Environmental Fertilisers | Beyond Organics™

Spring/Summer 2011

Newsletter 02

Building Farm Profits

Farmers need to begin to appreciate the value of soil carbon in their soils.

A bank in Australia now asks new land purchasers for their soil carbon tests, why in the earth would they do this. Simply this has a strong corelationship with the farms profitability.

A few years ago research carried out at Ruakura Research Centre showed a very strong correlation with soil carbon levels and crop yields [0.91].

The problem being in the last 30-40yrs we have mined some 30 000 – 40 000kg [30-40tonnes] of carbon from our soils.

Our soils have lost the ability to hold 3000-4000kg/ha of nitrogen and 120 000-160 000 ltrs/ha of rain water.

This now drastically affects the ability of grasses and crops to reach their genetic and or yield potentials and increases the inputs costs required to grow that crop, lowering the nett income to the grower.

The potential of our maize crops in the Waikato is limited by the decline of our soil carbon levels, this has a direct link with plant available Calcium, Nitrogen and Phosphorus, and these are the major key minerals for plant growth and photosynthesis.

Photosynthesis is directly related to the plants ability to capture photons from the sun and convert this energy into sugar and oxygen, if we can increase the plants ability to capture more energy from the sun and we have all the other plant nutrients available for growth, then a plant/crop can reach its genetic potential.

It is the job of the farmer to use biology, moisture, and geological resources to convert solar energy into a saleable product. In other words the farmers set up the environment that determines how much solar energy is captured.

So how do we measure the efficiency of plants? This is simple, if we look at the outcome of the functions of photosynthesis. The more energy a plant captures via photosynthesis the more carbohydrates and dissolved minerals are produced. When juice or sap is taken from a plant and placed on a refractometer a reading of 0-12 will be obtained, 0 indicating poor photosynthesis and energy capture and a 12 representing a plant capturing and converting solar energy to its genetic potential. This reading includes both carbohydrates and dissolved minerals. When ever a plant makes sugars it always combines minerals with the sugars.

During the drought Environmental Fertilisers trialled a new product [Humus Builder] to see if it was possible to achieve normal plant growth during severe drought conditions, the results were more than we expected.

To date the treated paddocks [6 x 0.2ha] have grown 6000kgDM/ha more than the control paddocks [4] over a 6 month period.

Financially this equates to 6000kgDM x $0.30/kgDM = $1800/ha, with an input cost of $120/ha = Nett return of $1680/ha.

During the drought the treated paddocks were growing at 35-40kgDM/ha/day vs. the control paddocks at 8-10kgDM/ha/Day.

This approach to pasture and crop production has the potential to increase yields and lower inputs costs, while build and restoring the soils carbon levels.

So everyone wins, the farmers increases his net income, he now has a product that is mineral dense with a high brix reading which the educated consumer will pay a premium for, as a result our communities health is restored and finally the environment wins.

For more information or to come and view the trials phone Environmental Fertilisers on 07 8676737.

Inside this issue:

Beyond Organics

Halting Psa-v

written by Greg Tate

Huge strategic and research resources are being thrown at halting the disastrous spread of Pseudomonas syringae actinidia in Hort 16A blocks that anyone can see is failing to deliver and costing the industry big time.

Starting near Te Puke, Psa-v has now spread to Waihi and Katikati orchards despite a rigorous regime of copper spraying, vine inspection, removal and orchard quarantine. I understand that many Plant and Food pathologists have been redirected to stop this threat to the industry. As an ex plant pathologist and understanding something about research paradigms and plant nutrition I am certain they will not find a solution. This is because by training and mind-set they are focused on researching and killing the pathogen to stop its spread and are untrained/uninterested in soil and crop nutrition, the basis of vine resistance and immunity.

A number of growers have raised their concern that the problem may have a nutritional than pathogenic cause but this seems to be falling on deaf ears, to the sole benefit of chemical firms and suppliers selling copper sprays, while growers are losing out. Since walking away from plant pathology 8 years ago and embracing soil and plant nutrition I now see plant disease from an entirely different perspective and cannot agree more with these brave growers who have stood up to challenge the current "wage war on Psa" paradigm. This is because their assertion is backed up by dozens of peer-reviewed research papers, expertly reviewed by Dr Chabousou in the book 'Healthy Crops' (1987), and also research by Dr Phil Callaghan, published in the book 'Tuning in to Nature' (1975).

IT ALL STARTS WITH BASIC ASSUMPTIONS

If you believe that Psa is the villain it's logical to attempt to 'control it', ie, protect the vines by spraying bactericidal coppers. The problem here is that Psa is microscopic, blows about on the wind and still gets into vines one way or another despite the copper barrier. Once in it finds a food source that's a perfect bacterial medium for growth and multiplication and the vines eventually die.

SPRAYING COPPERS WILL NOT STOP THE ADVANCE OF PSA

Phil Callaghan (1975) demonstrated clearly by his research that plants like all solid objects emit Infra red radiation and that nutritionally unbalanced plants emit aberrant IR waves which insect pests are attracted to. Chabousou showed in his review that pest insects and diseases are either attracted to or favoured by, foliage high in free N, free amino acids and simple sugars; that is, nutritionally unbalanced foliage provides a good diet for disease microbes and pest insects (nutritionally balanced foliage produces complex carbohydrates, true proteins, fats and oils - all good mammalian food).

In addition, pesticides and any N and Cl containing chemicals applied to plants inhibit protein synthesis which upsets plant nutritional balances, thereby creating this suitable microbe diet. Copper spraying creates nutritional imbalance/mineral deficiency which compromise plant cell immunity and resistance mechanisms. Copper spraying therefore worsens the situation by both reducing natural immunity to disease and creating a suitalbe bacterial diet.

The opposite is true for human and animal health. We are designed to digest complex carbohydrates, proteins fats and oils and our systems don't take kindly to food full of free N, nitrates, amino acids and simple sugars. So what is the heavy copper spraying doing to the eating quality of gold kiwifruit? And what are pesticides in general doing to eating quality? But I digress.

WHAT THEN IS THE ANSWER TO THE PSA ONSLAUGHT?

It's building natural immunity and strengthening vine resistance mechanisms through balanced soil and vine nutrition. Dr Chabousou clearly demonstrated that bacterial plant diseases were reduced by increased protein synthesis, especially during flowering and preharvest, by adequate leaf K, Mg, B, Mo and Mn levels, and by high K:Ca, K:N and Cu:N ratios. High N inputs obviously reduce the latter ratios and are also well known to increase disease susceptibility.

WHAT CHANGE IN TACK IS NEEDED BY KVH TO STOP PSA?

• To see Psa for what it really is. One of nature's (God's) clean-up crew, obeying its genetic instructions to eat food suitable for bacteria (and therefore unsuitable for humans as we do not share their food requirements).

• This means ditching wrong paradigms like evolution which underlie the 'wage chemical warfare' paradigm.

• To focus not on the pathogen but on vine nutrition, promoting maximum protein synthesis, providing adequate K, Mg, B, Mo and Mn to maximise resistance and immune responses. To achieve this stop using all pesticides and chemicals that inhibit protein synthesis.

• It also requires rebuilding soil biological diversity and balance to enable optimum vine nutrition. Side stepping nature's microbe-mediated system for feeding vines is not smart at all, and it's the chemical paradigm for growing crops that got us into this trouble.

• To use beneficial microbes rather than chemicals to compete with and suppress the pathogen on their own turf (leaf, flower, bark and rhizosphere surfaces). To blanket the environment where Psa is with beneficial suppressive microbes. To work with nature rather than against it. All these beneficials were designed for a purpose. The evolutionary paradigm has led us up the wrong track and we are paying the price with Psa and any other insects or diseases that attack our crops.

• See all insect pests and diseases (bacterial, fungal, viruses, nematodes) for what they really are. Clean-up crews to take out crops unfit for human (or animal) consumption. The huge rise in modern human diseases have exactly paralleled the uptake of modern chemical (industrial) farming/horticulture, which was accompanied by a parallel decrease in mineral content of food crops and animal food products. A wide range of minerals is required by living cells to do their work. Deficiency or excess of any creates unbalance and compromised health, whether plant or animal.

All human disease reflects mineral deficiency/imbalance and the chemical paradigm has much to answer for, from medical drugs to agricultural pesticides, environmental pollutants and chemical fertilisers.

If you want to save Hort 16A from extinction, adopt a biological approach to vine nutrition. Demand a change in research direction and strategy for protecting vines from Psa. Put, soil and plant nutritionists, agronomists onto the problem and retire the plant pathologists. Their approach is irrelevant as it's a nutrition issue, not a pathogen issue. The key to solving it is in how you see it.

Examples of calculating potential yields of crops using the Reams Soil Test Results

There is a law in mathematics that says 'The whole is equal to the sum of the parts'.

This law applies to the TDN [Total Daily Nutrients, the amount of plant available food/nutrient per unit of time]. The parts of the reserve soil TDN are Calcium, Phosphate, Potassium, Nitrate-Nitrogen, Ammonia Nitrogen, Iron and Copper. When these are summed up they should equal 98% of the soil reserve potential. If that potential equals 3300kg per ha or more, then it is possible to start predicting yield potentials for a given crop.

The higher the reserve potential, the more accurate the predictions.

In other words when the total kgs per hectare of available, soluble nutrients from calcium through to copper, add up to 3300kg/ha and the phosphate is in proper ratio to potassium, it is possible to calculate what the yield potential could be if the soil chemistry is managed properly. Remember CALCIUM makes up 80% of the TDN potential. Therefore the single greatest problem with our agricultural soils today is the lack of plant available Calcium.

When a farmer does not pay attention to the soil energy principles, its not only a gamble to farm but the farmer will be lucky only to get about 3-5% of the energy from the soil. On the other hand when all the parameters are dealth with, it becomes possible for a farmer to utilize the maximum soil energy for growth [20% of the sum of nutrients contained in a plant].

This means the maximum of 80% of the plants mineral energy is taken from the atmosphere.

Now lets do the sums. This will help to understand how much mineral is removed from the soil for a given yield. This will reinforce how important Calcium is.

Assume 40 000kg/ha of produce has been produced from a field. How much mineral is required ? Remember 80% of the produce is water.

40 000kg/ha x 80% = 32 000kg/ha of water

This leaves us with 8000kg/ha Dry Matter.

Of this 80% of the mineral came from the air-

8000kg x 80% = 6400 kg/ha

Leaving 1600kg/ha coming from the soil.

How much of this is Calcium? [Remember calcium makes up 80% of this mineral fraction]

So 1600kg/ha x 80% = 1280kg/ha is Calcium from the soil.

Therefore leaving 1520kg/ha of which is made up of phosphate, magnesium, potassium etc.

This means that 1280kg of the original 40 000kg of fresh produce is actually calcium, and this calcium came from the soil. And from one hectare of land.

There is one catch to this and that is that only 50% of the TDN can be removed in one growing season, providing the phosphate-potassium ratios are correct.

Therefore the soil requires 2569kg/ha of plant available Calcium to produce the 40 000kg/ha of fresh produce.

With 4000-5000 Reams Soil Tests we have conducted in New Zealand, with average soil calcium levels ranging from 300-800kg/ha, no wonder we have serious yield and quality issues arising.

EXAMPLE 1 – GRAIN CORN

Calculate rows to be planted per hectare = 1720 rows [36inch row spacings]

Seeds per row [6 inch spacings] = 420 seeds per row

72 618 plants per hectare

30% seed losses

59 832 plants survive

Production per seed-

Average ear size will be 25cm long with a minimum of 16 rows of kernels and 45 kernels per row.

Therefore 45 rows of kernels x 16 rows of kernels = 720 kernels per ear.

If the average dry weight at harvest is 0.6gms/kernel

Then 720 kernels/ear x .55gms/kernel = 396 gms/ear

Therefore 59 832 plants producing one ear @ 396gms

=23 693 kg/ha or 23-24 tonne of grain per hectare. [9-10 tonne/acre]

Is this too much too expect, No its not, If you consider that most yields are getting way less than half of this and the planting populations are higher.

What is happening? Basically the energy is not there to grow the plant and to produce an ear of corn per plant.

The reserve TDN required to grow and fill the grain is not there. The sugar content would be and in many cases less than half of what it should be. The weight per kernel is way down. In fact the average normal grain kernel weight is between 0.3-0.4gms.

Now lets look at a Reams Soil Calcium level of 1000kg/ha [which is common to what we see and record] and predict the yield.

Remember that only half of this Calcium is available for this corn crop.

So only 500kg [500 000gms] of calcium is available and each kernel requires 0.0444gms of Calcium this would produce 11 400 000 kernels, if each ear contains 720 kernels, this would yield 15 800 ears of corn per hectare and each ear weighs 396gms then the estimated yield would be 6.2 tonne of grain per hectare which is what we see.

So the potential yield with present planting densities of 100 000 – 110 000 plants should be 30-39 tonne of grain per hectare. And to achieve this we would need a Reams calcium reading of 6400 kg/ha of Calcium.

[100 000 ears with 720 kernels per ear with 0.0444gms of calcium per kernel, divide by 1000 to get kgs/ha, and then multiply this figure by two because only half the Calcium is available for this season.]

Creating a productive orchard

This summary encapsulates the wisdom and experience of Dr Carey Reams who practised and researched horticultural crop nutrition in Florida and elsewhere. Our approach to soil management is the Reams approach. Adapted from 'Biological Ionisation as applied to Farming and Soil Management', by Dr A F Beddoe, student of Carey Reams

Soil test in autumn and check soil profile for hard pans. If present rip as deeply as necessary. Apply 1t /ha of EF Soil Force in autumn to achieve the (2:1) ratio of available P to available K

Apply 250-500 kg Nano Cal on top as soon as possible to facilitate bonding of Ca and Phosphate. Don't use Dolomite Lime as Mg neutralises soil N

Plough to reverse positions of the deeper seated, leached Ca and the phosphate near the surface. These nutrients stimulate beneficial soil microbial activity

If low in available K (a rare event) add untreated sawdust at up to 2+ t/ha

Add extra iron sulphate or copper sulphate on top of the manure if indicated by soil test

Cultivate and lay-out tree planting grid and irrigation lines if required

Dig planting holes for bare root trees 0.6 m diameter and break out smeared side to ensure root spread

Add rocks to hole base to facilitate winter drainage, then add soil + high quality compost to 1/3 depth of hole, then a sizable rock on which to seat the bare root tree

Choose younger rather than older trees. Avoid container trees and especially root-bound trees or ones carried over into next season

Prepare a root soak for the trees (water 100 L, molasses 1-2 L, soft rock phosphate 20 kg, calcium nitrate 6 tblsp, Vit B1 600 ml)

Soak tree roots for 15 min before planting to set them up for rapid growth once conditions allow

Plant tree crowns onto the sizable rock with largest roots facing north (natural orientation). The rock provides a magnetic effect, assisting frequency adjustment of minerals entering tree roots. Don't plant any deeper than tree was previously at in the nursery

Fill hole with soil to ground level, working in around roots to avoid large air gaps

Add chicken manure or high quality compost at 4-6 t/ha, banded down the centre line between the rows to avoid root burn and to draw roots out towards the compost nutrients

Do not allow fruit to set for 2-3 years by maintaining anionic (vegetative) energy to ensure a strong tree superstructure and high quality fruit in the 3rd or 4th season. Add cationic (fruiting) foliars at flowering to set fruit in this year, reverting to anionic (vegetative) foliars to grow foliage and fill the fruit each season

Evergreens can be fed all year round: citrus require high levels of phosphate (400 kg /ha available P) so feed phosphate frequently by spraying Humus Builder. Deciduous trees are solid fertilised in spring and autumn

Foliar feed as required. Don't overdo soil N applications which result in watery, neutral sap with less attraction for minerals and causes excessive top growth & deficient root growth. Amount and type to apply depends on nitrate-N and ammonium-N availability in the Reams soil test

Excess Mg can be reduced by liming or growing green peas, mowing frequently to prevent seeding or adding synthetic N. Aphid infestation is a sign of Mg deficiency. Spray Epsom salts

Fe is the most important trace mineral, collecting heat for photosynthesis. Lichen on tree trunks and leaf yellowing are signs of Fe deficiency. Cu is the next most important, for bark flexibility

Blast and gummosis and any other bark splitting is a lack of Cu, resulting in infection of the exuding sap. First get the phosphate availability up then add Cu if necessary. Cu enables bark to grow with trunk girth increase

To ensure adequate Cu uptake, apply Sol-po-mag (Langbenite - $K_2Mg_2(SO_4)_3$) at 200 kg/ha between mid-Jan and mid-March once every 5 years to stone fruit and other tree/ vine crops but not citrus (may result in split skins). Stonefruit trees may split their bark but this is a good sign and they will heal over

Trace element deficiencies may be caused by lack of available phosphate to move them into plant tissue. High pH only affects Fe uptake if there isn't enough phosphate in relation to K. The same may apply to availability of other trace elements said to be affected by soil pH

Mn is vital for pollination and seed development and is best applied as a chelate

Hollow stems and missing lateral buds indicate B deficiency; pest issues indicate xylem sap flow problems

To release excess nitrate-N from soil apply Epsom salts ($MgSO_4$) and irrigate.

Zn makes the tree more magnetic and improves sap flow. Little leaf indicates Zn deficiency

B enhances sap flow and pith/xylem development. A lack encourages boring insects. Supply with foliars

Excessive S in soil causes fruit to ripen unevenly and decay. Reduce excessive sulphates by liming

Soil pH has little effect on nutrient availability if the P:K ratio is at 2:1, but lack of available P means trace element deficiency

If high Cl levels in soil, don't use chicken manure. Don't use potash, add lime or green manure to release Cl to atmosphere, add animal manure to increase bacterial activity

Anionic (vegetative) nutrients include Ca, K, nitrate-N; cationic (reproductive) nutrients include P, ammonium-N, Mg, minor nutrients and trace minerals. Relevant Environmental Fertilisers foliar products include EF Vegetative, Reproductive, Humus Builder, Liquid Micronised Humates, Fulvic acid, BioCal, BioChar Foliar and Mineral Chelates.

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

Environmental Fertilisers

Kerepehi Industrial Park,
Kerepehi Town Road,
Kerepehi, PO Box 204 Paeroa

P: 07 867-6737
F: 07 867-6068
E: info@ef.net.nz

www.environmental-fertilisers.co.nz