

# Soil for Life

## Growers Guidebook

Soil for Life is the original organic living soil, premixed and ready to go straight out of the box. We are passionate about helping gardeners of all abilities to grow the very best plants possible, without the need for additional feeds or fertilizers. We want to avoid any chemical or synthetic inputs, instead sourcing the finest natural raw inputs to combine into a soil blend that covers everything a plant needs from seed to harvest.

Soil for Life is different from traditional bagged mediums in that we do not need to feed the plants, the nutrition is already loaded into the soil. All of the ingredients we use are multi-nutritional and offer growth-stimulating benefits to maximise plant health, vigour and immunity.

Just like outside in nature, mother earth does all the work, we just have to help facilitate the process. With a few key techniques it is now possible to grow truly organic plants in containers indoors or out, with the power of Soil for Life!

Soil for Life works by harnessing the power of the soil food web – a term given to all of the life in the soil. It starts with microscopic bacteria and fungi and goes all the way up to the predators at the top of the food chain. It is this life within the soil that is responsible for breaking down raw materials into plant available nutrients, without them the soil would not be able to support plant growth and the whole system breaks down.

The good news for growers is that we don't have to understand all the complexities of what is going on in the soil, we just have to understand that plants are ultimately in control and that if we just create the right conditions they will grow themselves. It all starts from plants using the energy from the sun (or grow lamps) to make carbohydrates from air and water (carbon from  $CO_2$  and hydrogen from  $H_2O$ ) which they feed into the soil via their roots.

These complex carbohydrates, or exudates as they are known, feed the very first stages of life – bacteria – which in turn feeds nematodes. When nematodes feed on bacteria they excrete plant available nutrients.

Fungi are also working with the plants in many ways to help them access nutrition. mycorrhizae fungi attach themselves to plant roots, giving protection from pathogens and the ability to access nutrients in the rhizosphere that may not otherwise be accessible.

As the soil life builds and becomes more diverse, the food web can support more complexity and we start seeing arthropods (worms and insects) that all have their own jobs but mostly to break down organic material into smaller particles from where fungi and bacteria can do the rest.

Ultimately, the soil food web is all about breaking down dead organic material and decomposing it back into its elemental form so it can be used again and again, over and over, in the never ending cycle of life that is all about zero waste, maximum efficiency and peak health – just as nature designed it.

# Getting Started - Keys to Success

Soil for Life is very simple to use, but there are some key factors to getting the best from it. We will begin by explaining the best way to set up the grow space, what to consider and how to approach it. With the right set up at the start, the rest is easy, here are some things to think about...

## **Environment**

Before putting plants in soil, it is important to consider what environment the plants will require based on what they have adapted to in their natural habitat. If growing outside then little choice is given, but if we are in a greenhouse, polytunnel, grow room or tent then we can have some control over the environment and try to keep it within an optimal zone.

Temperature effects the soil and soil life as well, too cold and the microbial activity will slow down, and this will cause nutrient cycling to decline and eventually stop. The same for if the temperature is too warm, most microbes can tolerate higher temperatures but we do not ever want the soil to get too hot.

Humidity has a factor on the soil life as well because it determines the pressure on the soil and therefore how much moisture will evaporate. If the air is dry, more moisture will leave the soil and make it harder to retain optimal conditions. If it is too damp and wet then there is the chance of anaerobic conditions leading to pathogens.

## **Soil Volume**

When plants grow in nature, they are adapted to their environment and will express themselves to their maximum potential based on the resources available to them. When we grow in containers we have to consider that we are placing a restriction on their potential if the size of the container ever becomes too small for the plant.

Providing a plant has enough space to spread it's roots it can express itself as best as possible. However, if they run out of room in the root zone, it will restrict what they can produce above ground. The theory is the root mass needs to match the plant mass and therefore it is important to use plenty of soil to allow for plenty of fruits and flowers.

The easiest way to judge how much soil to use is to measure your desired canopy size and match that with soil below. If the canopy is 1m x 1m then we need equal amounts of soil below.

Soil for Life comes in a 45L box, and is designed to be used one box per 15gal/56l pot. This provides adequate soil volume to grow a full size plant but ideally more soil is always better! If possible a single 3 x 3ft bed is preferred to maximise potential.

## **Pots vs Beds**

Deciding whether to use individual pots or large beds is often down to each individual situation. Beds can hold more soil than pots in the same space and allow for more soil volume overall, because of this beds have a few advantages over pots such as greater yield potential and being easier to maintain optimal conditions due to shared fungal networks.

However, pots do have some advantages over beds such as being easier for beginners to judge moisture levels as they can be felt by hand and are also much easier to move if needed. Anything over a 15gal pot is very difficult for one person to move on their own.

In general we suggest new growers start with pots because it enables a more hands on approach when initially building intuition with the soil. The more contact a grower can have with the soil the better and when in pots it is easier to get in and feel around and underneath. Beds do bring a greater yield potential though and providing they don't need to be moved would be more suitable for long term use with Soil for Life.

## **Smaller Pots**

Smaller pots can be used but there is much greater risk of out-growing the container, either because there is not enough room to support enough micro-life to drive enough nutrient cycling or the moisture is getting used up too quickly causing drought conditions/inconsistent moisture levels. We do not recommend anything less than 10gal/39l for long term use.

## **Transplanting**

The grower can decide if they want to plant directly into their final container or allow to get established first in a small pot. The sooner the transplant goes into the final container the better so that the plant can maximise it's rootzone from young. It is also key to minimise disturbance to the soil. If using a potting-on system we would recommend transplanting from no larger than 1l starter pots.

## **Water & Moisture Levels**

Water is the key to life and in the soil world it's no different. The important thing to remember with water in living soil is that it has a massive impact on the condition of the soil, how aerobic or how anaerobic it is, which dictates the type of microbes that are present and how healthy the soil is.

If the soil is too wet, the oxygen is pushed out and the aerobic microbes we want to encourage die off. When the soil is too wet for too long it only allows microbes to grow that thrive without oxygen and in a living system this is generally not what we want, they are generally pathogenic and appear as moulds or mildews. They also feed on the available nutrition in the soil rather than making it available, starving the plant. An over watered plant can take a long time to recover.

**How to spot over watering, or too wet soil:**

- Yellow striped leaves on old growth
  - Red/purple stems and stalks
  - Limp curling new growth

However, if the soil gets too dry at any point, the microbes either die off or are forced to hibernate until sufficient moisture returns. This causes nutrient cycling to decline which will quickly show as deficiencies in the plant as it pulls mobile elements from old growth to support new. The plant does not have to show wilting to be underwatered. An underwatered plant generally recovers quite quickly.

How to spot under watering, inconsistent watering or dry soil:

- Pale or yellow lower leaves
- Reduced vigour and slow growth
- Brown spots on older leaves
- Poor fruit and flower development

### **Wet/Dry Cycle**

Now that we have stressed the importance of the correct water levels and what happens when they are off, we can explain how best to achieve the ideal moisture content and keep it there as consistently as possible.

Consistency is the key because we do not want a wet/dry cycle, soaking the soil and then allowing to dry, we want it constantly moist the entire time, but with a slight fluctuation from beginning to end.

The wet/dry cycle with living soil is much less extreme and occurs over the course of a grow cycle, not over a period of just a few days. The moisture level should not be too wet at the start or end, but can be wetter in full veg and bloom as the plant transpires and drinks more. Remember the moisture level is directly related to nutrient cycling.

Soil for Life is generally good to go straight out of the box, with minimal watering needed initially. We would suggest no more than 5% of volume be applied to start with and closely monitored, watering very carefully as required. The best way to decide if a container needs to be watered is to first check underneath, is it damp to the touch? If so then the soil is probably moist enough at the bottom. Next check the mulch and soil surface. If it also moist to the touch then generally no watering is required. As the top layer begins to dry, it will need to be watered, but the key is to do so without over wetting the bottom. Be careful – a little at a time is best until optimal moisture levels are obtained.

## **Water Quality**

Because water is so important to a living soil system like Soil for Life, water quality is a key focus. Living soil is very sensitive to chemicals or synthetic compounds that can damage the microbiology within the soil. When we have a soil made with clean sourced inputs and all we are adding is water, it pays to make sure the water we use is the best quality possible.

## **Water PH**

We do not recommend adjusting the PH of the water because the options are not suitable. Strong acids like Sulfuric and Phosphorus will damage the soil life and weak acids like Citric are not effective at holding PH stable in the soil. The PH in living soil is local to the rhizosphere and will swing gradually over the course of each cycle as the bacterial/fungal ratio changes and the plant requires different nutrients. Soil for Life is around 7.0 PH out of the box so is in an optimal range from the beginning.

## **Water Filters & RO**

Many growers are forced to use mains supply tap water and this can vary greatly in different regions. Some water supplies may be high in minerals or have added chemicals or heavy metals so filtration is worthwhile if possible. Inline water filters can remove sediments and chlorine but will still allow minerals to pass through and won't reduce hardness/limescale build up.

If necessary it may require the application of RO (reverse osmosis) filters to achieve clean water. RO water in the way it is made carries a negative charge which disrupts other mineral bonds in the soil so it is important to add some minerals or even just some tap water back in to stabilise before using in the soil.

## **Water Temps**

Water temperature is important and should be matched to the desired temperature of the soil, usually around 18-21c is good for most plants. By using an aquarium heater in the reservoir, water temperatures can be kept from getting too cold. Cold water can reduce the soil temperature and effect microbial activity. If the water gets too warm, it will not harm the soil but will hold less oxygen so is not desired long term.

## **Tools, Equipment & Techniques**

The best tools to use for watering Soil for Life depend on if the grower chooses to do so by hand or with an automated system. Hand watering is a great way to build intuition with the soil and over time the grower will instinctively know how much to water each container. However, we are lucky to have some tools at our disposal to help give additional information or automate some processes to help make our jobs a little easier.

## Hand Watering

The best tools for hand watering are watering cans and pump sprayers, both will enable to grower to achieve an even and gently rain like effect on the soil to re-moisten it carefully as needed.

Pump sprayers can be used for watering the soil as well as foliar applications and are ideal for when the plant is small and very sensitive to over watering. Pump sprayers enable to grower to have more control over how much water is being applied.

A good watering can with a long neck and suitable rose can be great when more water needs to be applied each time and we want to drench the soil a bit more. They still create a nice even effect but can get more water down faster than using a sprayer.

## Automation

Some growers are unable hand water or need to set up automation to assist them.

If so Soil for Life works great with automation like the Blumat irrigation systems because only water needs to be delivered. There is no additional nutrients to mix and keep stable, minimal cleaning and maintenance required and very simple to set up. They can be used in pots or beds, indoors or outside. They can even be set up on a gravity fed system so no pumps are required. Simple, effective & reliable automation!

Blumat systems maintain the the soil at a desired moisture levels and this alone can provide a level of consistency that increases yields by up to 15% on hand watering only.

## Moisture Meters

Moisture meters can be a useful tool for the grower but it pays to invest in a quality tensiometer for accurate results. A good meter with a digital readout helps give a visual indication that can be related to what is seen and felt. If using a digital meter like a Blumat Digital there are some suggested levels for each stage of growth:

- Young plants getting established: 100-120mb
- Established plants in vegetative stage: 90-110mb
  - Flowering plants in full bloom: 70-90mb
  - Ripening & senescence: 90-110mb

Of course, different plants and even different cultivars prefer soil that may be more wet or dry so the grower will need to match the moisture level to the plants needs.

## Growing in Soil for Life

Soil for Life can be used on it's own straight out of the box but there are a few additional things a grower can do to further enhance the eco-system and get even better results.

## Mulching

Organic living soil is all about adopting the processes that occur in nature and finding ways to make it work in a container. A large part of the cycle of life is about decomposition – death leading to life and around again. It is the microbes in the soil that process dead organic matter back into the soil and if we can re-create this system in our containers we can accelerate the health of the soil. Mulching can be as simple as keeping the soil covered – by covering the soil it is protected from the sun/grow lamps, it minimises evaporation of water and helps keep the overall moisture level more consistent throughout the soil. In nature it is all the leaves, branches, animal remains and excrement that fall onto the forest floor that cover the soil, in containers we often have to supplement with something like straw, but there are other options that offer greater benefits.

By applying a mulch layer to the soil, the grower can create a layer of decomposition like what occurs in nature and this is the action zone where most of the worm activity is. It is where inputs and amendments are broken down by the soil life and worked into the soil over time allowing us to feed to soil and develop it as we go.

We recommend Barley Straw Mulch for use with Soil for Life because it is high in carbon, which not only is a great microbe food but means it doesn't break down too fast. It protects the soil perfectly and worms love it. Usually one 12L box will cover 4x 15gal/56l pots. It will break down over time, just top it up as required.

We also encourage growers to use all of their waste plant material from pruning or defoliation as additional mulch, it may not be enough to use solely but the benefit of feeding plants their own material is that the nutrition within is already in the perfect balance.

## Cover Crops

Soil for Life also benefits from the use of cover crops to maximise carbon cycling in the soil and create a decomposition process that supports mulching alone. As explained previously, plants are constantly excreting exudates, feeding soil life and helping to build the overall health of the microbiome. Therefore, the more plants in the soil, developing roots and releasing exudates, the more microbiology that is stimulated, which is always a good thing.

Not only do the exudates improve the soil, but when the cover crop gets too wild it can be chopped back, allowing it to decompose back into the soil. If using a fast growing grass and legume blend like Cover Crop Mix in conjunction with Barley Straw Mulch it will create the perfect balance of carbon to nitrogen and build amazing compost right there on top of the soil.

The best time to sow a cover crop is at the start of each new cycle. We recommend around 50g or a small handful per 15gal/56l pot. Just sprinkle it on and work it in gently with fingers. Cover with fresh mulch if required.

## Live Worms

Live Worms are the organic gardeners best friend, they work for free, 24/7 365, just going about their business turning decomposing organic material into the most perfect soil conditioner we know of. They are the lifeblood of the soil, they take it from something good to something amazing.

When using a mulch layer and cover crops, worms are the next best thing to introduce because they will feed on the mulch, turning it into worm castings which in turn get worked into the soil as it's watered.

We can use this worm casting process to feed amendments to the soil that the worms work through their enzymatic digestive systems and process into plant available nutrients. This is how we can build better soil faster than ever and can in a gentle but efficient way. We recommend around 50-100g of Live Worms per 15gal/56l pot.

## Re-Using Soil for Life

If the benefits of Soil for Life are not great enough, it gets better with the fact that Soil for Life is not a throw away consumable like much of the gardening world, it is an investment in the future, a sustainable solution to growing plants that goes on forever, never needing to be replaced or upgraded.

## Harvest & Repeat

The first harvest in Soil for Life will be good, but if the soil is re-used, it will get better and better. This is hard to believe but it is exactly what this whole guidebook has been about – understanding that in nature there is no start and no end just, just a continuous cycle.

Therefore, when plants are harvested from Soil for Life, the soil is very much still going, it does not need to be replaced with fresh soil if it has been cared for as recommended. It is ready to go again with fresh plants for a new harvest. This methodology of keeping the same body of soil long term, never replacing it is how we learned about living soil and the benefits it can bring. Just imagine how good it would be not having to dump old soil and bring new loads in!

The amazing thing is that by re-using the soil over and over, it actually gets better. It develops more diverse microbial populations, it will start hold more water and require less inputs. The result of these changes means the potential yields increase the costs go down.

## Re-Amending

All that the grower needs to do at the end of each cycle is cut the plants at the base leaving some stalk and all roots remaining intact. The soil should be amended with 2-3 tablespoon of our SFL Amendment Kit and a cover crop re-seeded if required. Top up the mulch and plant a new clone/seedling in next to the old stump. The soil life will break down the old roots rapidly and the new plant will quickly interact with the existing fungal networks to settle in with minimal stress. Use any waste material from previous harvest as additional mulch.



## SFL Amendment Kit

The SFL Amendment Kit is a balanced organic nutrient mix designed to feed the soil with a diverse blend of nutrients and minerals. Created for use with our Soil for Life, but can also be used with other soil or coco mixes. Made from raw plant and ocean sourced ingredients, SFL Amendment Kit will nourish your soil to produce naturally productive plants. It is used to apply to the soil at the start of each new grow cycle to replace the minerals that the previous crop has taken. The worms in the soil will digest the ingredients in the SFL Amendment Kit and turn them into highly nutritious worm castings that will get watered into the soil over time to keep it in peak health.

## Additional Inputs

**Soil for Life** is made up of many fantastic organic inputs and on its own contains everything a plant could need but there are some other choice inputs which could be used to help boost the soil and in turn plant health further:

- **Indoor Organics Aloe Vera Powder** – Can be used regularly as foliar or soil drench to help maximise plant vigour, immunity and overall health. Works as a wetting agent in the soil to achieve optimal moisture levels. Can be used for rooting clones as well!
- **Indoor Organics Malted Barley Powder** – Can be used to drive microbial activity to increase soil functions which can result in faster root development, stronger branches, increased secondary metabolism for faster flower and fruit production!
- **Supercharged Compost** – The ultimate blend of premium organic composts and vermicompost for making teas, extracts or just top dressing. Brings diverse microbial populations and varied balanced nutrition. A good tool for any known or possibly unknown deficiencies!

## Integrated Pest Management (IPM)

### Pest Pressure

Soil for Life thrives on the activity of micro organisms within the soil, the beneficial ones usually dominate the harmful ones but on occasion pests can become a threat to crops and should therefore be considered. Most indoor gardens are hampered by common pests such as thrips, spider mites, fungus gnats etc. Less common are species like broadmite, russet mite, slugs, snails, woodlice etc. It depends on the pest pressure in the area as to what may be present but the good thing is they are all easy to control with organic techniques so no poisons or chemicals are required.

## Pest Prevention

As always, prevention is cheaper, easier and more effective than cure so it pays to plan ahead and be prepared for any potential pests that may be present. Nematodes can be applied to the soil, slow release sachets can be hung on plants and other predatory mites can be used to patrol the soil for any possible invaders.

Foliar spraying can also be effective to help boost plant immunity as well as deter pests that may be attracted to the plants.

The first rule of pest prevention is to minimise the chance of infection from known sources – consider what plants are brought into the grow area, where they come from and what possible infections they could carry. Having a quarantine system is often vital to ensure the grow room is kept clean from pests being brought in on other plants.

If no infected plants are brought into the grow room it can be easily kept clean by applying suitable predators in advance. For more information on pest pressure and predatory controls, get in touch with Indoor Organics for advice.

## Frequently Asked Questions

Does Soil for Life need to be flushed prior to harvesting?

*When growing in Soil for Life the plant will take up exactly what it needed, there is no over feeding or stored nutrients to worry about. Plants will enter senescence and ripen naturally as they are meant to genetically.*

Is Soil for Life suitable for vegan use?

*Soil for Life does not contain any animal products such as blood, bone, hoof, horn, feather, foot or any other slaughterhouse waste but does contain ocean sourced inputs such as Krill Meal and Fish Meal. These are sourced from sustainably managed clean seas only.*

Are all of the inputs in Soil for Life organic certified?

*Most of the inputs in Soil for Life carry organic certifications but the ones that do not have been traced to source to ensure the production and processing meets our highest standards.*

Can Soil for Life be used for all types of plants?

*Soil for Life is primarily designed for fast growing annual plants but is also suitable for other types of plants providing the necessary moisture content is achieved and maintained.*

Will Soil for Life work outdoors as well as indoors?

*Organic living soil methodology has been adopted from outdoor growers so can definitely be used outdoors as well as indoors. Sun grown plants are always the best and we would encourage growers to have an outdoor garden if at all possible.*

**Indoor Organics Customer Support Hotline:**

**0330 133 3063**