Measurements of leaf coverings in raspberries
Project „ClimaFruit“

• quantitative analysis: Jork
• biological analysis: Langförden
Experimental setup

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of repeats</td>
<td>4</td>
</tr>
<tr>
<td>Length of a plot</td>
<td>5 m</td>
</tr>
<tr>
<td>Position in each plot</td>
<td>9</td>
</tr>
<tr>
<td>Leaf number per position</td>
<td>10</td>
</tr>
<tr>
<td>Leaf number per plot</td>
<td>90</td>
</tr>
<tr>
<td>Number of leaves per variant</td>
<td>360</td>
</tr>
</tbody>
</table>
Test execution

- Application of a fluorescent substance
- Collect the leaves
- Clear of the coating in water
- Measurement of the intensity of the fluorescence with a fluorometer
- Quantify the leaf area by a leaf area meter
- Calculation of coverings
2010: 6 variants (quantity of water, droplet spectrum)

Sprayer: *Wanner SZA 32*
with horizontal air and fluid management
7 Nozzles
Air flow: 30.000 Kbm/h,
Speed: 5,5 km/h

<table>
<thead>
<tr>
<th></th>
<th>fine</th>
<th>coarse</th>
</tr>
</thead>
<tbody>
<tr>
<td>V4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ATR</td>
<td>100 µm MVD</td>
<td>200-350 µm MVD</td>
</tr>
<tr>
<td>AVI80</td>
<td>300 l/ha</td>
<td>600 l/ha</td>
</tr>
<tr>
<td></td>
<td></td>
<td>900 l/ha</td>
</tr>
</tbody>
</table>

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Leaf coverings in $\mu g/cm^2$ in the variants (300 l/ha, 600 l/ha and 900 l/ha) [coarse droplet size]
2011: 2 variants (air flow rate)

Sprayer: *Wanner SZA 32*
with horizontal air and fluid management

**variant 1:**
300 l/ha and **500 rpm** PTO speed
(coarse droplet size)

**variant 2:**
300 l/ha and **380 rpm** PTO speed
(coarse droplet size)
variant 1: 500 rpm PTO speed

variant 2: 380 rpm PTO speed
2012: 3 variants (air flow direction)

Sprayer: Douven radial fan
  • very high air exit speeds ($V_{\text{max.}} = 50 \text{ m/s}$)
  • variable air flow direction
**variant 1: air angle from below**

```
Zone
3   8,76 5,35 9,87
2   7,17 5,46 8,66
1   3,30 4,34 5,31
```

**variant 2: air horizontally**

```
Zone
3   6,77 4,97 7,21
2   9,06 8,37 10,44
1   8,53 6,44 8,89
```

**variant 3: airstream focused to the center**

```
Zone
3   8,26 6,91 6,73
2   15,88 14,57 15,38
1   9,15 4,31 10,66
```

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2012
2013: 2 variants
(Influence of two different drop sizes on the spray coating of the under- and upper side of the leaf)

variant 1:
coarse droplet size
air horizontally

variant 2:
fine droplet size
air horizontally

Sprayer: Wanner SZA 32
Summary

• **Quantity of water**
  – quantity of water
  → leaf covering in raspberries
    – we can detect a proportional increase of fluorescent substance on the leaf by increasing the application rate, up to a certain point

• **Air flow rate**
  – A moderate air flow rate leads tendential to a uniform covering in the center of the raspberry-shrub

• **Air flow direction**
  – the direction of the air stream has an influence in which area you can find the most covering

• **Influence of two different drop sizes on the spray coating of the under- and upper side of the leaf**
  – no influence by different drop sizes on the deposition
  – no difference between the upper- and the under side of the leaf
Thank you for your attention!