

## Soil BioPack's

### What is a Soil BioPack

A Soil BioPack is a living eco system of plants and soil biology particularly bacteria, fungi, worms together with mineral and trace elements. It is used as an inoculant to create a living soil which is more reactive and improves the health benefits of food crops.



They contain a combination of hosts plants, mycorrhizal fungi, bacteria and minerals in a biodegradable box which is simply buried in the ground so the soil biology spreads generating fertile soil.

Healthy food comes from healthy soil. Adding the bulk N, P, K fertilisers to the soil may result in rapid plant growth - that is the basis of modern agriculture which produces vast quantities of food very cheaply - but it will not give plants with all the complex phytochemicals, and vitamins, needed for health. That requires a range of minerals and a biological eco system to make them available to the plants.

### How are the Soil Bio-Packs prepared?

Mixtures of plants\* are grown in wicking beds in soil which already has rich natural bio-system. This is reinforced by adding beneficial fungi, particularly mycorrhizal fungi, bacteria including Rhizobia and soil macro creatures, such as worms together with minerals and trace elements. The plants form a synergistic relationship with the soil biology. Each BioPack is cut from the bed minimising damage to the rhizophore (where the roots and soil interact) and placed in a biodegradable box. This is then buried in the host ground to be inoculated so the soil biology can spread throughout the soil.

The macro creatures particularly the worms will spread the living microorganisms into surrounding soil so as long as they are fed with green matter and compost creating a living soil which will continue to expand.

Soil BioPacks are a living eco-system of plants, soil biology, worms and minerals all working together.

### The plants



Plants, by photosynthesis, provide the energy and the carbon for the living soil. The standard BioPacks currently uses a synergistic combination of plants. Senna Alata is a nitrogen fixing legume with a deep and powerful root system which is extremely efficient at extracting nutrients, particularly phosphorous from deep in the soil. Although a medium shrub they would normally be pruned to provide a supply of green material. Gota Kola is a spreading but non intensive creeping herb with a tap root which provides ground cover, crops will happily grow alongside without being outcompeted. Sub clover provides bulk and fixes nitrogen while a mixture of herbs provide a fibrous root structure complimentary to the tap rooted Senna Alata and Gota Kola.

Other plants can be used for specific climatic or soil conditions.

## **Mycorrhizal fungi and rhizobium bacteria**

The key to regenerating soil are fungi, particularly the mycorrhizal fungi. Their hyphae are incredibly fine and exude enzymes which can dissolve rocks and lignin, releasing nutrients and helping to structure the soil. But fungi operate at the micro level, and here we need the help of the larger soil biology - particularly worms.

The plants are inoculated with mycorrhizal fungi and rhizobium bacteria. Using a pre-inoculated host plant is the most reliable way of introducing these beneficial fungi to the soil.

## **Worms**

Worms (and other macro soil biology) have an important role in improving soil but have an equally beneficial role in moving micro-biology such as the fungal spores throughout the soil.

There are really two main types of worms, those like the compost worms that stay in place and eat what is available locally and those that travel around looking for new sources of food, like the Amyntus worms. These travelling worms are particularly beneficial as they make channels through the soil which make spaces for the roots and help to break up the soil. They release slime which helps hold the soil in place. Many varieties of soil biology emit exudates which are important as they bind the very fine clay particles into aggregates which are the feature of good soils.

## **Compost, mulches and minerals**

Compost is incorporated into the soil and will initially feed the soil biology however further compost and green matter needs to be added to continue to feed the expanding soil biology.

Minerals and trace elements are also included, these will be released by the mycorrhizal fungi and then to the plants but ultimately to provide us with healthy food full of minerals, trace elements and phytochemicals. (See [www.healthyfoodassociation.com](http://www.healthyfoodassociation.com))

## **Packing, postage and planting**

Soil Bio-Packs are supplied in biodegradable 152mm cube boxes and weigh 3Kg. The plants are pruned back to just above the soil line and covered with vermiculite to protect the remaining vegetation during postage. The boxes are opened and simply buried in the ground, they are a living system and need to be planted and watered on receipt.

Fungi are easily damaged by working the soil. You should never work over the entire area; always leave some refuge area for the eco-system. If you want to move your planted area let allow the BioPacks to spread to a new refuge area first.

## **Ordering**

Order by email giving your address and number of packs you want. Soil BioPacks contain living creatures so will be posted on the next Monday or Tuesday to avoid weekend delays. The lids needs to be removed and the boxes buried and watered on receipt.

Each Soil Biopack cost \$28, postage is \$15 for the first box then \$3 for each additional box.

\*For more information you see my web [www.waterright.com.au](http://www.waterright.com.au)