



# Wicking beds

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# What is a wicking bed?

‘The wicking bed system is a way of growing plants in which water wicks up from an underground water reservoir.

The major advantage is a significant increase in production while water use has been shown to be reduced by up to 50% of conventional practice.’

Colin Austin ([waterright.com.au](http://waterright.com.au))

# Key design elements

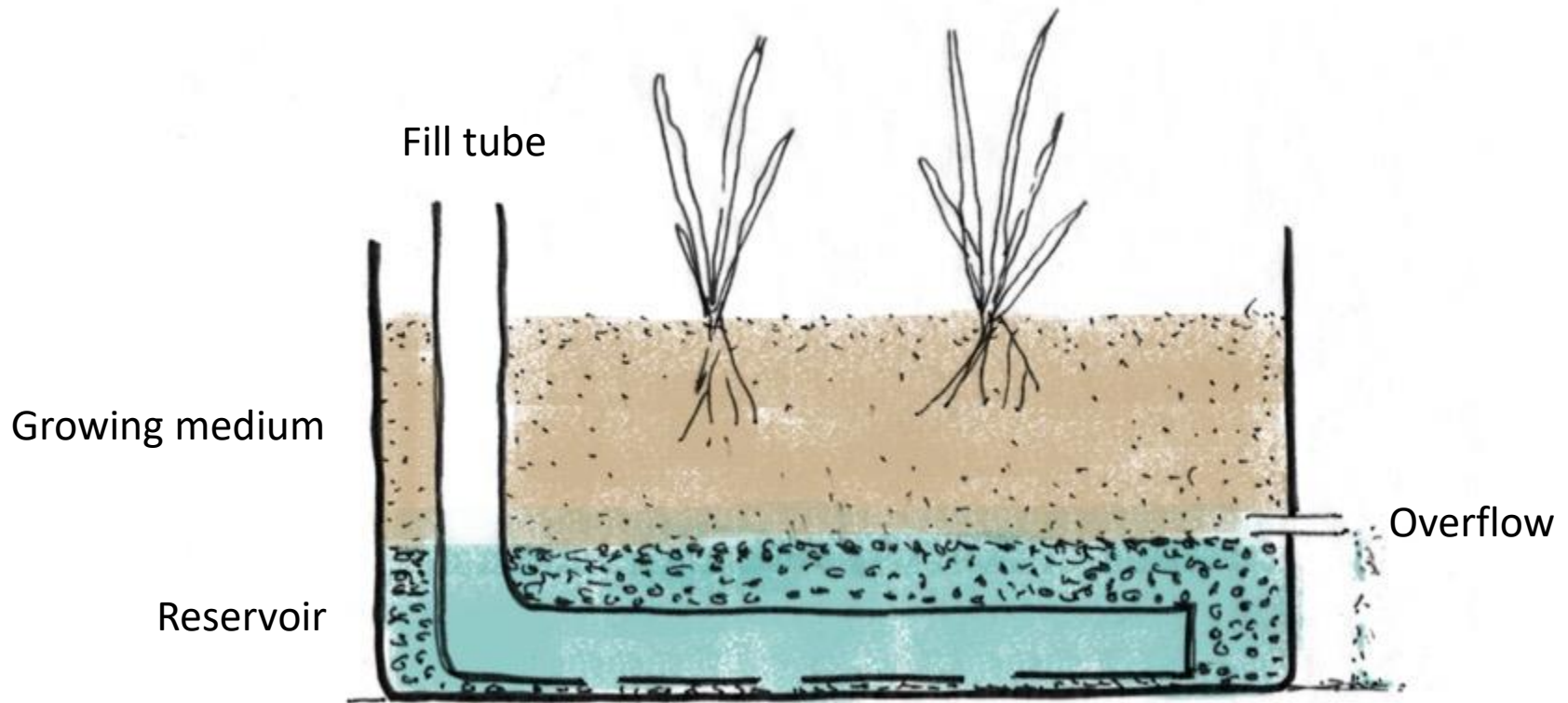


Diagram: J.Curtis



# Adapted pre-fabricated beds



[he.net.au/homegrown\\_home.html](http://he.net.au/homegrown_home.html)





Self-watering pots







Second hand containers





# Milk bottles





# Bath tubs







IBC cubes  
cut in half











# Waterright shadecloth design



[waterright.com.au](http://waterright.com.au)





[waterright.com.au](http://waterright.com.au)



[waterright.com.au](http://waterright.com.au)





Building a  
shade  
cloth bed













Open  
wicking  
beds









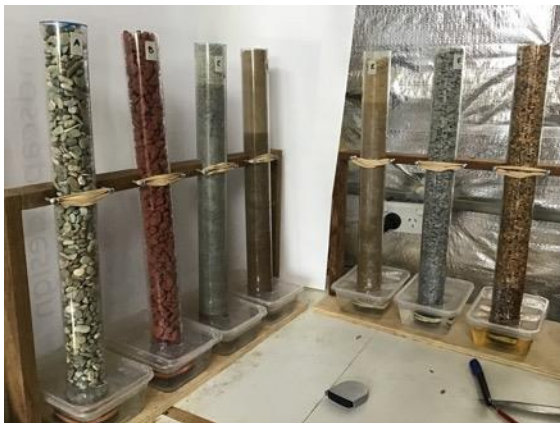
Open  
wicking  
bed in poly  
tunnel



# Experiments



Water holding capacity



Capillary rise



Wicking beds – Spinach, lettuce

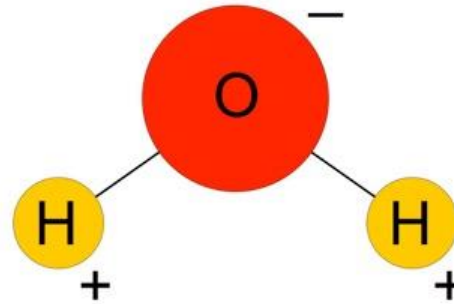


Small wicking beds

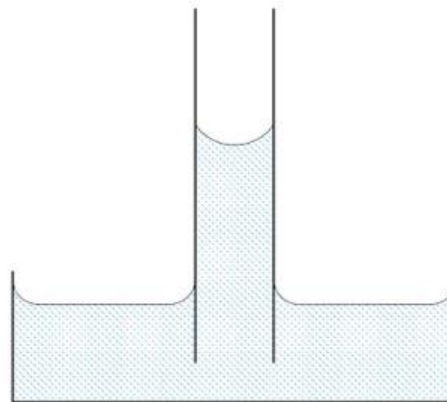


# Water (H<sub>2</sub>O)

- Polar molecule
- Cohesion
- Adhesion



- Capillary rise





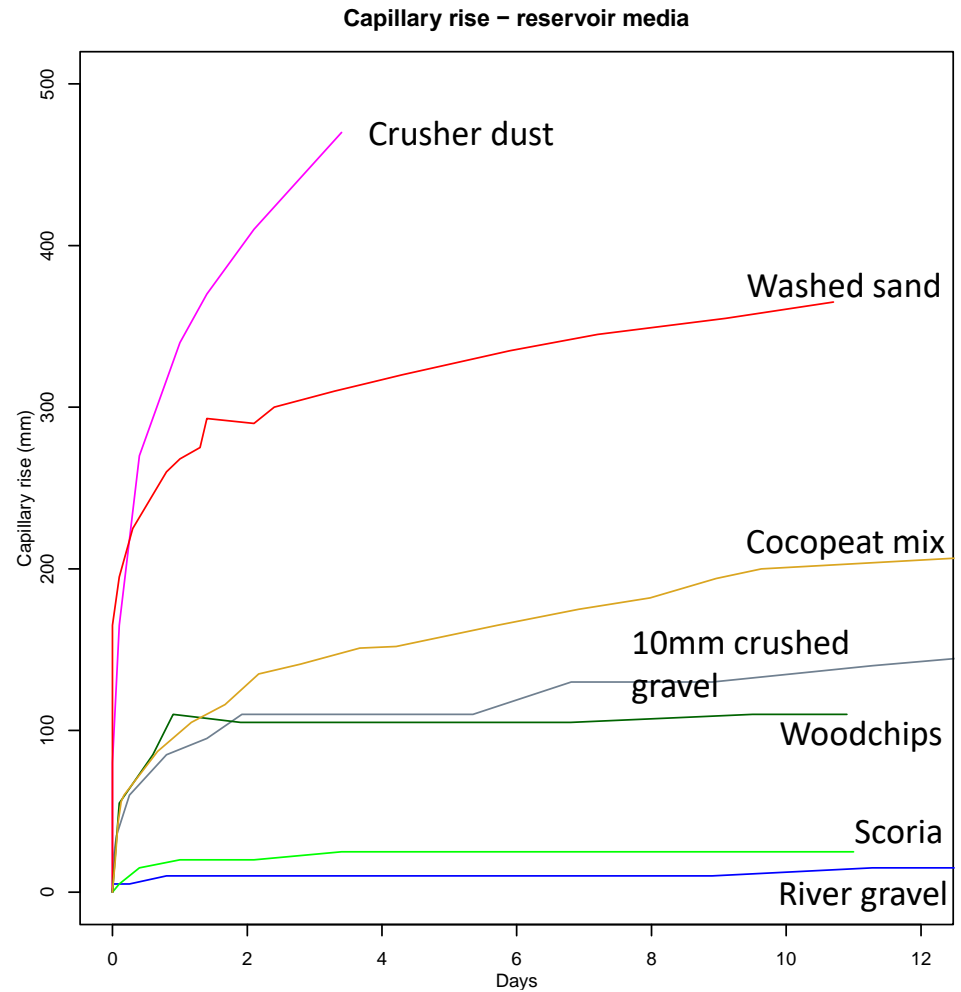
# Capillary rise





# Capillary rise

- Fine materials had greatest rise
- Coarse materials had lowest rise
- Scoria and river gravel had very low rise
- Cocopeat was hydrophobic





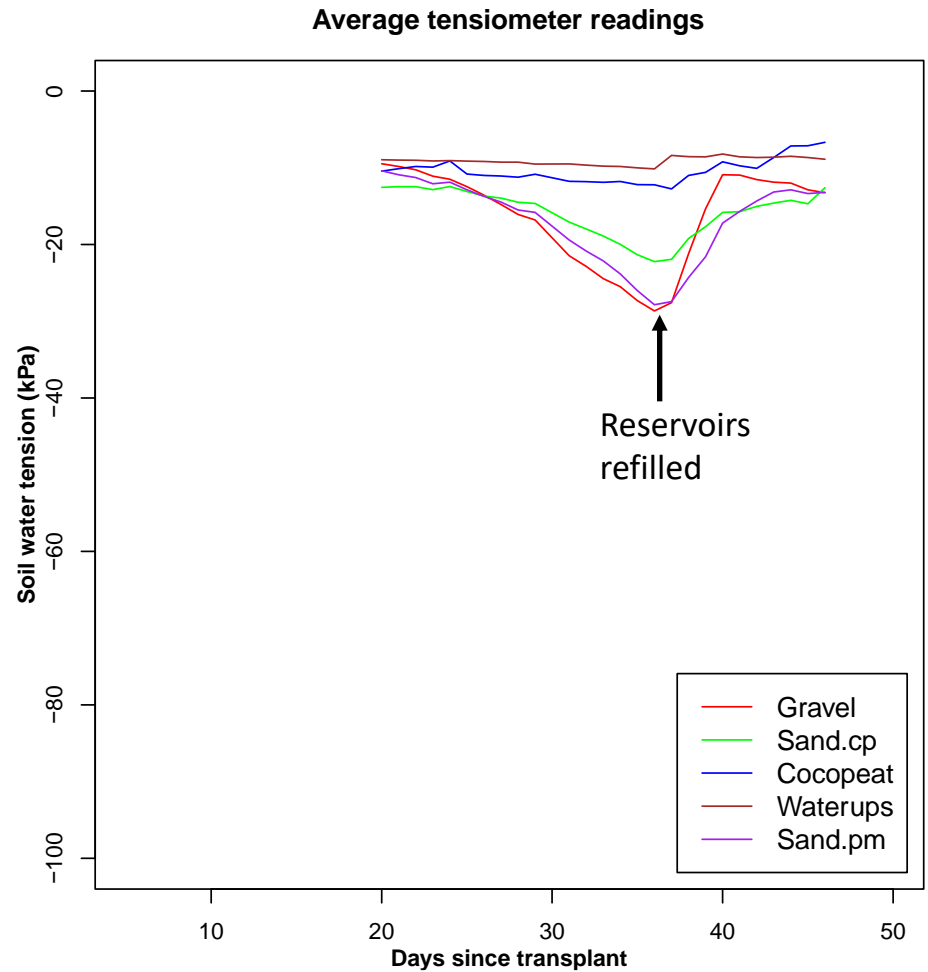
# Wicking beds – Lettuce





# Soil moisture at 150mm

- Constant soil moisture with WaterUps (with sand) and cocopeat mix
- Driest soil with gravel reservoir and potting mix





# Plant weight

## Spinach

- Greatest weight with cocopeat and sand reservoirs
- Lowest weight with potting mix
- Close correlation between weight and water used

## Lettuce

- No significant differences between treatments
- Probably enough water without needing much from reservoir





# What do these experiments tell us?

- Capillary rise was greater with fine materials than coarse materials
- Soil moisture was lowest with gravel
- Soil above gravel reservoir dried while water remained in reservoir
  
- Don't use gravel – it doesn't work well
  - only shallow reservoir
  - water more often
- Don't use scoria – it won't work at all



# What do these experiments tell us?

- Best soil moisture was with cocopeat mix reservoir and Waterups with sand wicks
- Waterups with sand wicks was better than just sand
- Probably due to lots of free water combined with good wicking ability
- Reservoir design with large voids for water should be good

# Beds with sand wicks





# Beds with sand wicks



# How often do you need to add water?

- Seedlings watered for first five days only
- Spinach watered 28 and 42 days after transplant
- Lettuce watered 36 and 46 days after transplant

**Table 37 - Mean number of days after transplant for each treatment before soil water tension dropped below -20kPa**

Treatment	Days after transplant	
	WBT1	WBT2
cocopeat	- <sup>1</sup>	-
gravel	32	31
sand.cp	37	35
sand.pm	44	32
WaterUps <sup>®2</sup>	35	-

<sup>(1)</sup>one cocopeat bed did drop below -20kPa on day 44 but has been excluded from these results because it did not rehydrate after the reservoir was refilled

<sup>(2)</sup>The WaterUps<sup>®</sup> treatment used medium grade perlite as the wicking medium in WBT1 and sand in WBT2





[www.roogulli.com](http://www.roogulli.com)