

Being Green and in the Black

Border Landcare Organic Group

Fact Sheet 2

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Inputs

What is this fact sheet about?

For most farms in Australia agricultural chemicals are essential to ensure productive crops and a profitable business. These chemicals include fertilisers, herbicides, pesticides and fungicides. However long term use of some of these conventional inputs can lead to problems on your farm. Biological farm inputs offer a new, more ecological choice in farm fertilisers, pest and disease products.

What are biological farm inputs?

Biological farm inputs are products and substances that help provide fertility and control pest and diseases without adversely impacting on your farm's natural cycles. They work with nature rather than against it.

Well known examples include manures and composts, mineral fertilisers, biological pest control agents such as Bt and compost teas which can stimulate the micro-organisms in your soil and on plant surfaces.

Why choose biological inputs?

Although very effective at supplying nutrients and controlling pests and diseases in the short term, conventional chemicals may lead to longer-term problems.

These problems include resistance in target pests and imbalances in your soil health and farm ecosystem. For example some chemicals can kill off soil fungi which play a vital role in cycling nitrogen and phosphorous in your soil. This may mean an increase in the need for more chemicals to control more and more problems.

Many conventional fertilisers do not efficiently provide nutrients to your soil. Much nitrogen is often lost when applied as a conventional fertiliser and much of the phosphorous that is applied as super phosphate can be locked up and become unavailable to your plants.

Types of biological inputs

There is a range of biological farm inputs available in the market today. They include:

Mineral fertilisers

Mineral fertilisers are slow release, natural products generally made by crushing a rock source into small

aggregates, sand or dust. Depending upon the mineral content of the rock, a mineral fertiliser will contain a range of different elements that are important for plant growth.

The most common elements found in rocks include silicon and aluminium but they can also contain important plant nutrients such as calcium, potassium and magnesium. Trace elements such as boron, iron, zinc, selenium and copper may also be present.

Common mineral fertilisers include crushed granites, crushed basalts, rock phosphates, lime and dolomite.

Bio-fertilisers

These are a range of fertilisers that are biologically active. The most well known two bio-fertilisers are compost and manure. A well made compost can provide the full range of nutrients in a biologically alive, humus base. Other bio-fertilisers include composted rock phosphates, activated minerals and active liquid products that have nutrients, stimulants and biology in them.

Carbon is an important part of soils and many bio-fertilisers are high in carbon. Compost, manured pellets and bio-char are three inputs that provide carbon to the soil to build up its health.

Biological inoculants

Bio-inoculants are products that contain living micro-organisms like fungi and bacteria that can be applied to your soil or crops.

Micro-organisms (also known as biology or microbes) are very small creatures such as bacteria and fungi that live in soils as well as in water and on plant surfaces. They are an essential part of all ecosystems including farms.

Other Fact Sheets in this series:

- 1 - Soil and Water Management
- 2 - Inputs
- 3 - Plant Protection
- 4 - Contacts, Links etc
- 5 - Conversion to Organics

How to and handy hints..

You can download these free books, "[Building Soils for Better Crops, 2nd edition](#)" and "[Managing Cover Crops Profitably, 3rd Edition](#)" at www.sare.org



Biological Farming is often described as being "Information Dense". Field days, workshops etc are great ways to keep on top of this ever growing knowledge bank.

Information is your most powerful input.

Where to go to get more info?

- Books; Research; Products
 - Organisations
 - Journals; Free magazines;
- See the BLOG Fact Sheet 4 [Contacts Links and Information](#) .



There are many different bio-inoculant products on the market. Some of these products only add very specific organisms like the *Rhizobia* bacteria that are added to legume seed to increase nitrogen fixation in the crop.

Other products, such as compost teas, add a diverse range of bacteria and fungi to help increase general biological activity.

The main types of bio-inoculants include:

Soil inoculants to improve soil biological activity

Plant inoculants to improve plant nutrient uptake and disease resistance

Residue inoculants to improve the breakdown of crop and litter residues

Biological stimulants

Bio-stimulants are substances that when applied to the soil, pasture or crops feed and stimulate the micro-organisms (such as bacteria and fungi) that are found in the soil and on plant surfaces.

Just like plants, animals and people, micro-organisms need energy, nitrogen and a range of nutrients. The ingredients of different bio-stimulants supply these needs for microbes. Some products such as molasses, which has a high carbon content (sugars), provide mainly energy to micro-organisms. Other bio-stimulants like fish emulsion may provide nitrogen and essential trace elements to the micro-organisms.

A wide range of other biochemical compounds beneficial to micro-organisms such as humic acids, carboxylic acids and fats may also be used. Common bio-stimulants include seaweed, fish emulsion and molasses. Other products include worm juice, humic acids & fulvic acids.

Bio-pesticides

Bio-pesticides are a range of pest control substances that are friendly on your farm's ecosystem whilst controlling insects and diseases. This new generation of products are often:

Target specific so they do not harm beneficial insects.

Natural Extracts from plants or micro-organisms (they use nature to fight nature).

Readily biodegradable in your soil so they do minimum harm to your soil's biology.

Benefits from using biological inputs

Cost effective supply of nutrients to your soils: Using bio-fertilisers is often a more effective way to supply nutrients to your soil as the nutrients are supplied in a readily available yet stable form. There is less risk of the fertiliser leaching or becoming locked up. This means you get to use all the fertiliser that you pay for.

Help your soil ecosystem not harm it: Biological inputs are microbe friendly when used in the correct way. This means that they do not have adverse impacts on the important soil organisms like fungi, bacteria and protozoa. All these creatures help your soil to store and cycle nutrients. In many cases biological inputs improve your soil's ecological functioning.

Help your crop ecosystem not harm it: Bio-pesticides are often more friendly on both plants and the beneficial insects that inhabit your crops and pastures. This means that they target pest organisms without disturbing predators and without leaving residual chemical pollutants in your soil and on your plants.

How & when to use biological inputs

When using biological inputs you need to be aware that they may "work" in different ways to your usual farm inputs. Some things to remember are:

Mineral fertilisers are not highly soluble and therefore require an active, carbon rich soil to supply nutrients.

Bio-pesticides work best when used as part of an Integrated Pest Management program.

Micro-organisms need moisture, carbon, nutrients and moderate temperatures to work effectively. When applying them ensure that you are putting them into a suitable environment. For example, think twice before applying them in cold or very dry periods.

Many conventional agricultural chemicals will adversely impact on microbial populations. Use chemicals sparingly.

A healthy tomato crop. Only minimal biological inputs applied.



This Fact Sheet is also available online at the BLOG website (www.granitenet.net.au/groups/BorderLandcareOrganicGroup/page.cfm) or at the BLOG Wiki (gb-blog.wikispaces.com/)

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