

Ecklonia maxima enhances photosynthesis, NUE and yield under semi-arid conditions

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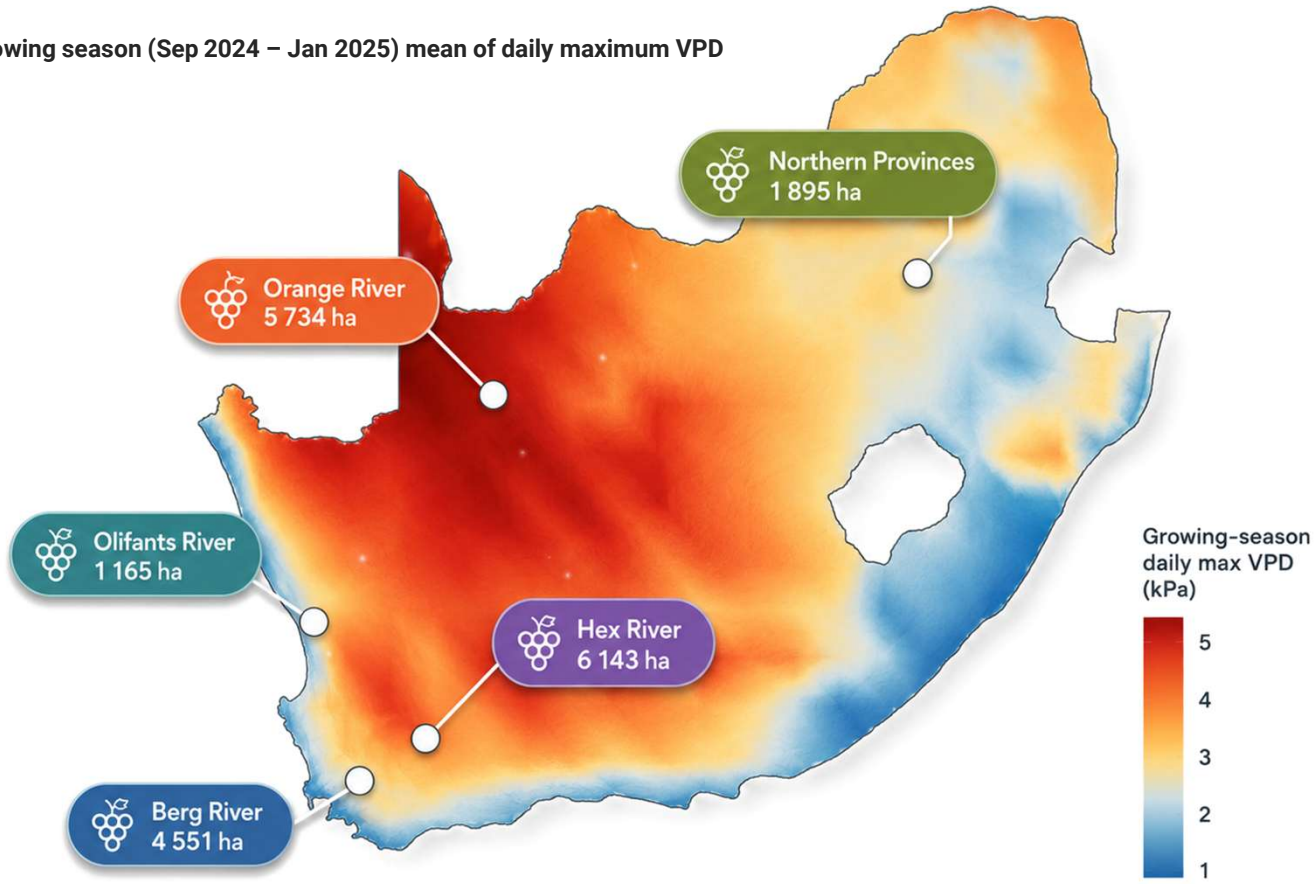
AFRIKELP

nurturing growth

Table grape conference 2026

Background
Table grape production in semi-arid regions

Growing season (Sep 2024 – Jan 2025) mean of daily maximum VPD



CHALLENGES

- High temperatures
- Intense radiation
- Water limitation

REDUCE

- Photosynthesis
- Nutrient use efficiency
- Fruit quality
- Marketable yield

VPD surface interpolated from a 0.75° grid of ERA5 daily maximum VPD (Open-Meteo, model-derived reanalysis).
ERA5 under-resolves narrow mountain valleys, so fine-scale coastal/montane detail is smoothed; the map shows the regional gradient, not farm-scale values.

Seaweed extracts in grape production

SWEs can improve root growth, nutrient uptake, photosynthesis, stress tolerance, quality and yield.

Benefit	Table grape implication	Reference
Root growth	• Builds root mass and finer feeder roots.	Singh et al. 2025
Nutrient uptake	• Helps roots access phosphorus	Masoud and Alsanosy,. 2025.
Photosynthesis	• Bigger, greener leaves have better photosynthetic efficiency.	Saleh et al., 2026
Stress tolerance	• Benefits for heat stress and sunburn.	Wu et al., 2024
Quality	• Improved colouring • Preharvest sprays improve shelf life	Samuels et al., 2022
Yield	• Increased berry size and pack out	Doğan and Yazar., 2025

Ecklonia maxima seaweed extract





1. Endemic to Southern Africa
2. Fast growing brown kelp
3. Increased distribution range past 20 years *(Smale 2020)*

Temperature, radiation and vapour pressure deficit (VPD) – Upington, Northern Cape

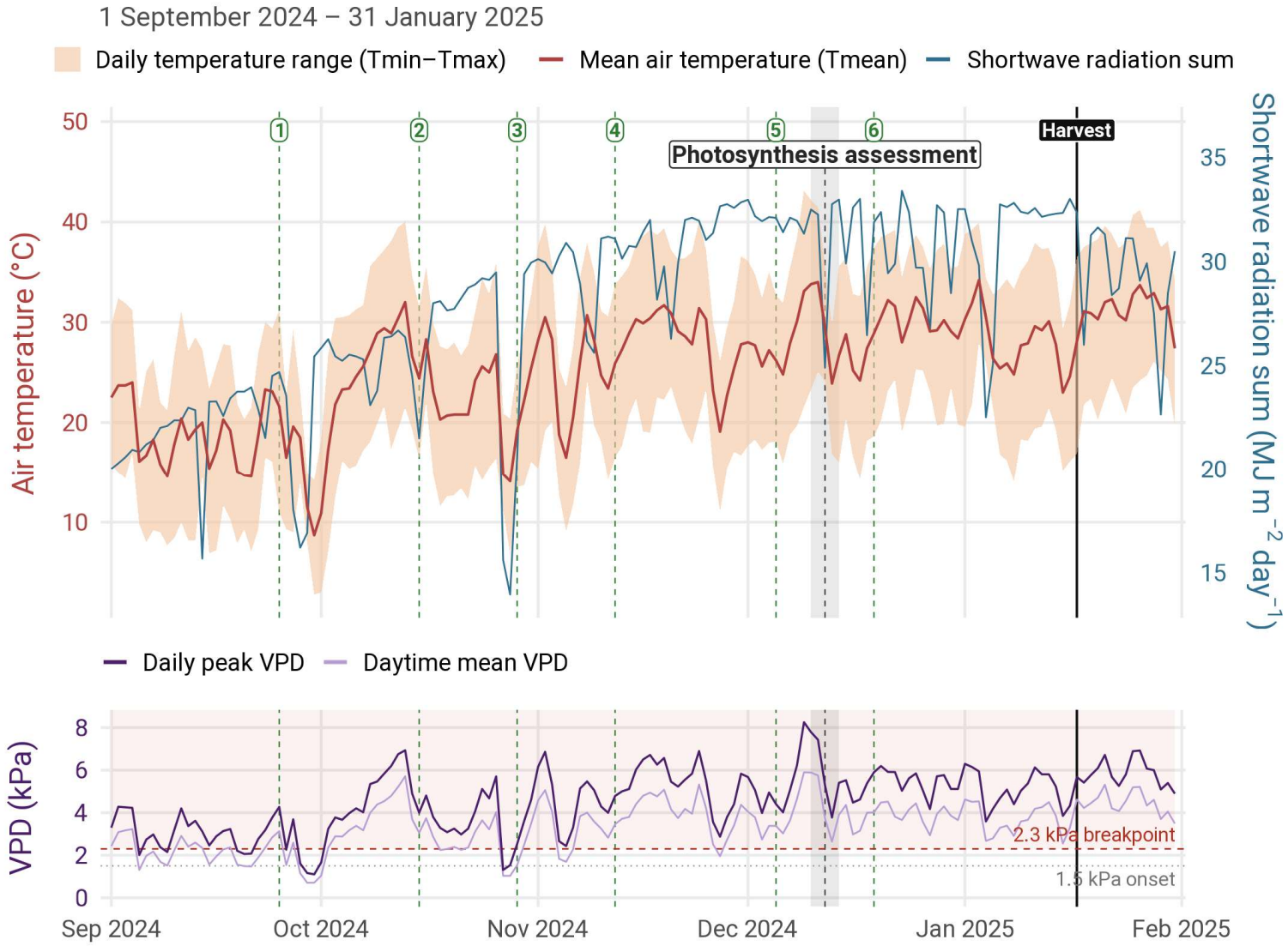
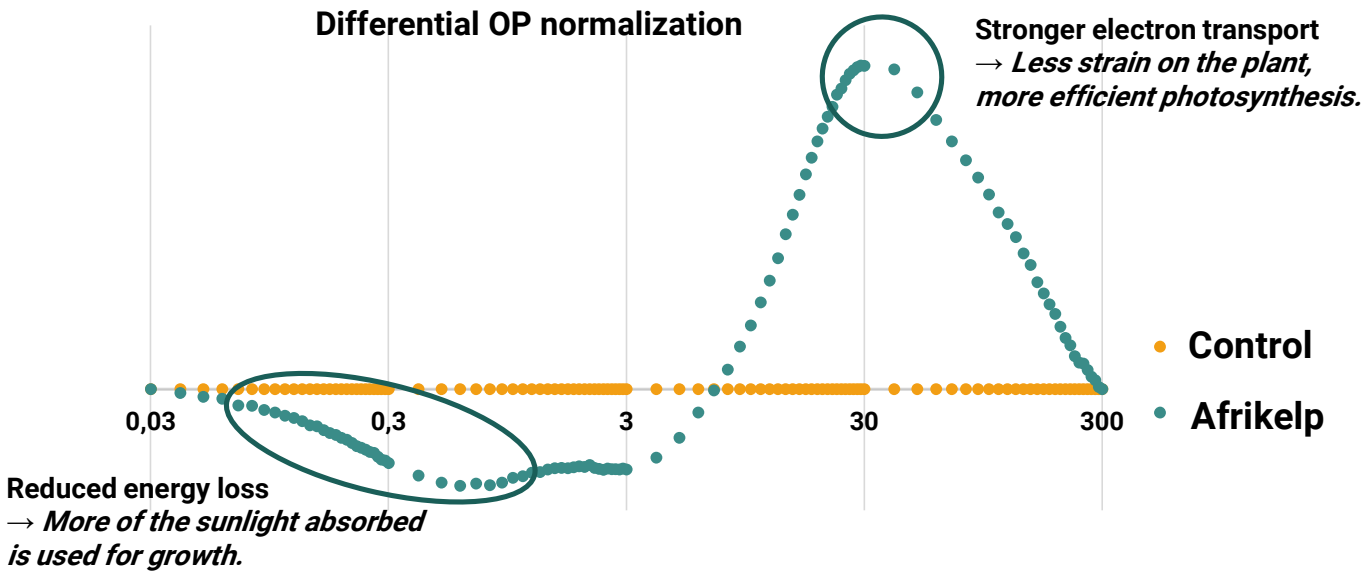


Table grapes (Mature vines)
Application programme

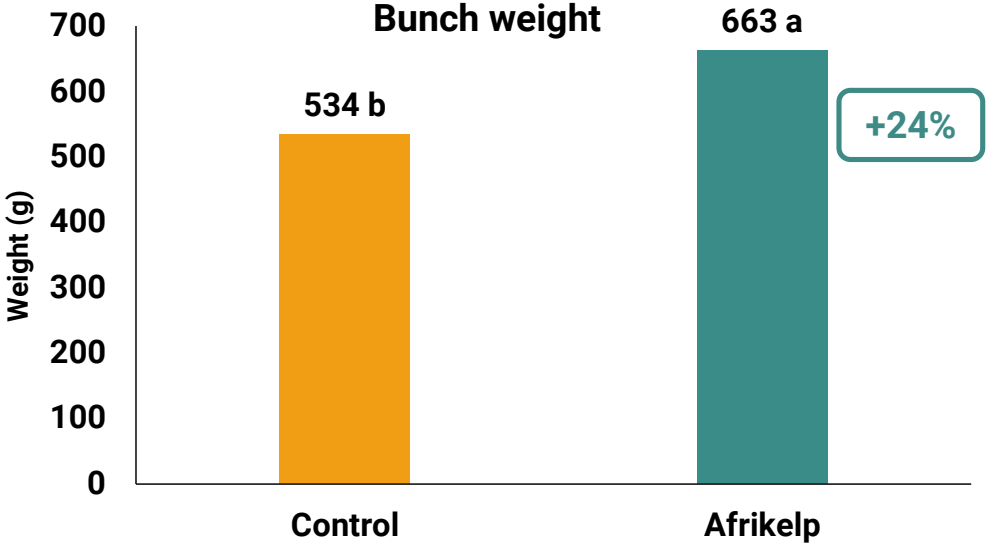
Rachis stretching	Berry growth	Veraison
		
<u>Application 1</u> **Foliar spray at 2-4 cm rachis length** **3 l/ha**	**<u>Applications 2 - 4</u>** **Foliar application at 4-6 mm berry size. Repeat at 14 days intervals with the last application at 14 mm berry size** **3 l/ha**	**<u>Application 5 - 6</u>** **Foliar spray at veraison. Repeat 14 days later** **3 l/ha**
Lengthen the cluster and improve shoot growth.	**Increase berry size and uniformity.**	**Improve quality, colour and/or finish.**

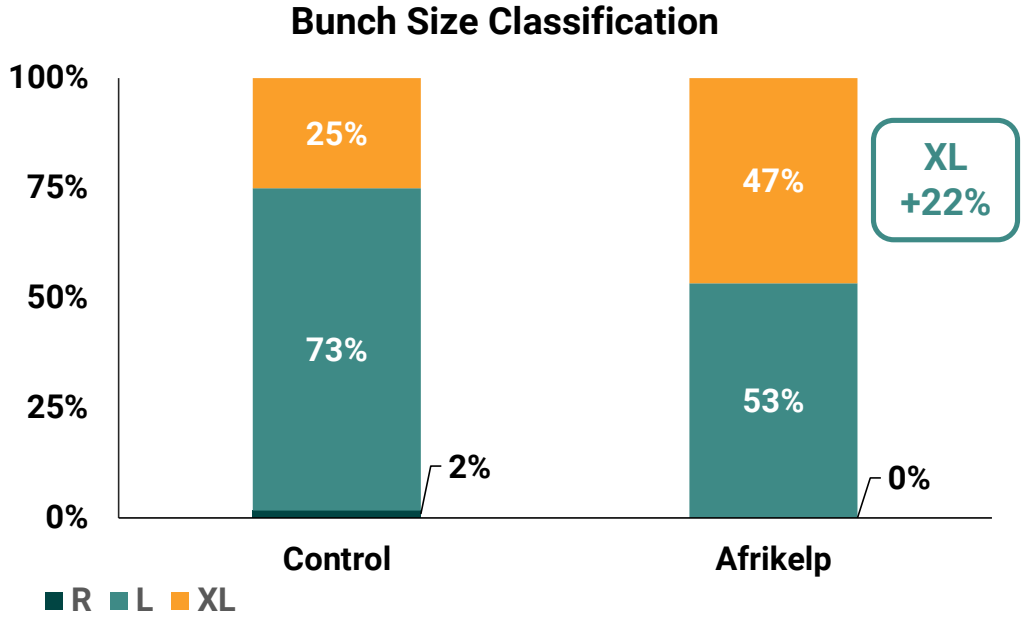
Key findings
Chlorophyll fluorescence at berry softening



F_v/F_m	ABS/RC	DIo/RC	PI_abs
+3.0%	–12.0%	–24.2%	+39.0%
Healthier leaves that use light better	Each working part carries less load	Less energy wasted as heat	A stronger, harder-working vine

Key findings
Bunch weight and size distribution



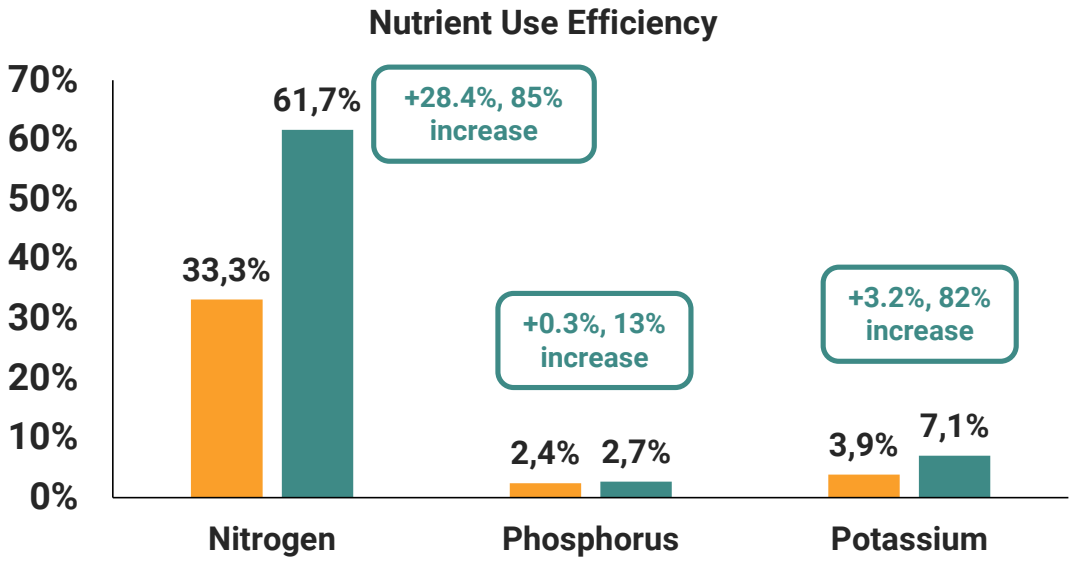


Larger bunches and more uniform berry size.

Berry Size Grading (mm)	
Regular	16
Large	18
Extra-Large	20

*** > 5% smaller berries - smaller size**

Key findings
Nutrient use efficiency

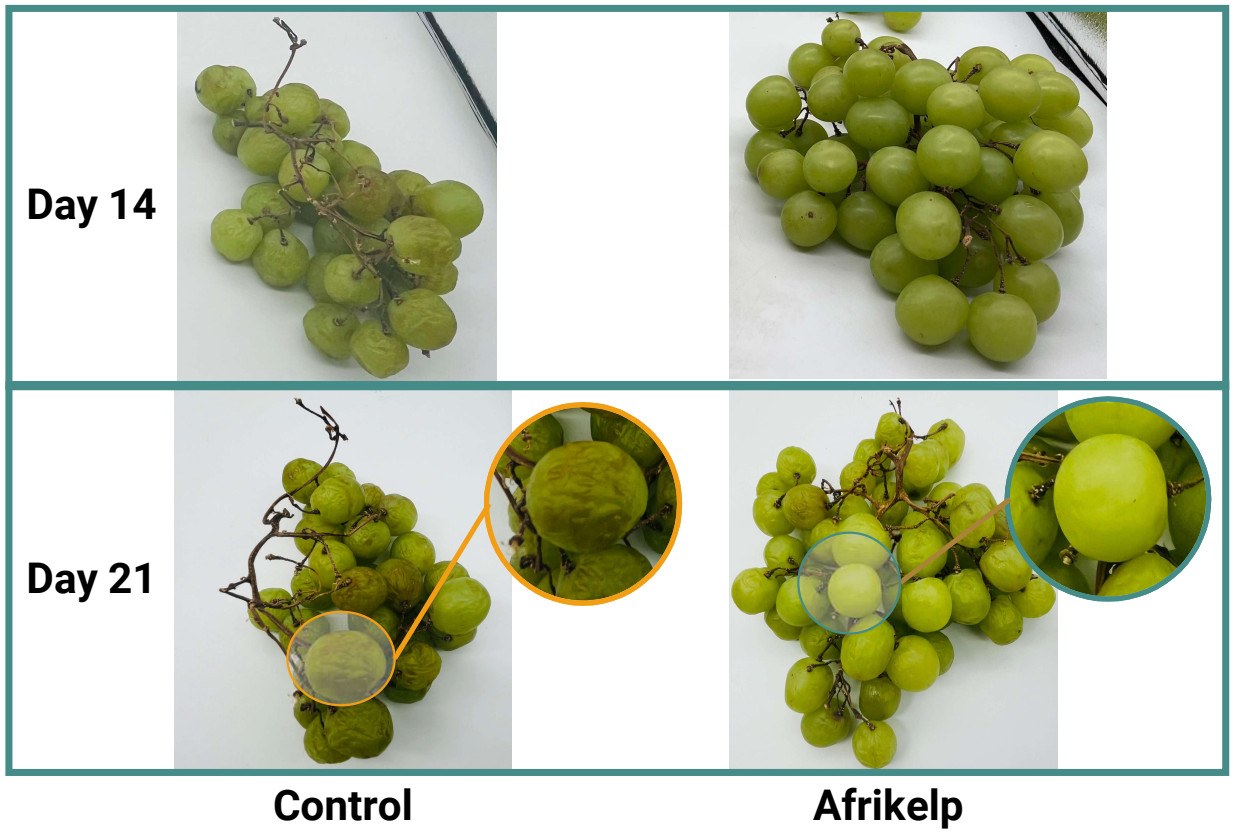


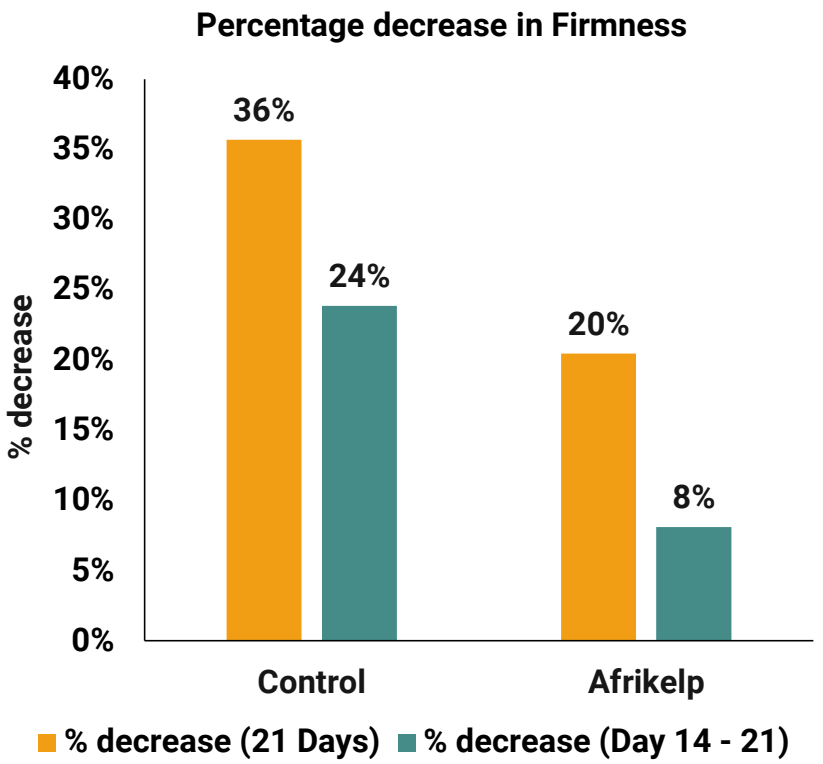
NUE determines how effectively plants absorb and use fertiliser.

Nitrogen (N)	Phosphorus (P)	Potassium (K)
• Canopy development • Chlorophyll formation • Photosynthesis • Overall vine vigour	Higher in perennial structures Long-term role in • energy transfer • root development • vine sustainability	Crucial nutrient for table grapes • Fruit quality • Sugar transport • Ripening

Key findings
Shelf life

Shelf-life assessment was conducted under accelerated conditions at 16˚C for 21 days.





Conclusion

1. SWE's can mitigate abiotic stress to protect crop production, quality and shelf life.

2. Continuous applications maintain photosynthetic efficiency under stress conditions.

3. Seaweed extract applications can improve nutrient use efficiency by improving uptake and assimilation.




THANK YOU
Nature is unpredictable.
Afrikelp isn’t.
AFRIKELP
nurturing
growth