-slain-during-argument-over-herbicide-use/344156412

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# Sheriff: Farmer killed during argument over herbicide use

KTHV 3:48 PM, EDT October 29, 2016



(Photo: KTHV)

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LEACHVILLE, Ark. (AP) - Authorities say the fatal shooting of a farmer in northeast Arkansas apparently occurred during an argument over the use of a herbicide that's used to kill weeds, but is also toxic to some crops.

Mississippi County deputies found 55-year-old Mike Wallace of Manila shot to death Thursday on a county road north of Leachville. Deputies later arrested 26-year-old Allan Curtis Jones of nearby Arbyrd, Missouri, for first-degree murder in the shooting.

Sheriff Dale Cook told reporters it appears the two men argued over the spraying of the chemical dicamba on Wallace's fields that ruined some of Wallace's crops.

Jones said he began shooting after Wallace grabbed his arm. A witness, who was not identified, told police Jones was backing away when Wallace grabbed him, then he heard gunshots.



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CAMPAIGN 2016 THV11

TRENDING VIDEOS

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10:27 AM 11/02/2016

• AGRICULTURE

# Spraying case under scrutiny

DA investigating farmers' claims that crop damages are in the millions



Twenty months after a helicopter herbicide spraying operation over two Delta islands allegedly went awry, the San Joaquin County District Attorney's Office is investigating whether civil or criminal prosecution is warranted.

At least nine lawsuits have been filed by farmers claiming their crops were harmed after winds pushed the chemicals past their intended targets.

Claims totaling at **least \$20 million** have been filed by as many as 200 growers, according to court documents. And one of the parties involved in the spraying already has been fined. Officials have said the public health risk from the incident was low. But, it illustrates how spraying operations can go wrong in a county where millions of pounds of pesticides are applied each year.

- ----- consulted with San Francisco-based -----, a global company reporting \$--- billion a year in sales, for a plan on how to control the weeds. ----- recommended the pesticides glyphosate, commonly sold as Roundup, and imazapyr, known by the brand Polaris.
- Lodi-based ----- Helicopter Service actually applied the spray.

## Farmers' claims

According to court papers filed by -----, farmers' individual claims ranged from **\$3,017 to \$2.2 million.**

*Elite*

Velocity

drift control agent/deposition aid



7545 Haygood Road Shreveport, LA 71107

Elite

Velocity

drift control agent/deposition aid



WATER ONLY



VELOCITY

# Velocity Wind Tunnel Test Results

**Study Directors:  
Greg Kruger, PhD –UNE and Brad Fritz, PhD – USDA  
College Station, TX October 2015**



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## PARAMETERS

- Sympatec Helos Vario KR Particle Size Analyzer
  - R6 lens
  - Detection range 9 – 1750 microns
  - Laser defraction
- Nozzles
  - Accu-Flo .047 @ 20 psi
  - CP11TT-A256-8020 @ 40 psi
- Wind Speed – 70 mph
- Measured micron sizes
  - 150 microns (Industry Standard)
  - 105 micron (Superfines) EPA and ASTM are focused on this size

# Treatment List Accu-Flo .047 @ 20 psi

Treatment No.	Treatment <sup>2</sup>	Rates <sup>3</sup> Mls / L	Wind Speed (mph)	Nozzle (Pressure)	Specific Comments / Instructions
1	Chopper Gen II + Garlon XRT	37.5 mls + 18.75 mls	70	Accu-Flo .047 (20 psi)	48 oz + 24 oz / A at 10 gpa
2	Chopper Gen II + Garlon XRT + Elite Supreme + Elite Velocity	37.5 mls + 18.75 mls + 10 mls + 1.5625 mls	70	Accu-Flo .047 (20 psi)	48 oz + 24 oz + 12.8 oz + 2 oz / A at 10 gpa
3	Accord XRT II + Chopper Gen II	50 mls + 31.25 mls	70	Accu-Flo .047 (20 psi)	64 oz + 40 oz / A at 10 gpa
4	Accord XRT II + Chopper Gen II + Elite Supreme + Elite Velocity	50 mls + 31.25 mls + 10 mls + 1.5625 mls	70	Accu-Flo .047 (20 psi)	64 oz + 40 oz + 12.8 oz + 2 oz / A at 10 gpa
5	Accord XRT II + Arsenal AC +	50 mls + 15.625 mls +	70	Accu-Flo .047 (20 psi)	64 oz + 20 oz / A at 10 gpa
6	Accord XRT II + Arsenal AC + Elite Supreme + Elite Velocity	50 mls + 15.625 mls + 10 mls + 1.5625 mls	70	Accu-Flo .047 (20 psi)	64 oz + 20 oz + 12.8 oz + 2 oz / A at 10 gpa

# Results

## 1. Gen 2 + Garlon XRT

1. <150 microns 21.2% reduction
2. <105 microns 29% reduction in "Superfines"
3. VMD w/873 microns and w/o 869 microns

## 2. Accord XRT 2 + Gen 2

1. <150 microns 37.8% reduction
2. <105 microns 50% reduction in "Superfines"
3. VMD w/852 microns and w/o 850 microns

## 3. Accord XRT 2+ Arsenal AC

1. <150 microns 13.8% reduction
2. <105 microns 26.3% reduction in "Superfines"
3. VMD w/920 microns and w/o 873 microns

# Treatments CP11TT-A256-8020 @ 40 psi

Treatment No.	Treatment <sup>2</sup>	Rates <sup>3</sup> Mls / L	Wind Speed (mph)	Nozzle (Pressure)	Specific Comments / Instructions
1	Chopper Gen II + Garlon XRT	37.5 mls + 18.75 mls	70	CP11TT-A256-8020 (40 psi)	48 oz + 24 oz / A at 10 gpa
2	Chopper Gen II + Garlon XRT + Elite Supreme + Elite Velocity	37.5 mls + 18.75 mls + 10 mls + 1.5625 mls	70	CP11TT-A256-8020 (40 psi)	48 oz + 24 oz + 12.8 oz + 2 oz / A at 10 gpa
3	Accord XRT II + Chopper Gen II	50 mls + 31.25 mls	70	CP11TT-A256-8020 (40 psi)	64 oz + 40 oz / A at 10 gpa
4	Accord XRT II + Chopper Gen II + Elite Supreme + Elite Velocity	50 mls + 31.25 mls + 10 mls + 1.5625 mls	70	CP11TT-A256-8020 (40 psi)	64 oz + 40 oz + 12.8 oz + 2 oz / A at 10 gpa
5	Accord XRT II + Arsenal AC +	50 mls + 15.625 mls +	70	CP11TT-A256-8020 (40 psi)	64 oz + 20 oz / A at 10 gpa
6	Accord XRT II + Arsenal AC + Elite Supreme + Elite Velocity	50 mls + 15.625 mls + 10 mls + 1.5625 mls	70	CP11TT-A256-8020 (40 psi)	64 oz + 20 oz + 12.8 oz + 2 oz / A at 10 gpa

# Results

## 1. Gen 2 + Garlon XRT

1. <150 microns 3.8% reduction
2. <105 microns 11.5% reduction in "Superfines"
3. VMD w/1000 microns and w/o 960 microns

## 2. Accord XRT 2 + Gen 2

1. <150 microns 49.5% reduction
2. <105 microns 61.8% reduction in "Superfines"
3. VMD w/966 microns and w/o 985 microns

## 3. Accord XRT 2 + Arsenal AC

1. <150 microns 43.3% reduction
2. <105 microns 57.1% reduction in "Superfines"
3. VMD w/972 microns and w/o 1006 microns

## TAKEHOME

- Many factors can influence DRT (drift reduction technology) performance
  - Nozzle
  - Tank Mix
  - Pressure
  - Environmental (Wind, Humidity, Heat, Rain)
- Adding Velocity (DRT) reduces the number of Driftable fines.
- Through university testing various nozzles (helicopter, ground and aerial) we **always** see a reduction of fines when adding Velocity.
- Cheap (A great added value to your spray tank) Insurance.

**Are your spray applications stopping where intended?  
(Fixed wing at 50 mph, 40 ft. elevation and 3 gpa)**



# Thank You

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