



Independent Trial

Mackenzie Basin NZ Trial 2021 - ongoing

Mackenzie Basin, New Zealand	2021 - ongoing
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Location	Year
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AgScience Limited	Pasture
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Conducted by	Crop
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Dry land and irrigated plots

Trial Type

Aim

To evaluate the impact of BioAg fertilisers in low rainfall high-country, where biological fertilisers are untested, but are of considerable interest to farmers.

Introduction

BioAg New Zealand commenced multi-year pasture trials in 2021 in the in low rainfall high-country of the Mackenzie Basin near Twizel, located in the South Island of New Zealand.

Unfertilised high country basin floor soils are typically free-draining, low in fertility with toxic subsoil aluminium levels. With irrigation and soil amendment they are highly productive, but the effects of biological fertilisers are unknown.

The trials are assessing the benefits of *BioAgPhos*, as well as *Soil & Seed* alone, and the interaction between the two when used in combination. These treatments act by enhancing efficiency of applied nutrients and by increasing plant nutrient availability through microbial mobilisation of soil minerals.

Trial sites composed of both dry land and irrigated plots drilled with lucerne.

Twizel rainfall data is shown in the table below. From fertilisation in May 2021 to first harvest in January 2022, total recorded rainfall was less than 520mm.

Table 1: Rainfall (mm) - Twizel, NZ

Dec '20	Jan '21	Feb '21	Mar '21	Apr '21	May '21	Jun '21	Jul '21	Aug '21	Sep '21	Oct '21	Nov '21	Dec '21	Jan '22	Feb '22
45.2	140.7	17.3	13.5	18.0	65.0	24.0	98.0	51.0	46.5	41.0	88.0	85.5	17.5	128.5

Method

Dryland

The dryland site had never been fertilised. It was precision soil mapped, soil tested, and rabbit fenced. *BioAgPhos* with lime and sulphur was hand applied in May 2021, and *Soil & Seed* was sprayed at 4 different rates (0, 4, 8 and 12L/ha) in November 2021. Dryland pasture production and species composition were assessed in January 2022, 7 weeks after *Soil & Seed* application and eight months after *BioAgPhos* application.

Irrigated

An adjacent irrigated developed site that had been previously limed and fertilised with high P levels was selected to allow for same soil parallel assessment. *BioAgPhos* was applied with *Soil & Seed*, at the same rates as the dryland trial process, also in November 2021. The irrigated site was not assessed in January 2022 as it was cut for silage.

Block design

Dryland *BioAgPhos* and *Soil & Seed* were applied in a randomised block design with Actinobor in four blocks, totalling 36 dryland plots. On the irrigated site a single application of *BioAgPhos* was applied with four rates of *Soil & Seed* in five blocks, totalling 20 plots (2 x 5m each). There was a 1m buffer strip between dryland plots and a 2m buffer strip between irrigated plots.

Table 2: Fertiliser Application Rates

Fertiliser	Rates
<i>Soil & Seed</i>	0 , 4 , 8 , 12L/ha
<i>BioAgPhos</i>	800kg/ha + 0 , 4 , 8 , 12L/ha <i>Soil & Seed</i>
Actibor	1.5kg/ha

Interim results - January 2022

Only the dryland trial site was able to be assessed in January 2022 as the irrigated site was cut for silage.

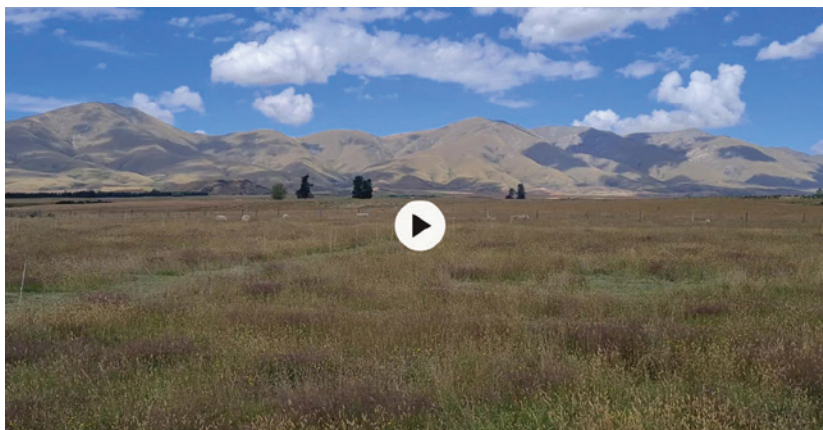
BioAg applications significantly altered dryland pasture composition (grass cover, $P < 0.007$; legume cover, $P < 0.0001$). Fertiliser significantly altered legume cover ($P < 0.00001$). *BioAgPhos* gave a huge increase in legume cover, principally the annual hare's foot trefoil. *BioAgPhos* increased legume cover by up to 307 times, both by itself and with all combinations of *Soil & Seed* ($P < 0.001$). Consequently this reduced the percentage of bare soil, resident grasses and weeds ($P < 0.001$).

The statistically significant or highly significant species composition and production responses to BioAg applications indicate genuine effectiveness of both *Soil & Seed* and *BioAgPhos*.

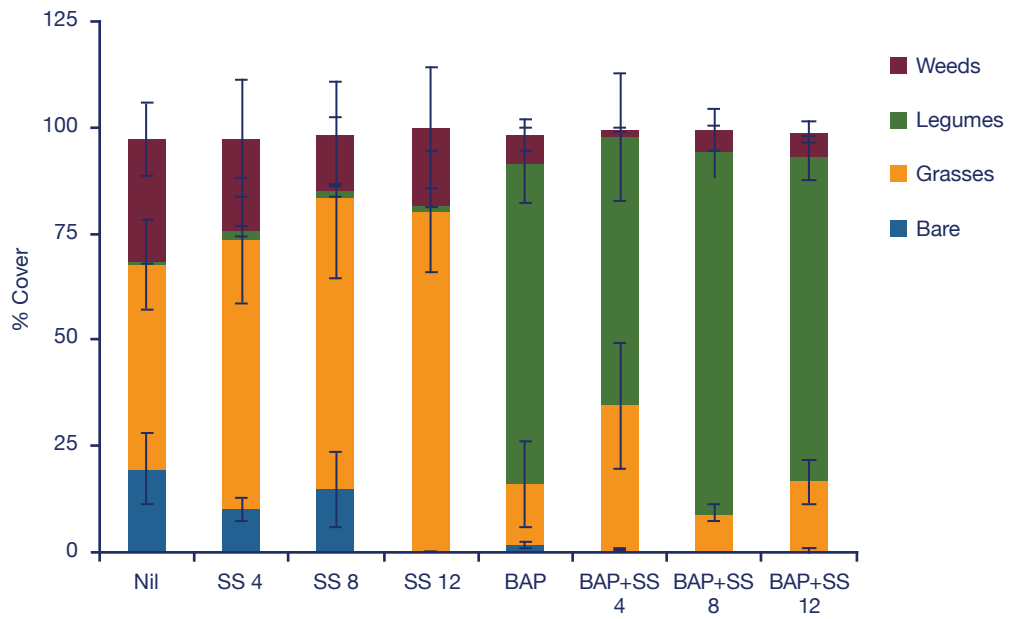
Figure 1 – Dryland Plots



Video - Shortlands Station



Effect of BioAg applications on pasture composition - dryland trial site (+/- Standard Error of the mean (SEM))



Soil & Seed applied alone progressively increased Dry Matter (DM) yield with increased rates of application; up to 17% above untreated grassland.

BioAgPhos alone provided a statistically significant result increasing DM production by 60%. Inclusion of *Soil & Seed* further increased production.

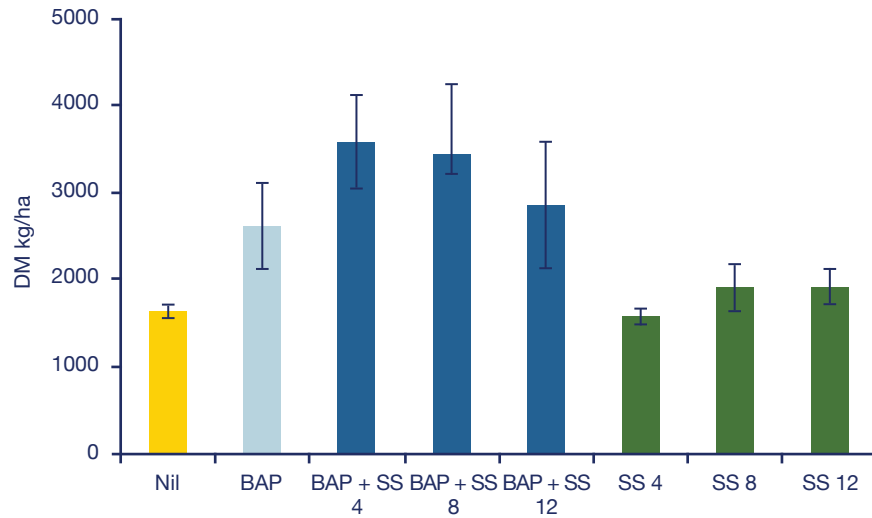
Table 3: January 2022 harvest results overview – increased Dry Matter yields

BioAg Soil & Seed	BioAgPhos	BioAg Soil & Seed & BioAgPhos combined
Up to 17%	60%	4L/ha increased yield 120% 8L/ha increased yield 110% 12L/ha increased yield 75%

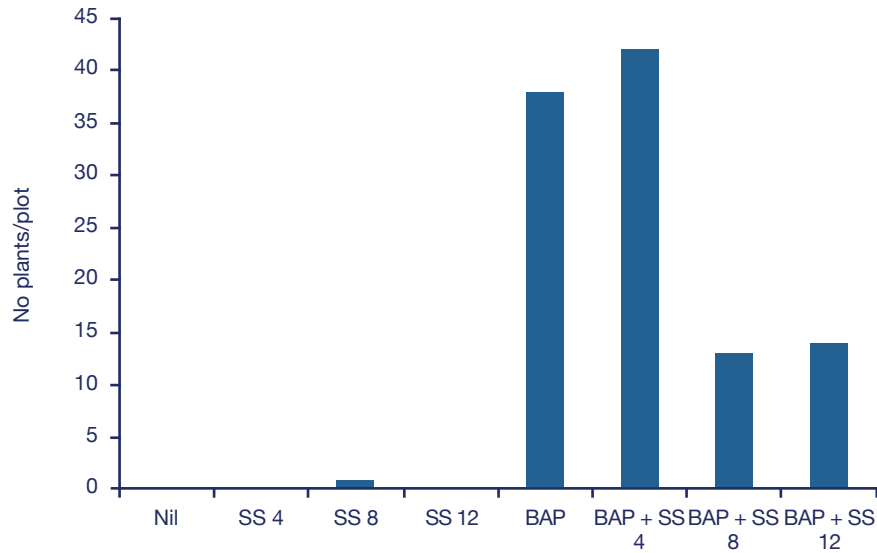
In addition, treatments (in particular those including *BioAgPhos*) significantly improved pasture composition and reduced bare earth.



Effect of BioAg applications on low fertility dryland pasture production (+/- SEM)



Effect of BioAg applications on lucerne number (+/- SEM)



Assessment of the trial sites is ongoing. These positive interim results are the first season of a planned three-year trial project. We will keep you posted on the future trial results.

View the full reports:

Establishment – November 2021

First harvest – January 2022



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.

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.