Twinpot Water Management System

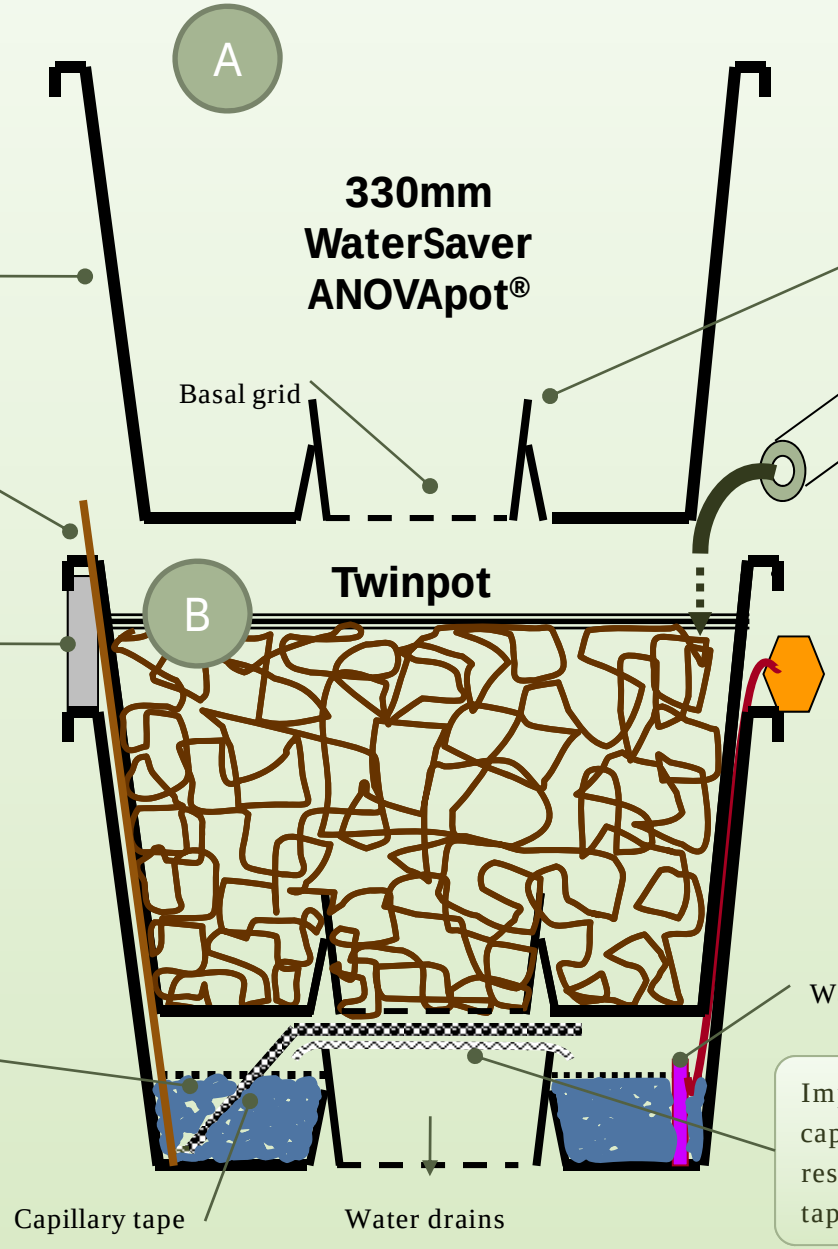
This illustrates the conversion of the 330mm WaterSaver ANOVApot® into a Twinpot configuration.

Upper pot fits snugly into lower pot with basal grid in close contact with capillary tape.

A dipstick slides between pots and into the bottom reservoir allowing manual water level monitoring.

Vertical polypipe spacers optimises separation distance and ensures weight of pot supported by rim of lower pot. Spacers may be replaced with WindClip brackets that separate pots vertically and provide horizontal stability.

Lower pot stores 2L water to the height of the collar (any more drains away). Water moves upwards by capillary action flow through the tape into the upper pot.

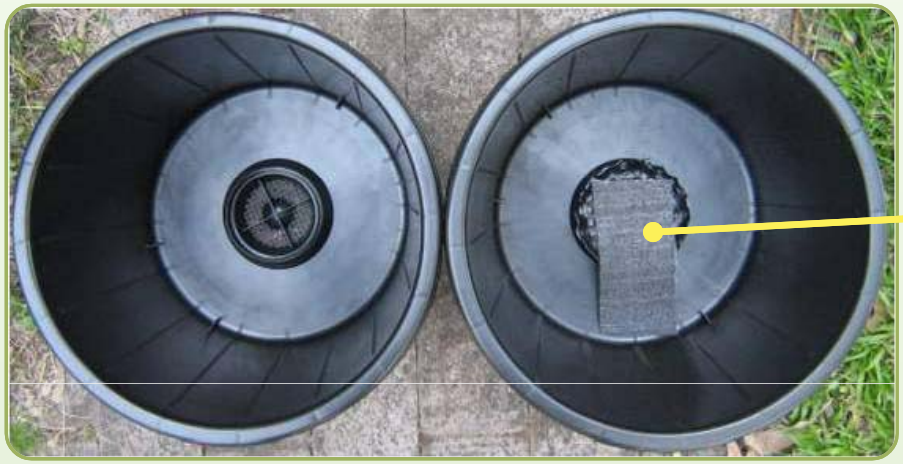


Radio head transmit water level data to automatic irrigator.

Free water DOES NOT pond but drains via capillary flow.

Impervious corrugated plastic cap directs drainage water into reservoir and supports capillary tape.

330mm WaterSaver ANOVApot® with the 40mm tall central wall.



Well covered with the capillary cap for use in the Twinpot configuration.

Inverted view of capillary cap revealing ripple surface to prevent sealing

Cutaway pot reveals positioning of the capillary cap in the Twinpot configuration.

Citrus just transplanted into a 330mm WaterSaver ANOVApot®, with another WaterSaver ANOVApot® set up as the lower pot in the Twinpot configuration with capillary cap in position.

Citrus as it appears in the Twinpot configuration after transplanting 21 Sept 2008. Note the spacers separating the pots.

Proof of Concept experiment

Effect of culture system (a) 300mm Sidehole (SH) pot, (b) Twinpot Water Management System™ with 300mm **ANOVApot®** prototype, on growth of *Syzygium australis*, cv Cascade and *Magnolia grandiflora*, cv Little Gem, 122 days after transplanting and one day before harvest.

.

SH(a) TWMS(b) SH(a) TWMS(b)

Syzygium ***Magnolia***

Proof of Concept

Comparison of the growth of *Syzygium australis*, cv Cascade in "standard' side hole pots and the Twinpot Water Management System™ with WaterSaver ANOVApot®, 122 days (26 May 2008) after transplanting.

Twinpot Water Management System

Queensland Sustainable Energy Innovation Fund supported experiment evaluating the use of irrigation sensors in the water reservoir of the WaterSaver ANOVApot® to automate irrigation.

Martin Hickey (*Cedar Glen Nursery*) and Wal Scattini (*Anova Solutions*) view the trial.

Effect of irrigation system and peat/bark composition of potting mix on growth of *Syzygium australis*, cv Aussie Boomer, 91 days after transplanting (fresh shoot weights (g/plant) shown).

Replicate (a)

Replicate (b)

Peat/bark percentage

Effect of pot type on growth of Bamboo Palm (*Chamadorea seifritzii*) 29 May 2008 ~ 21 Oct 2008 at Tropical Exotics Nursery.

Block of six treatment by five replicates

Index

Apot8	ANOVApot 8mm collar
Apot18	ANOVApot 18mm collar
TAPot1818	Apot 18 sitting inside Apot 18 (Twinpot config)
TAPot1840	Apot 18 sitting inside ANOVApot 40mm collar (Twinpot config)

Growth of Coffee in Twinpot Water Management System™.

At transplanting (2 Jan 2008)	Five months from transplantation (6 Jun 2008)	Fifteen months after transplantation (23 April 2009)

Growth of Coffee in Twinpot Water Management System™.

Coffee after 14 months (140cm wide x 150cm tall) in the Twinpot™ Water Management System with the 330mm WaterSaver ANOVApot®.

Heather Hunter wanted a plant to cover the hot water system.

Uses 2-3 L per day in summer.

Potato under Twinpot Water Management System™

Growth and yield (985g of tubers) of potato, cv Sebago after four months (7 Jun 2008 ~ 4 Oct 2008) under the Twinpot Water Management System™.

Plants emerged two weeks after planting tubers.

Because of proximity of building and low sun angle, plant received very little direct sun for the first two months.

At harvest

A range of herb species growing under the Twinpot Water Management System™

Chervil

Tarragon

Rosemary

Parsley

All pots, 40mm central well, 4 litre ANOVApot®

Chives

Growth of lettuce in the Twinpot Water Management System™

(40mm central well, 4L ANOVApot®)

Two weeks after transplanting

Sweet potato *(Ipomea batatas)* in the Twinpot Water Management System™

18 litre ANOVApot®

26 January, 2009

Sweet potato *(Ipomea batatas)* In the Twinpot Water Management System™

Sweet potato harvest (1.3kg) from one pot under the Twinpot Water Management System

(root balls upside down)

Growth of Citrus in Twinpot Water Management System™ after transplanting on the 24/09/08 into a 330mm WaterSaver ANOVApot®

24/09/08 (T) *21/12/08 (88DAT)* *23/04/09 (211 DAT)*

Growth of Avocado in Twinpot Water Management System™ after transplanting on the 28/10/08 into a 330mm WaterSaver ANOVApot®

28/10/08 (T) *21/12/08 (54DAT)** *23/04/09 (177 DAT)*

**left hand plant transferred to another location and unavailable for further comparisons*

Coffee in the Twinpot Water Management System™

First

The four faces of the root ball of Coffee (with base of root ball uppermost) three months after transplanting into 15L ANOVApot® Twinpot Water Management System

Second

Third

Fourth

Coffee in the Twinpot Water Management System™

Magnified portion of Coffee root system

Coffee in the Twinpot Water Management System™

Root ball

Front

Side

Base

Dipstick

Spacer

Coffee (12 Oct 2008) after nine months in the Twinpot Water Management System

Bamboo Palm *(Chamadorea seifrizii)*

Rep A

Rep E

Effect of pot type on root escape and root distribution within pot of Bamboo Palm (29 May 2008 ~ 21 Oct 2008) at Tropical Exotics Nursery

Twinpot Water Management System

Effect of culture system (a) Twinpot Water Management System™ with 300mm Watersaver ANOVApot® prototype (b) 300mm side hole pot on root balls of *Syzygium australis*, cv Cascade and *Magnolia grandiflora*, cv Little Gem, 123 days after transplanting, in replicate 2.

Syzygium

Side hole

TWMS

Magnolia

Twinpot Water Management System

Effect of irrigation system and peat/bark composition of potting mix on basal root distribution of *Syzygium australis*, cv. Aussie Boomer, 91 days after transplanting.

Daily irrigation

Peat/Bark %

10/90 *30/70* *50/50*

Sensor actuated irrigation TWMS

Effect of irrigation system and peat/bark composition of potting mix on basal root distribution of *Syzygium australis*, cv. Aussie Boomer, 91 days after transplanting.

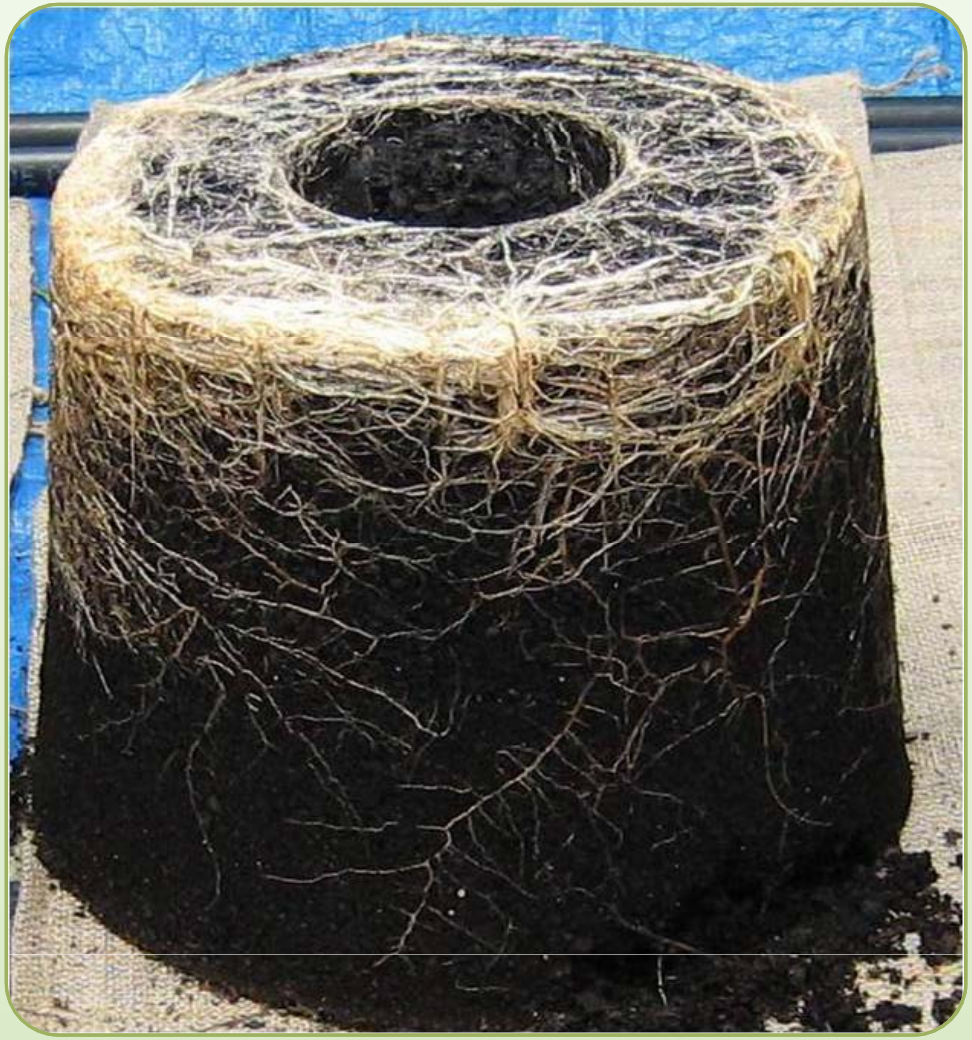
Daily irrigation

Peat/Bark %

10/90 *30/70* *50/50*

Sensor actuated irrigation TWMS

Magnified view of root distribution in *Syzygium australis*, cv Aussie Boomer in a 30/70 peat/bark potting mix 91 days after transplanting under a sensor actuated irrigation regime (TWMS).



Comparison of sunflower (cv Hysun 38) root escape* after 87 days in a side holed pot with capped, unplugged or plugged 200mm ANOVApot®. (Three grades of porous concrete)

Shoot fresh weight (g/plant)

491	502	500	506	524	490	374

1.98*	0.31	0	0	0	0.08	9.31

No plug	Cu Coir Plug	Coarse	Medium	Fine	Cap	Side hole

Porous concrete plug

* Fresh weight of escaped roots (g/pot)

Effect of copper level in compacted coir plugs in the wells of the ANOVApot® prototype on growth and root escape in Marigolds, 36 days after transplanting.

Growth

0	24mg	2.4mg

Root escape

Copper level

Effect of plastic paint containing copper on root distribution in sunflower grown in 200mm ANOVApot®

Copper paint on corner (205g shoot wt)

No copper paint on corner (204g shoot wt)

Response of sunflower roots to basal band of copper impregnated plastic paint.
(Note the complete elimination of vigorous large circling roots)

Preventing litter accumulation in the ANOVApot® when used in the Twinpot Water Management System™.

Set of 9 WaterSaver ANOVApot®s clipped together as the lower pots in the Twinpot configuration picked up and turned over to prevent leaf and water accumulation while empty.

Weed growth and root death occurs in the basal zone of side hole pots but is avoided in the culture of the ANOVApot®.