New innovations in spraying technology

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Measuring canopy volume

Key factor: know your canopy

Cabernet Franc

Automated control

**THE TARGET**
Leaves, fruit, diseases, insects, variable canopy due to growth stage, trellis or variety

**µg/cm²**

**SENSORS**
Using a canopy sensor to monitor volume, density, absence or presence. Sprayer: GPS will provide location and speed

**CENTRAL CONTROLLER**
Inputs, outputs and monitoring

**LIQUID FLOW**
Application rate, pressure, nozzle size and number. GPS location of spray & GIS mapping of spray use

**AIR FLOW**
Adjustable, to match the canopy via infinitely variable louvre system
Ultrasonic sensors mounted on the sprayer

The estimated density increased throughout the season but was not compared to actual density.

A probe is used to count the number of leaf layers.

- The frames have 4 horizontal bars, matching the ultrasonic sensors’ height.
- Each horizontal bar has 6 marks spaced 10 cm apart.
Automatic canopy volume measurement

Using ‘sensors 2’ to measure canopy density

Automatic canopy volume measurement

- ‘Sensors 2’ results show a good correlation between PQA and ultrasounds.

- The signal is related to intrinsic plant characteristics, such as leaf size, leaf softness, branches, structure, etc.

- Each species or variety has to be calibrated.
Canopy density sensing allows changes in real-time.

Liquid flow

Airflow
Lechler Vario Select

Liquid adjustment

Manifolds and Pressure

<table>
<thead>
<tr>
<th>Manifolds</th>
<th>Pressure (PSI)</th>
<th>Volume rate (L/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>30 PSI</td>
<td>0.087</td>
</tr>
<tr>
<td>#2</td>
<td>30 PSI</td>
<td>0.13</td>
</tr>
<tr>
<td>#3</td>
<td>30 PSI</td>
<td>0.17</td>
</tr>
<tr>
<td>#4</td>
<td>30 PSI</td>
<td></td>
</tr>
<tr>
<td>#5</td>
<td>30 PSI</td>
<td></td>
</tr>
</tbody>
</table>

ST 110-01 0.087 GPM 30 PSI
ST 110-015 0.13 GPM 30 PSI
ST 110-02 0.17 GPM 30 PSI
Air flow regulation system

Lamont Fruit Farms (USA) used Croplands Quantum mist with SARDI fan sprayer in their apple orchard (2014 – 2016)
Air flow regulation system

Croplands Quantum Mist with SARDI fans in apple orchard

E.D. signal and fan speed regulation from 0 to 100%
Monitoring spray application for record keeping

GPS system (rtkGPS)

<table>
<thead>
<tr>
<th>GPM</th>
<th>Line color</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.77 - 3.5</td>
<td>Orange</td>
</tr>
<tr>
<td>1.5 - 1.76</td>
<td>Blue</td>
</tr>
<tr>
<td>0.51 - 1.49</td>
<td>Yellow</td>
</tr>
<tr>
<td>0 - 0.5</td>
<td>Red</td>
</tr>
</tbody>
</table>

RFID cards

BRISTOL ID TECHNOLOGIES
Resistor

Light

emitter receiver

SKY TRIAL: Trainee pilot Lauren Goddard, pilot and instructor Phil Chadd and Tamburlaine vineyard manager Clayton Kiely have been testing the capabilities of the Yamaha Rmax helicopter at the Tamburlaine Organic Vineyard at Borenore. Photo: JUDE KEOGH 0503jkhelicopter11
## SnapCard

### Water sensitive paper image analysis

<table>
<thead>
<tr>
<th>Top</th>
<th>Mid</th>
<th>Bottom</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.2%</td>
<td>5.6%</td>
<td>3.5%</td>
</tr>
<tr>
<td>&gt;70cm²</td>
<td>45cm²</td>
<td>36cm²</td>
</tr>
<tr>
<td>28%</td>
<td>18%</td>
<td>16%</td>
</tr>
<tr>
<td>&gt;70cm²</td>
<td>50cm²</td>
<td>40cm²</td>
</tr>
</tbody>
</table>

PMapp

Powdery Mildew assessment & record keeping app

VitiCanopy app

VitiCanopy could be used when calculating ‘unit canopy row’

The fear of technology

- Costs involved
- Breakdown/repairs
- Labour to supervise

- Look to others involved in agriculture
  - Robotic milking equipment
  - Grading line equipment
  - Greenhouse automation
  - Field crop sprayers
Spray related factsheets:

Agrochemical ‘dog book’ online:

AWRI helpdesk – (08) 8313 6600 or helpdesk@awri.com.au


More information:
Wine Australia – http://research.wineaustralia.com
Australian Wine Research Institute - www.awri.com.au