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<td>Vanden Heuvel, Justine</td>
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The impact of flooding on cranberry vines

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Methods

• Flood water measurements:
  – Depth
  – Temperature
  – Dissolved oxygen concentration
  – Light penetration to vines

TNSC

• Total Non-structural Carbohydrates
• Carbohydrates are the product of photosynthesis
• Carbohydrates are the energy source used by the vine for growth and fruit production

Flash Floods

<table>
<thead>
<tr>
<th>Calibra Year</th>
<th>Date</th>
<th>Depth (cm)</th>
<th>Temp (°C)</th>
<th>Mins. (mg L⁻¹)</th>
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<th>Depth (cm)</th>
<th>TNSC (mg/100 mg)</th>
<th>ΔTNSC (mg/100 mg)</th>
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<td>15</td>
<td>19.8</td>
<td>7.3</td>
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<td>10.2</td>
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Only a significant decrease in TNSC in 1 of 7 flash floods
Flooding effects on TNSC

- Late water floods:
  - Δ TNSC between pre- and post-flood uprights from bogs ranged from -31% to +36% (13 floods)

- Harvest floods:
  - Δ TNSC between pre- and post-flood uprights from bogs range from -42% to +4% (29 floods)

Flood water conditions

- Path co-efficient analysis indicated that actual Δ TNSC (mg/100mg) was significantly affected by:
  - Date of flood application (+0.32)
  - Maximum water temperature (-0.56)
  - Minimum water DO (-0.37)

- Light penetration and water depth had no effect on TNSC

Date of flood application

- More reduction in TNSC with earlier floods

Flood duration

Water temperature

- Temperature differences still there in EB two weeks later, but not as much in Stevens

Late water flood – uprights

Arrows indicate end of flood

Temperature differences still there in EB two weeks later, but not as much in Stevens

Late water flood – roots

Arrows indicate end of flood

Temperature differences still there in Stevens two weeks later, but not as much in EB
Cross sections of leaves

- Fungal mat on leaf surface
- Erosion of epidermis

Blocked xylem
Clumped chloroplasts
Blocked xylem

Photo courtesy of Martin Goffinet

Roots

Darker roots are dying or dead

Photo courtesy of Martin Goffinet

Dissolved Oxygen

Simulated Late Water Flood

DO = 6.5 mg/L
DO = 9.0 mg/L

Effect of dissolved oxygen concentration during LW flood

Higher DO resulted in greater loss of TNSC!

↓ 71 %

↓ 94 %

Period of flooding (Days)
### Conclusions – Flash Floods
- Good options for pest control
- Use short flood with cool water

### Conclusions – Late water floods
- The impact of LW floods is variable – generally fine to use unless water gets warm (>68°F)
- Keep water cool by maximizing volume on bog and recharging

### Conclusions – Harvest floods
- Most dangerous flood!
- Can be very detrimental to vines, although recovery is possible under optimal conditions
- Keep flood as brief as possible, particularly early in the season
- Water needs to be as cool as possible

### Conclusions – Winter floods
- Don’t worry too much

### Questions?