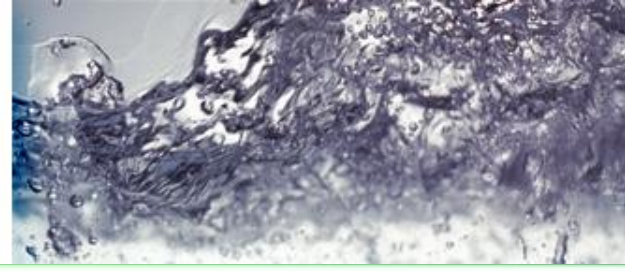


What is Capiphon?



Revolutionary Drainage Technology

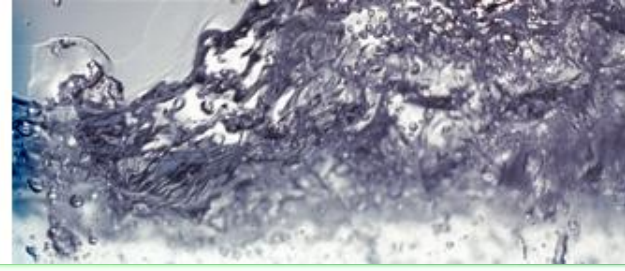


**Best Invention
of the Year 1999**

**International Exhibition
on Ideas, Inventions
and Novelties
*Nuremberg***



What is Capiphon?

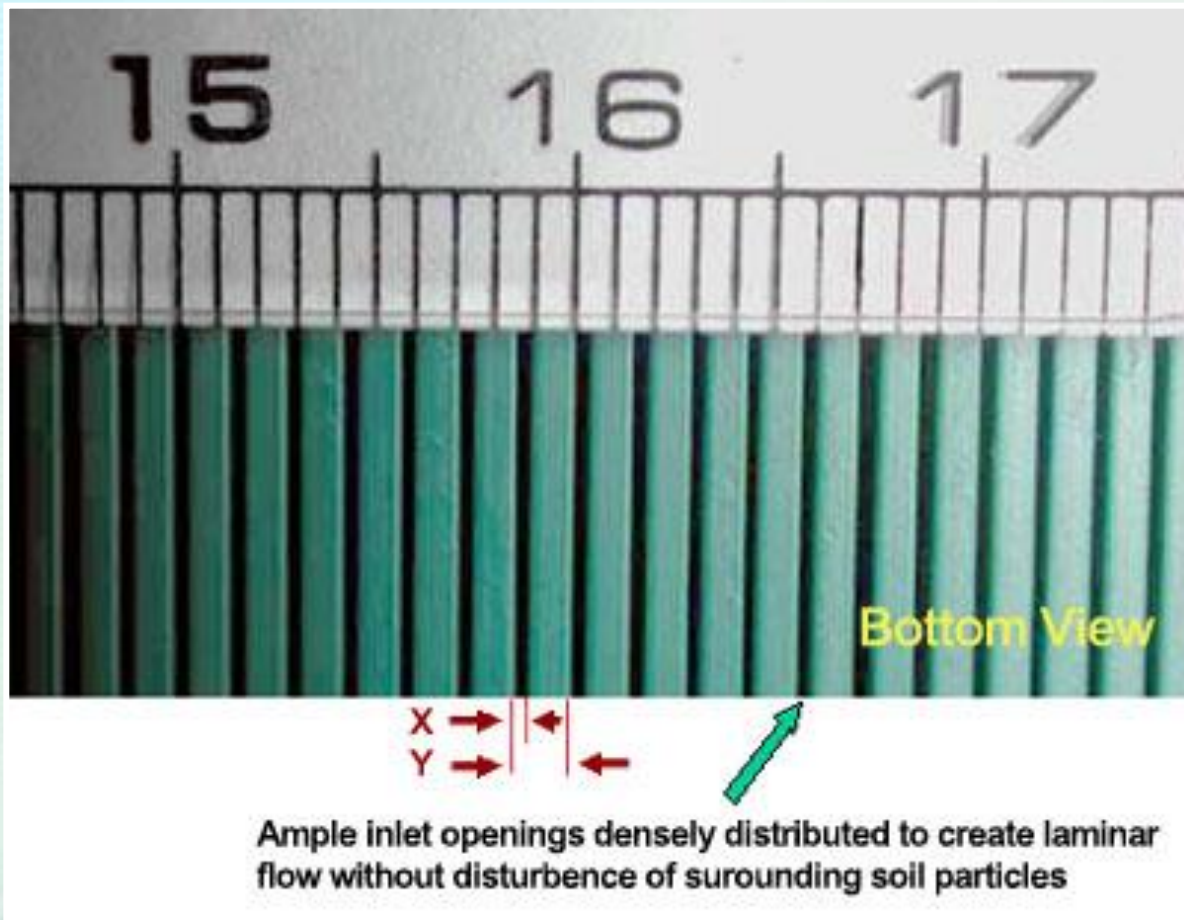
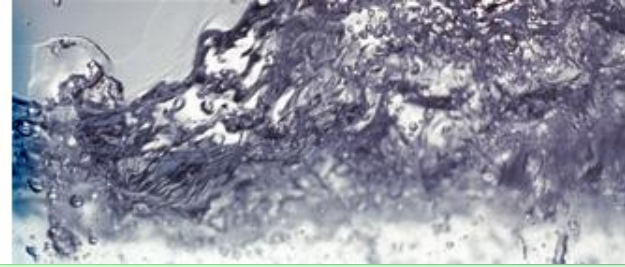


- 20 cm wide belt of soft durable plastic
- 2 mm thick
- Ω (Greek Omega) shaped grooves on under-side
- 0.3 mm opening, 1 mm internal pore

DRAINAGE WATER STORAGE
SAVE URBAN NATURAL
BREAKTHROUGH



What is Capiphon?



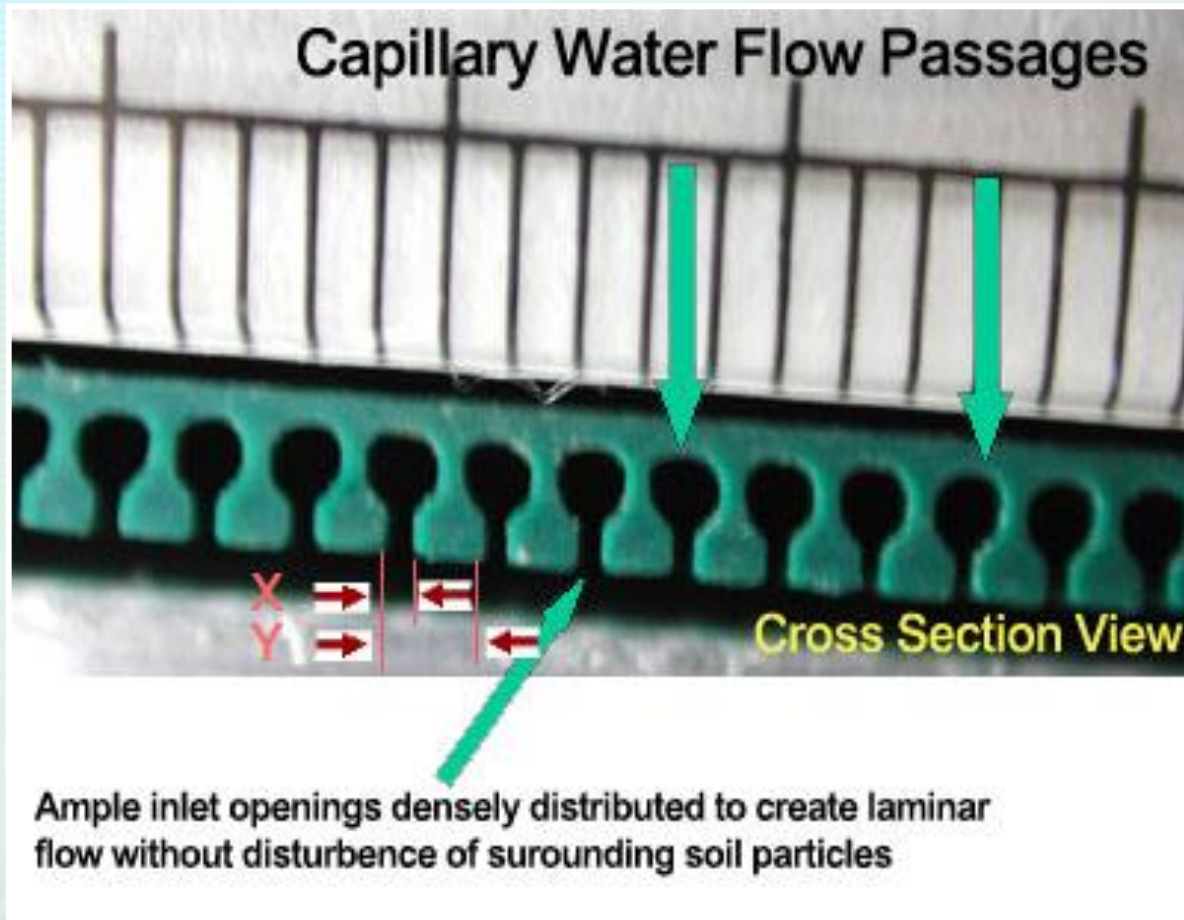
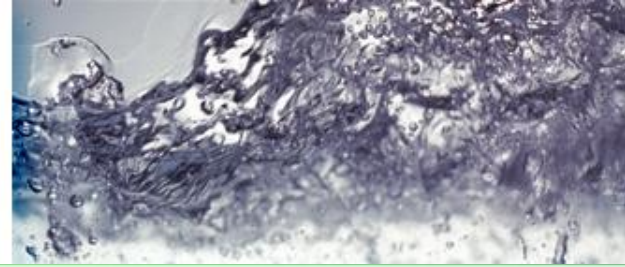
DRA

AGE

SAVE
BREAKTHROUGH

NATURAL

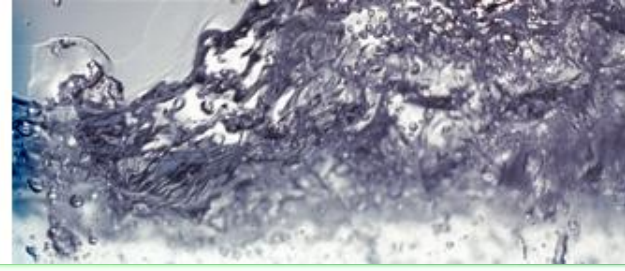
What is Capiphon?



DRA
SAVE
BREAKTHROUGH

NATURAL

What's in a Name?

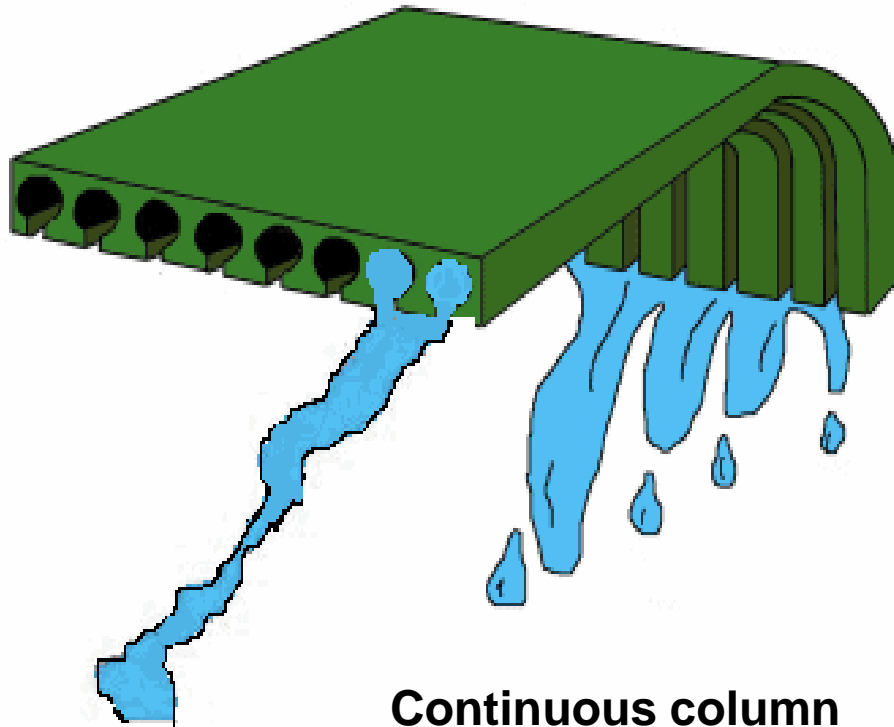
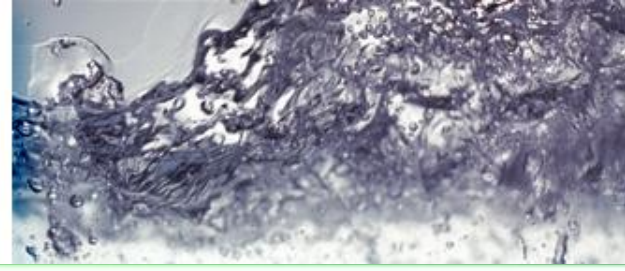


- Capiphon = **capillary** + **siphon**
 - Capillarity
 - Siphon
 - Surface Tension
 - Gravity

DRAINAGE WATER STORAGE
SAVE URBAN NATURAL
BREAKTHROUGH



How does it work?



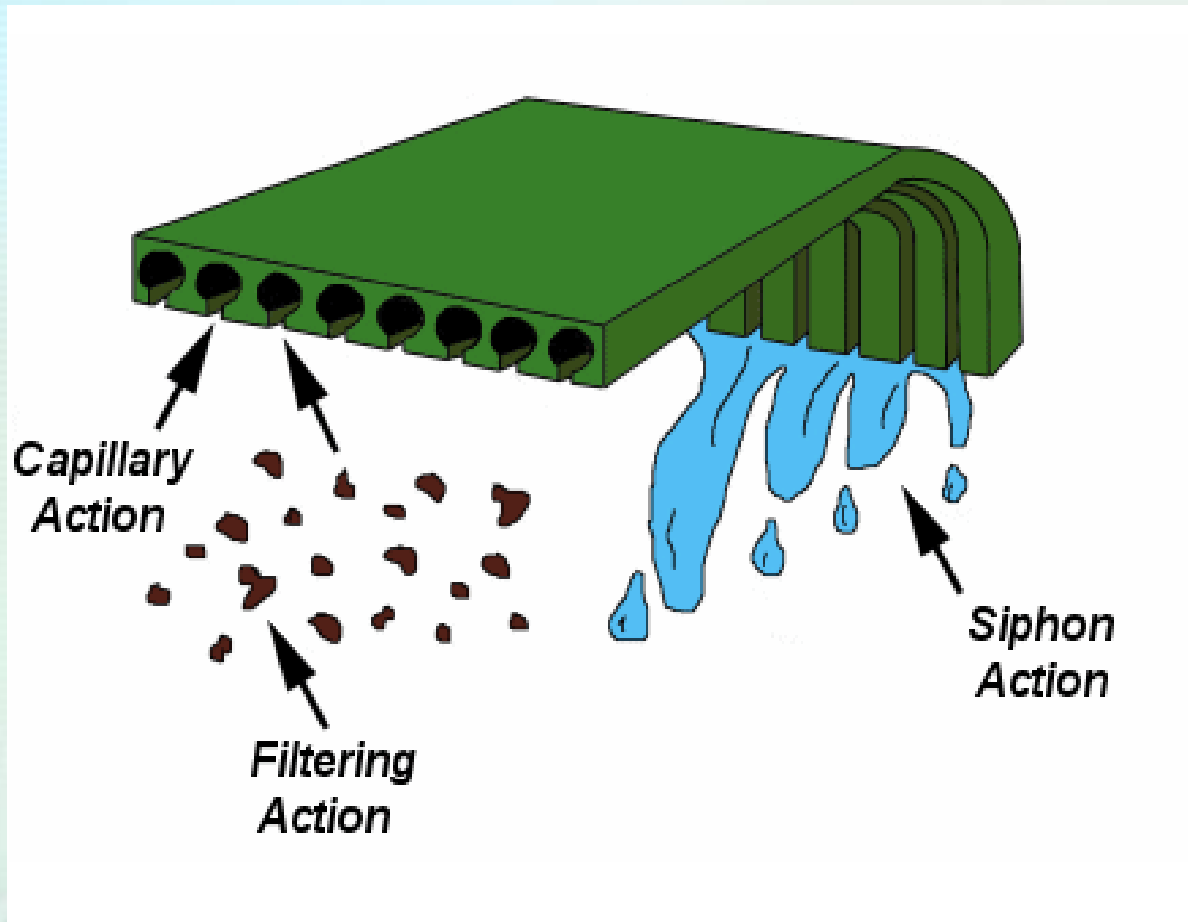
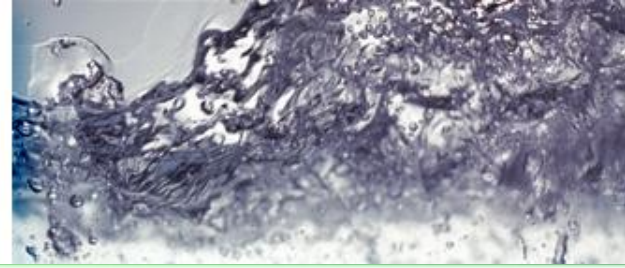
**Continuous column
of water in soil**



DRA
SAVE
BREAKTHROUGH

NATURAL

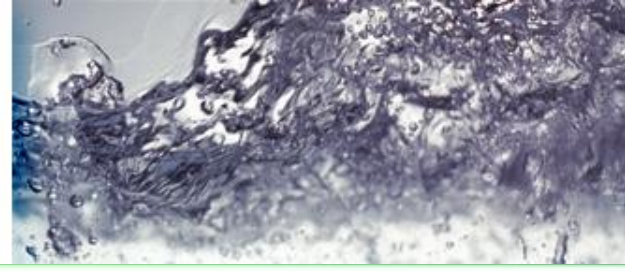
How does it work?



DRA
SAVE
BREAKTHROUGH

NATURAL

Year 1 Trial

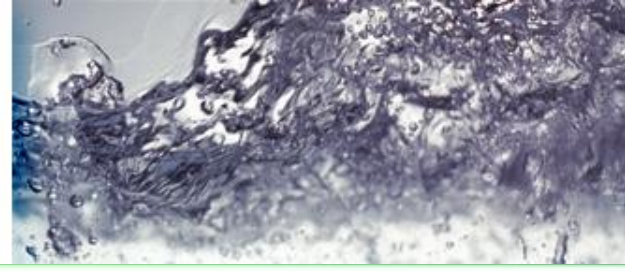


- Capiphon can be used to irrigate vineyards.
- Only low head required < 30cm
- Level of rise can be controlled by raising/lowering head
- Wetting band 1-2 metres either side
- Flow rate less than standard drippers.
- Flow rate varies according to existing soil moisture.

DRAINAGE WATER STORAGE
SAVE URBAN
BREAKTHROUGH NATURAL



Further Work Indicated



- Differing soil types/structures
- Wetting patterns in detail
- Optimal depth for differing species
- Plant responses
- Optimal scheduling
- Low pressure water supply
- Mechanical installation



This Study

Capiphon Belt vs Drip vs Nil

- Mark III system
 - Simpler to fabricate
 - Simpler to install
 - Robust
- Compare soil moisture responses at
 - Surface
 - 125 mm depth
 - 250 mm depth
 - 350 mm depth
- Fruit yield

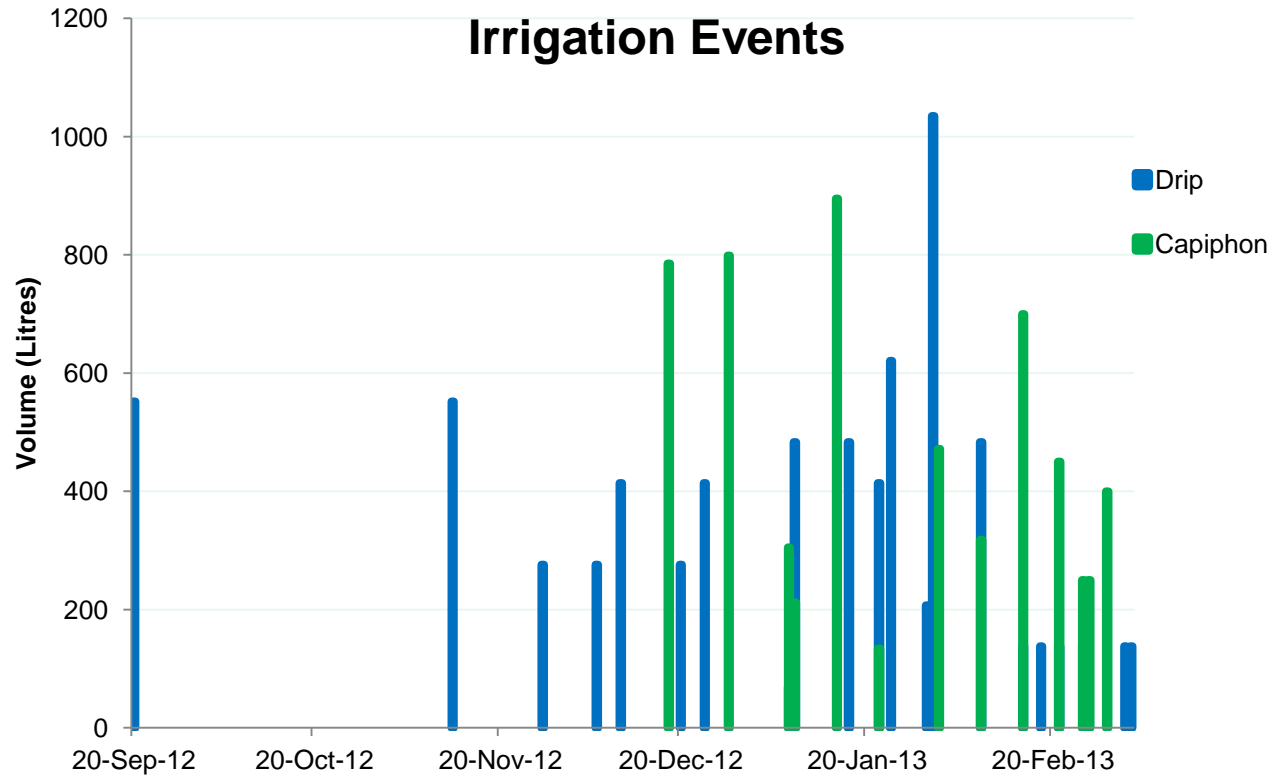
2 replications * 3 rows
Drip irrigation disabled on rows either side of plot



Measuring Water Volumes

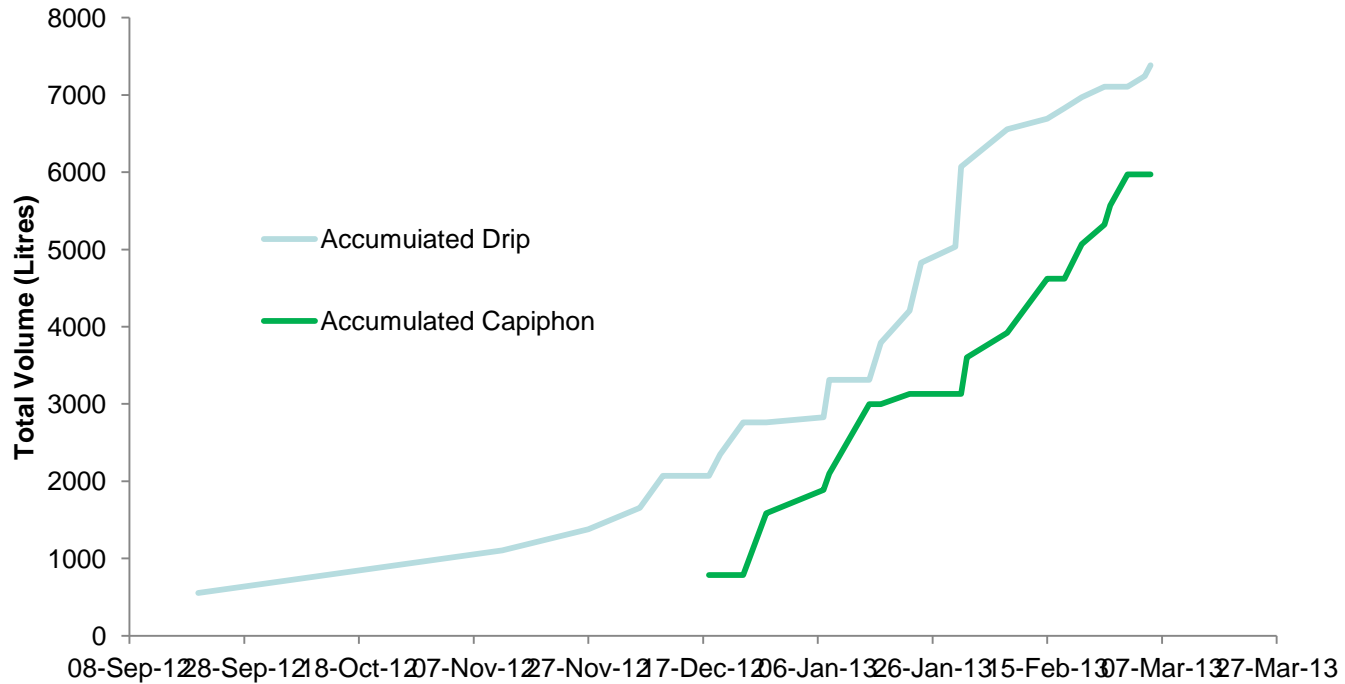


Water applied to trial site



Water applied to trial site

Accumulated Volume



Measuring Soil Moisture

Probes mid-way between vine and Irrigation Trench



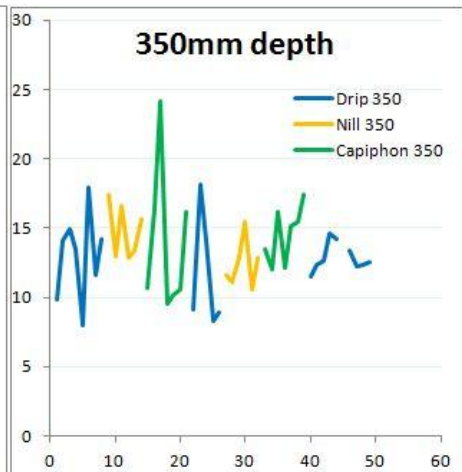
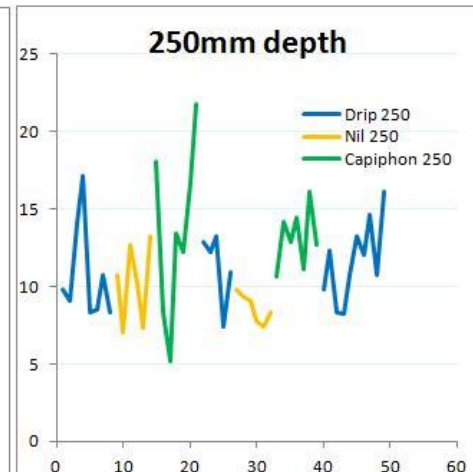
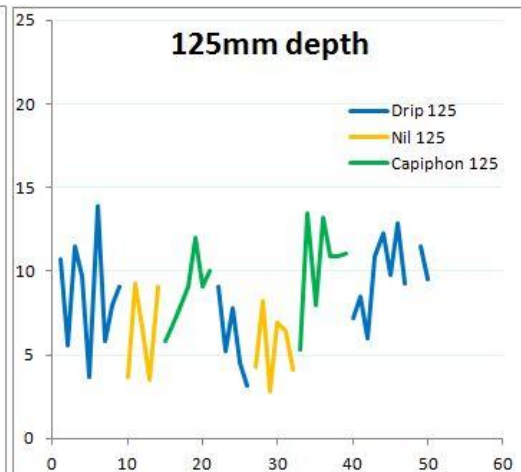
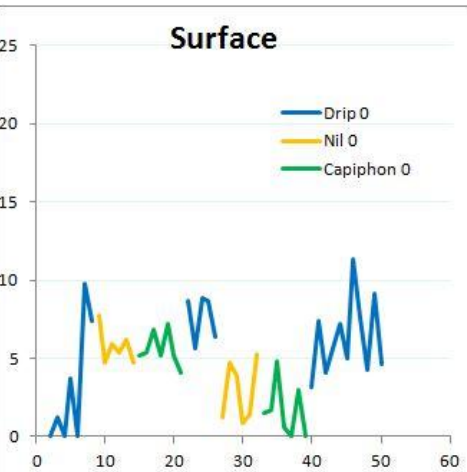
Soil Factors

- Duplex
- Variable – obviously shaped pre-planting
- Clay depth varied 125mm to 300mm

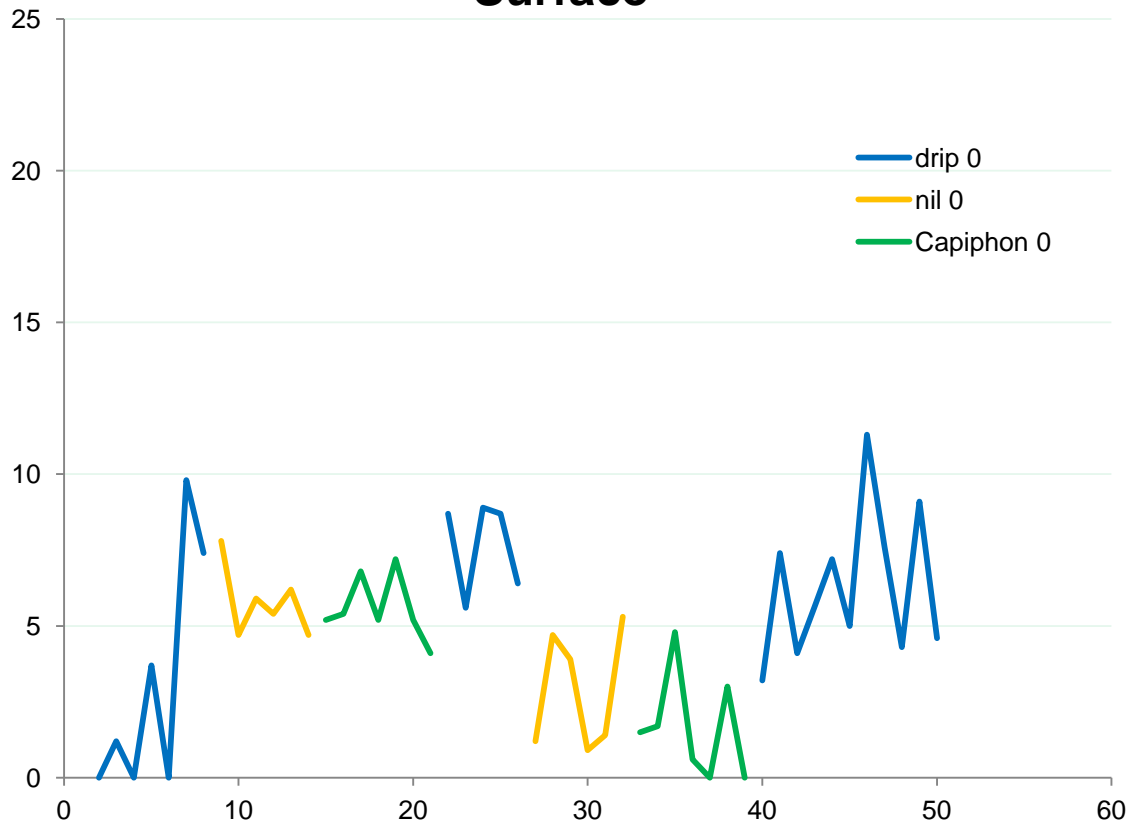




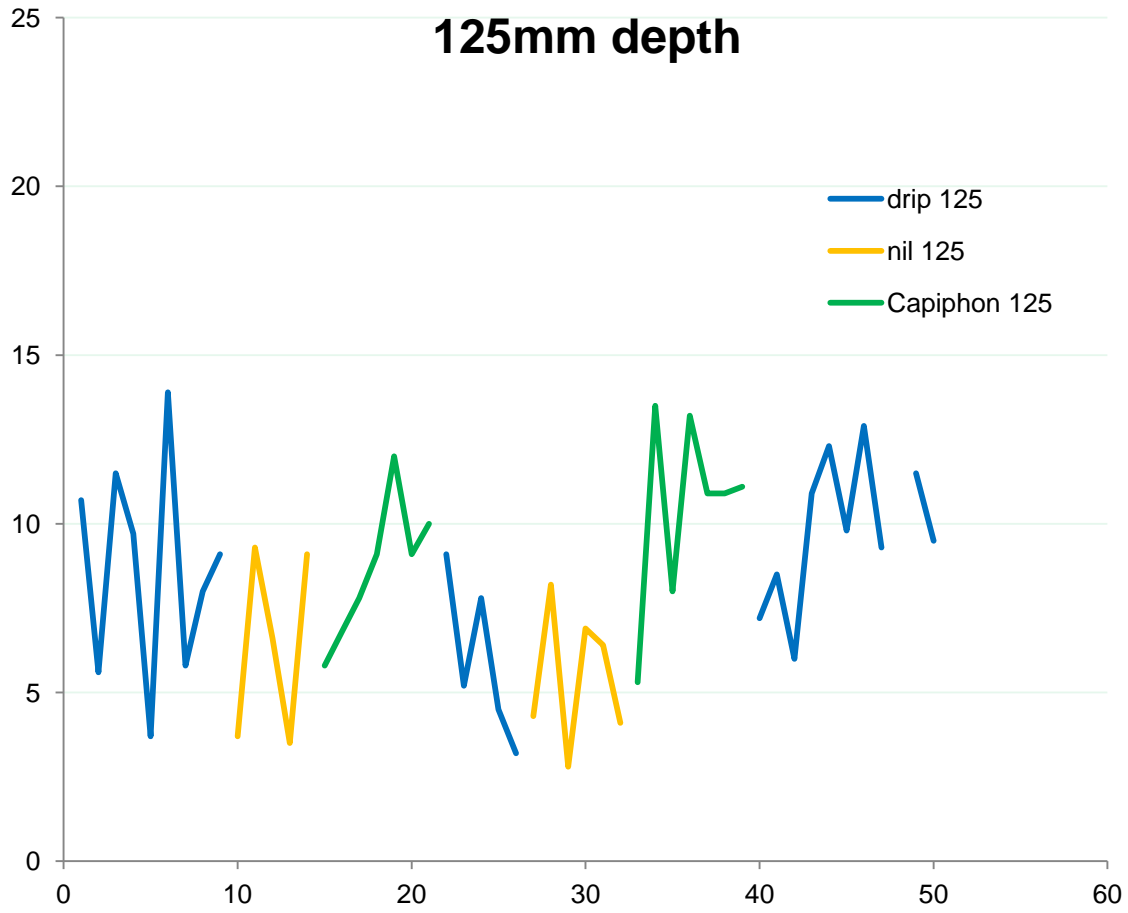




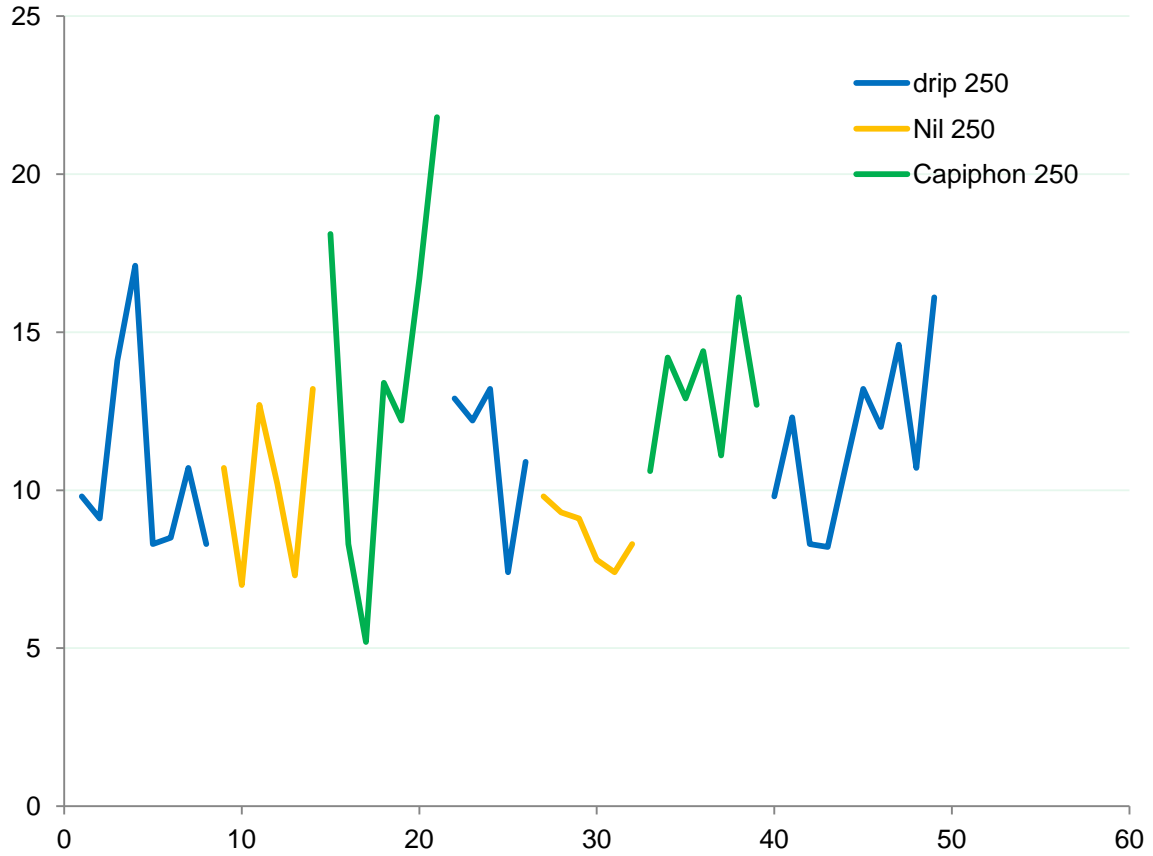
Surface

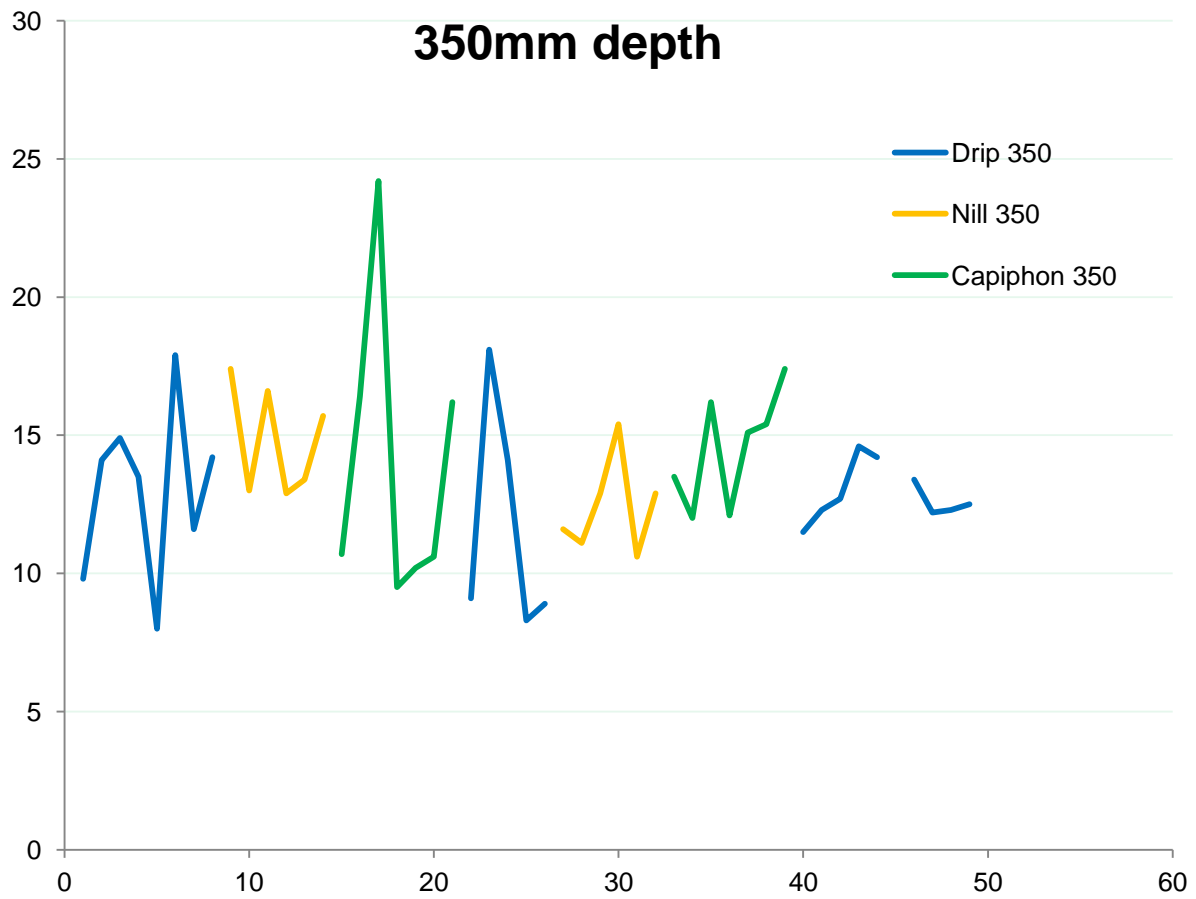


125mm depth



250mm depth





Average Soil Moisture at Depth

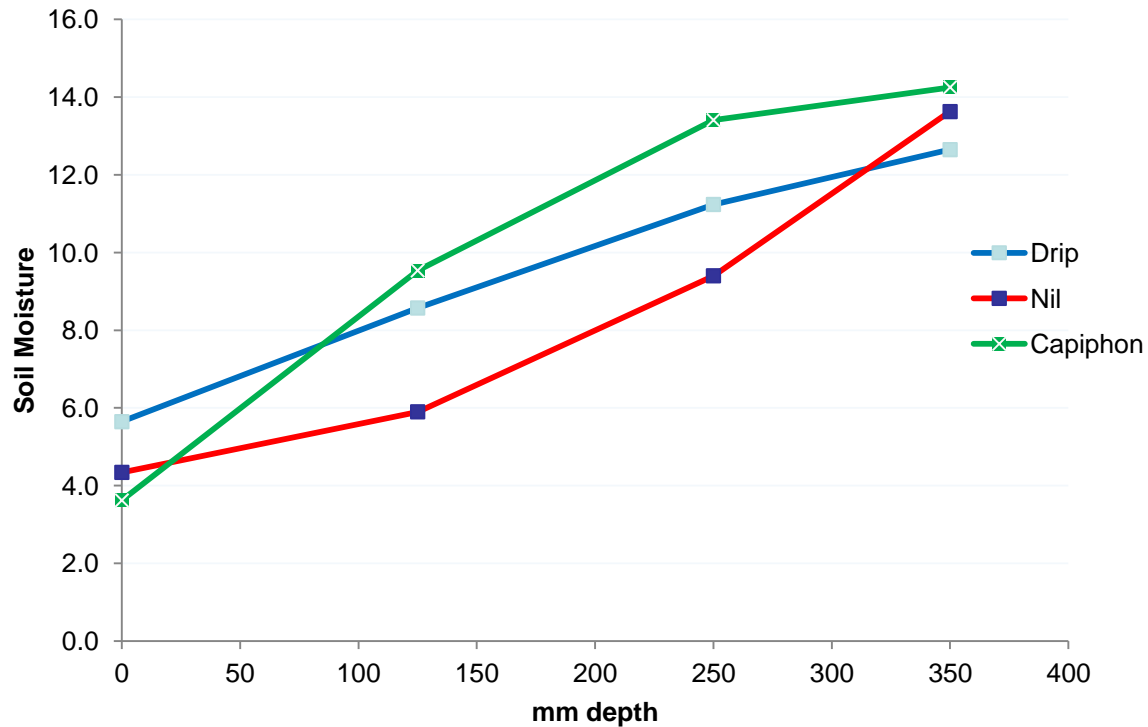
	0	125	250	350
Drip	5.6	8.6	11.2	12.6
Nil	4.3	5.9	9.4	13.6
Capiphon	3.6	9.5	13.4	14.3

Average Soil Moisture at Depth

	Drip	Nil	Capiphon
0	5.6	4.3	3.6
125	8.6	5.9	9.5
250	11.2	9.4	13.4
350	12.6	13.6	14.3

Moisture levels at root zone 1 (00-300mm) higher under Capiphon irrigation than under Drip

Soil Moisture at Depth



Equivalent fruit yield

	Fruit Weight (Kg)			
	Sum	No.	Mean	SD
Drip	266.2	57.0	4.67	2.12
Nil	57.6	23.0	2.50	1.46
Capiphon	112.8	27.0	4.18	1.49

The Treatment effect is highly statistically significant, showing no evidence of a difference in Fruit weight between the Capiphon and Drip treatments, but a sizable reduction of 1.73 units (95% Confidence interval 0.80 - 2.66) between the nil and Capiphon treatments.



Drip

Capiphon

Nil

Drip

Capiphon

Nil

Drip



J
CHARDONNAY
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Conclusions

Capiphon Irrigation

- Delivered water to plant root zone in a vineyard
- Used less water
- No significant difference in fruit yield compared to Drip

Further Work

- Larger, more refined trials
- Trials with less water
- Other crops
- Differing soil profiles
- Differing slopes
- Root spread
- Infrastructure
- Optimal operational procedures
- Lots, lots more ...

Acknowledgements

- Management and staff at Yalumba's Jansz Parish Vineyard (formerly Frogmore Creek) for their assistance and advice, especially for allowing me to get in their way.
- Emeritus Prof Don McNeil for the statistical analysis of fruit yield.