

The effect of environmental conditions on grape physical and chemical quality attributes before and after storage

19 August 2022
Kronenburg, Paarl

Janéne Strydom¹ & Dr Kobus Hunter²

¹Corresponding researcher

²Specialist Scientist

strydomj@arc.agric.za



Background

Environmental conditions and water supply

Grapevine reactions

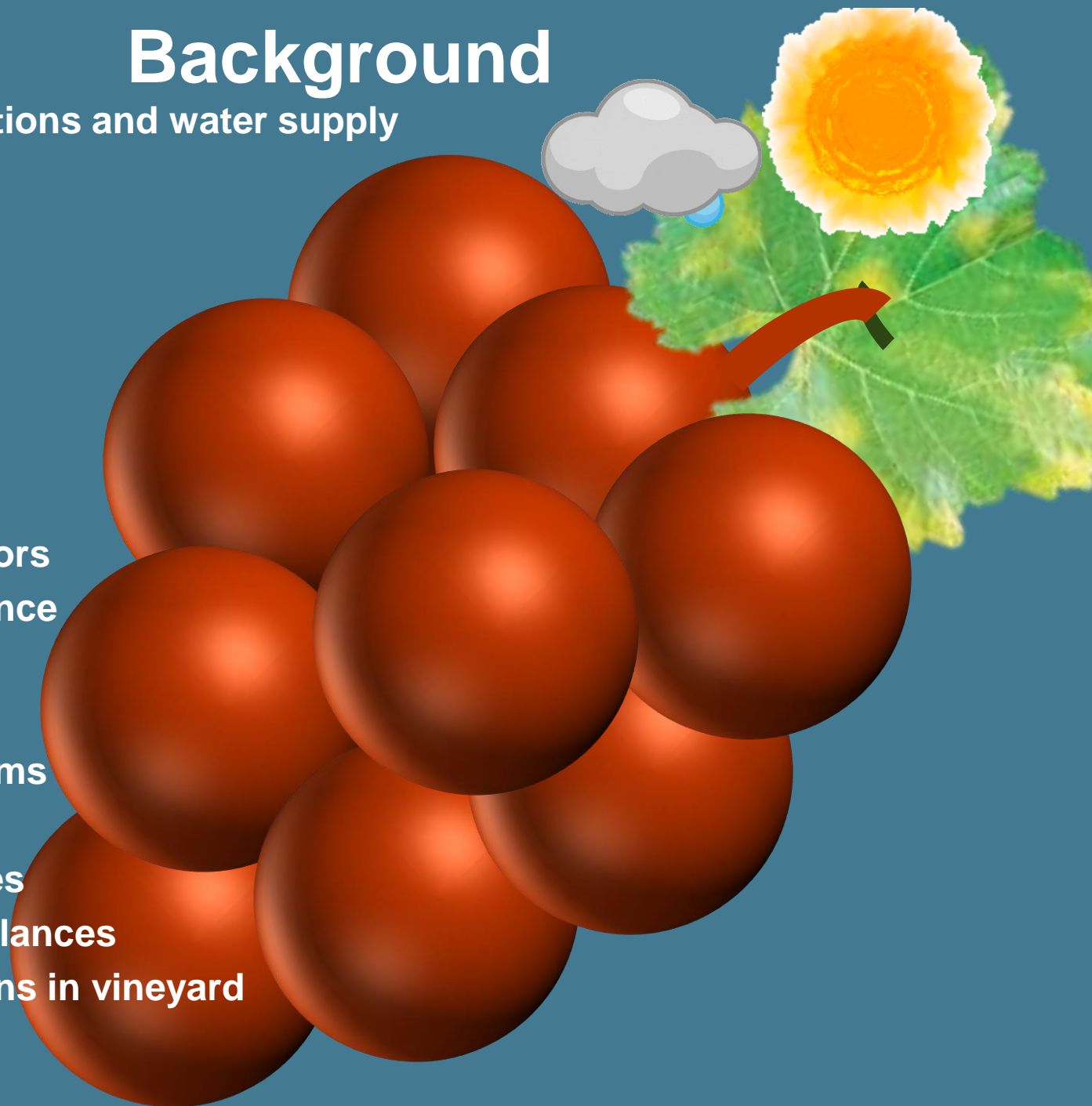
- Development
- Internal structure
- External structure
- Functioning

Grape quality indicators

- Taste and appearance
- Structure
- Osmotic function
- Defense mechanisms

Management practices

- Improve growth balances
- Changing conditions in vineyard
 - Time of ripening
 - Affects quality



Terminology

Weather: Short term atmospheric conditions

Climate: Weather of a specific region averaged over a long period of time

Climate change: Changes in long-term averages of daily weather

Macro-climate: Conditions in the region

Meso-climate: Conditions around the vineyard / on farm

Micro-climate: Conditions in the grapevine canopy and bunch zone

Field trials

Water Treatment (amount measured)	Ripeness level (Maturity Index provided by DAFF*)
W100	DAFF
W080	DAFF minus 10%
W070	DAFF plus 10%
W055	

*Department of Agriculture Forestry and Fisheries (DAFF, 1990)
Irrigation scheduling: ET_0 & crop factor (Commercial practice)

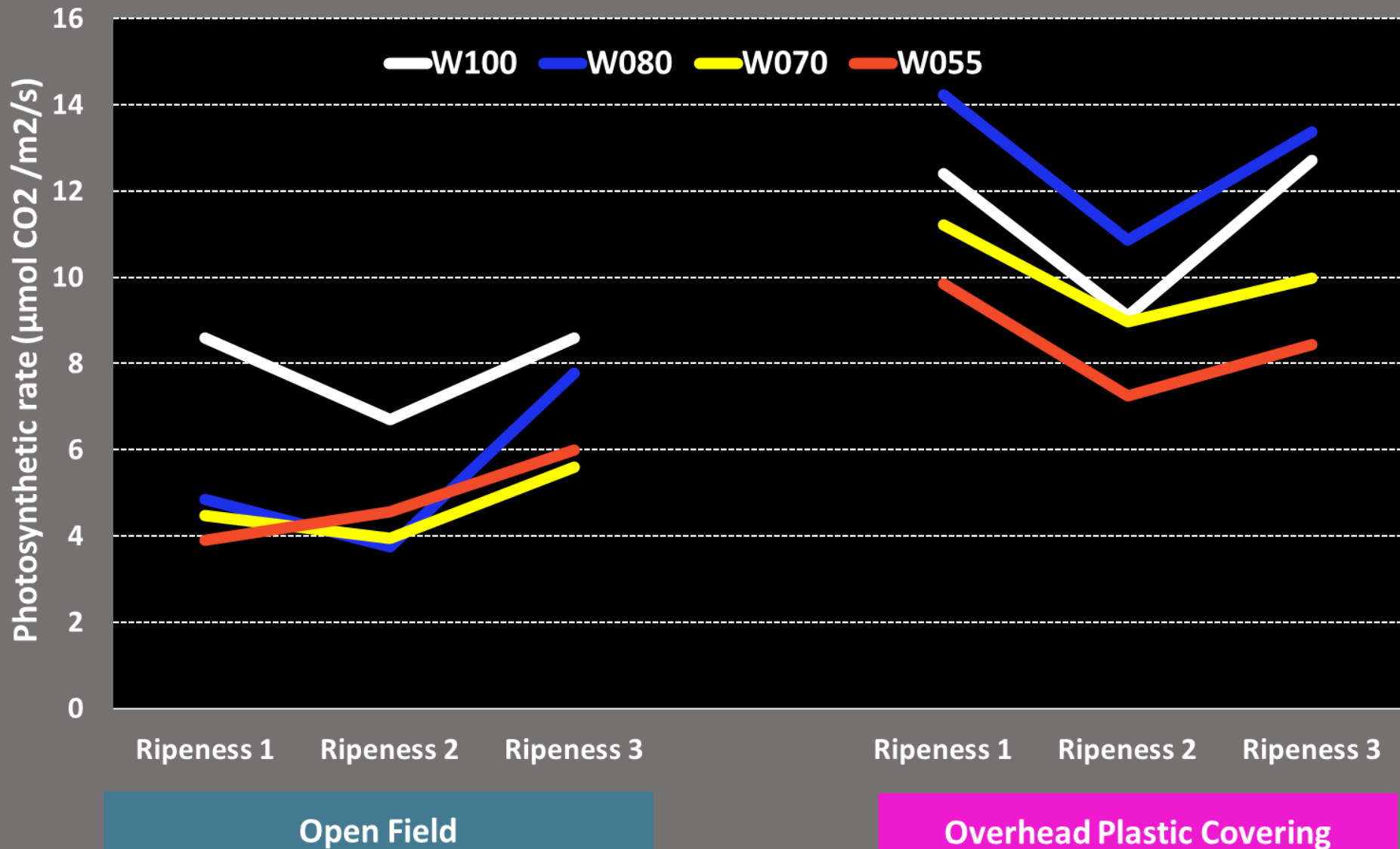


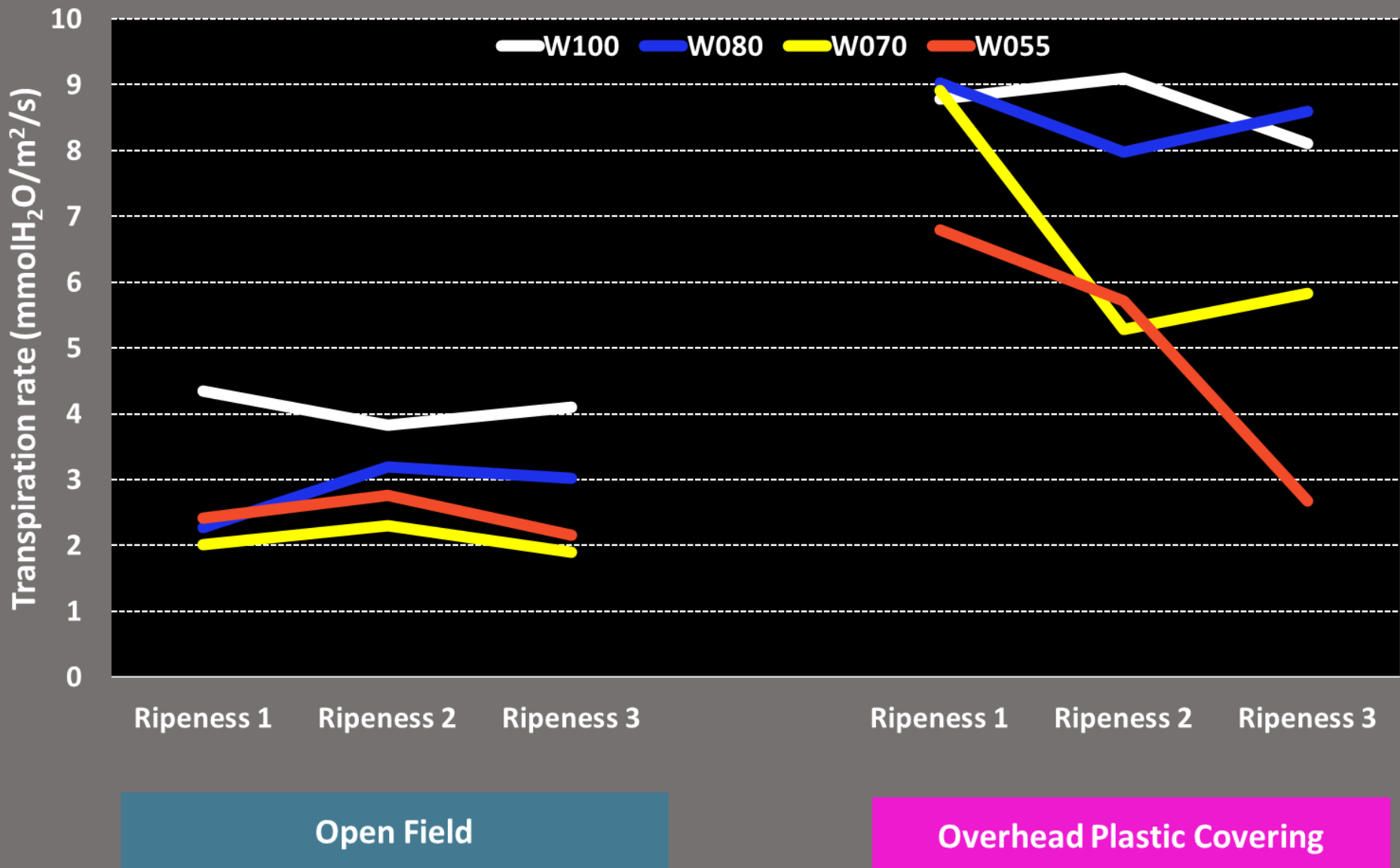


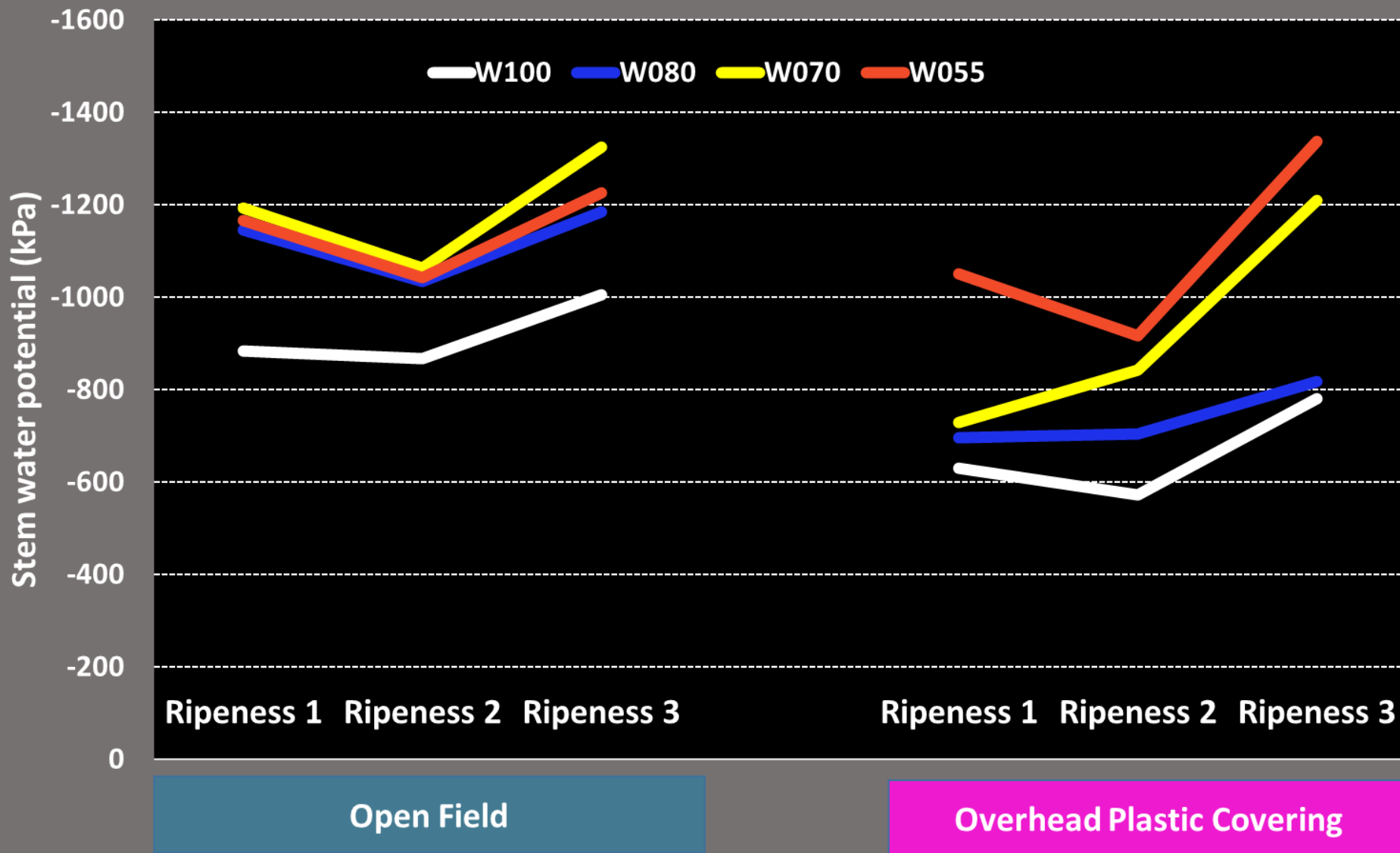
Conditions

	Jan-22					Feb-22				
Climatic variables	Macro	Meso	Water Trt	Micro OF	Micro OPC	Macro	Meso	Water Trt	Micro OF	Micro OPC
T_Ave	25.92	25.71	W100	24.57	24.44	25.24	24.95	W100	23.84	24.10
			W080	24.37	22.93			W080	23.66	22.80
			W070	24.48	23.08			W070	23.74	22.94
			W055	24.72	23.20			W055	23.93	22.96
RH_Ave	56.16	63.19	W100	57.59	60.78	56.03	62.93	W100	58.52	62.99
			W080	62.64	65.92			W080	63.39	67.49
			W070	55.82	66.02			W070	57.02	67.14
			W055	60.00	61.84			W055	61.07	64.30
Rain_Tot	10.40	1.90		Not recorded	Not recorded	22.30	14.99		Not recorded	Not recorded

Results









Open Field



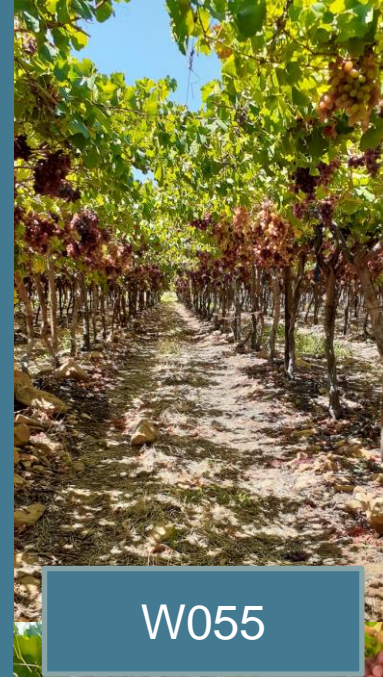
W100



W080

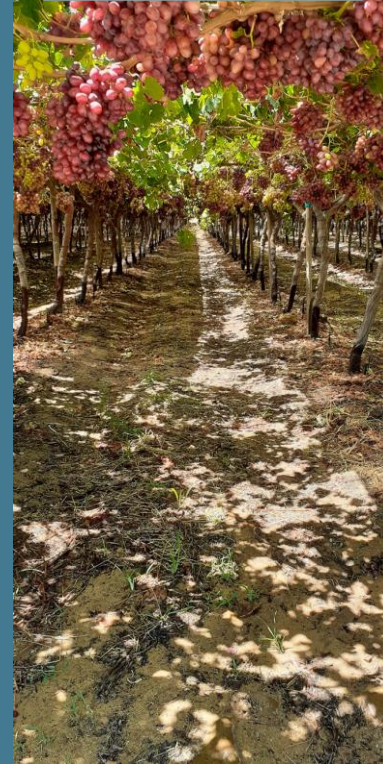
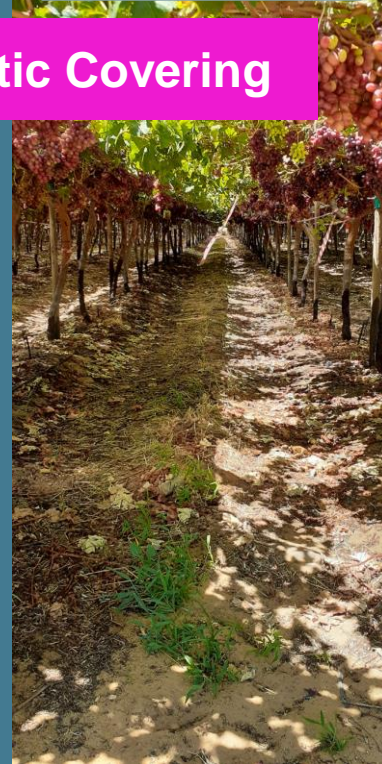


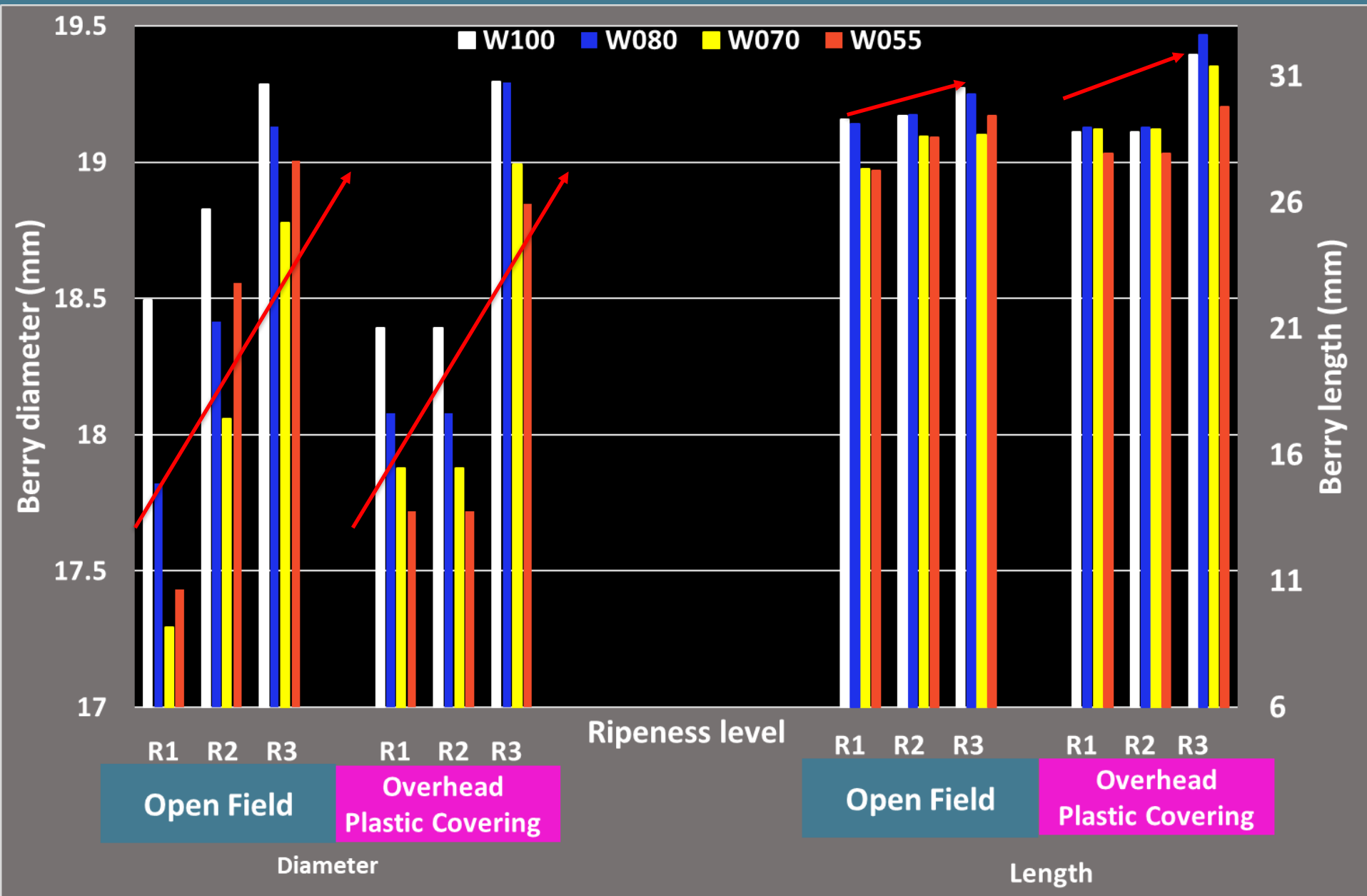
W070



W055

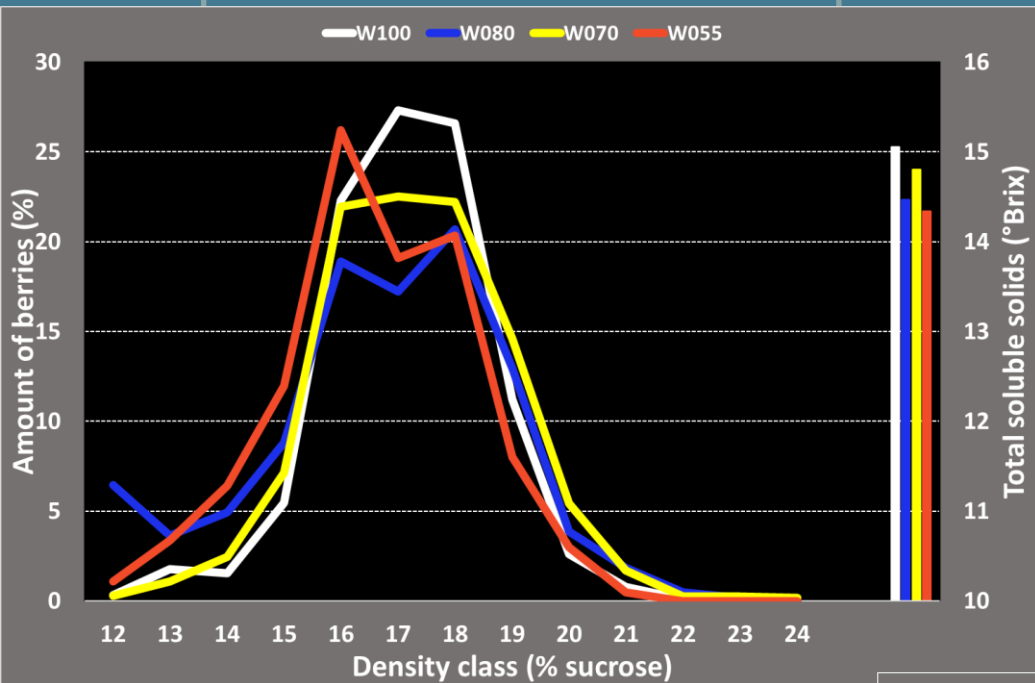
Overhead Plastic Covering



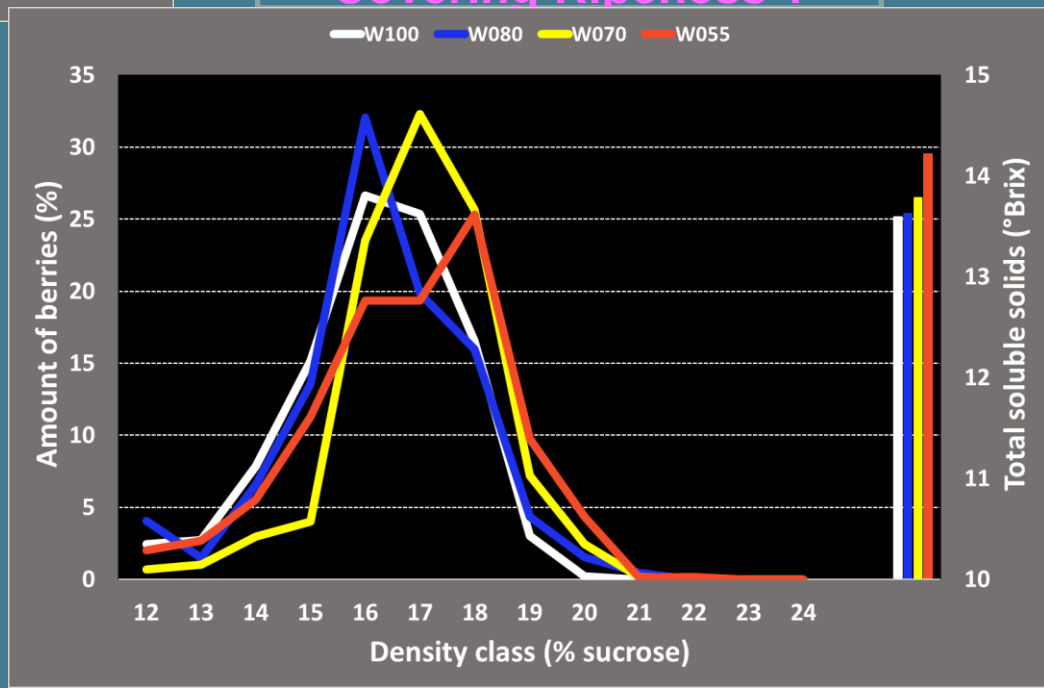




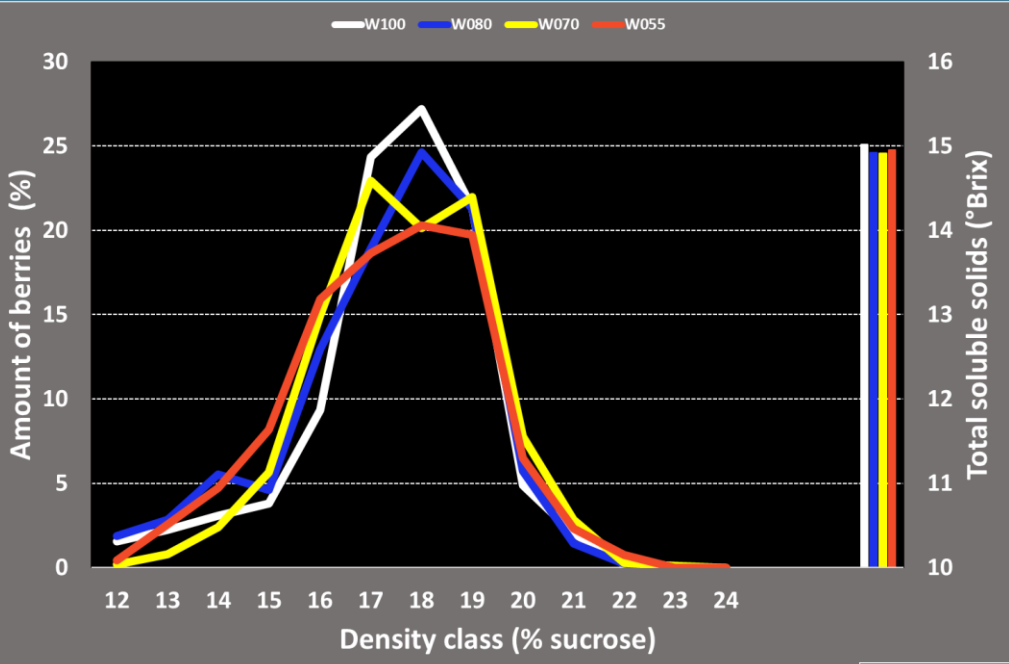
Open Field Ripeness 1



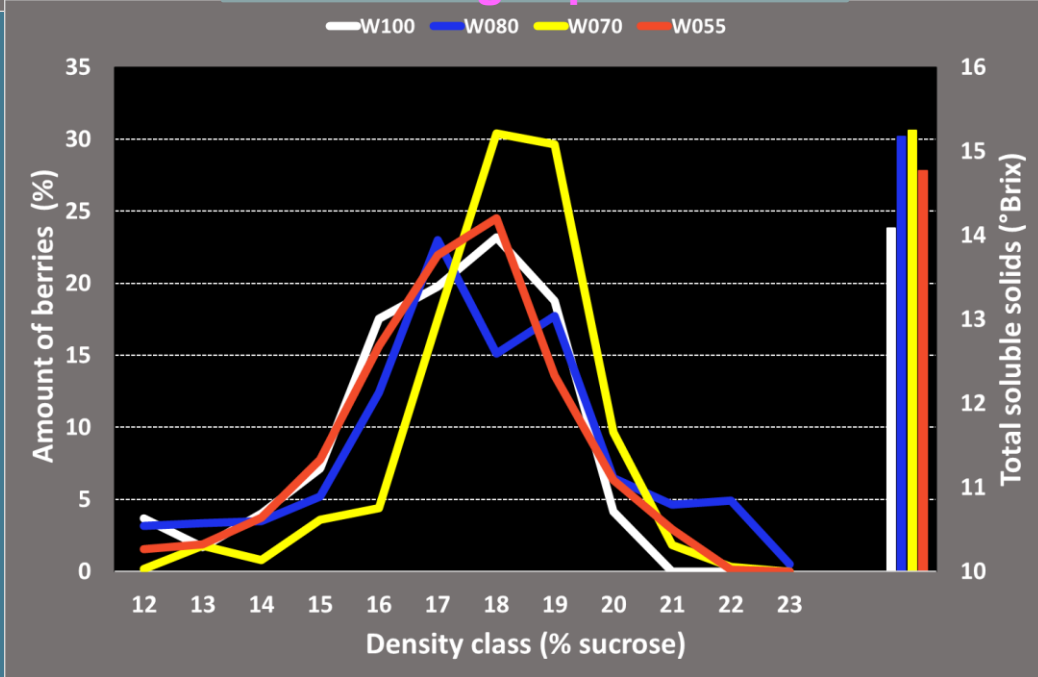
Overhead Plastic Covering Ripeness 1



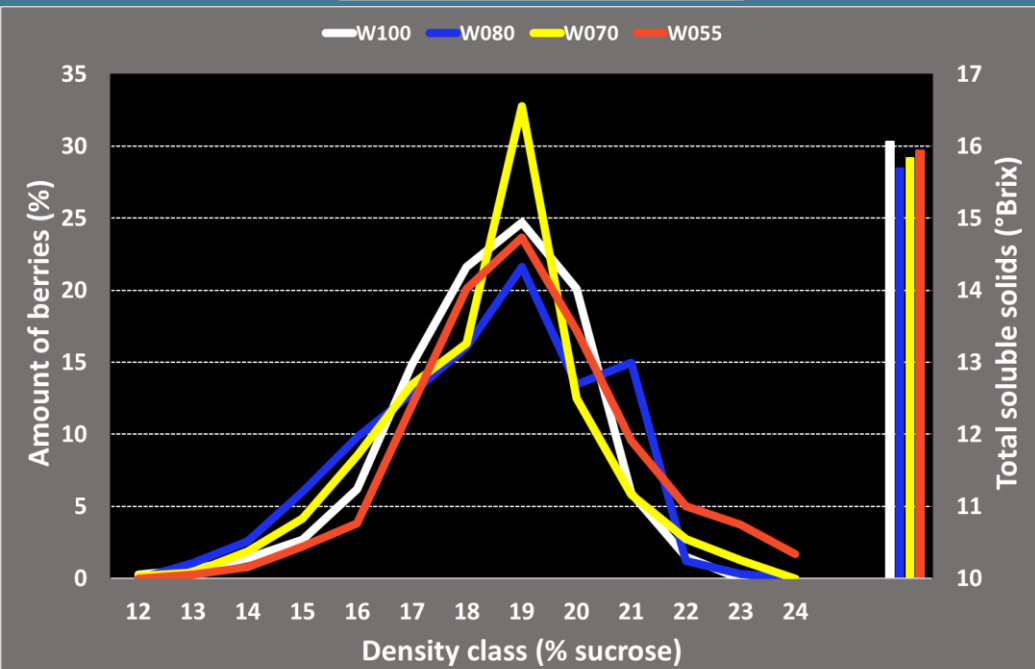
OF Ripeness 2



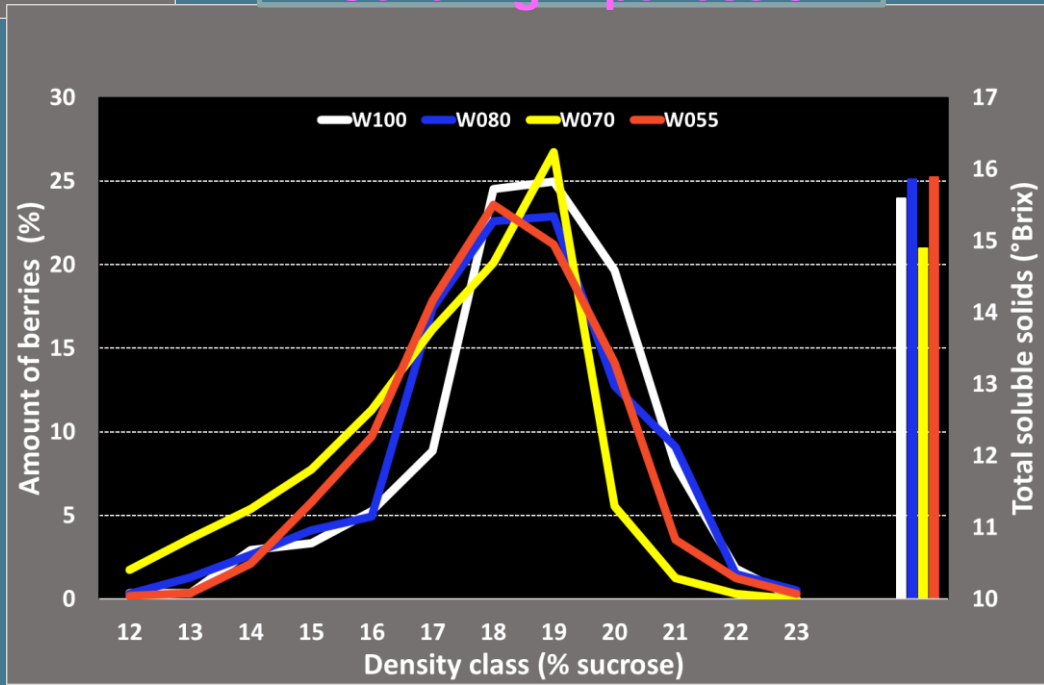
Overhead Plastic Covering Ripeness 2



OF Ripeness 3

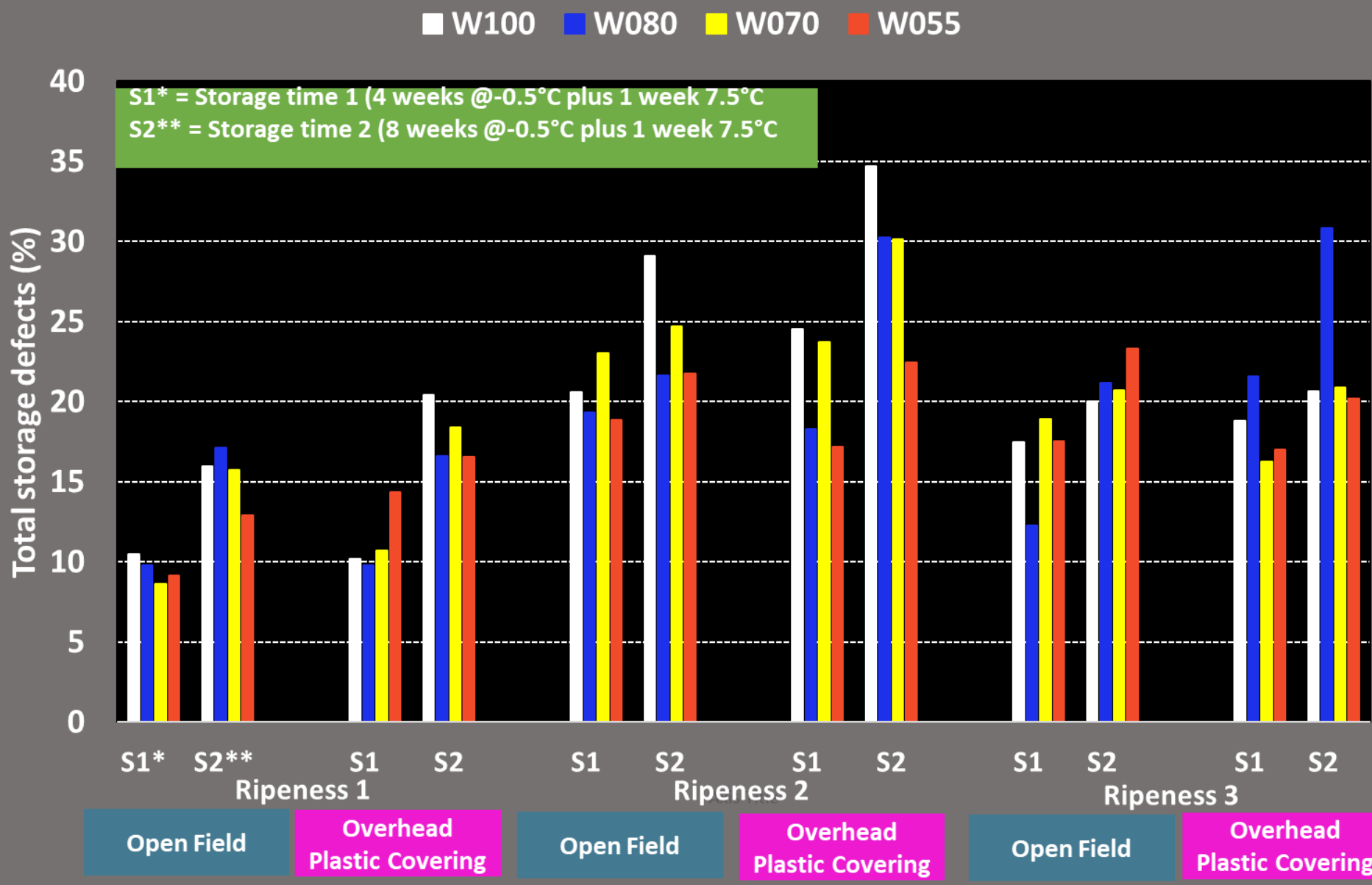


Overhead Plastic Covering Ripeness 3



Days after full bloom							
Treatment	5 weeks before harvest	3 weeks before harvest	1 week before harvest	Ripeness 1	Ripeness 2	Ripeness 3	
	OF W100	1.03	1.18	1.02	-4.08	-4.05	-3.96
OF W080	1.04	1.11	0.42	-4.11	-4.11	-3.98	
OF W070	1.08	0.52	-1.58	-4.11	-4.18	-4.09	
OF W055	1.08	1.43	-0.98	-3.99	-4.11	-3.57	
OPC W100	1.03	1.70	1.70	-1.82	-3.94	-2.95	
OPC W080	1.07	1.32	2.01	-2.99	-4.22	-3.71	
OPC W070	1.02	1.43	1.55	-4.18	-4.46	-4.39	
OPC W055	1.04	1.19	1.22	-3.97	-4.22	-4.40	

Colour Index



Conclusions

- Statistical analyses to confirm trends in research data
- Water affects grape quality before and after storage
- Vineyard climatic conditions affect grape quality before and after storage
- High humidity values and transpiration rates under OPC
- Low light conditions under OPC in this trial delays ripening
- Covering vineyards
 - Purpose of covering – earlier ripening, protection, delay harvest
 - Know your plastic – PAR and UV transmittance
 - Adapt cultivation practices

Acknowledgements

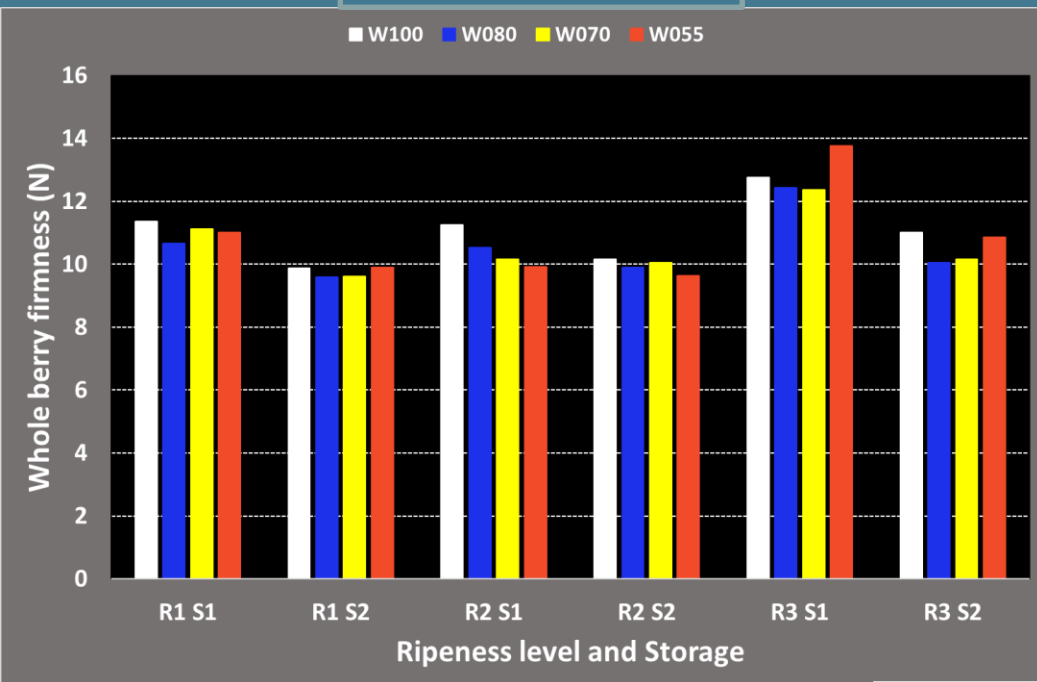


Research project:

- Hendrik Davids & staff of Imdawo-Ekühle (Pty) Ltd, Vergelegen, Robertson
- ARC Infruitec-Nietvoorbij technical support
- Funders



OF



OPC

