The past
History Of Spraying

Started c. 1958 – 10 gals/acre (110 l/ha)
Product Registration -1986 – voluntary industry code
Farm Sprayer 1978

- 200 l/ha
- 6 km/h
- 03 FanJet
- Med/fine spray
Flat Fan

- Spray Drops 1-1000μm (.001 – 1mm)
- Drops leave nozzle at 50 m.p.h.
- Smallest drops stop within 10 cm
- Largest drops slow to 25 m.p.h. after 1m
• Drops leave nozzle at 25 m.p.h.

• Drops contain air which acts as shock absorber

• Coverage important for biological activity
The present
Over time - the goalposts have shifted...
The influence of nozzles on drift reduction

<table>
<thead>
<tr>
<th>BCPC 110-03</th>
<th>3 bar</th>
<th>No drift reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDKT 120-03</td>
<td>1.5 bar</td>
<td>90% drift reduction</td>
</tr>
</tbody>
</table>
Farm Sprayer 2023

- £20,000 - £450,000
- 2000l - 6000l tank
- Boom width 24m +
- Output: 100-250 ha/day
- Spray Volume 70 - 200 l/ha
- Automatic boom height
- Self steering
- 10km/hr+
- PWM?
Syngenta Angled Nozzles range

The Next step in 3D Technology

Drift reduction >90%

Efficacy / Efficiency

Drift reduction

Drift reduction 25%

Drift reduction 45%

Drift reduction 60%

Drift reduction >90%
Improved efficacy

Increased work rate

Reduced drift
WHAT IS

• 90% drift reducing/4* LERAP up to 5 bar
• 55° nozzle – optimises deposition on back of targets
• Field trials confirm maintain efficacy vs 3D and exceed other 90% DRT
• Sizes: 05, 06, 08 (03, 035, 04 to follow shortly)
• Pre-em herbicides
• Potato fungicides
• Spring post-em herbicides, T0 and T3 cereals,
• Pre-orifice nozzle
• PWM Compatible
• Integrated Snaplock cap
Even with various products we get benefits

Barton, Cambridgeshire – assessed on Blackgrass control
What does it look like at application?

3D ninety 05

Flat Fan 05
What is Spray Assist?

- **Spray Timing & Alerts**: 5 day weather with hourly spray timing guidance and alerts if conditions change.
- **Spray Plans & Recommendations**: Plan your sprays and get recommendations on nozzles and parameters.
- **Equipment Management**: Register the equipment and nozzles you use to receive optimised recommendations.
- **Syngenta Digital Farm Set-up**: Create and connect your Farm for enhanced localisation.
What is Precision Application (PA)?

- Broadcast
- Banded
- Patch prescription
- VR prescription
- Optical Spot Spray

Classification: PUBLIC
Technical approaches for a banded application
Prescription Application

- **Broadcast**
- **Patch prescription**
- **Variable rate prescription map**
Advanced application technologies

*Pulse Width Modulation*

- Enabled by a valve in the nozzle body that rapidly opens and closes.
- Nozzles can be controlled individually: a key enabler for more precise and variable rate applications.
- Regulation currently out of step with technology evolution: nozzles lose their LERAP rating if used with PWM systems.

<table>
<thead>
<tr>
<th>Pulse Rate</th>
<th>Duty Cycle</th>
<th>1 Second</th>
</tr>
</thead>
<tbody>
<tr>
<td>10Hz</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>75%</td>
<td>75%</td>
</tr>
</tbody>
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<tr>
<th>Pulse Rate</th>
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</tr>
</thead>
<tbody>
<tr>
<td>30Hz</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>75%</td>
<td>75%</td>
</tr>
</tbody>
</table>
Flow chart for prescription map creation

1. Situation in the field
2. Detection
3. Map creation
4. Delivery towards grower
5. Application
Prescription Application building from drone imagery

- Drone
- Map pest
- Make prescription map
- Apply with precision

Grower benefits
- Higher ROI on CP use
- Reduced use of CP
- Higher sustainability
Green-on-Brown and Green-on-Green detection

GoB

GoG
A new generation of application & product technologies

Plant-by-Plant Optical Spot Spraying
Bringing plant potential to life