

# The influence of crop load and bunch size manipulation on *Vitis vinifera* L. cv Sable Seedless® table grapes ripening and optimal harvest dates.

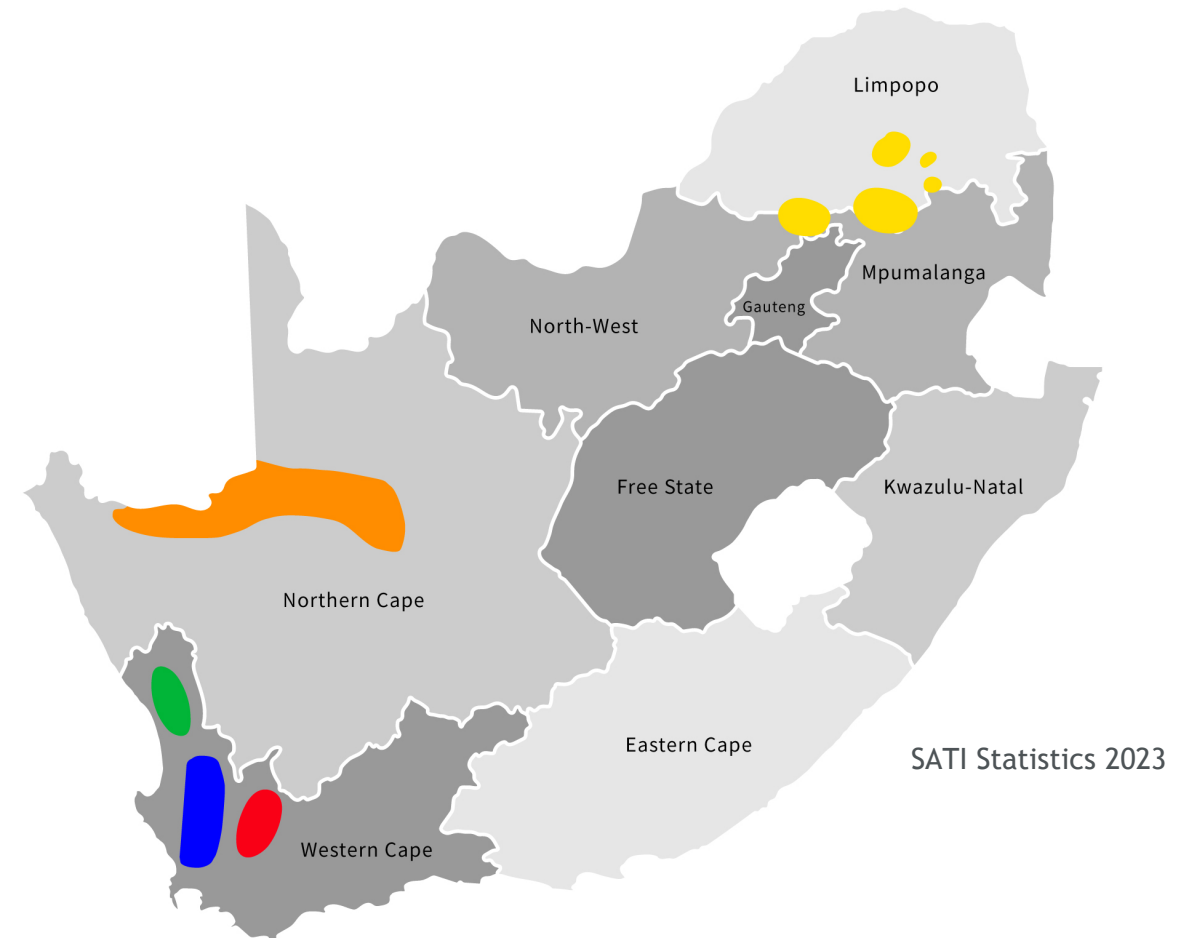


Photo: N. Viljoen

Presenter: N. Viljoen,  
10<sup>th</sup> International Table Grape Symposium – November 2023

# South African Table Grape Industry

- 5 producing regions
- >65 million cartons in 2022
- Regulated by Agricultural Product Standards Act of 1990
  - Berry size
  - Sugar - TSS
  - Acidity - TA
  - TSS:TA ratio



# Introduction & Background

## Sugrasixteen

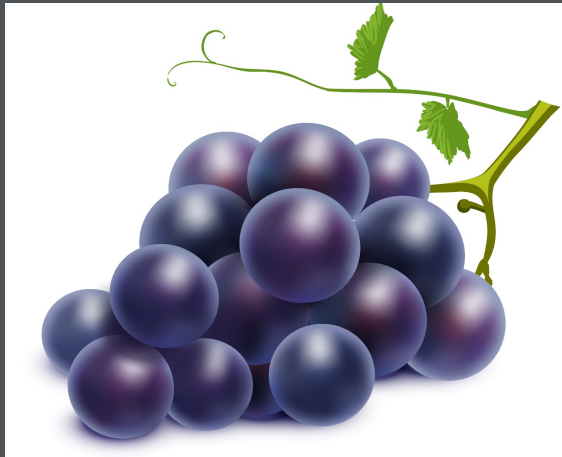
## Sable Seedless®

Neutral < 17°Brix



> 17°Brix

Tropical



Environment



Abiotic & biotic stress



Sugrasixteen marketed as high value



Viticultural practices

Crop Load



Bunch size

# Aims of PhD study




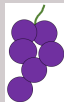
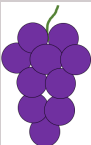
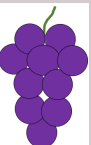



- To investigate the possible relationships between
  - Crop load
  - Bunch size
  - Sensory perception
- To establish a baseline chemosensory profile for Sable Seedless<sup>®</sup>.

# Research Objectives addressed in this presentation

- To investigate relationship between
  - **crop load** manipulation
  - **bunch size** shortening
  - **berry development and ripening trends**



# Methodology - Experimental design

Treatments: Crop load / ha	Low (3000 cartons / ha) 		Medium (6000 cartons / ha) 		High (9000 cartons / ha) 	
Sub-plots: bunch size						
Bunches / vine	10		20		30	
Replicates / treatment	8		8		8	
Panels / row	3		3		3	
Vines / panel						

# Bunch size differences between seasons

## First season (2020/2021)



Small bunch  
<100 berries



Large bunch  
>120 berries

## Second season (2021/2022)



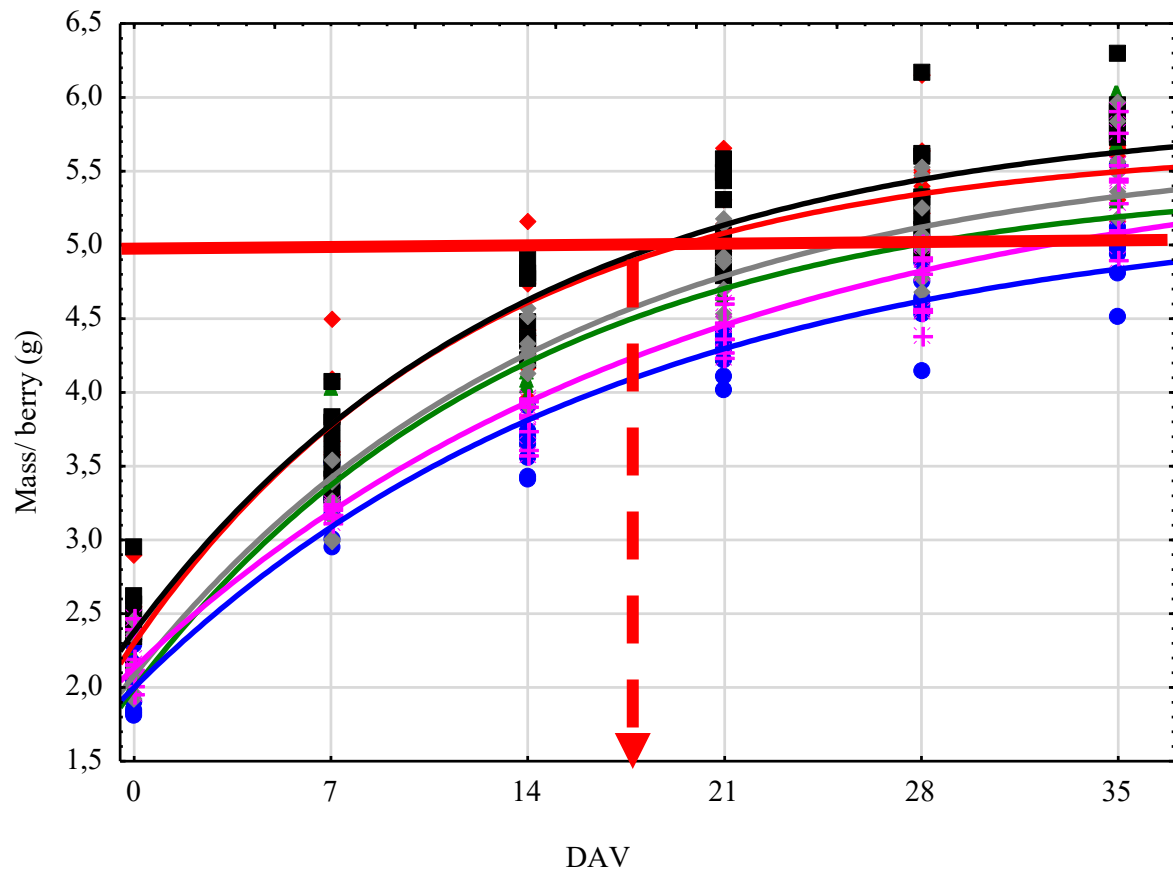
Small bunches (no Large bunches)  
<100 berries

# Methodology

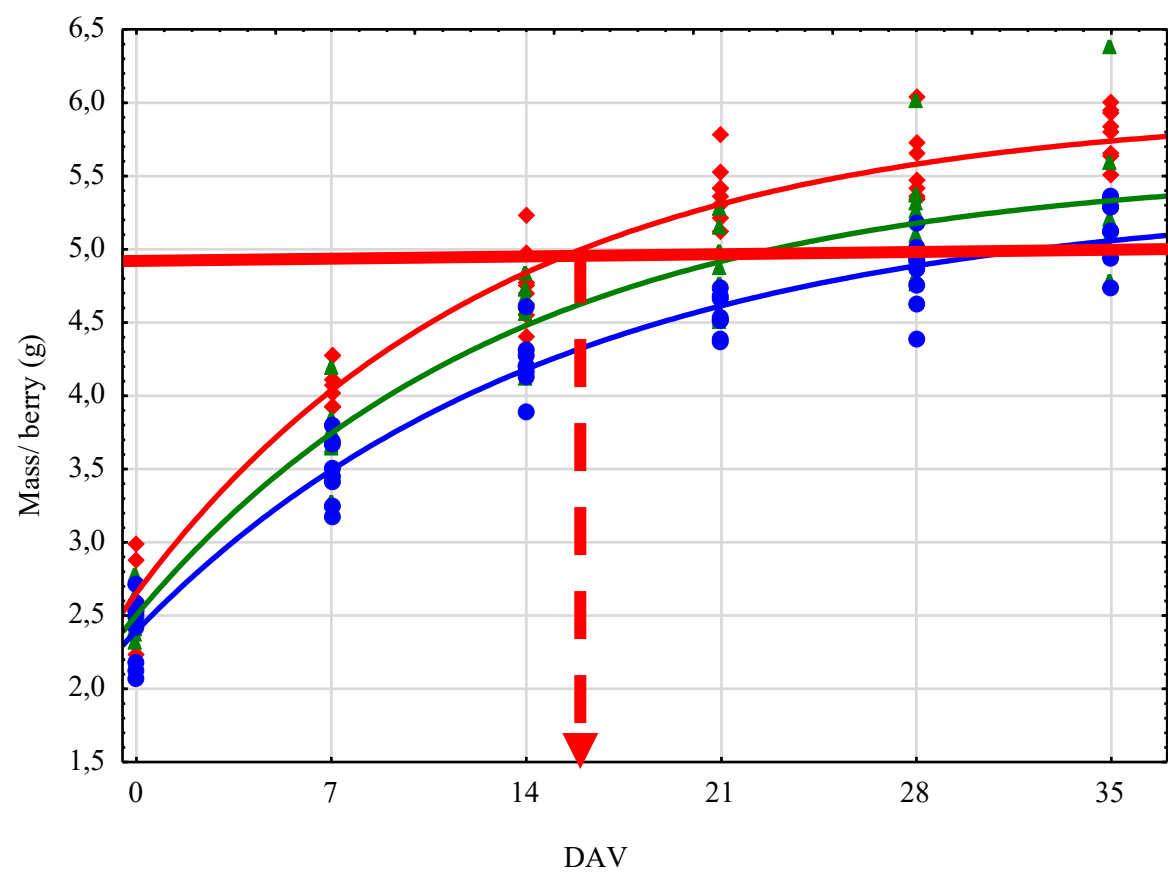
- Berry analyses:
- Weekly from véraison to harvest
  - Berry mass
  - Total Soluble Solids (Brix)
  - Titratable acidity
  - pH
- Data mining investigate ripening trendlines
  - $EC_{50}$  = 50% when the required parameter is reached



## First season (2020/ 2021)



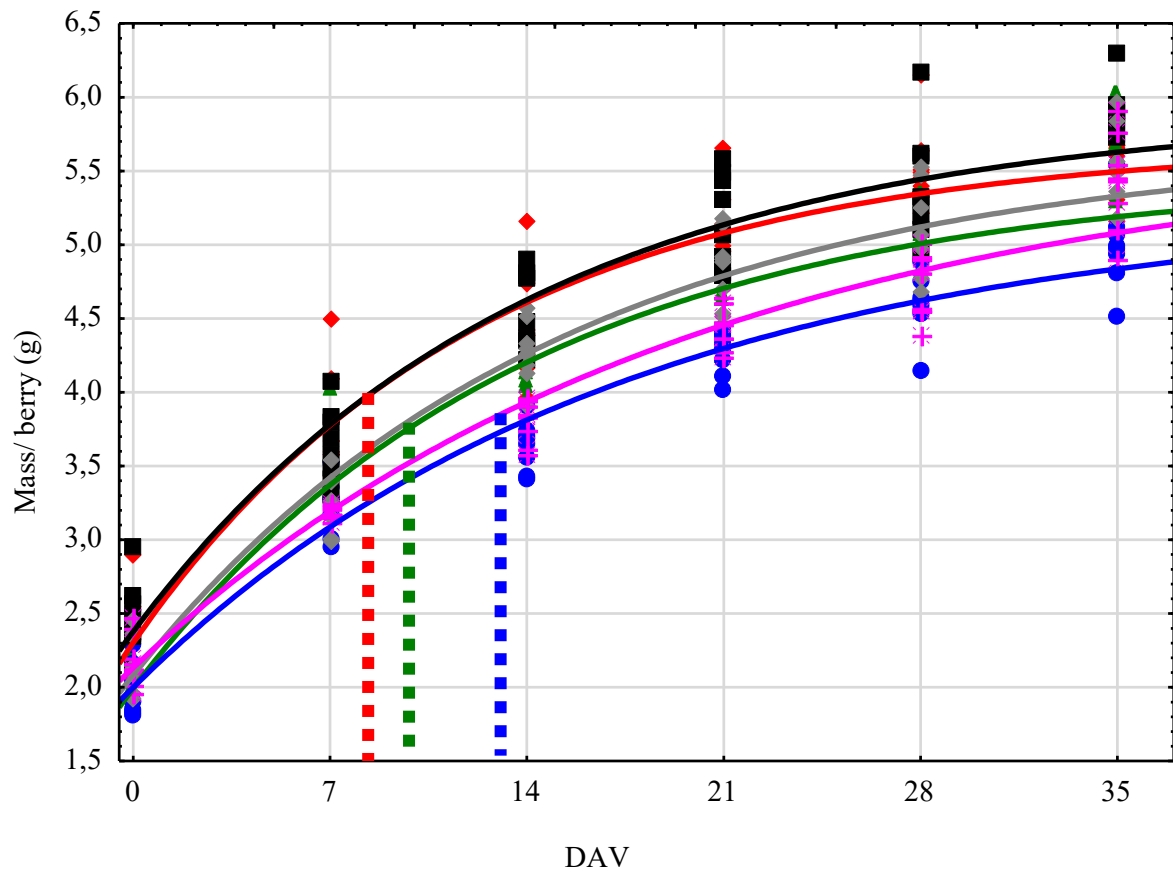
## Second season (2021/ 2022)



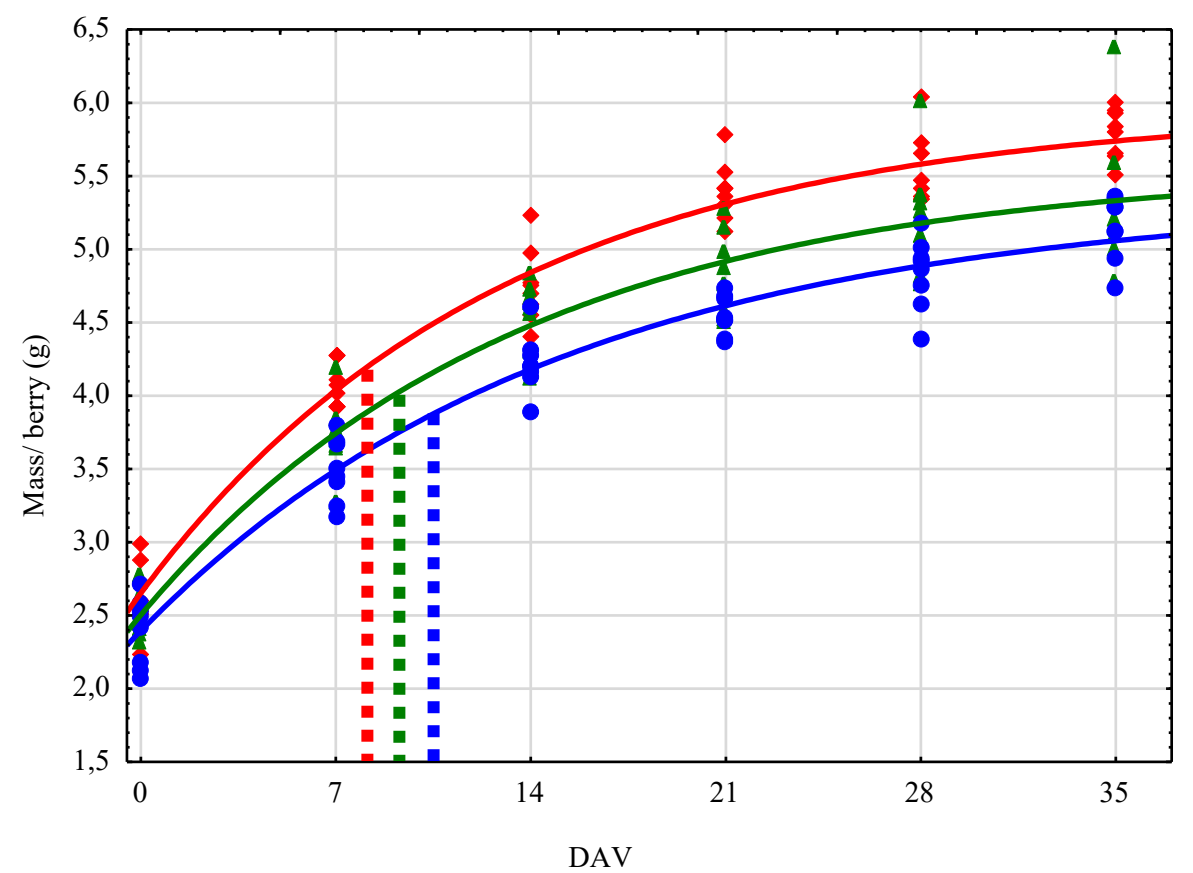
— Low CL\_Small BS   
 — Med CL\_Small BS   
 — High CL\_Small BS  
— Low CL\_Large BS   
 — Med CL\_Large BS   
 — High CL\_Large BS

**Higher Crop Loads = Smaller berries**

## First season (2020/ 2021)






## Second season (2021/ 2022)



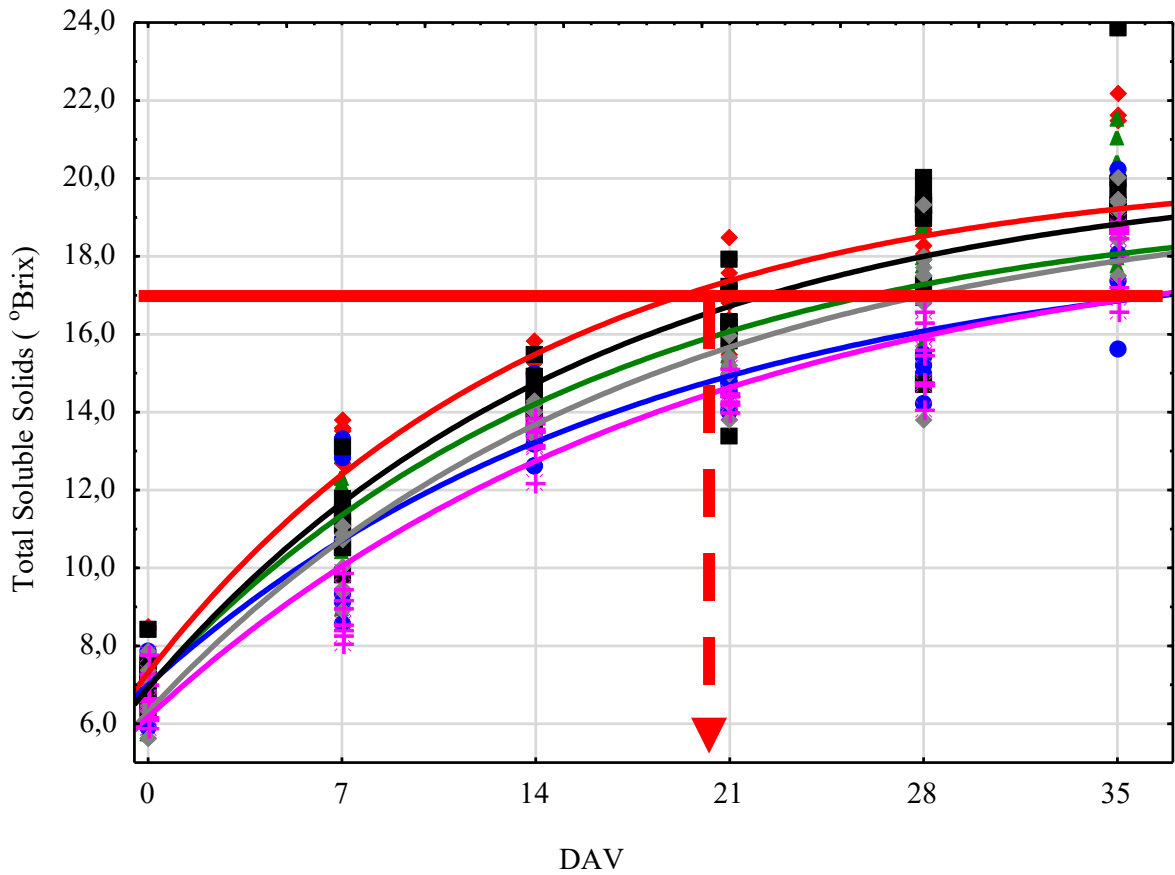
— Low CL\_Small BS — Med CL\_Small BS — High CL\_Small BS  
— Low CL\_Large BS — Med CL\_Large BS — High CL\_Large BS

**Higher Crop Loads = Slower increase in berry mass**

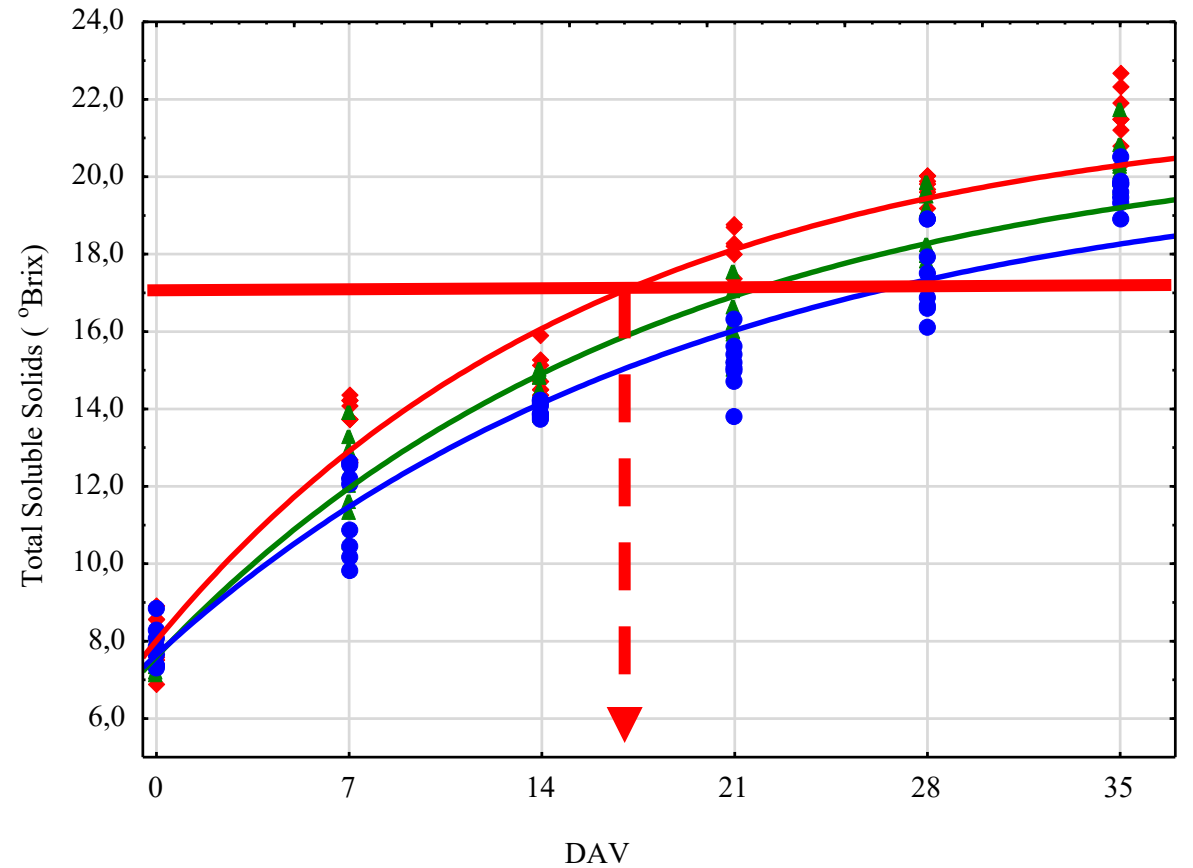
# Predicted vs Actual Berry Mass

Cropload	Both seasons	
	Predicted ( $EC_{50} \times 2$ )	Actual Mass (>5,0 gram/ berry)
Low	16 to 18 DAV	14 to 21 DAV 
Medium	19 to 22 DAV	21 to 28 DAV 
High	22 to 28 DAV	28 to 35 DAV 

## First season (2020/ 2021)



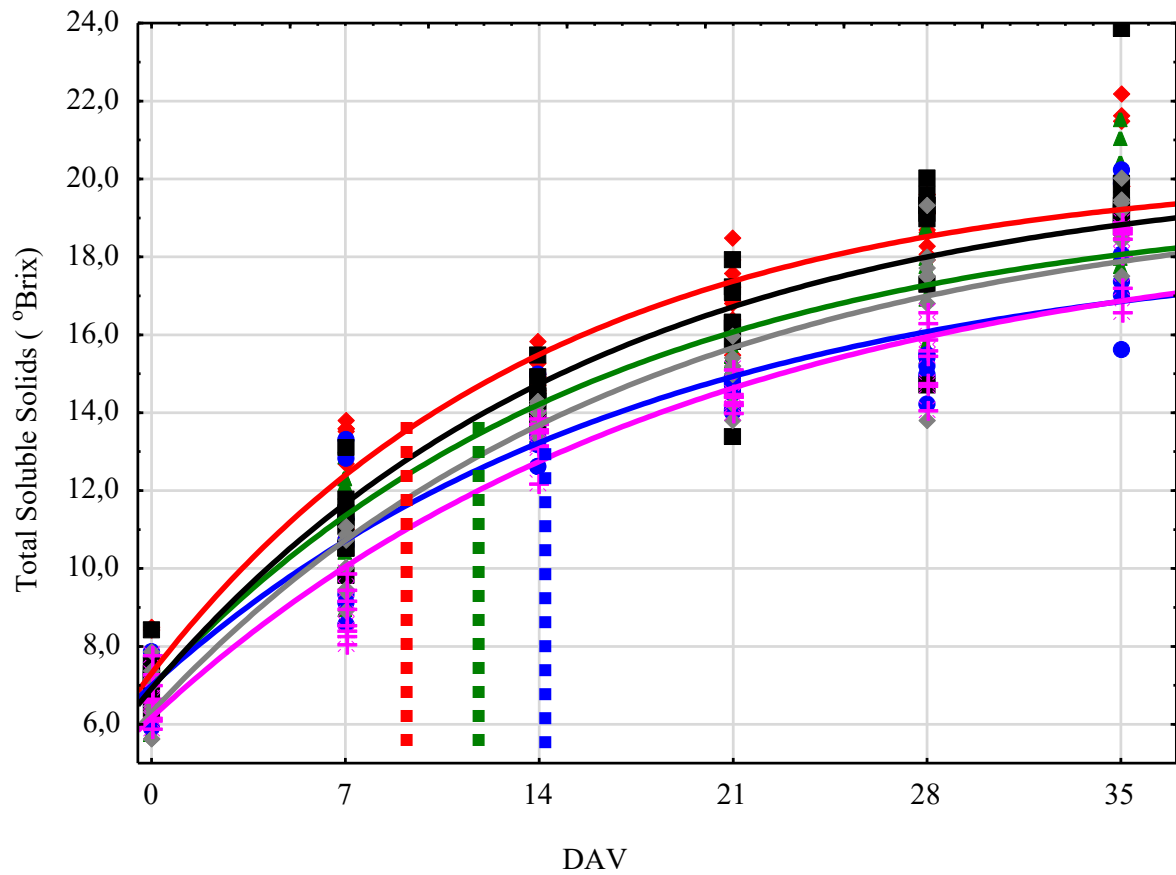
## Second season (2021/ 2022)



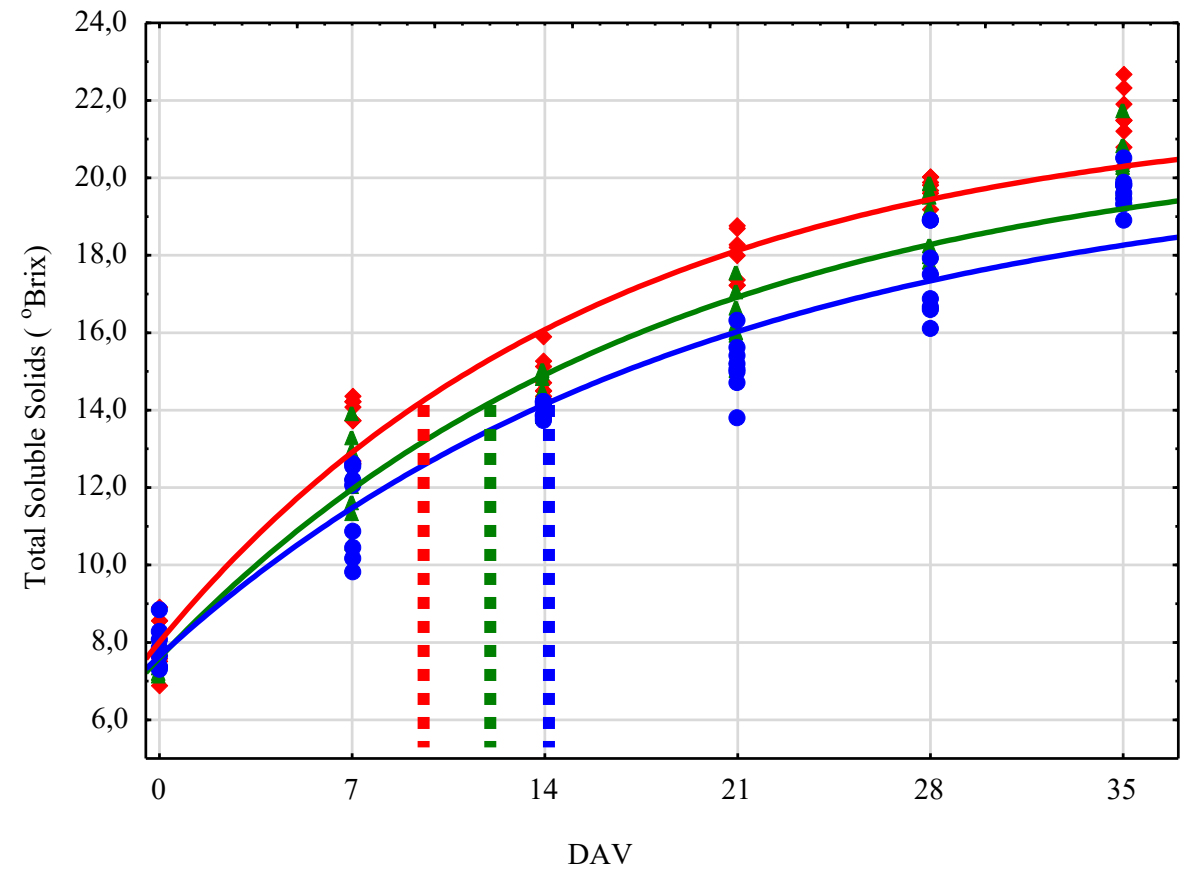
— Low CL\_Small BS   
 — Med CL\_Small BS   
 — High CL\_Small BS  
— Low CL\_Large BS   
 — Med CL\_Large BS   
 — High CL\_Large BS

**Question: The role of crop load and bunch size on TSS?**

## First season (2020/ 2021)






## Second season (2021/ 2022)



— Low CL\_Small BS   
 — Med CL\_Small BS   
 — High CL\_Small BS  
— Low CL\_Large BS   
 — Med CL\_Large BS   
 — High CL\_Large BS

**Higher Crop Loads = Lower TSS**

# Predicted vs Actual Total Soluble Solids (°Brix)

Cropload	Both seasons	
	Predicted (EC <sub>50</sub> x 2)	Actual TSS (>17 °Brix)
Low	20 to 22 DAV	21 to 28 DAV 
Medium	22 to 24 DAV	21 and 28 DAV 
High	25 to 27 DAV	28 to 35 DAV 

# Ripening trends

## Crop load impacts mass & TSS

- High CL = slower ripening  
increased variation in range of TSS levels per sampling date

## Bunch size impacts mass

- Only high CL:  
Large bunch = larger berries

# Possible predictions

## Optimal harvest dates for low to medium crop loads

# Future Research

## Based on current study:

- Bunch size manipulation - is this practice necessary?
- Could the same statistical equation be used to predict harvest date for other cultivars?

## Questions addressed in full study

- Has the unique Sable Seedless<sup>®</sup> flavour developed within the predicted timeframe?
- How does crop load and bunch size manipulation influence flavour?

# Acknowledgments

- Funding
  - SATI
- My supervisors
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  - Roodezand Farm's production team
  - SAGWRI Table Grape research group



DEPARTMENT OF  
Viticulture and Oenology





Thank you  
Enkosi  
Dankie