AGRICULTURAL SOIL ANALYSIS REPORT - SOLUBLE, EXCHANGEABLE AND TOTAL NUTRIENTS

2 soil samples supplied by Ausmin Australia on 19th November, 2009 - Lab Job No. A6285
Analysis requested by Mike Smith

					Block ID:	**Sample 1**	*Desirable*	
					Crop:	Sabet Bila	*Level*	
					Client:	n/g Livai Tora	*Heavy Soil*	
	Nutrient			Units		*A6285/1*	*guidelines*	
Soluble Tests & Morgan 1 Extract	Calcium	Ca		ppm		2013	*1150*	
	Magnesium	Mg		ppm		553	*160*	
	Potassium	K		ppm		255	*113*	
Soluble Tests & Colwell + Bray 2 Phosphorus Extract	Phosphorus (Morgan)	P		ppm		1.6	*15*	*As with most soils in Fiji we have adequete Phosphorous*
	Phosphorus (Bray 1)	P		ppm		12.2	*45* [note 8]	*With some improvement needed, however P availablility is*
	Phosphorus (Colwell)	P		ppm		100	*80*	*almost Non Existent, we will need to address this in anv*
	Phosphorus (Bray 2)	P		ppm		59	*90* [note 8]	*program we put together.*
	Nitrate	N		ppm		19.7	*15*	*the balance between the two forms of Nitrogen needs to be*
	Ammonium	N		ppm		5.9	*20*	*addressed and is a good indication that soil biological*
	Sulphate Sulphur	S		ppm		14	*40*	*activity is low. This is where the Biological liquids will be of*
	pH (1:5 water)			units		6.20	*6.5*	*great benefit.*
	Conductivity (1:5 water)			µS/cm		118	*200*	
	Organic Matter			%		3.39	*>5.5*	OM levels are reasonable
Ammonium Acetate Equiv. Extract	Calcium	Ca		$cmol^+/Kg$		29.56	*16*	
		Ca		kg/ha		13243	*7000*	
		Ca		ppm		5912	*3125*	
	Magnesium	Mg		$cmol^+/Kg$		9.46	*2.4*	
		Mg		kg/ha		2543	*650*	
		Mg		ppm		1135	*290*	
	Potassium	K		$cmol^+/Kg$		1.17	*0.6*	
		K		kg/ha		1021	*526*	
		K		ppm		456	*235*	
	Sodium	Na		$cmol^+/Kg$		0.45	*0.3*	
		Na		kg/ha		233	*155*	
		Na		ppm		104	*69*	
	Aluminium	Al		$cmol^+/Kg$		0.12	*0.6*	
		Al		kg/ha		24	*108*	
		Al		ppm		11	*54*	
Acidity Titration	Hydrogen	H^+		$cmol^+/Kg$		0.23	*0.6*	
		H^+		kg/ha		5	*12*	
		H^+		ppm		2	*6*	
	Cation Exchange Capacity			$cmol^+/Kg$		41.0	***20***	*This tells us we are working with a heavy soil that will be slow*
Percent Base Saturation	Calcium	Ca		%		72.1	*77*	to move in one direction or another.
	Magnesium	Mg		%		23.1	*12*	Calcium is at good levels in this soil, Magnesium is a little high.
	Potassium	K		%		2.9	*3*	Potassium is well balanced.
	Sodium	Na		%		1.1	*2*	as is Sodium.
	Aluminium	Al		%		0.3	*7*	
	Hydrogen	H+		%		0.6		
	Calcium/ Magnesium Ratio			ratio		3.1	*6.4*	
Micronutrients- DTPA +Hot $CaCl_2$ Extracts	Zinc	Zn		ppm		2.2	*6*	
	Manganese	Mn		ppm		168	*25*	
	Iron	Fe		ppm		155	*25*	
	Copper	Cu		ppm		4.9	*2.4*	
	Boron	B		ppm		0.37	*2.0*	
Acid Extract	Molybdenum	Mo		ppm		0.39	*2.0*	
	Cobalt	Co		ppm		21.00	*40*	
	Selenium	Se		ppm		0.82	*2.0*	
$CaCl_2$ Extract	Silicon	Si		ppm		83.1	*50*	
Total Nutrients	Total Carbon	C		%		2.03	*>3.1*	
	Total Nitrogen	N		%		0.15	*>0.3*	
	Carbon/ Nitrogen Ratio			ratio		13.9	*10 to 12*	
	Basic Texture	t				Loam	..	
	Basic Colour	c				Brownish	..	
	Chloride Estimate			equiv. ppm		76	..	
TOTAL STORED NUTRIENTS AND METALS *Total Acid Extractable*	Calcium	Ca		ppm		8,770	*1,000 - 10,000*	
	Magnesium	Mg		ppm		12,503	*e 500 - 5,000 Mg*	
	Potassium	K		ppm		2,298	*ge 200 - 2,000 K*	
	Sodium	Na		ppm		334	*ge 100 - 500 Na*	
	Sulfur	S		ppm		228	*ge 100 - 1,000 S*	
	Phosphorus (Total)	as P		ppm		870	*ge 400 - 1,500 P*	
	Zinc	Zn		ppm		115.8	*nge 20 - 50 Zn*	
	Manganese	Mn		ppm		1,011	*e 200 - 2,000 Mn*	
	Iron	Fe		ppm		38,967	*1,000 - 50,000 Fe*	
	Copper	Cu		ppm		56.7	*nge 20 - 50 Cu*	
	Boron	B		ppm		1.5	*ange 2 - 50 B*	
	Silicon	Si		ppm		1,117	*1,000 - 3,000 Si*	
	Aluminium	Al		ppm		32,354	*2,000 - 50,000 Al*	
	Molybdenum	Mo		ppm		0.39	*nge 0.5 - 3 Mo*	
	Cobalt	Co		ppm		21.00	*nge 5 - 50 Co*	
	Selenium	Se		ppm		0.82	*ge 0.1 - 2.0 Se*	
	Cadmium	Cd		ppm		..	*< 1 Cd*	
	Lead	Pb		ppm		..	*< 10 Pb*	
	Arsenic	As		ppm		..	*< 5 As*	
	Chromium	Cr		ppm		..	*ge 10 - 100 Cr*	
	Nickel	Ni		ppm		..	*nge 1 - 50 Ni*	
	Mercury	Hg		ppm		..	*< 1 Hg*	
	Silver	Ag		ppm		..	*< 1 Ag*	

In conclusion.

I would suggest the following program.

PowerPhos @ 120kg per Ha in the row twice per year

Dolomite Lime @ 100kg per Ha in the row 3 times per year.

Bio Brew Soil @ 8 litres per Ha in the row at planting .
Bio Brew Growth @ 8 litres per Ha mixed with 2 litres of C-Kelp Super per Ha, used as a foliar. continue using this foliar application monthly until desired fruiting height has been reached and then begin to combine Bio Brew Growth and Bio Brew Harvest @ 4 litres + 4 litres respectively with the C-Kelp also included @ 2 litres. continue with this application for the life of the crop.
we may look at an application of Vital Fish at intervals to be determined @ 3 litres per Ha on the ground in the row.

Notes:
1: Cation Exchange Capacity = sum of the exchangeable Mg, Ca, Na, K, H and Al
2: Methods from Rayment and Higgins, 1992. Australian Laboratory Handbook of Soil and Water Chemical Methods.
3: 'Reams' 'Morgan Extract' available nutrient testing adapted from 'Science in Agriculture' and 'Non-Toxic Farming' and Lamonte Soil Handbook.
4. All results as dry weight; ppm = mg/Kg air dried soil sieved at 2mm (ie. not crushed)
5. For conductivity 1 dS/m = 1 mS/cm = 1000 µS/cm
6. 1 $cmol^+/Kg$ = 1 meq/100g; 1 Lb/Acre = 2 ppm (parts per million); **kg/ha = 2.24 x ppm**
7. Conversions for 1 $cmol^+/Kg$ = 230 Kg/Hectare Sodium ; 780 Kg/Ha Potassium ; 240 Kg/Ha Magnesium ; 400 Kg/Ha Calcium.
8. Guideline values for phosphorus have reduced in accordance with Australian soils
9. .. Denotes not requested
10. Organic Matter = (%C Total Carbon) x 1.75
11. Sample digested with Aqua Regia acid for total nutrients/ salts and metals. 'Totals' guidelines are only included to provide typical nutrient storage.
12. Guidelines provided are suggestions only and based on 'Albrecht' and 'Reams' concepts

checked:.....