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Research Update Meeting 2006 - Flooding Effects on Cranberry Uprights 2006

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Flooding Effects on Cranberry Uprights

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Short-term Objective

- To determine the effect of late water, flash, and harvest floods on total non-structural carbohydrate concentration of cranberry uprights

Long-term Objective

- To develop a model to predict the effect of flooding on yield of cranberry uprights

Field flooding studies

Methods

- Floods investigated:
 - Late Water (1 mo. Duration, Mid-April to Mid-May)
 - Flash (48 hours, Mid-Late May)
 - White harvest (2 – 5 days, Sept in NJ)
 - Harvest (varying duration, Sept-Nov)
- Uprights collected immediately prior to and following the flood

Methods

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

Late Water floods

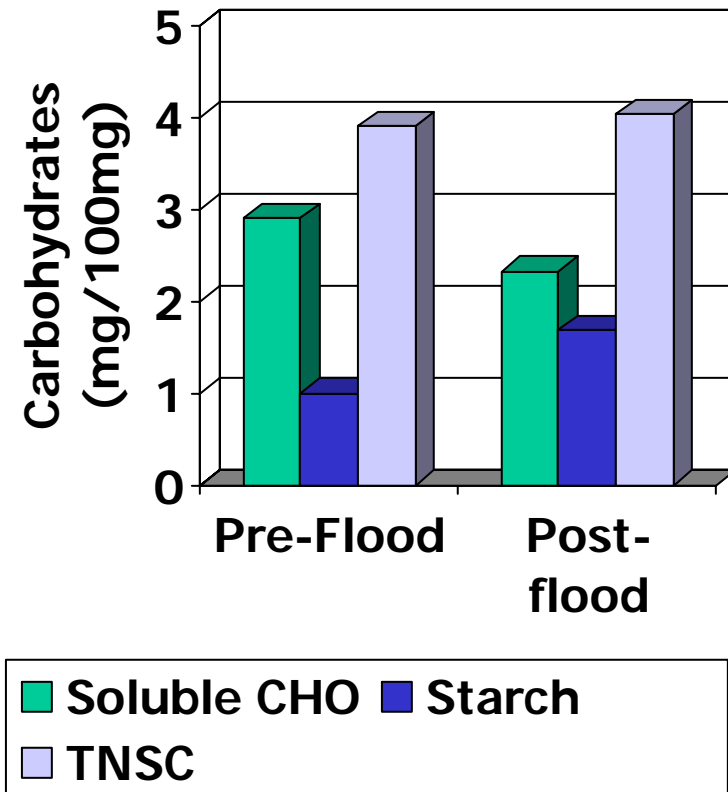
- Changes in TNSC from +23 to -32%
- Decreases in TNSC correlate well with warm water temperature
- Cool LW floods have little to no detrimental effects

Flash floods

- Changes in TNSC from +12 to -18%
- Vines have long time to recover from flood
- No concern about using this type of flood unless water is warm (above 65°F)

White harvest (NJ)

- 2-day floods fine
- 5-day flood a problem
- NJ may not indicate what happens in MA
- Keep floods brief!



Harvest flood

- Changes in TNSC from +4 to -42%
- Vines have little opportunity to recover before winter
- Early floods much more damaging than later floods
- Harvest floods should be as short as possible

Flooding parameters

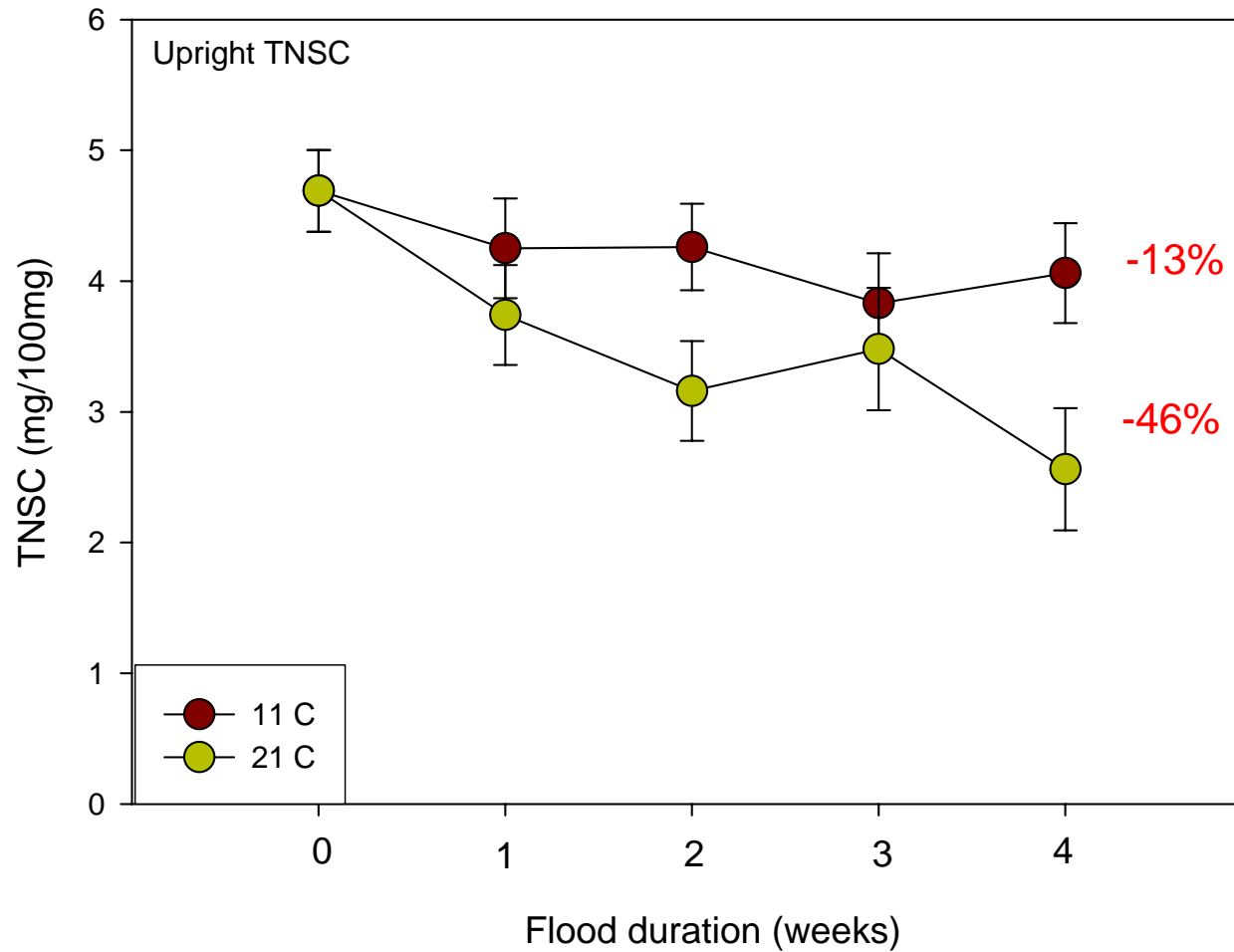
- Major factors affecting TNSC during harvest floods:
 - Date of application (early vs. late)
 - Water temperature (warm is bad)
 - Flood duration (long is bad)
 - DO (very low is bad)

Controlled Environment Studies

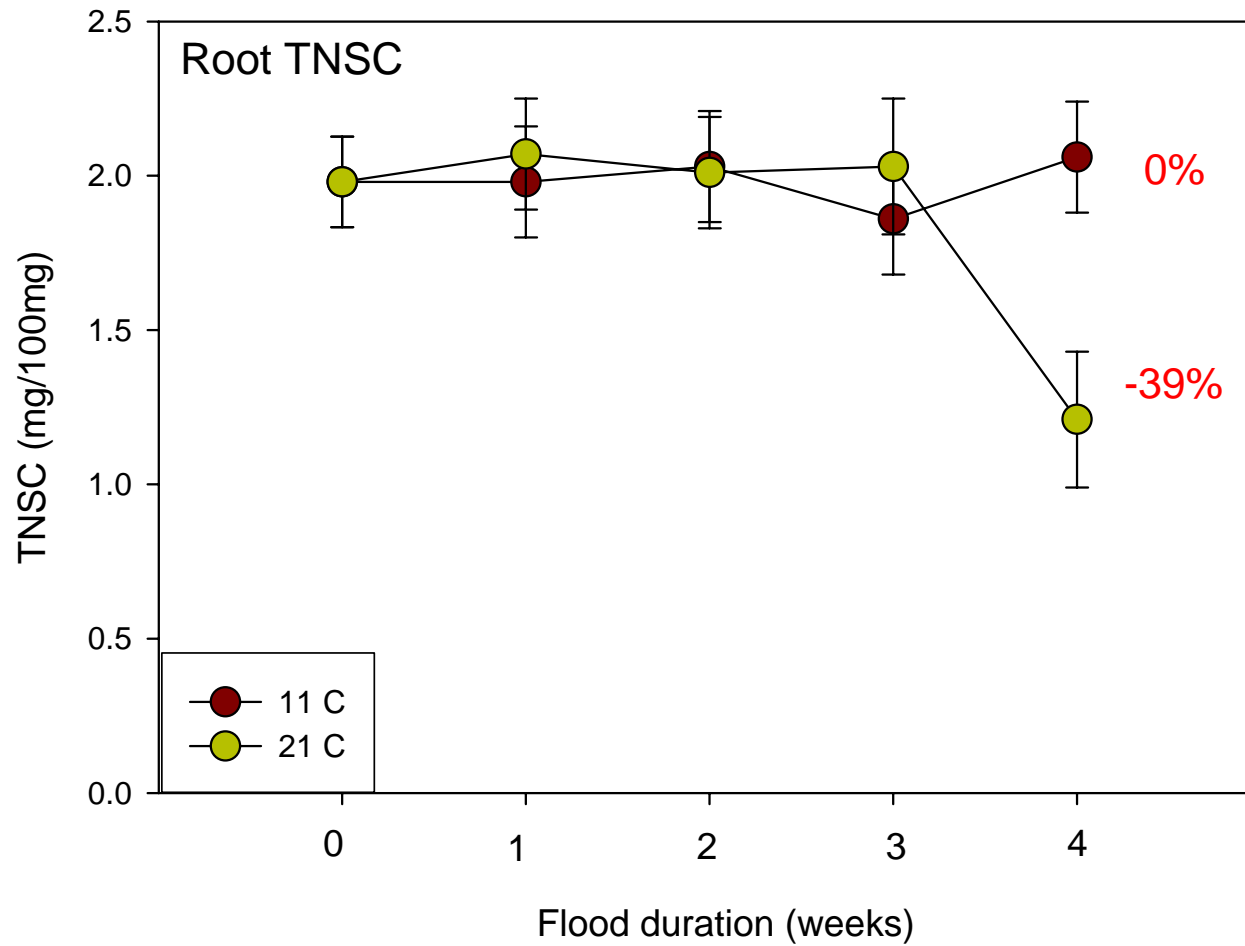
Lab study – Water Temperature



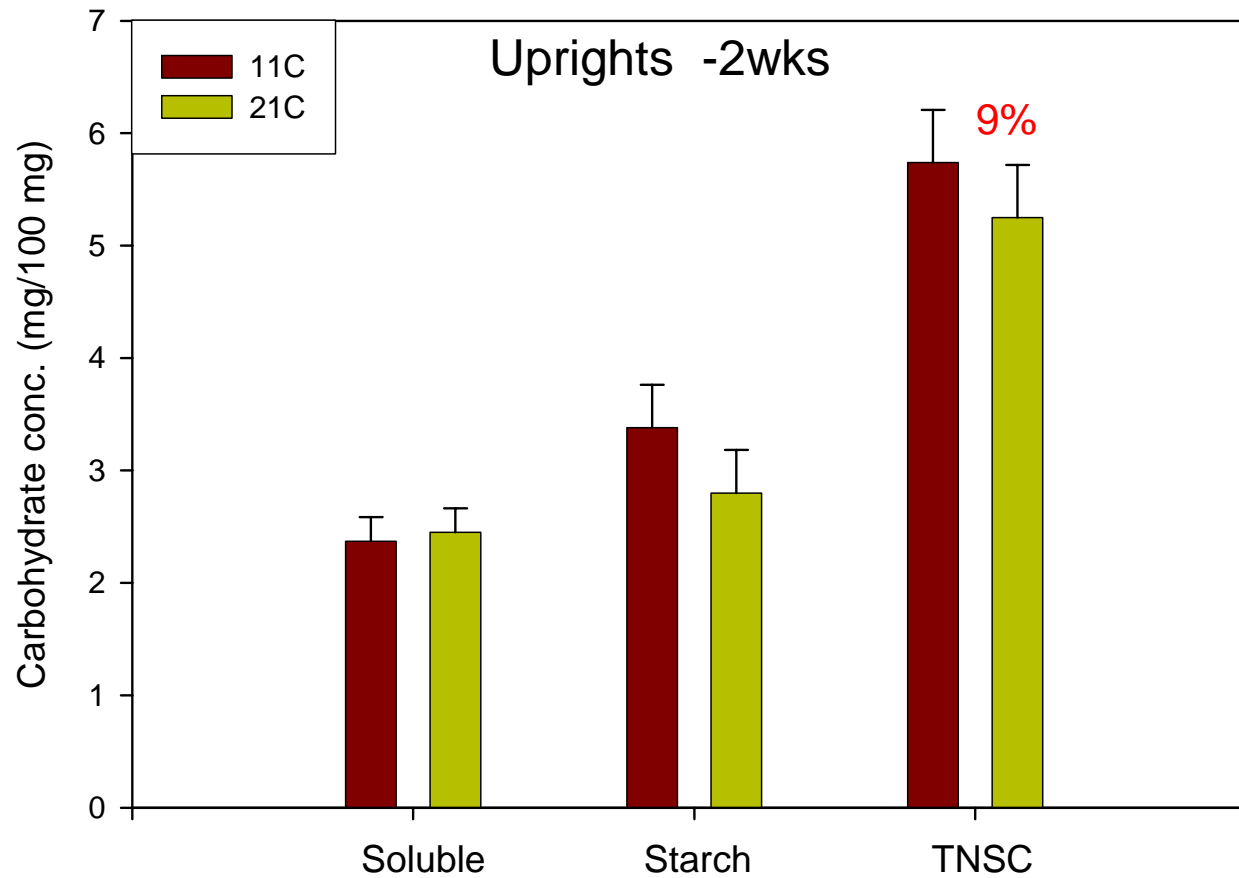
Late Water flood



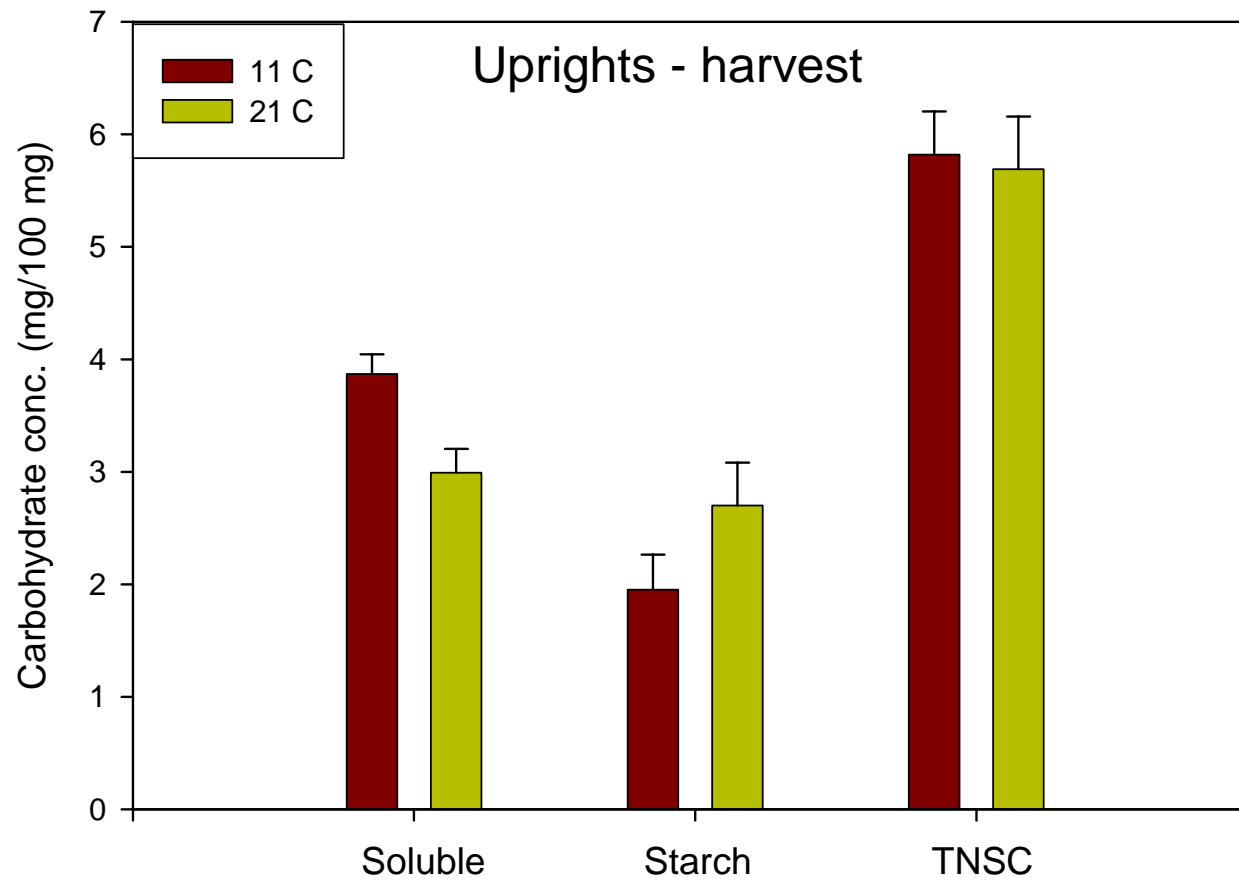
Late Water flood



Late Water flood



Late Water flood



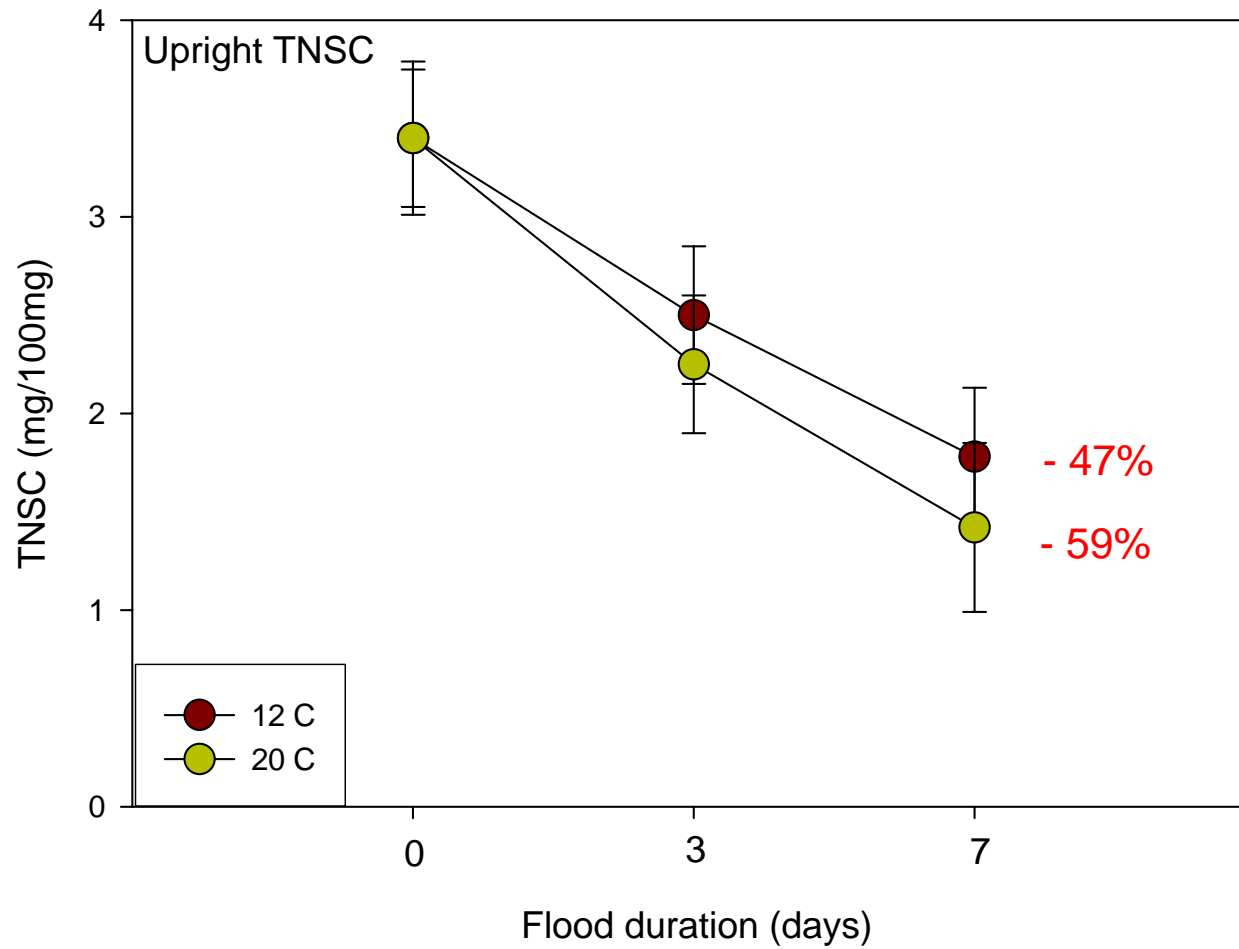
11°C: Starch 34%

21°C: Starch 47%

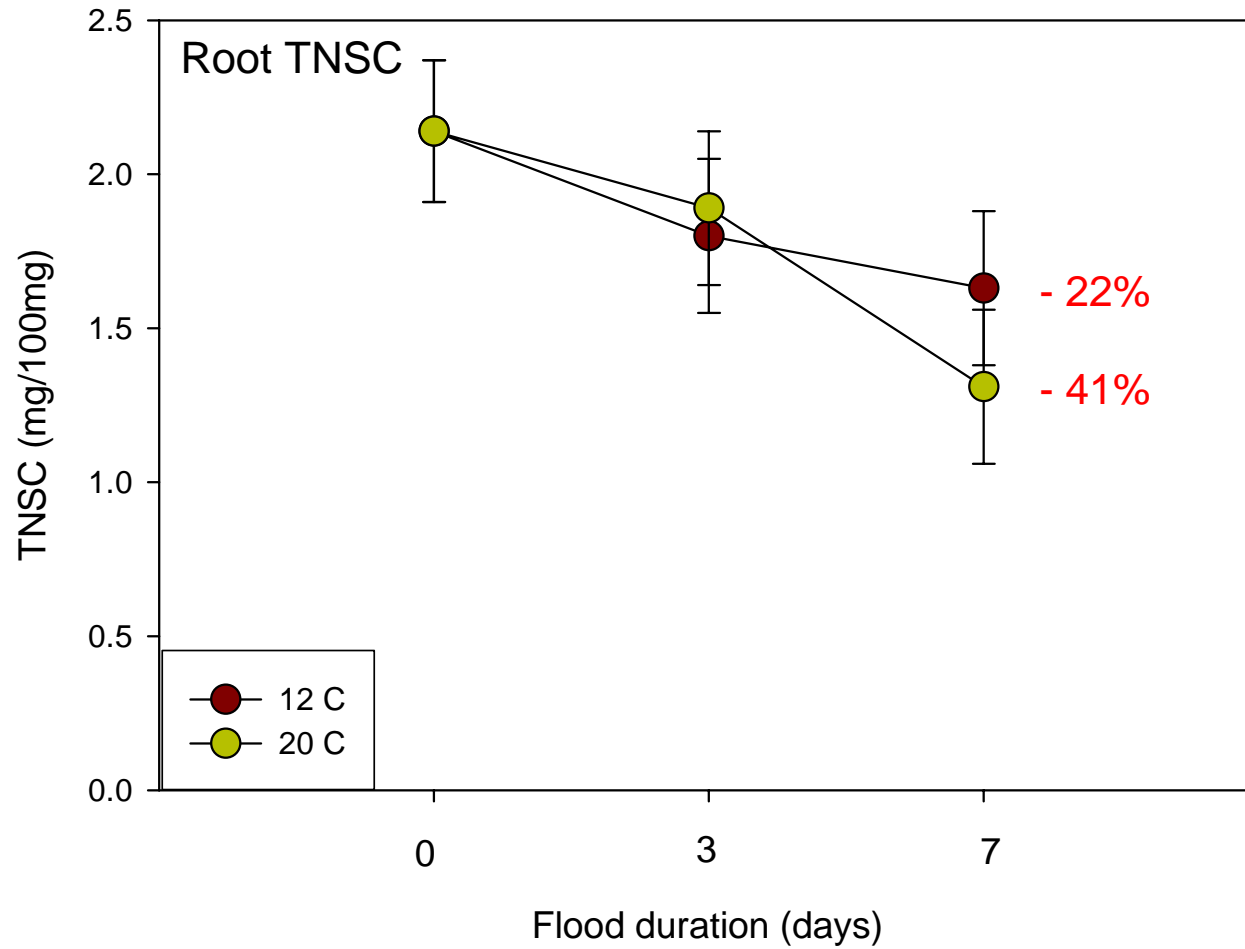
Conclusion

- Cool LW floods had little impact on vines
- Vines subjected to warmer LW flood still had fewer CHO at harvest
- Vines subjected to warmer LW floods likely have reduced CHO available for spring growth

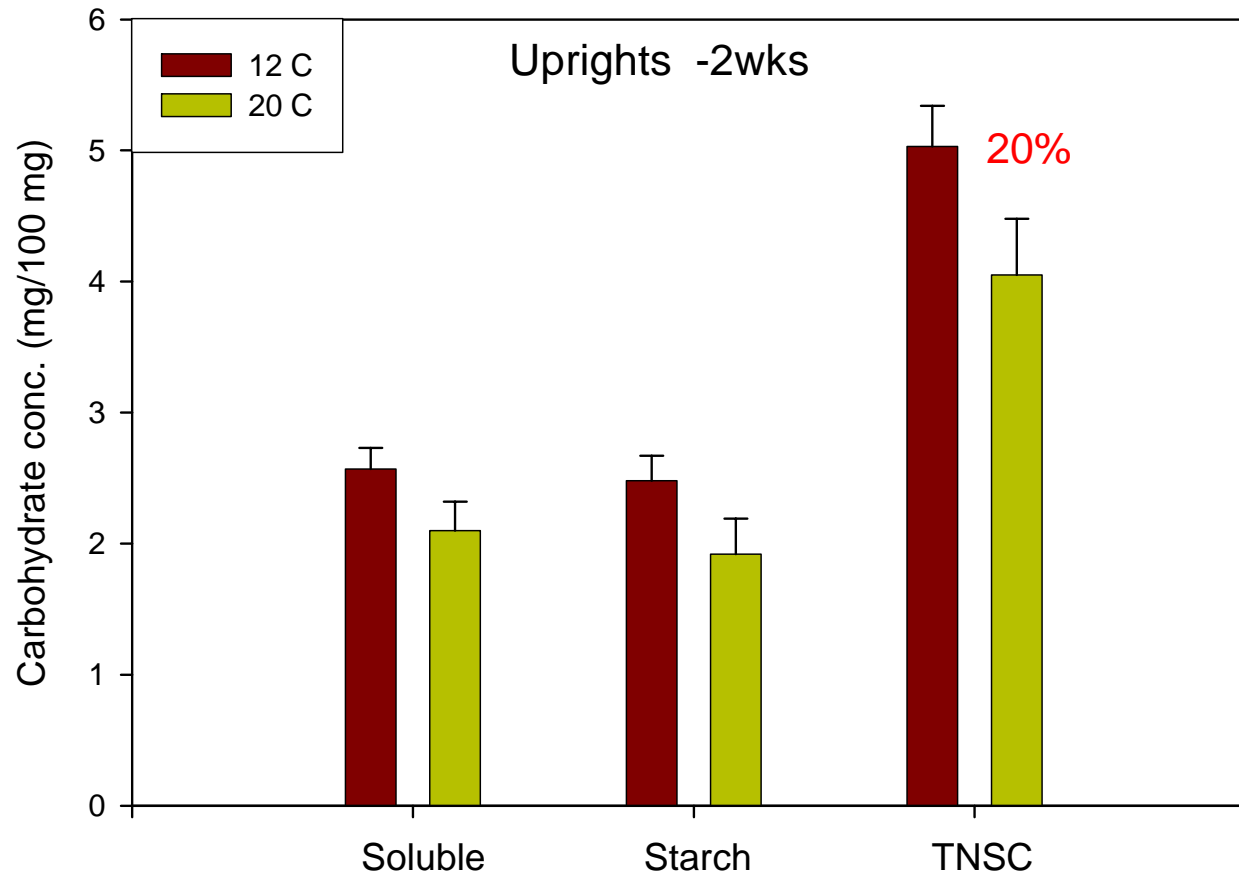
Harvest flood



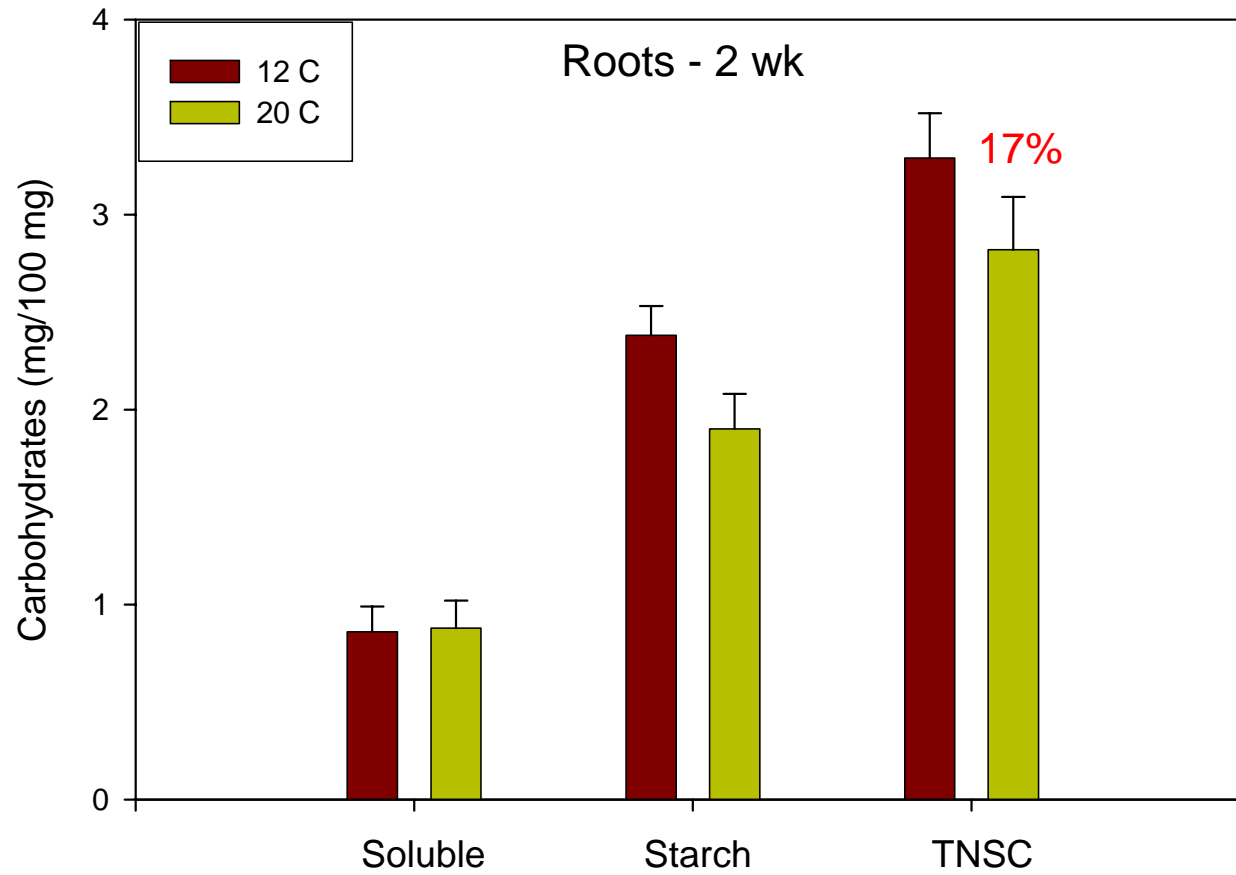
Harvest flood



Harvest flood



Harvest flood



Conclusion

- Regardless of water temperature, TNSC decreased rapidly during harvest flooding
- Vines subjected to warmer H floods have reduced TNSC in uprights and roots for winter protection and spring growth

Flooding recommendations

- Short floods have the least detrimental effect on carbohydrate concentration of uprights
- Deeper floods are recommended due to their ability to maintain cooler water temperatures for a longer time
- Recharging of floods from the water source may also help reduce water temperature on the bog.

Flooding recommendations

- Spring floods, particularly 48-h flash floods, should be considered a viable pest management tool on a healthy bog.
- Fall floods, particularly extended ones, should be applied as late into the harvest season as possible.

Questions?