Stinking reservoirs

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Improving gut biology and minerals in our diet are now widely recognised as the major health issue of our time. My main project nowadays is to work out ways of improving beneficial gut biology by developing ways that ordinary people can grow plant in soil with an active biology and available minerals.

This is a topic I take very seriously so I do not want to send out a message which may be lost over the holiday break.

They say in experimental circles that you learn more from experiments that fail than succeed. This may be good because I have produced some of the most spectacularly stinky soils which should now qualify me as a world expert.

I get a steady stream of enquires from people whose wicking bed have gone stinky. I normally reply to these on a one to one basis but this time I have decided to share my reply (slightly modified) with my readers.

Yes Val is real, she is running experiments on trial wicking beds prior to setting up a community garden - something I am very keen to support.

Hi Val,

I am struggling a bit to help you here but let me make a few comments.

I receive a steady stream of people complaining about stinky reservoirs. Much to my annoyance most of these are using the stone and cloth system which is more prone to becoming stinky than soil.

I appreciate that most people just want a simple black and white instruction manual - do a,b,c etc. and everything will work out fine. I will be the first to admit that even after many years of offering advice I have singularly failed to produce such a manual.

I really think that to make wicking beds work it is necessary to understand a few basic principles so I apologise if I come over a bit like a uni lecturer but this is the only way I know how to help.

How plants work

Let me start with a few basics - sorry if I am teaching granny to suck eggs.

Plants take up water into their roots by a process of osmosis in which water will always move from a weak solution to a stronger solution. If the solution in the plants roots is stronger than in the soil then water and nutrients will move into the roots.

Now water is funny stuff (that is why I always drink wine) and the molecules have an extraordinary high attraction to other water molecules (and other materials - that is how wicking works). As water evaporates from the leaves the water molecules act just like

a physical chain and literally pull the water up from the roots to the top of the tallest tree.

Water does not wick up a tree - the forces are too small - they are pulled up by inter molecular tension powered by the energy from the sun evaporating water. This is a very powerful process which uses a lot of energy - in a large tree the energy is similar to a small fire pump - several HP or kilowatts.

As the soil around the root system dries out water wicks - by surface tension - from the surrounding soil.

But this magical process only works when osmosis has done its job of getting the dilute water solution from the soil and into the roots.

But if the solution in the soil is stronger than in the roots osmosis works the other way and water will be sucked out of the plant and it will die. Believe me I spend my life in experimental growing systems and I have killed thousands of plants in my life in experiments in which the soil solution has become too concentrated. If I had $5 for every plant I have killed this way I would make Bill Gates look like a pauper.

I am going through this process right now with my experiments on learning to breed soil biology, the biology needs to be fed and in some of my experiments I have been overfeeding them - the solution becomes too concentrated and the plants die. And very quickly - it only takes a few hours to kill a plant by reverse osmosis.

I have just done that with an heirloom lettuce that I had been tending for ages to grow some seeds. This was an experiment using labile (young) compost - it just got too concentrated and my favourite grandmother heirloom lettuce plant just keeled over and died. Grrrrrrrr.

One of my current challenges is to find a simple way that people can have some idea of the level of concentration of the water without resorting to chemical analysis. The colour of the water seems as good as any - if it gets much darker than a light yellow (let's use urine as a bench mark) then it seems problems occur.

Wicking beds and normal beds - what's the difference?

How does this relate to wicking beds? There is a fundamental difference between a wicking bed and a normal bed that really needs to be understood to properly manage a wicking bed.

In a normal bed you apply nutrients and water as people have been doing for thousands of years. People seem to have a great affection for their plants and they typically apply too much water and nutrients but the excess water just washes any excess nutrients away (killing off the Great Barrier Reef and ruining the Queensland tourist industry).

But in a conventional garden the system works fine - as soon as the plants look a bit sick people apply extra water - the excess nutrients is washed away and the plant recovers.

The system of tender loving care really works and the plants happily grow for ever after - as they say in the kids stories.

Cruel to be kind

But tender loving care works in exactly the opposite way in a wicking bed. If you apply too much nutrients it is not washed away by flushing - the concentration increases and the plants die. If you adopt the normal practise of applying extra water this accumulates in the reservoir and without air turns into a stinky mess.

Victorian nannies had a saying 'you have to be cruel to be kind'. Actually they were just sadistic old bitches that produced a generation with no empathy for human suffering and used brute force to cause misery for millions of people around the world and also provided a template for Isis to use in modern times.

But they did have one grain of truth (in a whole beach of sand) don't over feed or over water Wicking beds - be a bit cruel.

Then people email me - sometimes in a friendly way asking for help. Sometimes less friendly accusing me of running a con trick - typically they have paid a ton of money in buying an overpriced commercial wicking bed - the manufacturer cannot help so they blame me. Sometimes I wish I had never pioneered Wicking beds.

But Val you are in the friendly group so I will keep on talking.

Tricks for Wicking beds

The tricks to Wicking beds are
- never to over fertilize and
- let the roots go right down into the reservoir and suck out all the water.

Then they work fine.

That is why I get so steamed up about the stone and cloth system which defies he basic laws of physics and how plants grow and leads to stagnation and the water turning putrid.

Wicking beds can be so simple - just dig a shallow trench - line with a scrap piece of plastic and back fill. (Preferably with weeds which provide nutrition.) Without the plastics the water and nutrients would drain past the root zone and be lost - yet this simple trench catches the water and nutrients and I have yet to have one of these single bed turn putrid.

I have made this style of bed up to 50 metres long (I would now make a long bed from multiple shorter bed end to end - more control and less worry about damaging the plastics). I have beds still in use after ten years.

I am at a total loss why people have to make things more complicated and expensive than needed.

Germination

But there is a problem with Wicking beds which despite experimenting with them for years I have never really managed to solve. That is how to start the bed off from scratch by germinating seeds.

I have tried all sorts of ways simple flooding - pre-flooding the soil, letting it drain then seeding etc. I simply have to admit that I have failed to develop a 100% reliable way using Wicking bed principles and watering from underneath.

Sometimes I have too much water and the seeds rot other times I don't have enough water so they fail to germinate or more often they lie dormant and will germinate on the next plant cycle so I end up with a crazy mix of plants. Life is fun.

Wicking beds really need active growing to work properly and keep the water moving.

Cheating

So what do I do if I really want the seeds to germinate? I do what school kids do and cheat - going back to the old system of overhead watering until the plant is well established. But this is where I have to be careful and not overwater. I apply just enough water to wet the first few mm of soil and do not let any water go down to the reservoir.

This is why I like the inspection tube in the base so I can actually see the water level. Running a Wicking bed without being able to see the water level is like driving a car in dense fog - a matter of chance.

Another way which seems to work quite well is to be a disorganised slob (I am really good at that) and instead of being neat and tidy and clearing out the old plants completely I just leave some mature plants in place. Tomatoes - being a gross feeder are particularly good - their roots will go right down to the water level and suck out the water so it is continuously on the move. Stagnant water is the bete noir of Wicking beds.

Another little trick I am finding works well is to make up my soil with the nutrients and minerals I really want in the bulk of the box. Then put a thin layer of commercial potting mix (which is generally usually pretty crappy as soil - inert with not much in the way of minerals or nutrients but has a good texture) on top and just use this layer for germination.

So Val to summarise - give it another go. When you make up your soil mix go easy on the nutrients, used a commercial potting mix on top for germination and top water but be very mean - those misting devices can be useful - or be slob like me and just wave a watering can in the general direction for a few seconds.`