WaterUps® Wicking Bed Gardens - Water Use Comparison Trial

Trial conducted at: Kimbriki Eco House & Garden Education Centre, Terrey Hills NSW

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Notes

- This trial was conducted in the Spring and early Summer of 2018 from Sunday 16th September 2018 to Sunday 18th November 2018 (9 Weeks = 63 days).
- All three garden beds were fully in the open so they all received any & equal rainfall during the trial period. Rainfall was not measured during this trial.
- Daily Temperatures were not measured during this trial.
- We topped up the Wicking Beds' Water Tanks each week and measured how many litres of water was needed until the overflow pipe began to run with water.
- The Traditional Garden was watered each morning, 6 days per week, using our automated watering system, of spray irrigation.

1. WaterUps® Raised Wicking Garden Bed

Trial period: This trial was conducted in the spring and early summer of 2018 from 16th September 2018 to 18th November 2018.

Garden Size: 6 Water-Up Cells = 1200mm X 800mm.

Average Water Usage per day

16th September to 28th September (12 days)
4.5 litres per day times 12 days = 54.0 litres

28th September to 30th October (32 days)
3.8 litres per day times 32 days = 121.6 litres

30th October to 18th November (19 days)
4.1 litres per day times 19 days = 77.9 litres

Total Water Usage for 63 days of the trial

54 + 121.6 + 77.9 = 253.5 litres

Total Water Use Per Cell

Raised Bed (6 WaterUps® Cells)
253.5 litres divided by 6 = 42.25 litres per cell

2. WaterUps® In-ground Wicking Garden Bed

Trial period: This trial was conducted in the spring and early summer of 2018 from 16th September 2018 to 18th November 2018.

Garden Size: 8 Water-Up Cells = 1600mm X 800mm.

Average Water Usage per day

16th September to 28th September (12 days)
9.5 litres per day times 12 days = 114 litres

28th September to 30th October (32 days)
8.9 litres per day times 32 days = 284.8 litres

30th October to 18th November (19 days)
10.1 litres per day times 19 days = 191.9 litres

Total Water Usage for 63 days of the trial

114 + 284.8 + 191.9 = 590.7 litres

Total Water Use Per Cell

In-ground Bed (8 WaterUps® Cells)
590.7 litres divided by 8 = 73.83 litres per cell

3. Traditional Garden Bed - directly beside the WaterUps® In-Ground Garden Bed

Trial period: This trial was conducted in the spring and early summer of 2018 from 16th September 2018 to 18th November 2018.

Garden Size: approximate equivalent area of WaterUps® In-Ground Garden Bed (1600mm x 800mm) equivalent to area of 8 WaterUps® Cells, and we had 2 spray nozzles watering this area.

Automated Watering System with spray nozzles.

We calculated that these two spray nozzles (combined) were emitting approximately 1.6 litres of water per minute.

The nozzles were running for 20 minutes per day
(20 x 1.6 litres = 32 litres per day).

Being watered once per day at 7am - 6 Days per week.

This equated to 32 litres per day x 6 days per week = 192 litres.

Total Water Usage per Week = 192 litres

Therefore over the 9 weeks of the trial this was a Total Water Usage of 192 x 9 = 1,728 litres

Total Water Use Per Cell

Traditional Garden Bed: 1728 litres divided by 8 = 216 litres per cell equivalent

4. Additional notes

Important calculation note

Calculation to correlate the different sizes of the Raised Wicking Bed, the In-ground Wicking Bed, and the Traditional Garden Bed:

Raised Bed: (6 Water-Up Cells) =1200mm X 800mm

In-ground Bed: (8 Water-Up Cells) = 1600mm X 800mm

Traditional Garden Bed: = approx. 1600mm X 800mm

Total Water Use Per Cell

Raised Bed: (6 WaterUps® Cells)
253.5 litres divided by 6 = 42.25 litres per cell

In-ground Bed: (8 WaterUps® Cells)
590.7 litres divided by 8 = 73.83 litres per cell

Traditional Garden Bed:
1728 litres divided by 8 = 216.0 litres per cell equivalent

Some Comments about the Results & Research Methodology

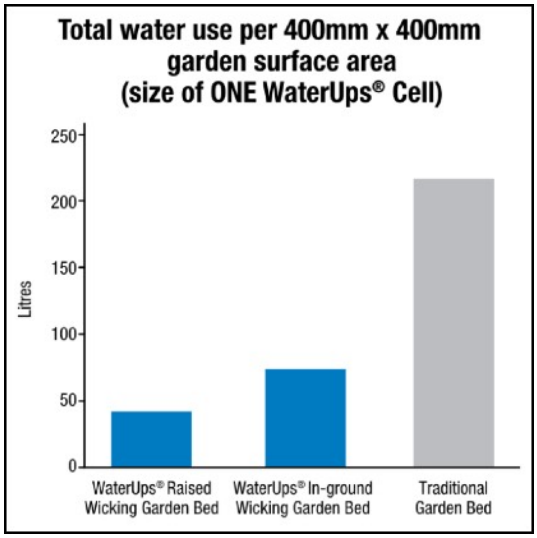
This trial is NOT a scientifically controlled trial, but rather a trial of interest to gain a good indication of the water use of Wicking Beds compared to Traditional Garden Beds.

The most interesting aspects of these results are:

- The huge difference in total water usage over the 63 days of the trial, between the Wicking Beds and the traditional garden beds. (We may have overwatered the traditional gardens, with water being applied 6 days per week, but in the intense summer heat, this is what we do as our normal practice.)

  Total water use per 400mm x 400mm garden surface area (size of ONE WaterUps® Cell)

  Raised Bed = 42.25 litres per cell
  In-ground Bed = 73.83 litres per cell
  Traditional Garden Bed = 216 litres per cell equivalent



- The variation in total water usage between the Raised Wicking Bed and the In-Ground Wicking Bed

  Total water use per 400mm x 400mm garden surface area (size of ONE WaterUps® Cell)

  Raised Bed = 42.25 litres per cell
  In-ground Bed = 73.83 litres per cell

  The Raised Wicking Garden Bed was fully enclosed so absolutely NO Water loss to surrounding soil.

  The In-Ground Wicking Garden Bed soil was covering the Water Tank area, BUT ALSO touching the surrounding soil, extending out from the wicking area. So, logically it seems very evident that the water from the In-Ground Wicking Bed Tank, was 'wicking' out to the soil beyond the area directly above the garden water tank.

- The anomaly of why the daily water use is higher in the first 12 days for the raised and in-ground wicking beds.

  This could perhaps be explained because the new gardens were 'settling-in and establishing a full water 'profile'.

  Then, the water use could be attributed to plant transpiration and natural soil surface evaporation.

- Also the Measurement of the Total Water Use in the Raised Wicking Bed could have been compromised to a small degree.

  How?

  Well, in the Raised Wicking Bed, the water inlet filling pipe is at the same end as the overflow pipe, and this may have given a false reading because the entire water tank may not have been full, at the time the overflow began to run. (ie the water going in may not have filled the entire tank to the far end, away from the overflow).

  The water inlet filling pipe in the In-ground Wicking Bed is at the opposite end to the overflow pipe.

  I would recommend that the inlet pipe, is always advised to be at the OPPOSITE end to the overflow pipe.

Plant Species and Plant Growth

- We did NOT monitor actual growth rate of the herbs and veggie plants in the gardens. The plants used in all three gardens were a mixture of Basil, various types of lettuce, giant Mustard Lettuce, Violas, Snap Dragons, Lemon Balm.

  We did NOT duplicate exact plant species or numbers of total plants in each garden, but did put a mixture of all plants in all three gardens.

  Our regular observations of the gardens showed that the plants in the wicking bed gardens maintained a more even and 'lush' growth, compared to the plants in the traditional gardens.

- There was some very hot weather during the trial, and with any future trials, it would be good to monitor Maximum and Minimum Daily Temperatures as this could have a significantly different effect on Transpiration and Evaporation Rates in Wicking Beds compared to Traditional Gardens

- We also did NOT monitor rainfall, but all three gardens were near each other and subject to the same amount of rainfall, so this was a constant for all three gardens.