# Types of Wicking Beds

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## Summary

Wicking systems rely on the attraction between soil and water so water (and nutrients) will rise up from a water storage to the soil where the plant is growing. Here we review the various systems and conclude that the soil is the most important factor.

## Wicking flower pots

A flower pot sitting in a saucer is the simplest wicking system. It catches any excess water which can then wick back up into the pot as the plant uses the water.

It is a very old system probably dating back to when pottery was first developed and was likely used by the ancient Egyptians.

They rely on the soil acting a wick to pull the water out of the saucer.

They catch both water and nutrients - avoiding losing nutrients is particularly important as it leads to higher growth.

Another version is simply putting the drain holes in the side of a container rather than on the bottom so automatically creating a water reservoir - so simple.

Normally a layer of organic material is laid in the base. The water is stored in the organic material and in the soil.

The same system can be used in larger in-ground beds. The water is stored in the soil which needs to have a high void space to store the water as well as being hydrophilic or water loving for wicking to occur.

## Water stored in the soil

All these systems rely on storing water in the soil. This works very well with a soil with a high void content which occurs in soils with a high organic content and an active soil biology. They work less well with a compacted and overworked soil. A classic heavy garden soil is unlikely to work well but can be readily improved as discussed later.

A highly porous soil may have a void content of over 60% so makes an effective water storage.

## Pots with wick

A simple extension of the basic pot and saucer system is to put a wick in the hole in the base of the pot so that water can wick up from a lower container. The wick should be made from a material with good wicking properties - a dish cloth is both cheap and effective.

The hole in the base of the pot also acts as a drain so there is no danger of the soil becoming water logged.

There are typically two separate pots so normally the top pot is lifted up and the lower pots filled with water.

These are very easy to make as a do it yourself project.

Cotton makes a very effective wick and takes up little space so virtually 100% of the reservoir is available for water storage.

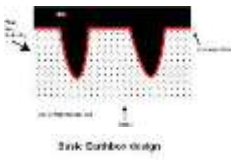
This the basic principle of my wicking baskets but in this case the basket fits inside a bucket which is convenient but means a drain tube must be fitted.

The drain tube can be twisted to control the water level - it can also be used for filling. The water level can be raised when seeding and lowered as the roots develop.

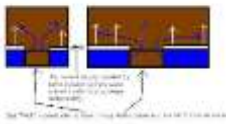
A similar system uses a standard horticultural tray which just sits on a lower container filled with soil and water. In this case the roots go straight through the mesh so there must be good contact between the soil in the upper and lower containers (e.g. no air gap).

This very simple ‘hole in the side’ box uses a pipe so the water is filled from the base and rises. This helps flushing and avoids stagnation.

## Soil fingers



Another version of the wick is to use the soil as a wick by having soil fingers going down into a lower water reservoir



These systems are more complex to make and often use a plastic moulding so they are not so suitable for the handyman.

There are many commercial versions of this system some with separate water containers others with a single container.

Soil fingers reduce the volume of water in the reservoir and are not as effective at wicking as a cloth wick and there is a compromise between the size and number of soil wicks so less of the water reservoir is available for the plants.

They are widely used because they are sold at high prices which give margins for promotions - there is no promotion margin in a 2 cents dish cloth which is technically superior.

Some of the commercial systems have side openings to make a vertical garden to save space.

Some more adventuristic handyman have still found a way of making this type themselves from scrap.  Good on them. But why they use a soil wick rather than a dish cloth is a mystery.

## Crates

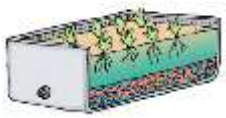
Another version is to have some form of internal container to act as a reservoir.

The container which could be an old crate is wrapped in geotextile to prevent the soil getting into the box.

In some cases a simple upside down plastic is used as a water reservoir.

They are really a version of the soil wick as the soil must surround the crate.

## Gravel Beds



Gravel beds aim to create a water reservoir by filling the base with stones so the water can be stored in the spaces between the stones. Water storage is a lot less but is practical for the larger boxes.

A distribution pipe is laid in the bottom - then a layer of stones - then geotextile then soil on top.

Stones do not wick but roots are aggressive and will push straight through the geotextile to pick up the water. Also water will evaporate from the water surface and condense on the soil above. This can be quite effective if the soil is hydrophilic when it will readily absorb the water from the air. (A bit like silica gel).

The water storage can be significantly increased by using a porous rock (like pumice)

## Larger beds

Beds can be made in many ways such as this raised bed made from shade cloth lined with plastics.

How the beds I made is not important as long as it hold water.

Drainage is essential, this sight glass and drain tube can be swivelled to adjust water level. The drainage pipe can be connected to an external reservoir which can be very large holding a lot of water to extend the time between irrigations.

## Which are the most water efficient and the best?

This is a natural question to ask - but is it the right question? The fact is that they all supply water on a fairly continuous basis to the plants so they all work pretty well when judged by increasing the time between watering.

But lets us see whether we are really asking the right question by asking why people use Wicking Beds.

Of course some people just want to save the work and inconvenience of watering but I would hope that most people would say because they are concerned about the chemical farming of commercial produce - high in calories and low in nutrients - and want to eat healthy food, full of minerals, vitamins and phytonutrients to improve their health.

On that basis all of the above systems are just ways of delivering a steady supply of water to the plants but do not directly improve the health giving benefits of the plants which Wicking Beds can do very well as there is no flushing of nutrients.

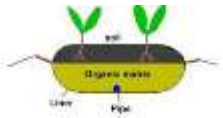
## Growing healthy food

Science has known for many years the minerals and vitamins that are essential for health however our soils have become depleted in trace minerals. The ‘productisation for profit’ of our food system has been a disaster leading to the world’s worst health crisis.

At one time it was thought that all we had to do was to take vitamins pills and we would be healthy.

More recent science has shown just how complex the human body is and the food chain which powers it. We are just becoming aware of the importance of gut bacteria and the hormones which control our body and how they can be affected by the minerals and biology in the soil in which our food is grown.

## Closed Wicking Beds



In a closed Wicking Bed there is no direct connection from the surrounding soil so both minerals and biology must be added to the bed.

Soil biology creates the right surface chemistry for wicking and to hold onto the nutrients so they are available to the plants.

Whatever type of Wicking Bed you choose having a living soil with the needed minerals and soil biology is the single most important factor.

The spectrum of soil biology from the microscopic fungi and bacteria to the larger creatures releases the minerals in the soil and makes them available to the plants. The larger creatures like worms release glues so the soil forms aggregates and create tunnels which give a high void capacity.

Worm bins (buried - not as shown) can be used directly in a Wicking Bed. It is easy to add the needed minerals to a Wicking Bed and they can be inoculated with pre-grown soil biology to start the process.

However adding soil biology is not like adding an inert fertiliser. Soil biology is living and while it can grow very rapidly it must be cared for like a farmer looks after his animals.

For further information see www.waterright.com.au go to library - soils.

How to create soils is the subject of my next article - put your name on the mailing list or for further information contact me at colinaustin@bigpond.com