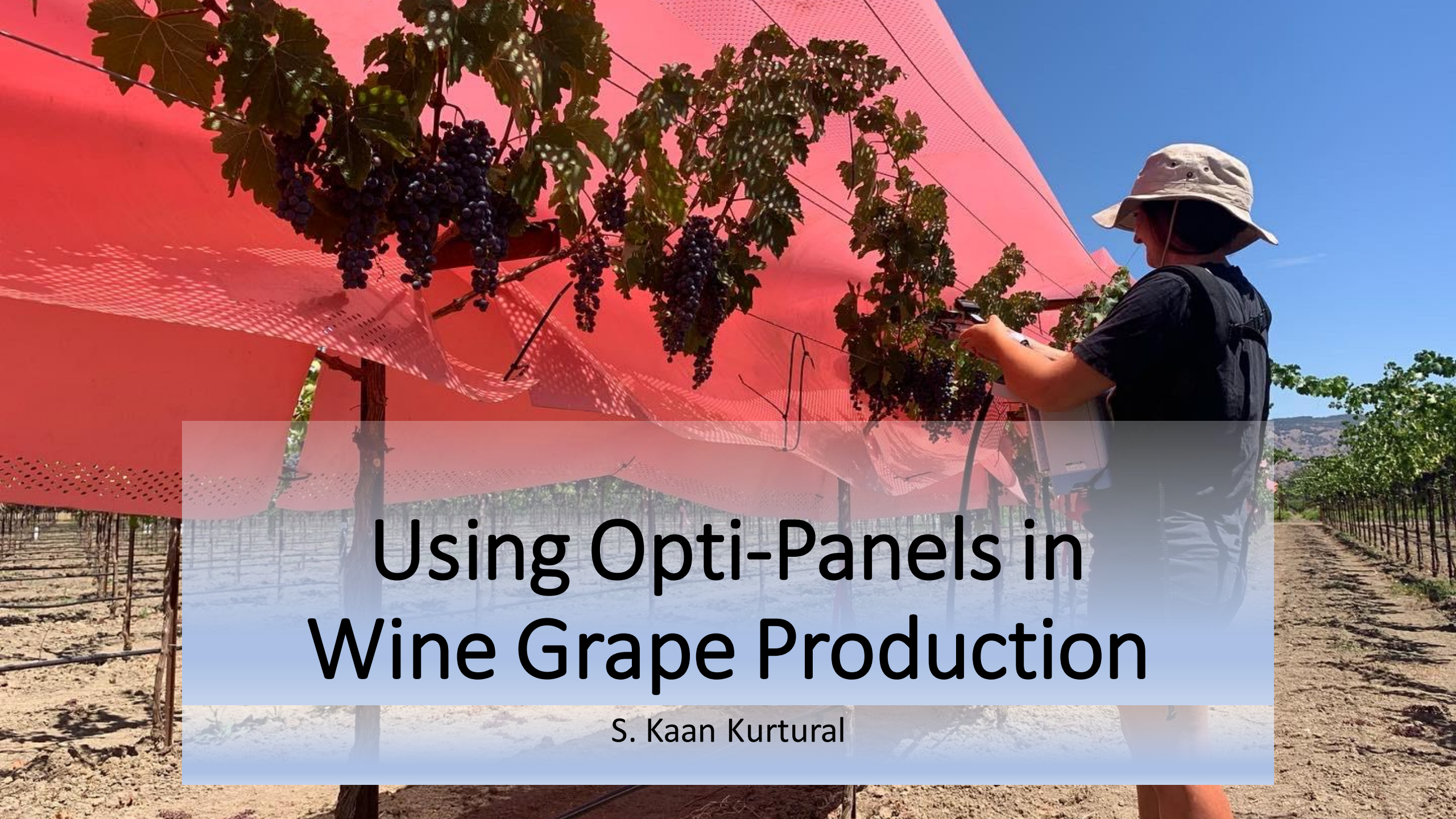


Using Opti-Panels in Wine Grape Production

S. Kaan Kurtural

Impacts of high temperature on grape berry

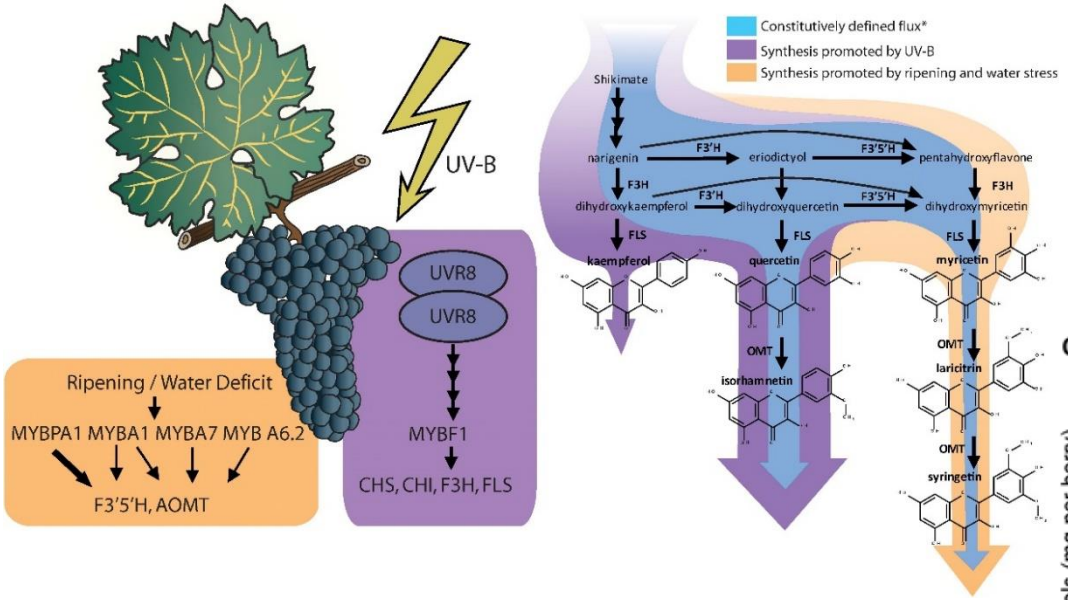
Examples of clusters with **no damage** used for the evaluation at harvest.

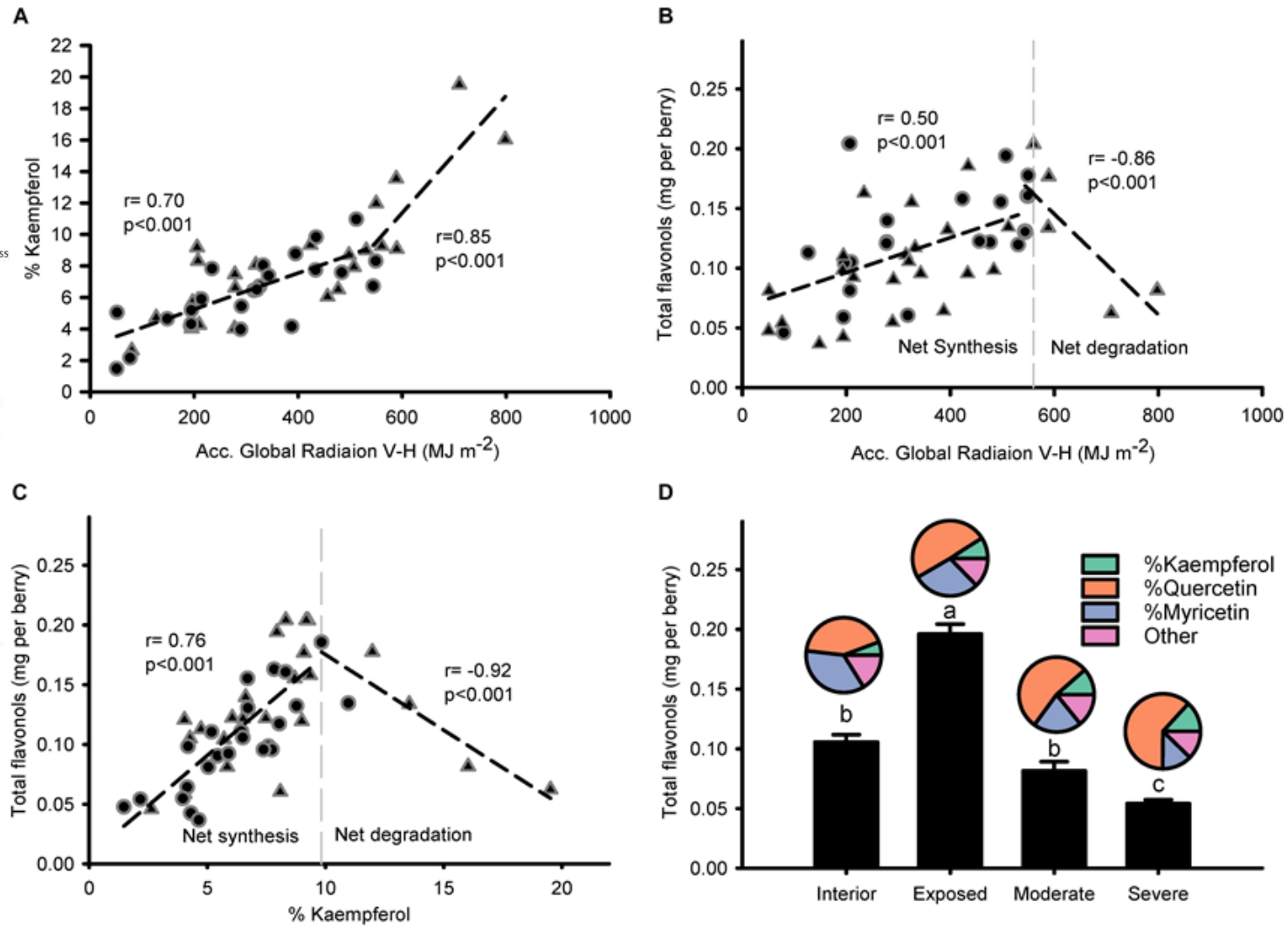
Examples of clusters with **severe damage** used for the evaluation at harvest. Note most berries are discoloured or dehydrated and ripening impaired.

- **Yield loss**
  - Smaller berry size
- **Shriveling**
  - Bunch stem necrosis
- **Crop failure**
  - Return bloom

Water deficits	↑
Vapor pressure deficit	↑
Applied water requirements	↑

Grape berry IS the datalogger



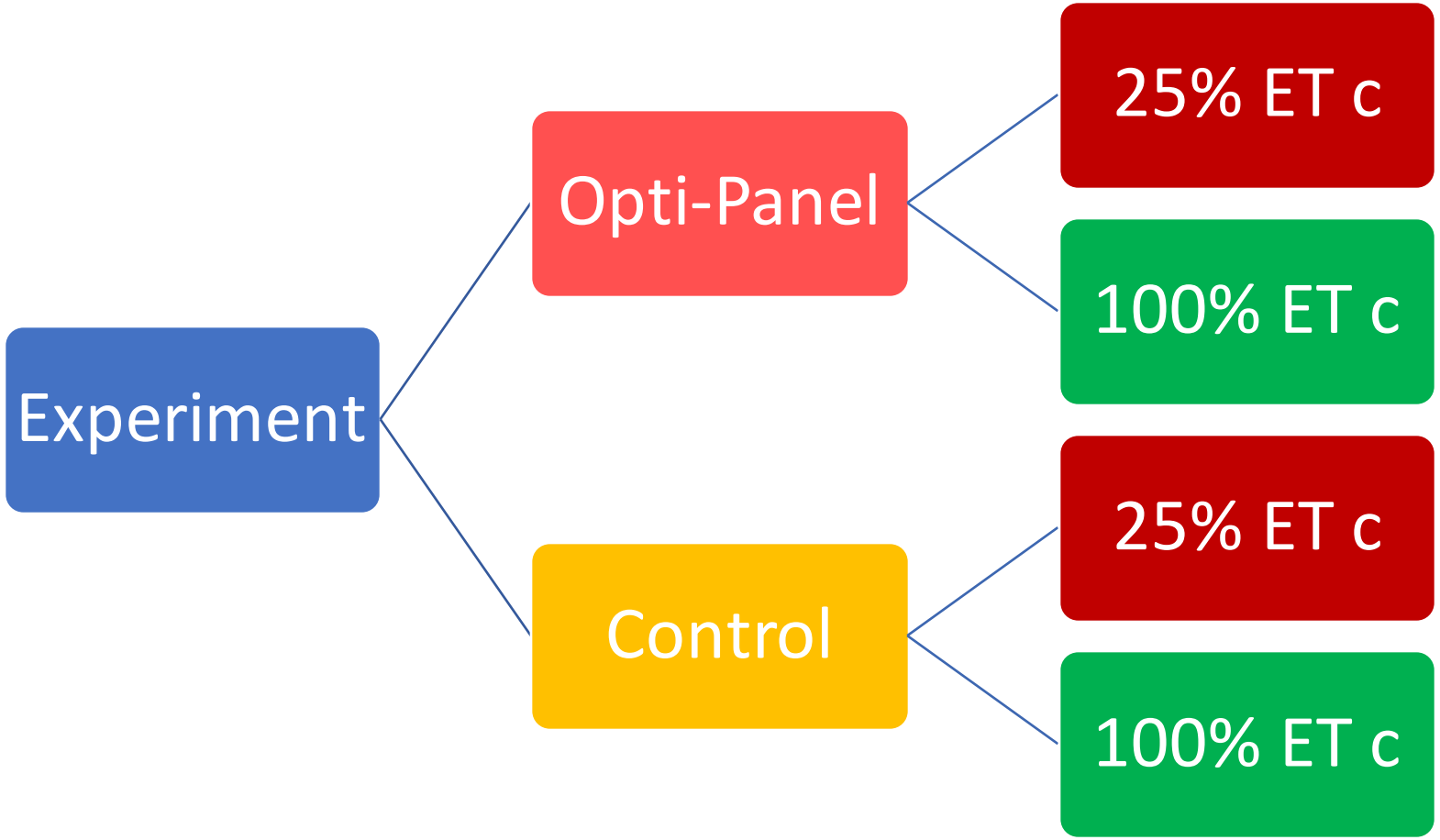


Martinez-Luscher et al. 2019; © UC Regents
Kurtural et al, 2022 US Patent US20210333257A1

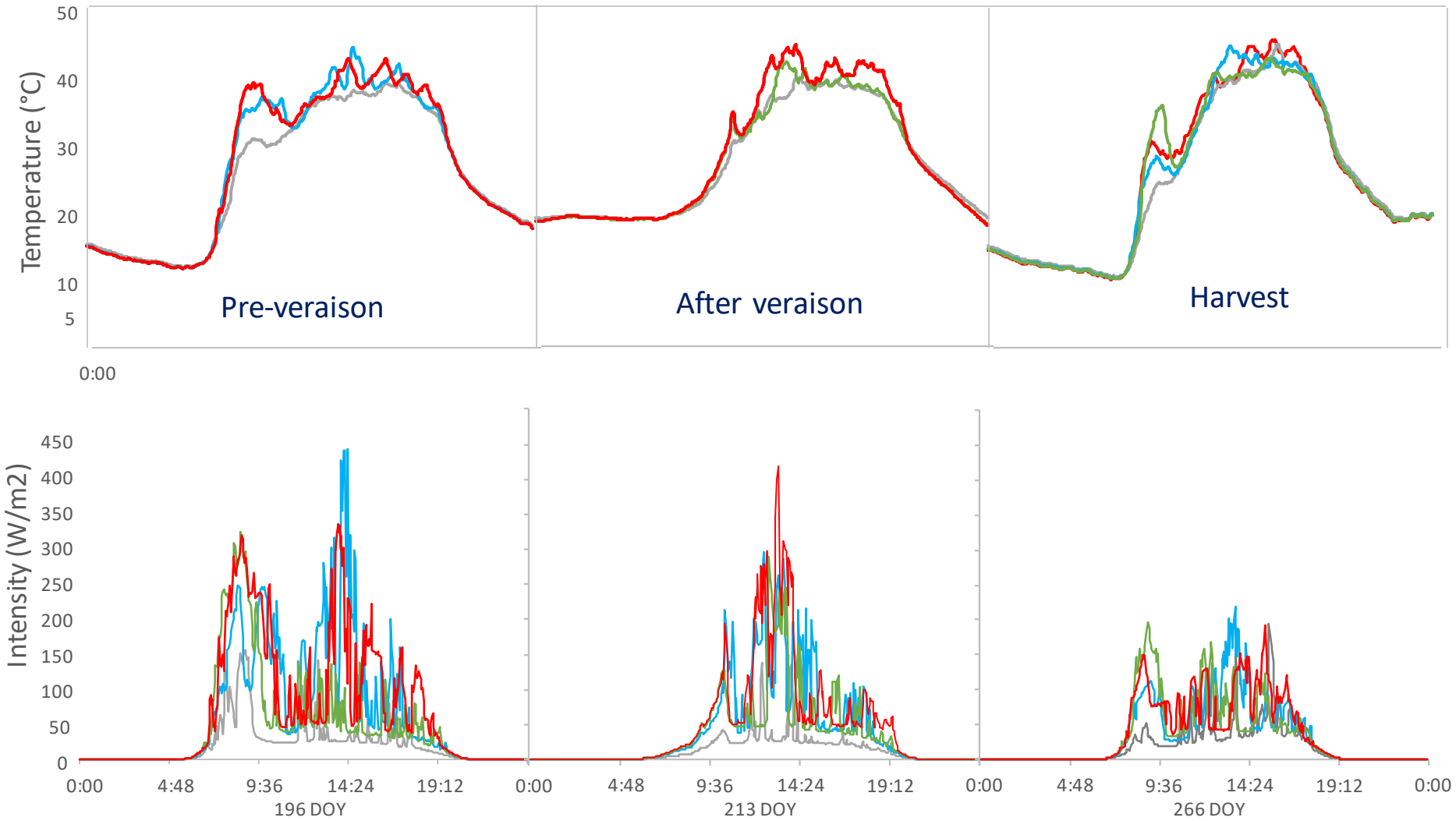
Objective

- Can Opti-Panel application at *veraison* reduce:
  - Berry temperature
  - Dehydration
  - Maintain yield
  - Flavonoid degradation

Experimental design



Impact of Opti-Panels on berry temperature



Leaf gas exchange with Opti-Panels

	3 August 2022		10 August 2022		16 August 2022		30 August 2022	
Shading	A	gs	A	gs	A	gs	A	gs
Uncovered Control	11.2 b	110.8 b	10.7 b	108.3 b	10.4 b	106.8 b	9.8 b	102.7 b
Opti-Panel	13.1 a	130.4 a	12.2 a	122.7 a	11.8 a	118.3 a	11.4 a	118.7 a
P	0.0358	0.0004	0.0023	0.0002	0.0361	0.0014	0.0471	0.0037
Irrigation								
100% ET crop	14.2 a	150.8 a	13.8 a	128.7 a	12.6 a	122.7 a	11.8 a	118.7 a
25% ET crop	9.8 b	98.7 b	10.1 b	99.8 b	9.8 b	100.6 b	9.2 b	98.3 b
P	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Shading x Irrigation	0.3257	0.9871	0.3691	0.2579	0.4561	0.3667	0.1781	0.1178

Components of yield with Opti-Panels

Shading	Berry mass(g)	Cluster weight (g)	Cluster no.	Yield (kg/vine)
Uncovered Control	1.12	102.2	18	1.84
Opti-Panel	1.14	103.4	18	1.86
P	0.2235	0.0944	-	0.7721
Irrigation				
100% ET crop	1.21 a	110.2 a	18	1.98 a
25% ET crop	1.08 b	98.1 b	18	1.76 b
P	0.0311	0.0003	-	0.0211
Shading x Irrigation	0.2215	0.3367	-	0.5514

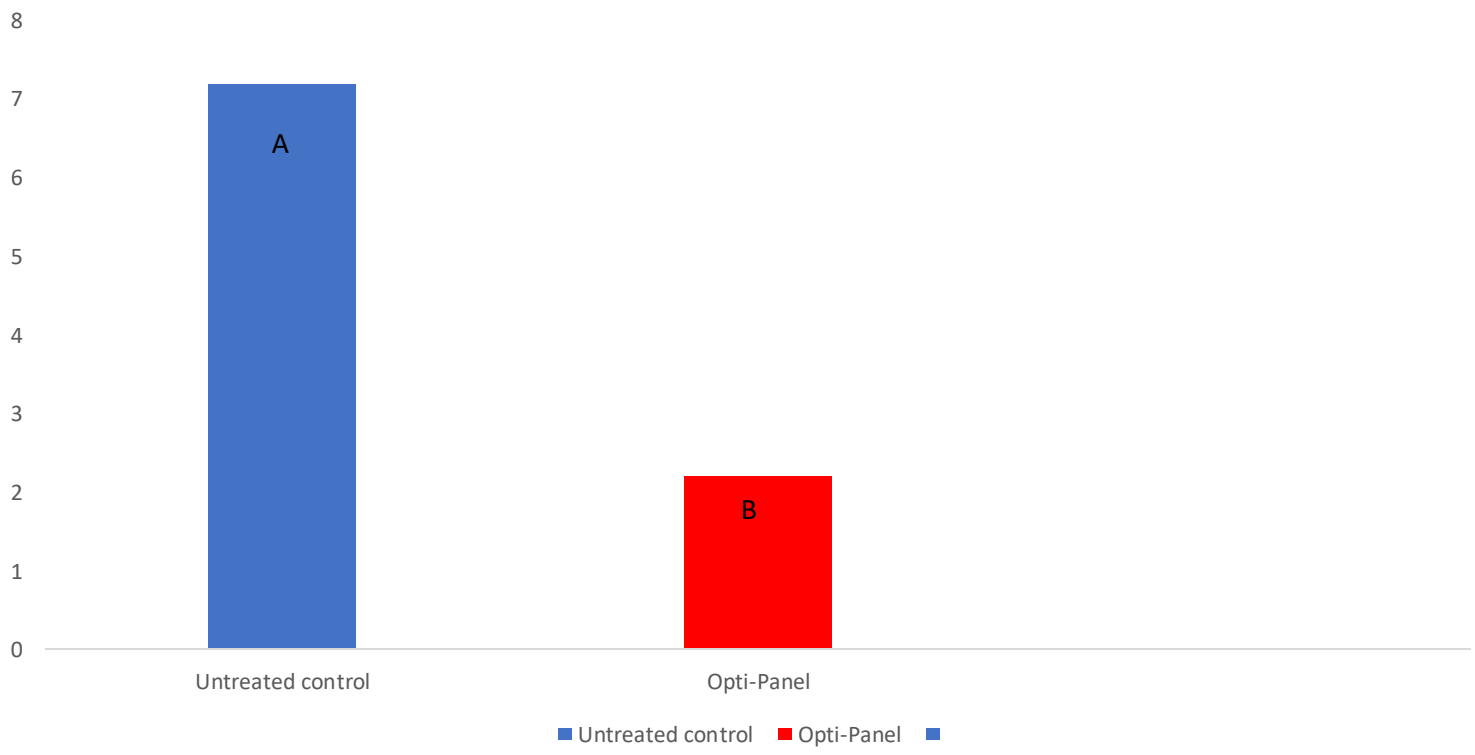
Berry Composition with Opti Panels

Shading	Berry mass(g)	TSS(%)	Juice pH	TA (g/L)
Uncovered Control	1.12	28.2 a	3.77	6.9 b
Opti-Panel	1.14	26.1 b	3.77	7.2 a
P	0.2235	0.0001	0.8871	0.0022
Irrigation				
100% ET crop	1.21 a	25.2 b	3.78	7.0 a
25% ET crop	1.08 b	28.1 a	3.76	6.4 b
P	0.0311	0.0001	0.9914	0.0112
Shading x Irrigation	0.2215	0.5547	0.7714	0.7712

Effects on anthocyanin content and composition

Shading	Total skin anthocyanins (mg/berry)	3'4'5' to 3'4'OH anthocyanins	Total skin flavonols (mg/berry)	3'4'5' to 3'4'OH flavonols
Uncovered Control	1.81 b	18.2	0.11 a	0.7 b
Opti-Panel	2.20 a	18.1	0.06 b	1.4 a
P	0.0001	0.9945	0.0001	
Irrigation				
100% ET crop	1.88 b	18.2	0.05 b	1.3 a
25% ET crop	2.22 a	19.2	0.11 a	0.6 b
P	0.0022	0.5541	0.0091	0.010
Shading x Irrigation	0.2356	0.1124	0.7319	0.7712

Effects of Opti-Panels on Overexposure Biomarker: kaempferols (% molar abundance)



Conclusions

- Partial solar radiation exclusion with Opti-Panel
  - Maintained leaf gas exchange
  - Turgid berry
  - Arrested flavonoid degradation
  - Reduced plant water demand
  - Reduced overexposure of grape berry