Spring 2015

In this edition

BioAg COUNTRY

Turn your rain into top quality grain – act now!

It's been a long wet winter for many croppers, particularly in NSW and NE Vic. As spring arrives and crops are hungry having endured the wet and cold there are opportunities to make profit from feeding these crops.

A full profile of moisture is a rare luxury for most to enter spring with and our advice is that you don't waste it. Applying the right foliar feed from 2nd node to head emergence in cereals will maximise the plant's potential to deliver yield and grain quality.

2L/ha of Fruit & Balance along with 20L/ha of UAN (if nitrogen is suboptimal) can be tank mixed with fungicide or insecticide should either of those be required.

For forage and fodder crops including pastures, similar rules apply. 2 L/ha of Balance & Grow tank mixed with 5 kg/ha of calcium nitrate and up to 20 L/ha of UAN will maximise the volume and value of forage produced by the full profile of moisture.

Get set to take maximum advantage of the longer days of sunlight and higher soil temperatures that spring delivers. Contact your BioAg agronomist and get your product on farm so you are ready to go when conditions are right. Your BioAg agronomist will assist you to fine tune your programs.

Increased YIELD and NITROGEN use efficiencies in RICE Research Australia trial

- $220/ha yield increase
- $18.50/ha less spent on inputs
- Resulting in the grower being $238.50/ha better off

The 2014/15 year saw BioAg's Soil & Seed undergoing trials by Rice Research Australia's research farm at Jerilderie NSW, where it produced a response in terms of yield, and especially in nitrogen use efficiency.

The replicated trial compared standard fertiliser practice with a rice nutrition program that included Soil & Seed.

The trial found that the treatments using Soil & Seed were able to take up larger quantities of nitrogen, to the extent that, at panicle initiation there was no need for top dressing of urea.

For deep-water rice crops, this means a 44% reduction in nitrogen use, and for shallow-water crops, a 34% reduction.

In dollar terms, the Soil & Seed treatment cost $60/ha compared to the control top dressing application that cost $78.50/ha. A saving using the Soil & Seed program of $18.50/ha.

In addition, the Soil & Seed treatment resulted in an additional 500 kg/ha yield increase. At todays prices, that is an additional $220 in yield increases for each hectare of rice grown.

In total, the grower would be $238.50/ha better off using the Soil & Seed based program.

John Hill, Technical Sales Manager at BioAg said "whilst the yield response was not statistically significant, it was great to see more grain grown with less nitrogen".

"It is exciting to see the increase in nitrogen use efficiency from this trial and that this technology has the ability to span across a number of intensive irrigation cropping industries", said Hill.

Nitrogen use efficiencies-a reoccurring theme

The Rice Research Australia trial is not the first where BioAg programs have delivered reductions in inputs such as nitrogen.

Trials conducted by AgriCenter International using BioAg's liquid microbial fermented cultures on corn, cotton and soybean over two years averaged 22% yield increases. These results included replications using 15% less nitrogen than the standard district practice.

A case study on a NZ Dairy monitor farm resulted in a 90% reduction over 3-years in applied nitrogen following the introduction of a BioAg program.

How is this being achieved?

Anton Barton, Managing Director of BioAg said, "Most of the work we are doing is about improving the efficiency and sustainability of conventional farms".

"This is achieved through improving the soil health and by increasing the microbial population and diversity in the soil. This then allows the applied nutrients to become more plant available, and the excess to be stored in a plant available form", said Barton.

Rice research Australia will be conducting further trials on BioAg products in the coming season.

International news: **BioAg customer wins TOP FRUIT GROWER OF THE YEAR**

Gala apples ready for picking.
Hill Farm, Boxford.

Carmella Meyer, Robert Rendall, Susanna Rendall and Boxford Farms Director Robert England.

This year, Boxford Farms, one of BioAg's customers in the UK won the Top Fruit Grower of the Year award for 2014.

A BioAg user since first trialling some of our products in 2010, Boxford Farms are one of our customers obtained through our UK distributor, Thomson & Joseph, based in Norwich.

Prior to this award, they had already won Tesco's Small Grower of the Year title.

Boxford Farms is a 200ha farm at Boxford and grows over 40 different varieties of apples with a balance of modern and traditional orchards.

The Company uses BioAg's Soil & Seed across all of their drip-fed apple crops, with the intention of creating a living, healthy, and balanced soil to improve crop health and soil structure.

Initial trials

In 2010, Boxford Farms trialled BioAg's Soil & Seed which was applied via fertigation over an 18-week period at 10-14 l/ha.

Representative soil samples were taken from both Control and BioAg treated blocks using ADAS Standard Soil Analysis Procedures.

The soils were analysed for extractable (available) levels of phosphorus, potassium, magnesium and calcium.

Results

Mean soil available levels were increased for all of the measured nutrients. In the case of P and Mg, the increase was equivalent to increasing the Soil Index by 1.

P +75% Ca +32%

Mg +74% K +11%

Robert England, the farms Director said "There have been quantifiable increases in both fungal and bacterial micro-organisms in the soil around the root-zone of the drip-irrigated trees".

"This has led to less waterlogging, a greatly improved soil structure and the breakdown of elemental minerals into readily available forms, leading to better yields, improved tree health and reduced nutrient and agrochemical inputs", said England.

KAGOME AUSTRALIA RESEARCH TRIALS – ECHUCA

Compiled by Dan Hill
Area Manager, Southern Victoria & Tasmania

- *BioAg treatment delivered 14 t/ha improvement above the control*

Courtesy of Kagome Australia and Tomato Topics (Horticulture Innovation Australia) Volume 25, Number 2, June 2015.

Based in Echuca VIC, Kagome Australia is the country's largest tomato processing company, supplying many supermarkets in Australia and internationally with high quality, Australian grown product, which they have done since 1996.

Kagome Australia conducted a number of fertiliser field trials throughout the 2014-15 processing tomato season.

One of these trials, conducted by Steph Moore in her R&D role for Kagome included the use of BioAg's liquid microbial fermented culture products Soil & Seed, Balance & Grow, and Fruit & Balance.

These products balance the nutrient supply for plants and soil microbes, and stimulate soil microbial population and diversity.

The trial compared a control treatment versus the BioAg treatment, and was replicated four times across two separate sites. The BioAg treatment was applied through fertigation and foliar sprays in three applications throughout the growing season.

Tissue test, yield, brix, and pH results were measured.

Fig 1. Yield, brix and pH results.

	Yield (t/ha)	% change	Brix	pH
Control (site 1)	105.7		5.35	4.49
BioAg (site 1)	119.7	13.25	5.18	4.43
Control (site 2)	75.9		6.37	4.26
BioAg (site 2)	81.1	6.85	6.77	4.27

About the products used

BioAg's liquid microbial fermented culture range, consists of:

- Soil & Seed: suitable for all crops and pastures
- Balance & Grow: for vegetative growth, and
- Fruit & Balance: for flower and fruit-set.

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The Pasture ECOSYSTEM

Part 1
Compiled by David Phelps
Area Manager, Southern NSW

This is part one of a three-part article on the pasture ecosystem. In this first part we talk about what dwells in and on our soils, and what roles they play.

As pasture based livestock producers, we are in the business of harvesting solar energy and converting it to food & fibre. We attempt to manage plants to optimize this harvesting of solar energy via the management of the above ground portion of the pasture.

However there is more biomass & biological activity occurring beneath us than we realize.

What does live beneath us?

All living things have a place or a niche in the pasture ecosystem. Each has an optimum physical and chemical environment, which provides adequate amounts of food and cover, allowing the species concerned to reproduce and maintain itself. The environment is based on the climate, the time of year, soil texture, position on the landscape and management.

Here is a brief summary of what lies beneath our feet.

Plant Roots – these are essential to the above ground producers. They gather water and nutrient for the plant and provide a major source of live & dead matter for food for soil organisms.

Earthworms – eat dead plant material and are opportunistic predators of bacteria, protozoa, nematodes & fungi when they consume the dead plant material. They act as a shredder to large pieces of organic matter (OM). They aerate and invert the soil improving soil drainage and help with particle aggregation. They can also act as a food source (e.g. to birds)

Slugs & Snails – similar to earth worms in that they break down larger pieces of OM and can act as a food source.

Nematodes – consume plant roots & algae, predate on bacteria, protozoa, fungi & other nematodes. Help in the nitrogen cycle (by eating bacteria and releasing the nitrogen back into the soil) and are a food source to other nematodes, fungi & mites.

Woodlice – feed on dead plant material, help shred course OM. Can act as a food source to birds & spiders.

Spiders are predators.

Mites – consume algae and can predate on nematodes, springtails, fungi, insect larva & eggs. Some also feed on decomposing OM.

Centipedes & Millipedes – mostly predators of insects, slugs & worms but can consume decomposing OM.

Springtails, Beetles, Ants & Termites – generally consume dead OM & fungi and help with

the ecological function of soil aeration, soil inversion and nutrient cycling in the over soil community. They both predate and act as food sources to other insects & birds.

Bacteria – are central in the nitrogen cycle (via root nodules on legumes). Bacteria also feed on decomposing OM breaking protein down into ammonia whilst also converting ammonia to nitrate. Bacteria also act a food source to protozoa & nematodes.

Actinomycetes – look like a fungus but are closely related to bacteria. Help decompose dead OM; some also help with nitrogen fixation while others can act as plant parasites.

Protozoa – three main types. Consume bacteria and are food to nematodes.

Fungi – come as molds, mycorrhizae and mushrooms. They decompose dead OM. Some fungi are predators on nematodes. Mycorrhizae fungi have a symbiotic relationship with plants supplying the plant with mineral nutrients in exchange for energy & protein. There are two main types of Mycorrhizal fungi: ectomycorrizal (cover root surfaces) and endomycorrhizal (enter inside the plant root cells). Fungi also produce glomalin, a glue-like material essential in the formation of soil aggregates.

What do they actually do?

All these organisms work together in our pasture system via nutrient cycling and the solar energy flow within the ecosystem.

The green leaves of plants gather solar radiation via photosynthesis. The plants take carbon from the air, water from the soil & lock the energy into sugar while releasing oxygen to the atmosphere. Plants take the sugar and add nitrogen (supplied from the soil or via rhizobia bacteria with legumes) to make proteins. Plants then use these sugars & proteins to grow new shoots, leaves & roots. This metabolism needs the use of all the macro (N, P, K, S, Ca, and Mg) and micro (Cu, Zn, N, Mn, Mo, Fe, and B) nutrients. Plants are the primary producers in the pasture food web.

When stock graze a pasture, plants drop off some roots while they are in the process of growing new leaves. Along with the roots, clover plants drop some of their nodules. Earthworms eat these dead roots as they burrow through the soil while bacteria decompose dead roots and nodules that the earthworms do not eat. Later earthworms may end up consuming these bacteria as they go back through the soil.

Some bacteria prefer the highly digestible sugars and proteins while other bacteria prefer the readily digestible fibre. After the highly digestible parts are digested, fungus and actinomycetes go to work digesting the less digestible fibre and lignin. Ultimately the indigestible carbon forms somewhat stable soil humus. All of this activity is necessary for the decomposition of dead plant material to return the mineral nutrients to the soil to be used again by plants. This is the process of nutrient cycling.

During grazing, stock tread down part of the pasture sward. This material likewise is consumed by earthworms and detritus feeding insects, mites, bacteria, and fungus releasing C back to the air as they use the carbohydrates for energy and the protein nitrogen and minerals to sustain themselves. When organic matter energy is in good supply bacteria hold onto the nitrogen, divide, and make a whole lot more of themselves. Then when predatory nematodes and protozoa come along they eat the bacteria and release a large part of the nitrogen (what they don't need) back into the soil where it is available for plants to use.

Part 2 of this article will appear in *BioAg Country*, Summer 2015 edition.

References:

E.B Rayburn - Pasture Ecology: Managing Things That We Cannot See: 2009

USDA/NRCS. Soil Biology Web Site. http://soils.usda.gov/sqi/concepts/soil_biology/biology.html

In case you missed it

In August, BioAg and some of its customers were featured on the ABC's Landline.

The theme of the segment was on contemporary farming systems, and especially organic farmers and products.

While BioAg's organic range was what attracted Landline, 98% of our product is actually supplied to conventional growers that are incorporating BioAg products and programs into their conventional soluble soil and plant nutrition programs in order to optimise fertiliser use efficiency, maximise crop yield and quality, and returns.

BioAg is in the business of helping farmers to be increasingly sustainable, increasing the health, productivity and viability of their farm enterprises.

When the next generation takes over the farm, as is occurring with each of the BioAg customers appearing in the Landline story, Commins, Vidler, and Wiseman, the farms are all much more productive than they were when BioAg started working with them in 1999 and 2000.

They have all grown their size significantly during the intervening period. You cant do that if you're not farming more profitably than your peers.

BioAg wishes to thank Neil, Gina and Luke Wiseman, Drew Vidler, and George Commins for all taking the time out of their busy schedules to appear in the Landline segment in support of BioAg.

Our bill for making you all famous movie stars comes later.

If you haven't seen it yet, there is a link to the Landline segment on the front page of our website.

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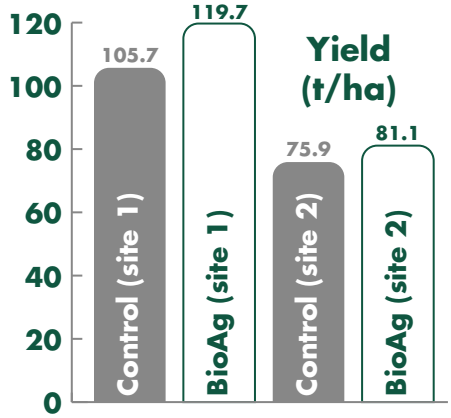
Each product is a source of microbial species important to each stage of production, as well as a food source for both the crop and the microbial populations.

Fig 2. Yield comparisons of Control and BioAg treatments.



The products contain a diverse range of:

- Vitamins
- Minerals
- Amino Acids
- Proteins
- Enzymes
- Carbohydrates
- Dormant microbes

The microbial populations that the products add perform numerous functions that improve the condition of soil and the production of the crop. These include aspergillus microbes that are nitrogen fixers and agents in remediating contaminated soil, and penicillium (P. notatum) that promote plant growth, while other species suppress root pathogens.

Organisation FERTCARE®

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Better soils. Better crops. Better stock.™

For more information, phone 02 6958 9911 or visit www.bioag.com.au