Environmental Fertilisers | Beyond Organics™

Autumn/Winter 2012

Newsletter 03

We have moved!

We are now located at 1 Railway Street, Paeroa, in the old dairy factory, with greatly improved facilities for bulk fertiliser storage, blending, liquid fertiliser production/storage and upgraded office facilities.

We have over 3000 m2 of indoor shed space with improved quality control and mixing/despatch of fertiliser loads under one roof.

We have an upgraded Reams testing laboratory and can arrange Albrecht style soil tests and Hill Labs foliage analyses.

Our phone number and postal address stays the same as before.

We love the new location and everyone is welcome to come and see us. Turn west off the main street at Countdown Supermarket towards the river and head for the tall building about 100 m away.

It's autumn again. Time to order autumn soil tests and fertiliser requirements. Give us a call.

Inside this issue:

Beyond Organics™

Organic vs Conventional crops – nutritional content

Growing crops in healthy soils results in food products containing high nutrient levels.

There is mounting evidence that organically grown fruits, vegetables and grains contain more vitamin C, iron, magnesium and phosphorus, and less nitrates and pesticide residues than their counterparts grown with synthetic pesticides and fertilizers. Consider the following research.

A two-year study led by John Reganold of Washington State University that provided side-by-side comparisons of organic and conventional strawberry farms has shown organic farms produced more flavourful and nutritious berries while promoting healthier and more genetically diverse soils. Published Sept. 1, 2010, in the peer-reviewed online journal PLoS One, the research study analysed 31 chemical and biological soil properties, soil DNA, and the taste, nutrition and quality of three strawberry varieties on 13 conventional and 13 commercial organic fields in California. The multi-disciplinary research team included expertise in agro ecology, soil science, microbial ecology, genetics, pomology, food science, sensory science, and statistics. Findings in the paper showed organic strawberries had significantly higher antioxidant activity and concentrations of ascorbic acid and phenolic compounds, longer shelf life, and dry matter. In addition, the organic soils excelled in the areas of carbon sequestration, nitrogen,

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Organic vs Conventional crops – nutritional content contined...

microbial biomass, enzyme activities, and micronutrients.

Source: John P. Reganold, Preston K. Andrews, Jennifer R. Reeve, Lynne Carpenter-Boggs, Christopher W. Schadt, J. Richard Alldredge, Carolyn F. Ross, Neal M. Davies, and Jizhong Zhou, "Fruit and Soil Quality of Organic and Conventional Strawberry Agroecosystems," Plos ONE, September 2010, Vol. 5, Issue 9, e123456 www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0012346

A French researcher's review of scientific findings concerning organic products has confirmed the high nutritional quality and safety of food produced using organic practices. The literature review, prepared by Denis Lairon of the University of Aix-Marseille in France, was commissioned by the French Agency for Food Safety (AFSSA). Lairon notes there are nutritional benefits to organic produce, such as more dry matter, minerals and antioxidant micronutrients than their non-organic counterparts. Meanwhile, studies show organic foods have significantly lower amounts of nitrates and residues of toxic chemical pesticides, fungicides and herbicides than do non-organic foods. This article appeared soon after much press coverage of a British article in-press in The American Journal of Clinical Nutrition that concluded there wasn't much difference in nutrient density between organic and non-organic foods. That article, however, prompted criticism that it didn't look at all the attributes of organic products and included studies dating back 50 years that did not have clear parameters on whether products examined were truly organic. One of the confounding factors in comparing the nutritional aspects of organic and conventional agriculture has been that few studies have been conducted with the scientific rigor required to show definite differences. Even the authors of the British study acknowledged that although they did not see documented significant nutrient differences between organic and conventional food, they did not rule out that possibility. Lairon noted that current organic agriculture practices have the potential to produce high-quality products with improved antioxidant content, and lower nitrate accumulation and toxic chemical residue levels. What is needed now is additional research support to give organic farmers tools such as improved cultivars that are disease-resistant, to help grow organic production from a "niche" to sustainable agriculture worldwide.

Source: Denis Lairon, Agronomy for Sustainable Development, 2009 www.swroc.cfans.umn.edu/organic/ASD_Lairon_2009.pdf

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Researchers studying cultivation practices for high-bush blueberries in New Jersey found that blueberry fruit grown organically yielded significantly higher fructose and glucose levels, malic acid, total phenolics, total anthocyanins and antioxidant activity than fruit grown using conventional methods. Scientists carrying out the study are based at the U.S. Department of Agriculture's Genetic Improvement of Fruits and Vegetables Laboratory in Beltsville, MD, and at Rutgers University in New Jersey.

Source: Journal of Agricultural and Food Chemistry, Vol. 56, pages 5,788-5794 (2008), published online on July 1, 2008.

A report jointly produced by The Organic Centre and professors from the University of Florida Department of Horticulture and Washington State University provides evidence that organic foods contain, on average, 25"% higher concentration of 11 nutrients than their conventional counterparts. The report was based on estimated differences in nutrient levels across 236 comparisons of organically and conventionally grown foods.

Source: "New Evidence Confirms the Nutritional Superiority of Plant-Based Organic Foods," www.organic-center.org/reportfiles/5367_Nutrient_Content_SSR_FINAL_V2.pdf

A study has shown that organic soups sold commercially in the United Kingdom contain almost six times as much salicylic acid as non-organic soups. John Paterson, a biochemist at Dumfries and Galloway Royal Infirmary, and scientists at the University of Strathclyde in Scotland analysed 11 brands of organic soup and compared their levels of salicylic acid with those in non-organic varieties. Salicylic acid, which is responsible for the anti-inflammatory action of aspirin, has been shown to help prevent hardening of the arteries and bowel cancer. The average level of salicylic acid in 11 brands of organic vegetable soup was 117 Nano grams per gram, compared with 20 Nano grams per gram in 24 types of non-organic soup. The highest level (1,040 Nano grams per gram) was found in an organic carrot and coriander soup. Four of the conventional soups had no detectable levels of salicylic acid.

Source: New Scientist magazine, March 16, 2002, page 10; European Journal of Nutrition, Vol. 40, page 289.

Research by visiting chemistry professor Theo Clark and undergraduate students at Truman State University in Missouri found organically grown oranges contained up to 30"% more vitamin C than those grown conventionally. Reporting the findings at the June 2 Great Lakes Regional meeting of the American Chemical Society, Clark said he had expected the conventional oranges, which were much larger than the organic oranges, to have twice as much vitamin C as the organic versions. Instead, chemical isolation combined with nuclear magnetic resonance spectroscopy revealed the higher level in the organic oranges.

Source: Science Daily Magazine, June 2, 2002.

Our position is that biological farming methods are basically organic, avoiding chemicals harmful to soil but not as restrictive in its soil building options, focusing on soil nutrient balance & availability, soil microbial balance & health and high-brix/nutrient-dense crops offers premium nutrition for farm stock and consumer food products. Unless organics as a certified process produces nutrient density in the crops grown it is still failing the consumer.

That is why Environmental Fertilisers has the registered trademark 'Beyond Organics'.

Beyond Organics

New corn hybrid could benefit NZ growers

A new variety of corn that is suitable for organic and biological farming systems could benefit New Zealand farmers who rely on corn seed imports.

A new corn hybrid developed by Blue River Hybrids has been shown to protect corn from pollen drift including GMO pollen. The corn called PuraMaize has been developed through selective traditional parent – line breeding of corn plants which are able to block pollen from other varieties. This gene blocking mechanism is found mainly in tropical corn plant species.

New Zealand farming sector has a zero-tolerance policy for commercial GE crops. This stand supports our clean green and safe food reputation, but in the last decade farmers have experienced a number of instances of GE contamination of corn seed, which have harmed farmers and threatened exports.

The corn variety gives farmers a solution in the fight against deliberate or accidental contamination of the food supply by GE constructs.

"This is a welcome development. The new variety has good yields and if grown organically has no chemicals. This is in stark contrast to GE grown crops which have unstable yields, are laden with insecticidal toxins and heavily sprayed with herbicides that affect reproduction and the endocrine system," says Claire Bleakley, president of GE-Free NZ in food and environment.

In the US 88% of the corn that is grown is genetically engineered. This imported corn seed carries a high-risk of GE contamination for farmers and consumers. With the globalization of food chain, imports of US GE corn and soy foods have impacted countries around the world, including New Zealand.

After 15 years of commercialization of GE, there is now greater risk of exposure to higher level of pesticides in foods than ever before, this is especially concerning for pregnant mothers, children, those with compromised immunity and the elderly. Yet GE crops have been approved through the revolving door of regulatory and business interests, which continues to this day with new untested varieties.

"The promises by some scientists, like Tony Connor and Colin Eddie of Plant and Food, that GE we would get rid of the toxic agricultural pesticides, have been proven to be fairy tales" says Claire Bleakley.

In Africa there are many varieties of corn that have been developed through traditional breeding to withstand droughts and pests, yet instead of focusing on the sustainable traditional varieties Agri-biotech seed companies are pirating these communal traits then adding their patented genes and claiming the benefits.

The handful of GE food crops approved for commercialisation - corn, soy, canola, cottonseed, sugar beets, sugar, potatoes - are mostly now engineered with insecticidal genes and herbicide resistance genes so they can be sprayed through their growth with a cocktail of herbicides like RoundupReady*, Busta*, 2,4-D*, and Targa*.

In stark contrast to non-GE food plants that cannot withstand herbicides while growing, GE varieties survive and absorb the pesticides, increasing the exposure of consumers to chemicals that are known to be toxic.

"Importers of seed must take care to stay within the law and it is encumbent on them to seek varieties that can give farmers assurance that they are growing seed that is uncontaminated with GE" said Mrs Bleakley.

Soil Carbon loss caused by excessive use of synthetic nitrogen

I recently came across the reason heavy N use has degraded humus levels over time on NZ farms (acknowledgement to Mesa Verde Humates); please take careful note. NZ research by Schipper and co-workers of Waikato University corroborated these findings. You could be inadvertently burning up your valuable and crucial soil carbon upon which your farm production and bottom line depends!

SHORT SUMMARY:

New research results show that synthetic nitrogen fertilising is detrimental to soils.

Long term N use by NZ farmers has led to a decrease in soil C levels.

It results in depletion of humus levels and release of soil C as carbon dioxide.

CO2 is lost faster than C can be sequestered as humus.

It even outweighs the regular addition of organic matter to increase soil C levels.

Nitrogen fixing bacteria are outcompeted, severely reducing the amount of free atmospheric N normally fixed by them.

Low carbon soils cannot store as much water, nitrogen or microbial life, requiring even more N inputs and creating drought-proneness and poor productivity.

That nitrogen 'fix' is highly destructive to the normal balance and function of soil and will cost you dearly.

For decades conventional thinking has been that applications of synthetic nitrogen fertilisers help enhance soil carbon levels by stimulating soil microbes to feed on organic matter from crop residues. But new research indicates that the opposite is true. A group of scientists at University of Illinois says that research from the Morrow Plots, the oldest research plots in the USA, indicate a steady decline in soil carbon from the use of synthetic N fertilisation.

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Soil Carbon loss caused by excessive use of synthetic nitrogen continued...

THE WAY IT WORKS

Plant residues are left behind in crop production, and various tilling and residue management methods make use of that residue as a means of adding organic matter to the soil. What we have been led to understand is that soil microorganisms are stimulated by synthetic N, causing these microbes to increase their activities in breaking down plant residues and adding to the humus/carbon content of the soil. What's being discovered now is alarming.

Soil microbes degrade plant residues and reduce their carbon and nutritional content into plant-available forms and long-term, fully-degraded carbon, or soil humus. The other result of this microbial activity is that when microbes feed on carbon in plant residues and they die, they release the carbon as CO2. Volatilization of this rapid cycling carbon from plants may be the larger part of what happens in this process, so as high inputs of N stimulate the microbes to feed, eventually the organic matter disappears before it can become humified (changed into long-lived C forms). The pathway of humification is interrupted by removal and volatilization of carbon before it reaches the form of humus. "Over time, the impact of this N-enhanced microbial appetite outweighs the benefits of adding more crop residues" says Tom Philpott of Grist.org.

The last aspect of this carbon loss is explained by taking a look at carbon based organic acids in the soil: humin, humic acids and fulvic acids. Due to the acceleration of microbial oxidation of humin by N stimulation, these acids are reduced from the carbon rich humin, to the less carbon-rich humic acids, and finally to fulvic acids, which have very little carbon content. This process is natural and healthy, but when the soil is lashed with excessive amounts of N, the process is accelerated dramatically, allowing less time for new carbon inputs (from residues) and proper humification of organic matter to occur.

The net effect of this is that soil carbon levels decline, making it even more difficult for soils to store nitrogen. As the ability of the soil to store nitrogen declines, more N inputs are needed. Soil tilth, water holding capacity and nutrient retention also suffer, causing compaction and leaching of nutrients. A vicious cycle is born.

NEW INFORMATION

Three university of Illinois professors, Richard Mulvaney, Saaed Khan and Tim Ellsworth have been raising some eyebrows with new data that testifies to this. In two recent papers, "The Myth of Nitrogen Fertilization for Soil Carbon Sequestration" (Khan et al 2007) and "Synthetic Nitrogen Fertilizers Deplete Soil Nitrogen: A Global Dilemma for Sustainable Cereal Production" (R.L. Mulvaney et al 2009) the researchers show that the net effect of synthetic nitrogen use is to reduce soil carbon levels. The proposed mechanism is stimulation of soil microbes by nitrogen fertilizers, causing the microbes to consume excessive amounts of organic matter. To make matters worse, inputs of synthetic N create tough competition for nitrogen fixing bacterial populations like Rhizobium and Azospirillum. Adding synthetic N is highly stimulatory to microbes that feed on it. These microbes then outcompete the nitrogen-fixing bacteria, making N from the atmosphere even less accessible to the crop. How important are the nitrogen-fixing bacteria? According to the A&L Agronomy Handbook "It is estimated that 35,000 kg of N are available over a single hectare of land. In return for the supply of food and minerals they get from the plant, nitrogen-fixing bacteria supply the plant with a significant part of its nitrogen needs, from 50- 75% of it".

WHAT TO DO

We know that nitrogen inputs are important in crop and turf production. However we suggest that nitrogen inputs be managed much, much more carefully and recommend the use of humates to restore soil carbon in its most active form. Applications of humates will not only increase soil carbon levels, but also improve water retention, drainage, soil tilth and nutrient retention. Humates also provide a healthy substrate for beneficial soil microbes. Research has shown that soils with less than 3% organic matter can lose 15 - 40% of N in a growing season. Anchoring nitrogen in the soil is part of the important job of soil carbon/humus, as N binds readily with carbon-based acids such as humic and fulvic acids. This reduces the need for heavy, expensive inputs of N fertilisers. Moreover, the stimulation of symbiotic and free-living nitrogen-fixing bacteria by humic substances adds to availability of N from the atmosphere, supplying, in many cases, up to 75% of a crop's needs. By applying humates to soils where synthetic N and other fertilisers are used, we can restore soil carbon levels, balance the ratio of carbon to nitrogen and break the vicious cycle we have created in most conventional production soils. Humates are a direct input of soil organic matter, providing the most important aspect of a healthy, productive soil.

This is the reason we routinely add humates to our fertiliser blends.

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References:

S. A. Khan*, R. L. Mulvaney, T. R. Ellsworth and C. W. Boast, 2007, "The Myth of Nitrogen Fertilization for Soil Carbon Sequestration" Published in J Environ Qual 36:1821-1832 (2007).

R. L. Mulvaney*, S. A. Khan and T. R. Ellsworth, 2009, "Synthetic Nitrogen Fertilizers Deplete Soil Nitrogen: A Global Dilemma for Sustainable Cereal Production" Published in J Environ Qual 38:2295-2314 (2009).

Tom Philpott, 2010, "New Research: Synthetic Nitrogen Destroys Soil Carbon, Undermines Soil Health" www.grist.org 2010

Reams Soil Tests vs Albretch Soil Testing

Who is right or wrong? The answer is simply this... neither.

So why the discussion? I have over the years used a number of soil tests ranging from the basic Hills test through to now days a complex Lismore soil test accompanied by a Reams Soil Test. I felt the need to explain why I have settled on these two major tests, for me as a soil consultant that is driven by a desire to get results and grow giant mineral dense produce ultimately to feed to ourselves but more importantly our kids.

The soil is an excessively complex environment with minerals, organic matter, biology and electrical energy being integrated as a single operating unit.

The Albretch Test as promoted by a number of American soil scientists coming to NZ is a test using strong to medium acids to extract the soil minerals off the soil samples that are sent for testing.

These test give great information, but what is it they are telling us, if the test involves using strong acids and or alkalis as extraction agents, then these tests are extracting a large majority of the soil minerals in the soil sample sent to the lab.

This is what we call the total amount of each nutrient in the soil. For example Calcium test results may say there is 9000kg/ha of total calcium in the soil, and this is important information to know. Over the years I would look at these results and think well this is great and we have enough soil calcium and there is no need to add anymore.

But I would see signs off calcium deficiencies in the fields and paddocks I was testing [like giant and small buttercup- however if you were a chemical farmer would interpret these weeds as a lack of 24D or MCPA applications]

So now we introduce the Reams Soil Test and test that same soil that had the 9000kg/ha of Calcium as determined by the Albretch Soil Test and we find we get a soil test result of 400kg/ha of Calcium. Why did we only get 400kg/ha of Calcium when the other lab result says we have 9000kg/ha. Well the Reams test uses a milder extractant to extract the soluble calcium off the soil sample.

The Reams test tries to mimic how the plant roots and root hairs sees soil minerals in the soil.[Plant roots and root hairs generate mild acids as they grow through the soil.]

This soil test also helps to identify biological issues. For example a low ammonium reading represents poor microbial activity and natural nitrogen cycling, therefore indicating a possible need for possible synthetic nitrogen inputs. The calcium levels tell us how much potential yield we could get, this is covered by an article I wrote on predicting maize yields from the Reams calcium soil test, each time we have done this we have been within a few hundred kilograms of final yield.

The ERGs reading tells us how much energy is present available for plant growth.

On the 6000 odd Reams Test we have done in New Zealand we have discovered how deficient our soils are in plant available phosphorus, this seems bewildering considering the amount of superphosphate some farmed soils have received over the last 50-70yrs. What this is telling us is you cannot get a high Reams Phosphorus reading using an acid based phosphate. I have since

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We are adding to our sales team for the Waikato area and will introduce them in the next newsletter.

Reams Soil Tests vs Albretch Soil Testing continued...

trialled a new product Cal-Phos which is a colloidal calcium and phosphorus and this has raised the phosphorus levels to the desired operating range of 200-300kg/ha. The other important point here is the low humus levels in our soils, we have been mining our soil carbon at the rate of 1000kg/ha/yr, over 60 yrs that 60 000kgC/ha, in simple terms our soils are behaving like water deficient hydroponic systems.

The Albretch Test gives us a total of all the macro elements and micro elements [trace minerals], this is important information as we need to know how much of each mineral we have in the soil and is there capital inputs of minerals required to. We have since used the services of a Lab in Australia that gives us this information but also provides further soil test figures which give more detailed information compared to a Brookside or Perry Lab.

From these figures we can also determine the balances and mineral ratios between minerals. For example Calcium needs to be in a ratio of 7:1 with magnesium on large capacity soils like peats and clays and 4:1 on light sandy soils.

So when discussing the Soil Test results with a grower I always point out the difference between each soil test, but then what is important is the Reams results as this will determine the final yield you receive and finally the payment received so you can meet your daily financial commitments, there is no point have a large bank of minerals or money sitting around if you can't access it and meet your daily financial commitments.

I have seen soils with high plant available calcium, magnesium and phosphorus levels as test by the Reams soil test and the yields and quality of the crops coming off these soils is certainly impressive, the crops never suffer from disease or insect pressure.

RESULTS COUNT

Maize Production

Last year we achieved 16 tonne of grain maize per ha compared to 12 tonne from the chemically grown, this was in the same paddock over a 50acres trial site. This was simply achieved by increasing the plant available Calcium levels on the trail areas and maintaining the ERGs in the soil, it is my belief present maize yields could be doubled if the soils were brought back to the recommended Reams levels outlined on a soil test.

Onion Production

We achieved 120 tonne per hectare on the trial site vs the national average of 30 tonnes per hectare achieved by chemical farmers.

Giant Vegetables

There may be no market for a 5kg beetroot or 4kg cauliflower or a 6kg cabbage, but it's impressive and definitely impresses visitors and then they are blown away with the sweet taste of such produce.

Ring our sales team for this seasons new products and specials!

07 867 6737

Our Goal

To maintain and grow your soil health & productivity, pasture & crop yields & profitability by supplying fertilizers producing mineral-dense feed/food.

Our Motto

Healthy soil, healthy pasture/crops, healthy animals, healthy consumers.

Beyond Organics™

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