Loveland Adjuvants and Weed Control
Ron Heavner PPM Loveland
TO THE PLANT DRIFT REDUCTION
ON THE PLANT DROPLET RETENTION
IN THE PLANT PENETRATION
Drift Reduction with Performance Sized Droplets.
Leci-Tech formulation affect on Driftable Fines

Roundup WMax

Nozzle Type
XR11003 @ 40 psi
12.4%

Roundup Wmax & *WeatherGard Complete
4.5%

Roundup WMax

Nozzle Type
AIXR11003 @ 60 psi
3.4%

Roundup Wmax & *WeatherGard Complete
0.91%

Wind speed 15 mph
Alpha = 0.05 level
University of Nebraska–Lincoln
Dicamba Only

5.6 Gallons

9.4 Gallons

Dicamba & PowerMax

6.6 Gallons

8.4 Gallons

Dicamba & PowerMax & Liberate

8.9 Gallons

6.1 Gallons

percentage of the spray volume that is 730 μm and smaller
Total Spray Volume = 15 GPA

Just Right

Dicamba Only

37%

5.6 Gallons

9.4 Gallons

Dicamba & PowerMax

44%

6.6 Gallons

8.4 Gallons

Dicamba & PowerMax & Liberate

59%

8.9 Gallons

6.1 Gallons

The Performance Line

Left of the line
Performance sized droplets

Right of the line
Waste due to Bounce, Shatter, etc

percentage of the spray volume that is 730 μm and larger

TTI11004 @ 40 PSI
Wind speed 15 mph
Sympatec Helos KR
Alpha =0.05 level
U of Neb - 2012
On The Plant – Droplet Retention by Adhesion & Spreading.
Droplet Retention

Control

2% Glyphosate + 5% Kaolin

2% Glyphosate + 0.25% Liberate + 5% Kaolin

NOTE: Kaolin has dried and is therefore more visible on leaf surface.
In The Plant – Increased Penetration without Cuticle Disruption
Penetration

Cuticle Disruption

Makaze – loaded Leci-Tech package
2% Glyphosate at 48 Hours

Low Amount of Radioactivity

High Amount of Radioactivity

2% Glyphosate & .25% Leci-Tech at 48 Hours

Low Amount of Radioactivity

High Amount of Radioactivity
• pH Reduction
The World’s Best Selling Adjuvant

Application Info

- 1-2QTs/100GLs
- Add to tank last

Opportunity

- Post Emerge Weak Acid Herbicides
- Insecticides
- PGHs & Defoliants
- Foliar Nutrients

Reference Only. Please Refer to Label for rate and tank mix info
Alkaline hydrolysis

- Is permanent and irreversible
- Can reduce the life of a pesticide in solution
- Preventable by testing and treating your water

The degradation or breakdown of a pesticide in the presence of high pH (above 7) water

LI 700: pH REDUCTION

<table>
<thead>
<tr>
<th>pH</th>
<th>LI 700 Ounces / 100 gallons</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>7.5</td>
<td>8</td>
</tr>
<tr>
<td>7</td>
<td>16</td>
</tr>
<tr>
<td>6.5</td>
<td>24</td>
</tr>
<tr>
<td>6</td>
<td>32</td>
</tr>
</tbody>
</table>

Ounces of LI 700 / 100 gallons of spray mix
C-14 Imidaclorpid Study

70-80% uptake

10% uptake

Imidaclorpid +

Imidaclorpid

7 days after application

Lars Weichel and Ralf Nauen: Bayer CropScience AG, Research, Global Biology Insecticides, Alfred Nobel Str 50, D-40789 Monheim, Germany
TO ON IN

• Neutral pH – ideally used with SU’s

• 100% active, Odorless & Defoamer
Most versatile adjuvant in the market today

Application Info
- 1-2QTs/100GLs
- Add to tank last

Opportunity
- Sulfonyl Urea (SU) Herbicides
- Fungicides
- When mixing water and oil soluble chem together
- Those chemistries requiring a neutral pH

Reference Only. Please Refer to Label for rate and tank mix info
**pH neutral**

Liberate will not acidify the spray mixture.

**Helps retain droplets on the leaf surface**

Even on waxy leaf surfaces like lambsquarters, Liberate helps retain droplets that are too large for the best coverage.

As leaf angle changes, Liberate keeps even large droplets on the leaf surface. This is an important part of consistent performance of post-emergence herbicides. However, Liberate produces more droplets in the RIGHT SIZE for the best possible coverage.
• Increased plant uptake V’s standard MSO formulations

• Improved crop safety V’s standard MSO formulations
Methylated Seed Oils (MSOs) are utilized when superior cuticle penetration is needed. MSO is often used with herbicides during hot, dry conditions. During these stressful environmental conditions, plants will develop thick waxy cuticles in an effort to conserve moisture. The demonstration above compares the differences in activity of water, crop oil and MSO Concentrate with LECI-TECH. The ability of MSO to solubilize a waxy cuticle is shown in the chart below.

### Penetrating Ability of Methylated Seed Oil

**Green Foxtail Wax Solubility**

<table>
<thead>
<tr>
<th>Exposure interval (min)</th>
<th>0</th>
<th>5</th>
<th>10</th>
<th>20</th>
<th>40</th>
<th>24 hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distilled Water</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Petroleum Oil</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2.5</td>
<td>2.5</td>
<td>9</td>
</tr>
<tr>
<td>Sunflower Oil</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2.5</td>
<td>6</td>
</tr>
<tr>
<td>Methylated Seed Oil</td>
<td>2.5</td>
<td>5</td>
<td>6.5</td>
<td>9</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

Evaluation scale: 0 = no solubility; 10 = totally dissolved

Manthey, F.A. and J.D. Nalewaja; NDSU, Fargo, ND; 1992
Hard on Weeds, gentle on Crops!

Application Info
• 1-2PTs/Acre
• Add to tank last

Opportunity
• Kixor Technology
• Clethodim (Intensity One)
• Wherever an MSO is called for

Reference Only. Please Refer to Label for rate and tank mix info
A multi-purpose adjuvant designed to lock-up all hard water cations, allowing maximum herbicide performance, unlike AMS that only locks up calcium.
## Choice Weather Master vs. AMS

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Choice Weather Master</th>
<th>AMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use rates</td>
<td>Lower use rates</td>
<td>Higher use rates</td>
</tr>
<tr>
<td>Formulation</td>
<td>Convenient liquid formulation</td>
<td>Bulky and difficult to handle</td>
</tr>
<tr>
<td>Effectiveness on hard water cations</td>
<td>Effective on ALL hard water cations</td>
<td>Effective on only Calcium cations</td>
</tr>
<tr>
<td>Performance consistency</td>
<td>MORE consistent PERFORMANCE</td>
<td>LESS consistent performance</td>
</tr>
</tbody>
</table>

**ALWAYS** add the water conditioner to the tank first!
Application Info

• 1-2QTs/100GLs
• Add to tank first

Opportunity

• Weak Acid Herbicides; Particularly Glyphosate
• Applications where water conditioning is needed

Reference Only. Please Refer to Label for rate and tank mix info
CHOICE® TRIO is a non AMS liquid water conditioner designed to aid in the performance of herbicides susceptible to the negative effects of hard water. CHOICE TRIO performs via three modes of action; sequestering, chelating, and complexing of all hard water cations.
Features

• Water conditioning of all hard water cations

• Proprietary Liquid Formulation; NO AMS

• Three acting components
  - Sequestering
  - Chelating
  - Complexing

Benefits

• Lower use rates than AMS

• Convenience over Dry AMS

• Effective on ALL hard water cations

• Can be used in applications where AMS not recommended
AMS

1 mode

Sulfate: Effective at tying up Calcium

2 modes

Sequestering Complexing

3 modes

Sequestering, Synthetic Chelating Complexing
No AMS
**Application Info**

- 1-2QTs/100GLs
- Add to tank first

**Opportunity**

- Weak Acid Herbicides; Particularly Glyphosate
- Applications where water conditioning is needed

Reference Only. Please Refer to Label for rate and tank mix info
Thank You!