

Novel Photoselective Trellis Panels Provide Multiple Horticulture Benefits for Table Grape Production and Protect Vineyards from Extreme Weather Events

10th INTERNATIONAL TABLE GRAPE SYMPOSIUM
Somerset West, SOUTH AFRICA 2023

Atiako Kwame Acheampong,

William L Peacock, Nick Booth, Yosepha Shahak Ravid

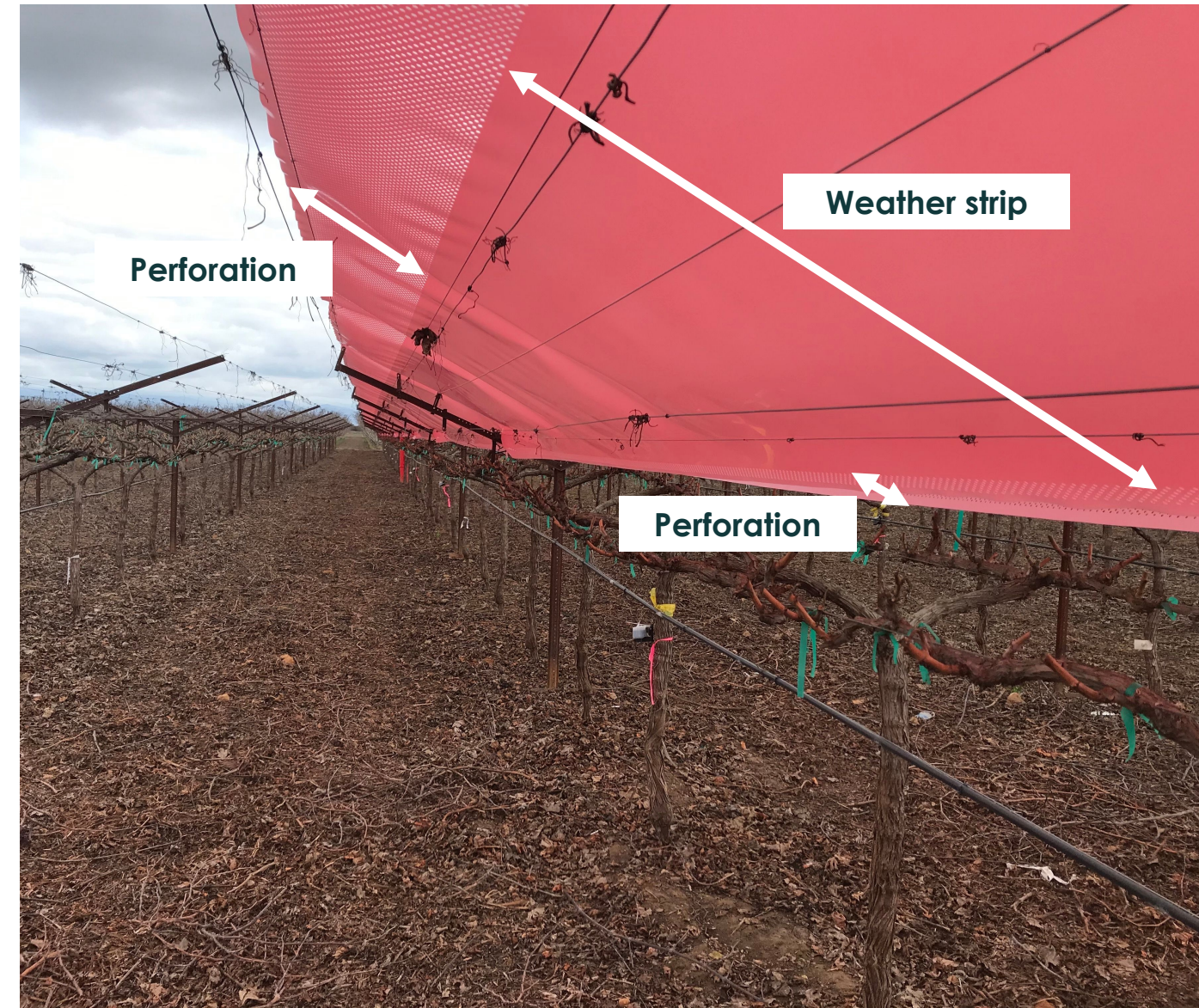




**Constraints of table
grape cultivation**



Opti-Panels developed for grape trellis systems



Durability

from a durable high-density polyethylene (HDPE) formula designed for 8–10-year lifespan.

Uniqueness

allows more natural sunlight to be blended with the Opti-Filter™ diffused, red-enriched light”.

Versatility

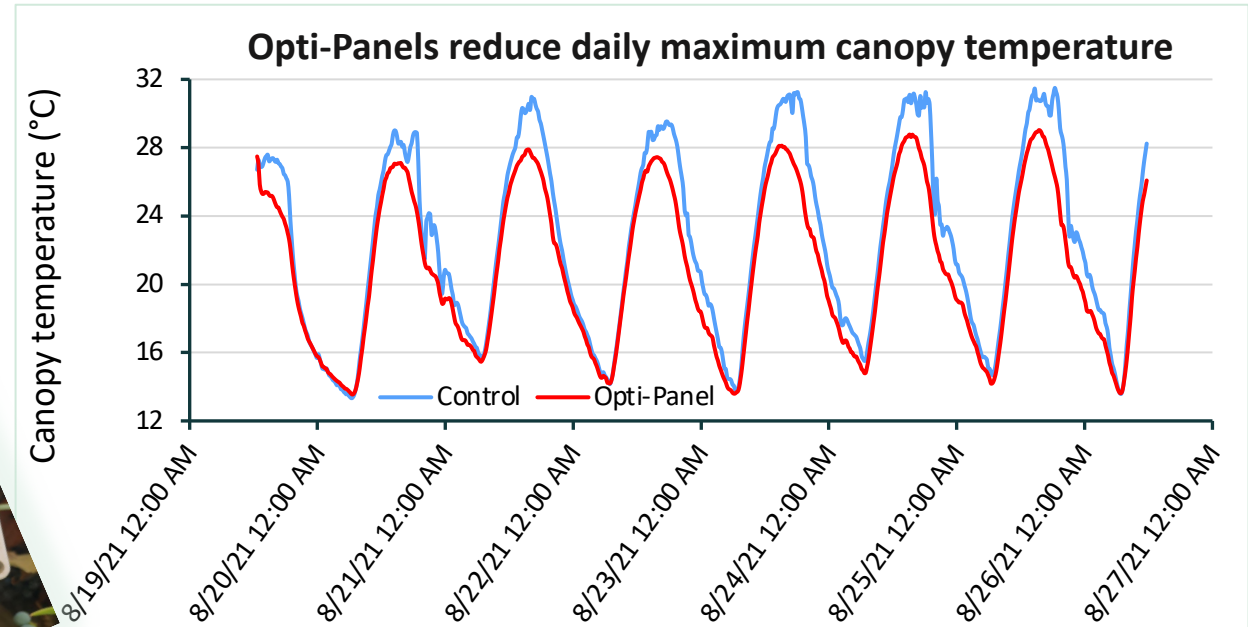
can be retrofitted into existing trellis structures or incorporated into a new trellis system for newly planted grapevines.

Sustainability

reclaims and recycles Opti-Panels at end of life in support of sustainable farming and circular economy.

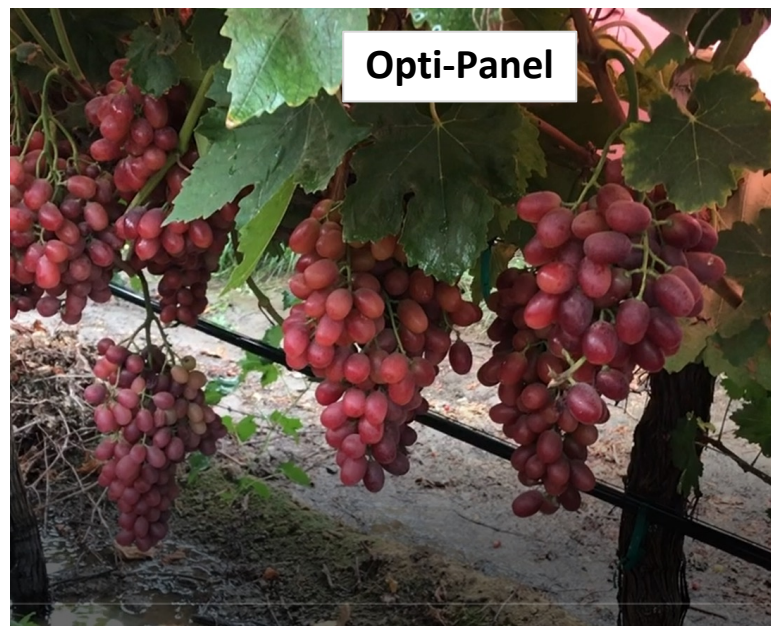
Protecting vines against adverse weather conditions

Reducing canopy air temperature



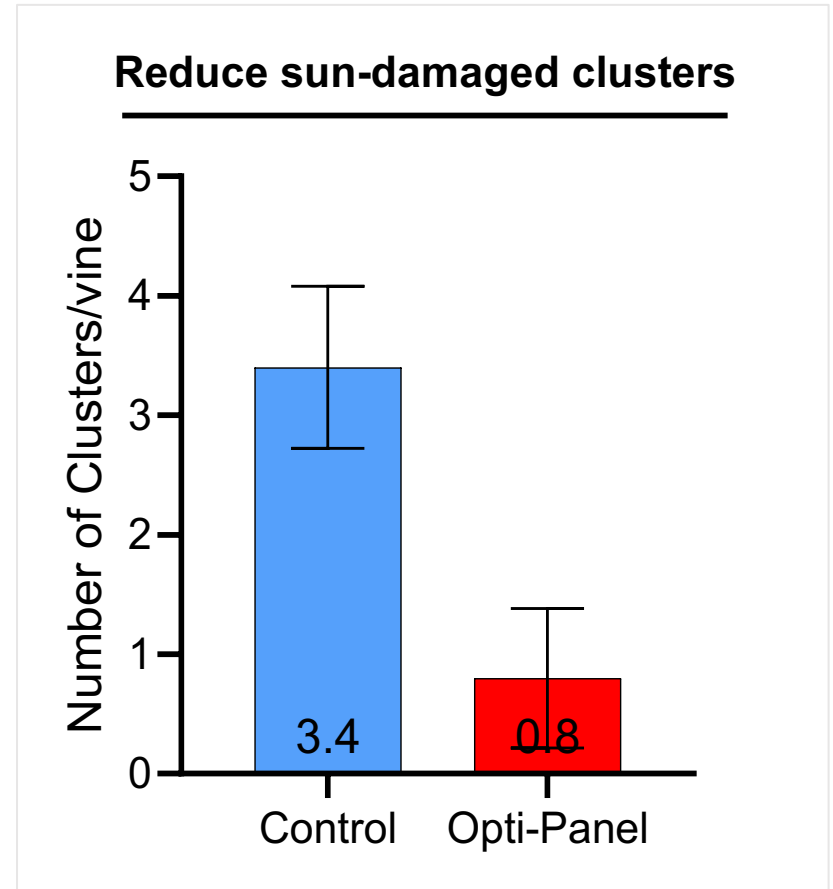
Opti-Panels reduce temperature in the canopy and round the fruiting zone

Opti-Panels reduce excessive radiation and heat damage



Opti-Panels significantly reduced sun-damaged clusters by **5-folds**

This illustrates the benefits of Opti-Panel in hot climates and/or areas prone to frequent heat waves due to climate change



Opti-Panels: a solution to the yearly ritual of plastic covering

Common-practice plastic covering
for rain protection



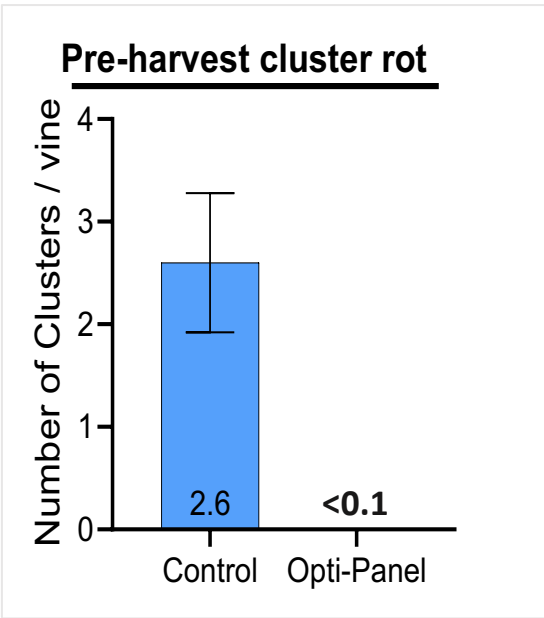
Opti-Panels



Opti-Panels are permanent installations that withstand strong winds and hail (Right).

A solution to the yearly installation, maintenance, removal, and disposal of the common-practice plastic film covering, that rip during wind events (Left).

Opti-Panels reduce pre- & post-harvest fungal decay



Opti-Panels prevent rain-caused pre-harvest decay



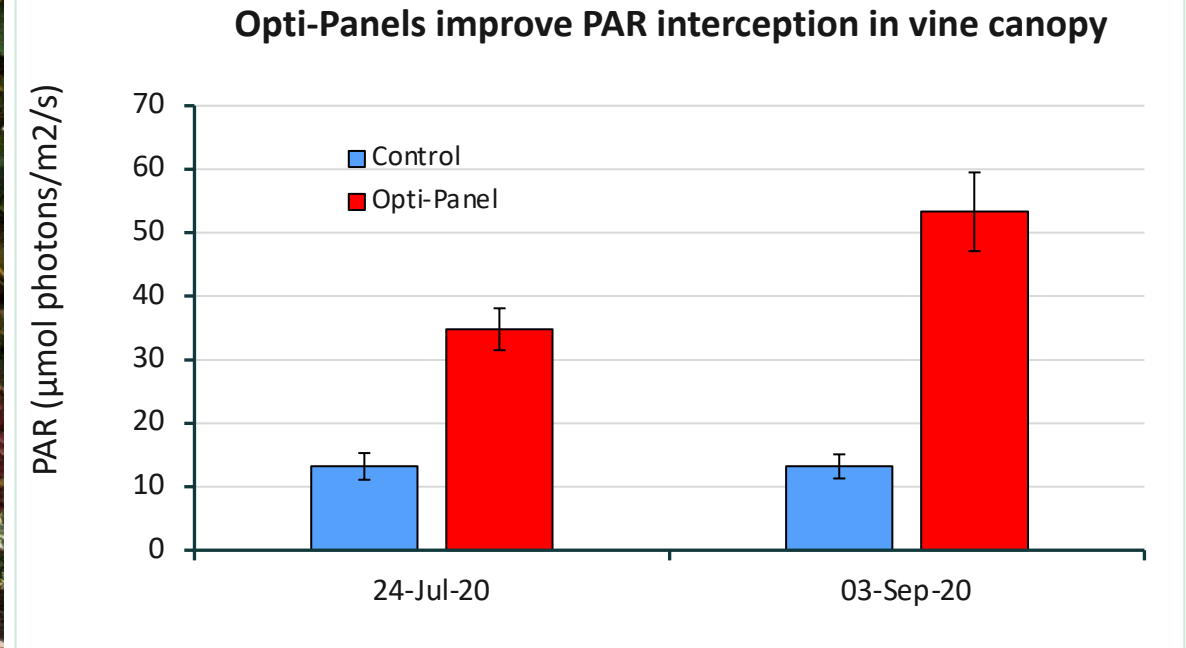
Common berry-rot-causing pathogens

Post-Harvest Decay Evaluation				
Proportion of berries infected with microbe (%)				
Treatment	Botrytis cinerea	Cladosporium	Penicillium sp.	Aspergillus niger
Opti-Panel	0.1	0.2	0	0.1
Plastic film	1.6	0.3	0.4	0.4

The Panels reduced the levels of incipient fungi and bacteria in the berries

Optimizing vine performance

Optimizing light interception in canopy and fruiting zone

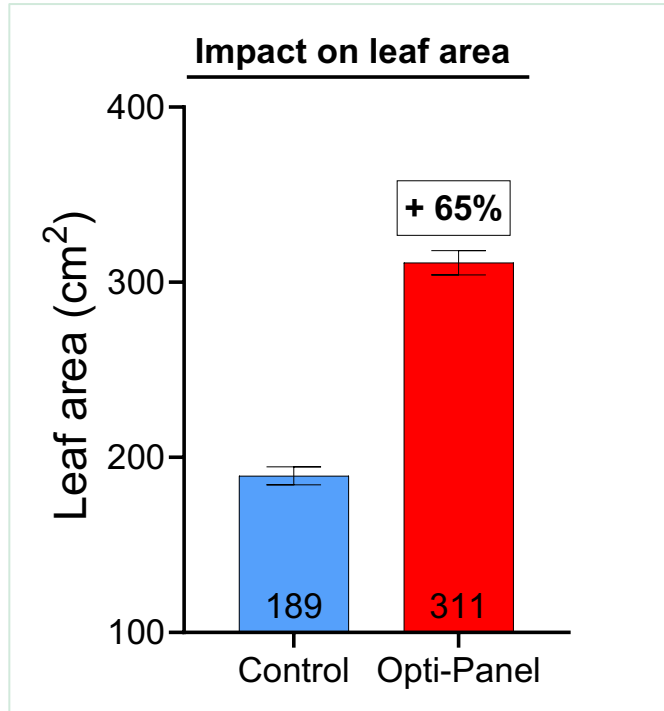
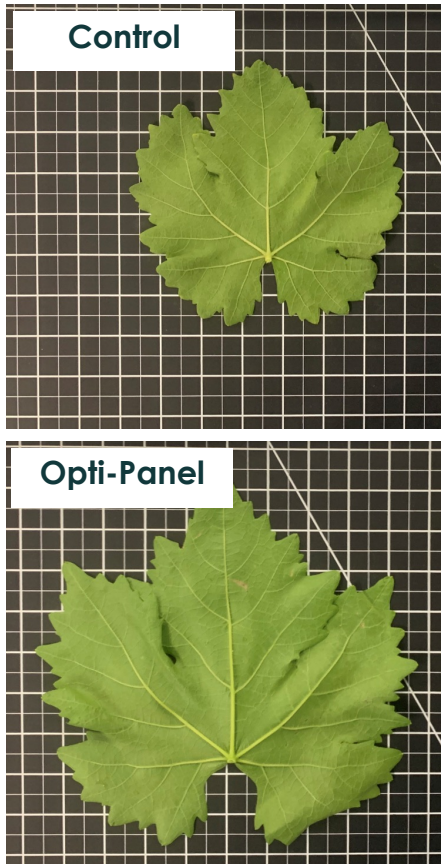


Opti-Panels increase PAR interception and penetration by **3-5 folds**

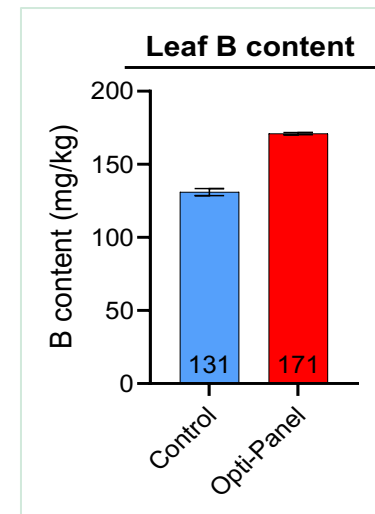
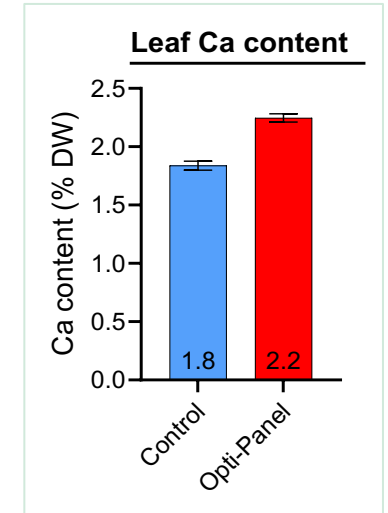
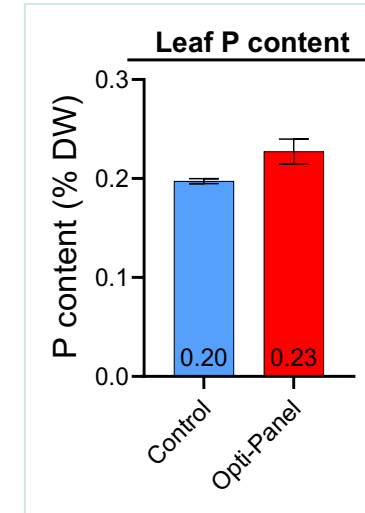
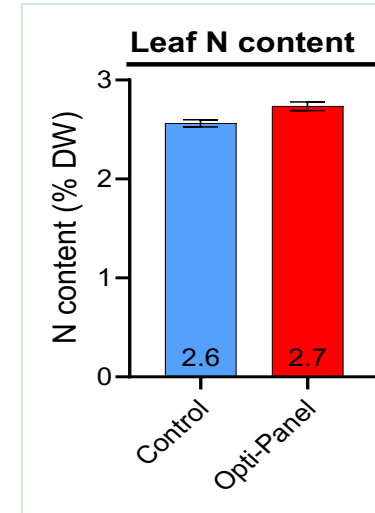
This enhances photosynthesis and other light-mediated vine processes such as berry ripening



Improving photosynthetic capacity and nutrient uptake



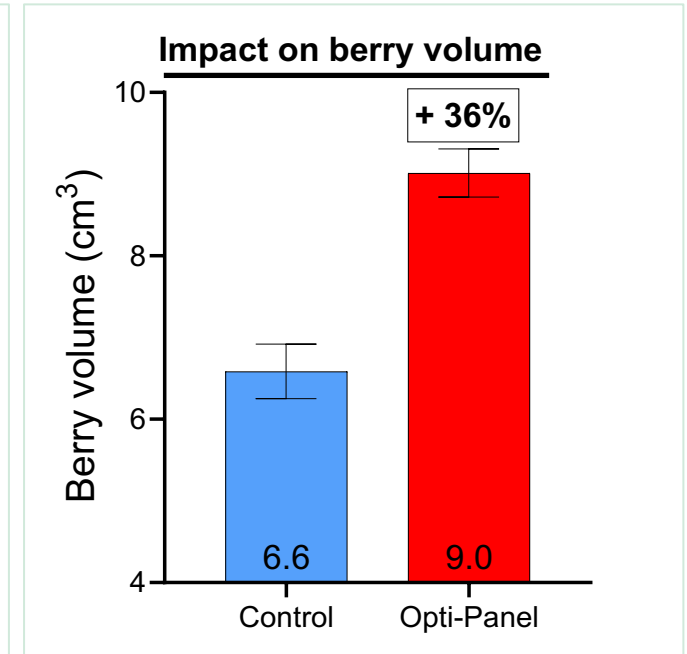
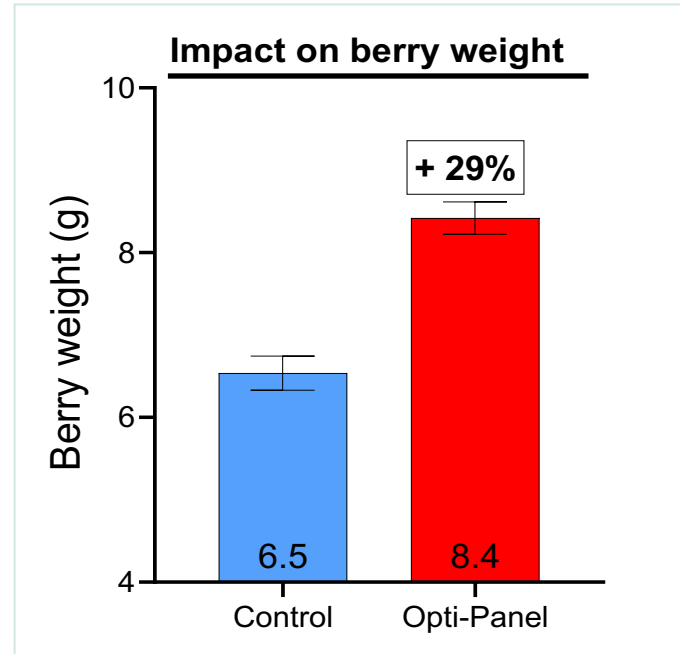
Opti-Panels increase leaf weight and leaf surface area



Opti-Panels enhance nutrient uptake and accumulation in the leaves due to better-developed *root system*

These enhance vine photosynthetic capacity

Improving components of yield



Opti-Panels -

- Increase berry weight
- Increase berry volume

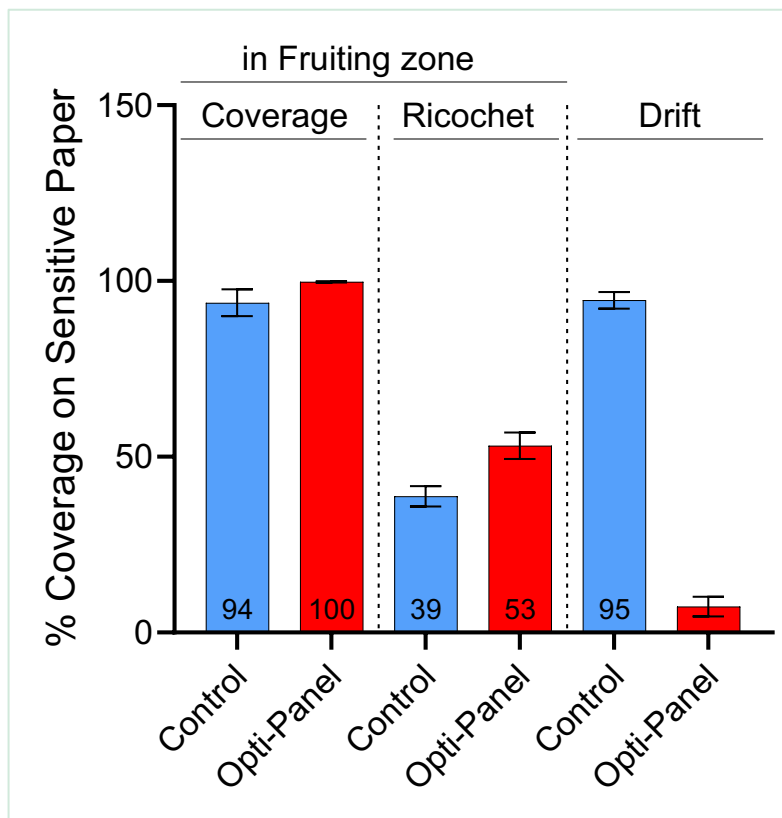
Reducing operational costs

Opti-Panels reduce labor cost



Opti-Panels naturally train shoot onto trellis wire, and therefore reduces labor cost associated with Shoot positioning, leaf removal (“leafing”), tying, etc.

Opti-Panels improve spray efficiency & reduce drift



Opti-Panels enhance efficiency of spray application by:

1. Improving coverage in fruiting zone
2. Reducing drift

SUMMARY



The Opti-Panels represent a revolutionary light, canopy, and fruit management system providing optimized light and microclimate environment, rain protection, and self-training for table grapes.

Opti-Panels improve bud development, fruitfulness, and overall fruit quality.

THE RESULT:

Protecting grapevines from:

- Rain and fruit rot
- High humidity and condensation
- Sunburns and heat damage
- Hail
- Strong wind
- Post-harvest decay: *Botrytis*, *Aspergillus niger*, *Penicillium*, etc.
- Vine trunk diseases

Saving costs associated with:

- Reduced irrigation & fertigation due to improved uptake and transport
- Labor costs associated with canopy management - Center canopy pruning, leaf removal, shoot positioning
- Fruit lost to rot & postharvest decay
- Fruit deemed non-marketable
- Enhanced spraying efficiency & reduced drift

Thank You

ACCELERATING GROWTH IN NEWLY PLANTED CROPS



OPTI-SHIELD™

Avocado, Citrus, Tree nuts



OPTI-GRO™

Table, Raisin, & Wine Grapes



OPTI-PANEL™

Grapes & Other Trellis Crops



OPTI-SKYLIGHT™

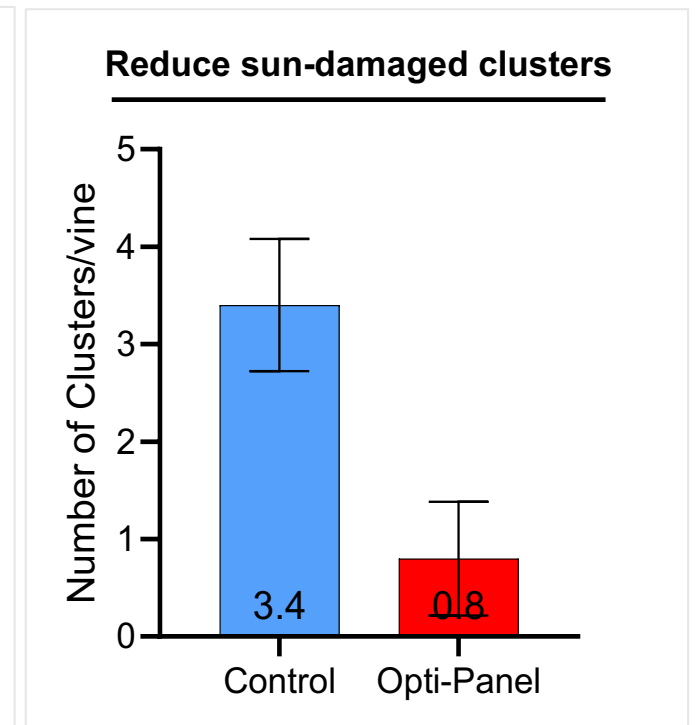
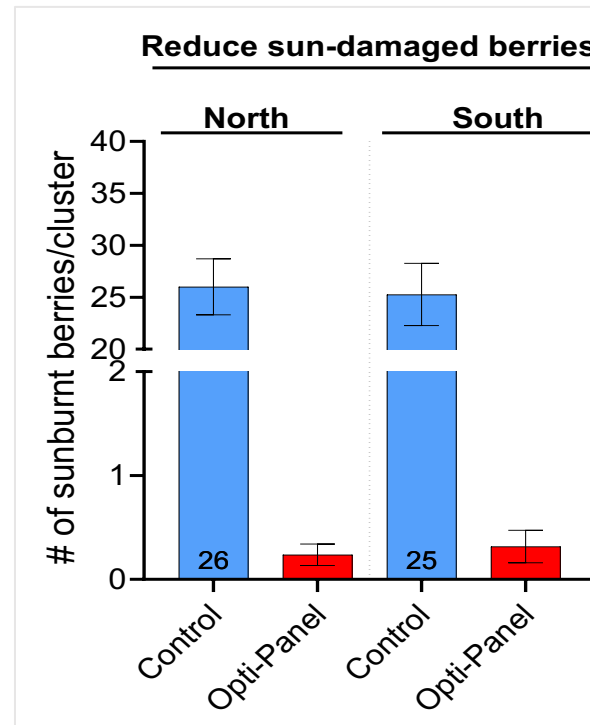
Citrus, Pistachio, & Almonds

Opti-Panels reduce excessive radiation and heat damage

Opti-Panels significantly reduced the -

1. Number of heat damaged (sunburn) berries by more than **25-folds**
2. Number of sun-damaged clusters by **5-folds**

This illustrates the benefits of Opti-Panel in hot climates and/or areas prone to frequent heat waves due to climate change



Protecting against trunk & shoot diseases

Opti-Panels suppress spread and germination of spores

Phomopsis Cane and Leaf Spot fruiting bodies (black spots) not obvious on spurs under Panels.



Phomopsis Cane and Leaf Spot fruiting bodies (black spots) apparent on uncovered vines.



Opti-Panels keep trunk and spurs relatively dry during the late-year rainy period; thus, suppressing the spread and germination of spores of Phomopsis cane and leaf spot

Opti-Panels protect vines from trunk diseases such as

- *Eutypa* dieback
- *Botryosphaeria* dieback,
- Esca, and
- Phomopsis dieback.

Expected to extend the economically productive life of the vineyard by five or more years.