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BioAg NEWSLETTER

Phosphate Prices Head North Again

In our December 2009 Newsletter we predicted that the prices of phosphate fertilisers had probably bottomed. How right we were! But, equally, we were surprised by the speed and the extent by which the prices have risen in the past two months, as supply lines have emptied and manufacturers and traders have sought to buy inputs on the world market.

We, on the other hand, landed a shipment of Egyptian phosphate rock in late 2009, and locked in the selling price of our BioAgPhos® in December, and have no intention to lift it until stock made from the present shipment runs out.

The BioAgPhos Value Proposition

BioAgPhos is a unique fertiliser which provides pastures and crops with an



Unloading Egyptian phosphate rock at Geelong Port in December 2009 for conversion into BioAgPhos fertiliser.

immediate and continuing source of plant-available phosphate. The rock is treated with a proprietary microbial culture which yields a product containing 13% phosphorus (30% P₂O₅) which is not water soluble and thus doesn't suffer from leaching or “locking up”.

It offers excellent value for money. Based on recommended retail prices prevailing at the end of February, the cost per

kilogram of phosphorus in BioAgPhos is \$2.62, compared with around \$4.11 for MAP and \$4.32 for Single Super, calculated on the same basis, offering savings of around 36% and 39% respectively.

If you would like to learn more about BioAgPhos, and this season's “while stocks last” offer, contact us on 1300 599 911, or talk to your local distributor.

“Peak Phosphate” Revisited

The debate about “peak phosphate”, mentioned in our December newsletter, continues to rage.

See, for example, Matt Cawood's article in *The Land* of 21st January. Clearly, the argument is not about whether the world demand for phosphorus will exceed supply, but rather when this will occur, with estimates ranging from 30 years back to a much shorter timeframe.

Cawood observes that few nations have access to enough phosphorus to supply their own agricultural needs; most of the world's known phosphate reserves are controlled by China, the USA and Morocco. China has the largest reported reserves, but its central government introduced a massive tariff on exports last year to protect domestic supply.

The US, historically the world's largest consumer, importer and exporter of phosphate fertilisers, is now thought to have only 25 years of domestic phosphate reserves left. It imports large quantities from Morocco which produces a third of the world's supply, but is subject to political instability.

He summarises the Australian position by saying that phosphate supplies are finite and subject to political uncertainty, but Australia's agricultural and food systems remain highly inefficient users of the fertiliser. Up to 75% of P is locked up in agricultural soils. About 20% is exported in farm produce and a minor amount is leached into waterways or the sea.

We believe that the implication for Australian farmers is that we must get used to high priced water soluble phosphate fertilisers from now on.

The advent of BioAgPhos means that farmers can reduce their dependence on these inefficient phosphate sources by partially replacing them with BioAgPhos in cropping systems and completely replacing them in grazing systems.

Our message for this season is that we're offering the opportunity to buy an efficient phosphate fertiliser cheaply. Once our present stock is sold, we expect a substantial rise in price as world prices have already risen dramatically.

Ivan Mitchell at Deniliquin



Ivan Mitchell (L) at a recent field day with BioAg Plant Manager, Barry Knight.

Long serving BioAg agent Ivan Mitchell says that after 11 years, he can see the fruits of his labours in promoting biological farming in Northern Victoria and Southern NSW.

Ivan has been a BioAg agent since the formation of the company 11 years ago, and worked with Managing Director Anton Barton for several years before that. The BioAg suite of products has represented the whole of his business since he started with the company, and has provided him with a good living during that time.

He is based at Deniliquin, but when asked about the breadth of the territory he covers, he said that in the early days, its boundaries were "wherever the next phone call came from". With more structure in BioAg since the company has grown, he now describes his region as being from Swan Hill to Griffith and Carathool (although there are rumours that he has been seen as far East as Benalla!). This region supports the full gamut of farming – from horticulture and tree crops, through cereal cropping to dairy pasture production, and from irrigation to dryland farming.

What changes has he seen in the last 11 years? "Well, I can't point to massive yield improvements, because we've been in drought for much of that time, and irrigation water allocations have been minimal to non-existent. However, I can demonstrate great improvements in soil structure, with increased topsoil depths and biological activity. Even when soils

have been without irrigation water for two years, they still demonstrate good biological activity, and farmers comment that they smell sweeter and are far easier to work after the application of biological nutrients.

"Irrigated dairy pastures in particular show the benefits of biological nutrition, with farmers reporting that the pasture is thicker, and looks good", he says.

Ivan notes that, over the past 11 years, more people have taken up biological farming methods. "They have seen the damage that has been done to the soils that have been treated continuously with conventional fertilisers for many years, and want to set about rebuilding them. They recognize that they have stewardship of the land, and want to pass it on to the next generation in better condition than when they started farming it." Another interesting observation is that "good conventional farmers are the most successful biological farmers, as they understand soils and managing the crops they plant in them."

Ivan believes that the biological approach to farming will continue to grow at least over the next 15 to 20 years. One reason for this is the shocks that farmers have received with the escalating prices of conventional fertilisers over the past two seasons. This has caused them to look at other means of providing crop nutrition, despite the skeptics who prophesy that "it'll never work". The results to date indicate otherwise.

Digest-it Out in the Cold in the UK

Chairman and Technical Director, Jep Gates has just returned from visiting our UK distributor, Thomson & Joseph in Norwich, the purpose of his trip being to review the progress of our Digest-it for Dairies trials during the northern winter.

Because of the extremely cold conditions in the UK, dairy practices are quite different, with the effluent being stored in tanks, ponds and lagoons all winter, and spread on the fields in spring. The purpose of the trials is to show that the Digest-it will break down the manure, reducing the odour and preventing the build-up of crusts and sludge in the pond, as it does in Australia.

This winter was one of the coldest in the UK on record, with the daily temperatures during Jep's visit ranging between -5 and +5 degrees Celsius (only one degree warmer than the average domestic refrigerator setting). We were a bit afraid that the cold conditions would cause the microbes introduced into the trial ponds to become dormant, and not be able to carry on breaking down the manure.

Not so! Inspecting the trial ponds in miserable conditions, Jep was pleased to find that they were bubbling away, digesting the manure, and keeping the surface liquid. The farmers reported that the odour has certainly decreased.

The proof of the efficacy of Digest-it will come in March/April which is when the slurry is pumped out of the tanks and lagoons and spread on the pastures. The microbial activity under these very cold conditions gives us confidence that the results will be very good indeed.



A slurry pit showing microbial activity (the white bubbles) at a very cold 5°C.

Soil & Seed Gives An Even, High Yield Crop



Paul Kerin operates a large wheat property at *Fairfield Grange* at Trangie in NSW's Central West. This year, he has increased his cropping capacity from 5,000 to 7,000 ha. It is principally wheat country, supplemented with canola, lupins and chick peas.

Three years ago, Paul developed up a new paddock of 160 ha., clearing and grader boarding it level. Normally it takes 7-8 years to produce a reasonably even crop on this country which comprises a mix of heavy black clay and red loam. Yields can vary from two to 12 bags per acre (around 0.4 to 2.4 tonne per ha) across the paddock.

To establish this paddock, Paul sought the advice of BioAg agent, Andrew Watt of Cumnock, who provided him with a fertility program based around BioAgPhos, Soil & Seed, sulphate of ammonia and lime.

In just one season, he and his agronomist noticed a substantial improvement in both evenness and yield (compared with his

neighbour's crop in similar country). In the following year he applied the same program, and noted that the evenness and yield had improved further.

Last season, he applied Soil & Seed with just MAP, and was delighted that the crop was almost perfectly even, and the yield had improved from a notional 1.4-1.6 tonne per ha three years ago to an average of 2.8 tonne per ha in this crop.

Paul has been so impressed with the performance of Soil & Seed that this year, he will apply 5,000 litres across 7,000 ha of crop.

He applies no pickle to his seed wheat, but applies Soil & Seed as a seed coating as he transfers it to the field bins. He applies the balance at sowing, just in front of the sowing rig. With lupins, he mixes part of the Soil & Seed in with the seed inoculants.

For more information, call Andrew Watt on (02) 6366 1608.



Great Citrus Results at Palinyewah Producers



Palinyewah Producers is located near the village of Ellerslie, 35 km north of Wentworth. The 47 ha orchard, owned by Keith and Jan Richards, is planted to navels (Thompson, Nevelina, Washington, Fisher, Lane, Powell, Tangelo), valencias (Hamlin), mandarins (Imperial), grapefruit (Star Ruby) and avocados (Hass and Reed).

According to Peter Donaldson, who has managed the operation for more than 25 years, the biological nutrition program he adopted seven years ago can be directly attributed responsible for a significant improvement in tree and soil health, as well as improved quality, yield and consistency.

"We implement the BioAg program by the book and it has paid off," Peter said. "We are conservatively picking 40 or 50 t/ha of good-sized and uniform fruit on a regular basis.

"Our trees look much better. We are not getting clusters like we used to. The fruit holds better, the skin quality is better, the sugar-to-acid ratio is better, and we find we can start picking earlier.

"We have also seen some definite improvements in the soil. The pickers always say our ground is softer than on other properties."

More importantly, the orchard is now achieving some of the highest pack-outs at Mildura Fruit Company, one of the largest citrus packing companies in Australia. "A pack-out of 12 cartons per bin, or about two thirds of a bin, of first grade fruit is considered to be good," Peter said.

"We are consistently getting 13 or more. We are making more money, plus we are getting a bonus on top of this from our packers because it's more profitable for them as well. The packers tell me I don't know that you are doing, but keep on doing it."

Fruit from Palinyewah is also packed at Tuckers Creek Citrus Packers, whose manager, Tony Barila, is so impressed with its quality that he has begun recommending BioAg nutrition programs to his suppliers.

Peter said the BioAg program cost less to implement than his previous conventional fertiliser program. "The whole program costs about \$650/ha including consulting, which is less than what we were spending before, yet we are making more profit."

For more information on BioAg's citrus and horticultural programs, contact us on 1300 599 911.

Testing the Biological Activity of Reactivated BioAg Liquid Products



Three new tanks (220,000 litres capacity) were added to the tank farm in 2009 to cope with increased production and demand for liquid fertilisers.

BioAg Expands and Modernises its Narrandera Plant

Increased demand for its liquid nutritional and digestion products caused BioAg to increase its storage capacity at its Red Hill liquids manufacturing facility at Narrandera in 2009, allowing more efficient use of the fermentation facility, and hence greater production. Another three tanks, with a total capacity of 220,000 litres of finished product were added to the tank farm.

Again, with production efficiency in mind, we installed a high speed drum filler to transfer finished product from the storage tanks to shuttles and drums for sale. Prior to its installation, we had to weigh the contents of each drum as we filled it, to ensure the amounts we supplied to our customers were accurate, a slow process and prone to error.

The new Flexpack filler system fills three to four 20 litre drums per minute. Fortunately, it was commissioned just before we dispatched an order of 916 drums to the UK, allowing quick, clean and accurate packing of the order, which would have presented difficulties otherwise. The filler system can be used to fill containers from 5 litre drums to 1,000 litre shuttles, and has a self-cleaning system to ensure rapid cleaning and freedom from cross-product contamination.



BioAg staff member, Adam Hopkins, filling an order of 20 litre drums with the high speed, automatic, precision drum filling line installed in 2009.

As mentioned in the December newsletter, BioAg's lab is up and functioning.

One of the first microbiological tests we have been working on is the re-activation of our liquid products such as Soil and Seed and Digest-it for Dairies.

Our liquid products contain a mixture of microbial metabolites, nutrients and dormant microbial populations. Our aim with this testing program was to quantify the dormant microbial populations, and show that, once prepared for on-farm application, they can be brought out of dormancy.

To do this we used plate techniques as used in medical microbiology, food processing quality control and other fields. We are continuing to investigate other techniques, as some publications suggest that as little as 5% of soil based microbes are grown on conventional media.

The ultimate goal would be DNA profiling, but that's some distance away, as unlike medically significant bacteria, not many soil bacteria have been DNA sequenced as yet, and there are significant costs involved in the testing.

There are no methods manuals for what we are trying to do, so a lot of what we have found out is by way of experimentation. Some of the things that have been looked at include the types and concentrations of the nutrient broths we use to dilute the products, the incubation temperatures, pre-incubation times to break dormancy, and mixing concentrations of the product and the nutrient broth during pre-incubation. As one might expect, as each of the liquid products is based on different microbial populations, each product reacts differently to these parameters.

We use Petrifilm® media cards instead of the conventional petri dishes of media, that you might remember from High School or College. A plastic back is coated with absorbent material and impregnated with media which is protected by a plastic cover. Different media types are used to identify different microbial families. The photograph shows a typical growth plate for most common bacterial families.

At the end of the pre-incubation period the plates are inoculated with the

product/nutrient broth mixture. The plates are then incubated at between 25°C and 37°C for 48 hours before the bacterial colonies are counted.

In the photo each of the small red spots are individual bacterial colonies, termed Colony Forming Units (CFU). One could take any of the individual colonies, mix them with nutrient broth, incubate and re-culture them and get lots of colonies on the new plate.



Digest-it for Dairies plated onto TPC Petrifilm®

The photograph shows the CFU results for the 10⁸ to 10¹⁰ dilutions. On all the dilutions of greater concentrations than these, the growth was so heavy that individual colonies could not be seen.

We count the plates with between 10 and 200 colonies. In the case of the Digest-it for Dairies shown in the photograph, the plate labelled -8 was counted. There are approximately 80 colonies on this plate. This absolute count is then multiplied by the dilution factor giving, in this case, a result of eight thousand million (8,000,000,000) colonies per ml of re-activated product.

What does it all mean?

This work has given us a means of quantifying the microbial populations in our liquid products, and demonstrating that the populations range from less than 100,000 CFU/ml in the dormant state when shipped to several billion CFU/ml when diluted for on-farm application.

Importantly for us, we have developed a tool to enable us to check that the microbial activity of our product batches meets our internal standards, and that product quality is ensured.



Better soils. Better crops. Better stock.™

For more information,
phone 1300 599 911 or visit www.bioag.com.au