Independent Trial

Improved microbial biomass with Soil & Seed

Adelaide, South Australia	2010 – 2011
Location	Year

Creative Innovation Agriculture & Forestry

Conducted by

Pot trials

Trial Type

Aim

The aim of the trial was to determine the effect of BioAg's *Soil & Seed* on microbial population in soils (microbial biomass), soil nutrients within the microbial population, and soil carbon levels. The trial was completed on a range of soil samples: sandy soil, loam, and clay loam.

Method

Trial Design

In each trial, a control soil and a treated soil was used. All soil samples were collected from non-production areas of the respective farms.

Soil & Seed was applied to the treated samples after collection.

Over a 20-day period, there were no further applications however there were rainfall events during that time.

Treatments

Control
1 x 120 l/ha water

Treated
1 x 100 l/ha water
1 x 15 l/ha *Soil & Seed*

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Results

Using protein clipping, biochemical analysis and DNA analysis, CIAAF determined the changes in the microbial biomass (fungi and bacteria) in each sample.

Average total fungi increase +82%

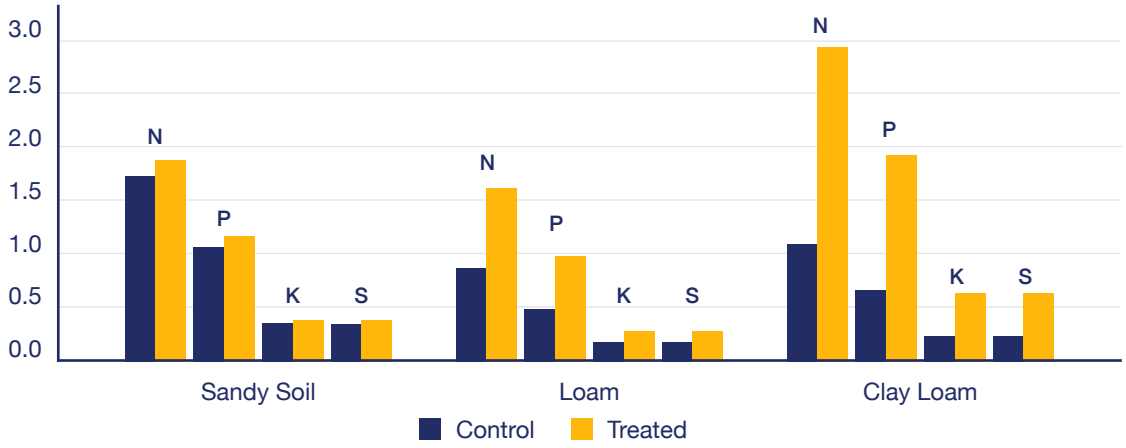
Average total bacteria increase +58%

On average, the total number of microorganisms (bacteria and fungi) increased by 77% above the control.

Nutrient increases

Based on trial results, CIAAF are able to estimate the effect on the total amount of soil nutrients that form part of the microbial biomass, and when compared to the control.

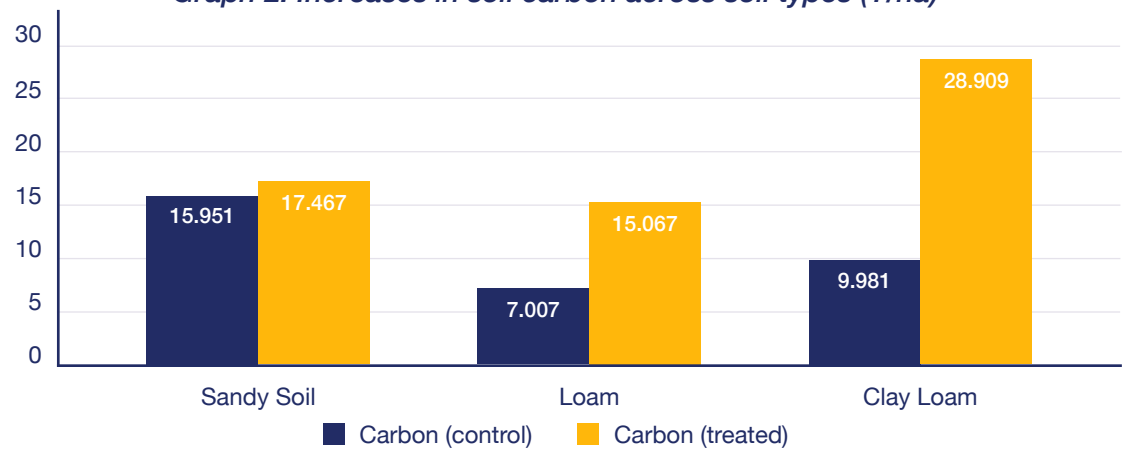
Graph 1: Nutrient increases in biomass across soil types (T/ha)



Soil carbon

Soil carbon was increased in sandy soil, loam and clay loam by a minimum of 1,516 kg/ha and up to 18,928 kg/ha in clay loam soil.

Graph 2: Increases in soil carbon across soil types (T/ha)



Observations

While mixing the soil samples at the end of the trial period the test soil:

- Felt and appeared more friable
- Seemed to have a slightly higher soil temperature
- Seemed to have a higher water holding capacity.

Conclusion

As can be seen in the results, the addition of *Soil & Seed* improved total microbial mass, total nutrients within the microbial mass, across all key nutrients, and total soil carbon across all soil types trialed.

Why are these results important?

An increased number of micro-organisms in the soil (microbial biomass) improves a number of factors that affect crop production. A higher microbial biomass:

- Improves nutrient supply from the soil to the plant
- Extends the volume of soil from which nutrients are drawn
- Breaks down organic matter
- Stores nutrients in plant-available form
- Suppresses disease-causing soil pathogens
- Increases plant tolerances to heavy metals, drought & salinity
- Converts nitrogen into a plant-available form
- Binds soil into aggregates, improving soil structure

Improving nutrient content within the soil microbial mass has benefits by reducing the amount of “free” nutrients in the soil that can be locked up by antagonists or be prone to leaching in periods of higher rainfall. Nutrients within the microbial biomass are more readily available to plants compared to nutrients attached to soil antagonists.

Microbial biomass improves access to nutrients: even when a nutrient (such as phosphorus) is deficient, plants in soil with a larger soil microbial biomass are more able to access and take up the available nutrients, resulting in better plant health and productivity.

Additional Background – About BioAg

BioAg is an Australian manufacturer of liquid biostimulants and natural phosphate fertilisers. BioAg’s liquid biostimulant are a range of proprietary microbial cultures, specifically formulated to support different plant growth stages by improving plant and soil performance.

Each culture / product contains a:

- Balanced food supply of carbohydrates, amino acids, enzymes, vitamins, essential nutrients and growth promoters, that feed both plants and beneficial micro-organisms
- Large and diverse population of beneficial micro-organisms, including fungi, bacteria, yeast and protozoa.

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Each product has been developed to:

- Stimulate soil biology and plant processes
- Feed soil biology to ensure it is active and able to interact with the plant
- Improve the balance of beneficial microorganisms in soils, and
- Provides microbial food and microorganisms into soils that are low in microbial activity or diversity due to factors such as, stress (cold, heat or water logging), lack of plant activity (fallow) and/or due to a lack of plant diversity (monoculture).

Applying the appropriate product at the requisite growth stage will support and enhance:

- Structured vegetative growth and enhance root development
- Nutrient cycling and improved plant availability of nutrients
    - Chelation of nutrients, via amino bonds
    - Conversion of in-organic nutrients into a microbial form (becomes part of the biomass)
    - Helps to unlock nutrients previously bound in soil complexes
    - Improves the flow of nutrients through the plant
- Water retention and uptake, and
- Plant vigour and tolerance to abiotic stresses.

The benefits of biostimulants can be depleted with time. In addition, as plants develop reach their next growth stage the nutritional needs of the plant also change. Applying the appropriate biostimulant, soil inoculant or foliar application, at the right time is a key attribute of any program.

BioAg's three core biostimulant products are:

1. *Soil & Seed* is a broad-spectrum microbial inoculant that assists; nutrient accessibility, nutrient solubilisation, nutrient cycling, enhanced seed germination, root development, disease and drought resistance and residue breakdown.
2. *Balance & Grow* is a broad-spectrum source of foods and stimulants for balanced plant functions, plant health, and vegetative growth including; calcium and phosphate, vitamins, minerals, proteins, enzymes, amino acids and carbohydrates.
3. *Fruit & Balance* is formulated to increase flowering, fruit set and soil microbial activity. It delivers a rich source of plant-available phosphate when the plant is under peak load, stimulating strong fruiting and enhancing yield potential. Fruit & Balance contains a rich source of vitamins, minerals, proteins, enzymes, amino acids, carbohydrates, and growth promoters.

Each product is also available as an organic variant.

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