Current State
Air Direction & Volume; Proper Rate; Laborious

Drift; Profit loss

Common Sprayers
Current State

Air Direction & Volume; Proper Rate; Laborious

Drift; Profit loss
Common Sprayers

Nozzles
Nozzles
Manual Adjustments

Problem
Air Direction & Volume; Drift; Proper Rate; Laborious

Solutions
Offer options, but changes 1 problem
Dual Function

Time Saving
Air Adjustment

Too much; blow through; miss target

Drive 1 row
Drift poles 1-3’ above canopy

Too much; blow through; miss target

Drive perimeter
30-100’ swath
Drift poles, 1-3’ above canopy

mph
0.5
1
3
92
157
42 ng/cm²

mph
6
21
4
1

497
265
198 ng/cm²

5x
2x
4x
Too much; blow through; miss target

Drive 1 row
Drift poles 1-3’ above canopy
Too much; blow through; miss target

Drive perimeter
30-100’ swath
Drift poles, 1-3’ above canopy

\[
\begin{array}{ccc}
npl & 6 & 21 & 4 & 1 \\
& 497 & 265 & 198 \text{ ng/cm}^2
\end{array}
\]

5x 2x 4x
Innovative Spray Technology

Current State

Total Automation

Semi-Automated Technology

Automated Application

Manual Adjustments
Semi-Automated Technology

Using Technology to Adjust Spray
Purpose and Problems

- Corrects for 1 problem: Proper Rate from user 'error'
- Changes Flow based on Speed

- Can be calibrated incorrectly
- Closed Cab
Automated Application

Automatic:
Detection
Data Acquisition
Spray Adjustments

Using Technology to Adjust Spray

AgOtter
Intelligent Canopy Sprayer
WeedSeeker
See & Spray
AgOtter

Adjusts Flow (2 meters)
Open/Closed Cab
Data Acquisition

AgOtter Log Summary

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filename:</td>
<td>00000007</td>
</tr>
<tr>
<td>Date:</td>
<td>01/28/16</td>
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<tr>
<td>Start Time:</td>
<td>12:26:03</td>
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<tr>
<td>Duration:</td>
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<td>Spray Time:</td>
<td>02:54:18</td>
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<td>Serial Number:</td>
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<tr>
<td>Driver:</td>
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<tr>
<td>Job Name:</td>
<td></td>
</tr>
<tr>
<td>Field</td>
<td></td>
</tr>
</tbody>
</table>

- Product: 1680.6 G
- Amount Applied: 1680.6 G
- Avg Flow Rate: 9.6 GPM
- App Rate - Left: 105.6 GPM
- App Rate - Right: 92.1 GPM
- App Rate - Both: 98.5 GPM
- Avg Spray Speed: 2.4 MPH
- Area: 17.2 Acres

Over Flow
Under Flow
Over/Under
Others in the Market

CapstanAg
Fede and H30

Sold!

Start at 0:45
Start at 0:45
Others in the Market

CapstanAg
Fede and H30

Sold!
Intelligent Canopy Sprayer

1st Gen Specialized Sprayer

Adjust rate (presence, size, shape, and foliage density)
2nd Generation
Adapt to current sprayers

Conventional
Automatic
Automatic

Videos courtesy of Dr. Heping Zhu, USDA-ARS
WeedSeeker

- Detects Green - 1st Gen Detection
- Adjusts spray
- Could* reduce herbicide use

Weed It
WeedSeeker

- Detects Green - 1st Gen Detection
- Adjusts spray
- Could* reduce herbicide use

Weed It
See & Spray

Machine Learning
High level detection
Adjusts spray
Data Acquisition

Sold!
See & Spray

Machine Learning
High level detection
Adjusts spray
Data Acquisition

Sold!
Innovative Spray Technology
Total Automation

Data Acquisition
Innovative Spray Technology

- Current State
- Total Automation
- Semi-Automated Technology
- Automated Application
- Manual Adjustments

Washington State University