What's In A Soil Report ?

The attached soil report (p2&3) is just one example from a soil laboratory that is commonly used by growers – there are other options available. Below is an explanation of the type of information provided for growers in such a soil report.

Table and bar graphs showing the desirable and detected levels of the following soil characteristics:

Total Exchange Capacity: This is a measure of the nutrient holding capacity of the soil. Sandy soils have low TEC and a limited ability to hold nutrients so they need to be fertilized more often but with smaller amounts. Clay soils have good nutrient holding capacity. TEC can be thought of as measuring how big the soil's "fuel tank" is.

Total colloidal organic matter: this tests measures the fine organic matter particles in the soil and doesn't include coarser bits like twigs and roots. This is important fraction of the soil organic matter for improving soil structure and water holding capacity and for supporting healthy soil microbial activity.

Major nutrient anions: These elements are needed in relatively large amounts by plants so you need to make sure that there is enough in your soil to support your crops before planting. If the soil test shows that an element is deficient, add some as fertilizer.

Major nutrient cations: These are the positively charged elements in the soil and are also needed for plant growth. The balance or relative proportions of these elements in can affect the physical condition of your soil and also the ability of your crop to take them up. Too much of one cation can reduce the plant availability of others. A balanced fertilizer program based on a soil test is essential for healthy, well fed plants.
Calcium is a very important cation and in a balanced soil up to 70% of the exchange capacity should be calcium.

Chlorides: this is generally a measure of how much sodium chloride (salt) is in your soil. This can be used as a check to see how much of the soil's conductivity is due to salt and how much is due to other factors like gypsum application. Chloride can also be applied in Muriate of Potash fertilizer.

EC (electrical conductivity) as dS/m (decisemens/m): this is a measure of the salts or salinity of the soil. As the conductivity gets higher, plants are not able to take up water properly and will start to wilt.

Trace elements: these elements are only needed in very small amounts but are still essential for plant growth. If they are deficient, they can be added to the soil in the fertilizer program or sprayed onto the leaves in foliar fertilizer.

The second part of the report contains detailed recommendations for correcting imbalances and deficiencies in the soil. These recommendations can be affected by specific conditions on farm such as recent applications of lime or gypsum that take time to change the soil and may not have had an effect before the soil sample was taken. There are also subsoil conditions that will not be identified in a topsoil test that should be considered before following a fertilizer program.

While a soil analysis is very important it should be looked at together with a leaf nutrient analysis just after flowering and prior to the first fruit set to be certain plants are getting the required nutrients at this critical time. It would also be very useful to do another leaf test late in the crop, but while the plants are still in reasonable health to see the levels in older plants as a measure of the efficiency of your soil and plants over the entire crop cycle. If you are not getting as many high quality capsicums as Phuong it could be due to nutrient exhaustion at some later point in the crop cycle.

This project has been funded by HAL using the vegetable industry levy and matched funds from the Australian Government

Fact seet prepared by Phil Barnett (ProAg soil management)

Australian Perry Agricultural Laboratory
Soil Analysis

Customer:

Advisor: Phil Barnett-Pro Ag

Sample Name: SOIL TEST

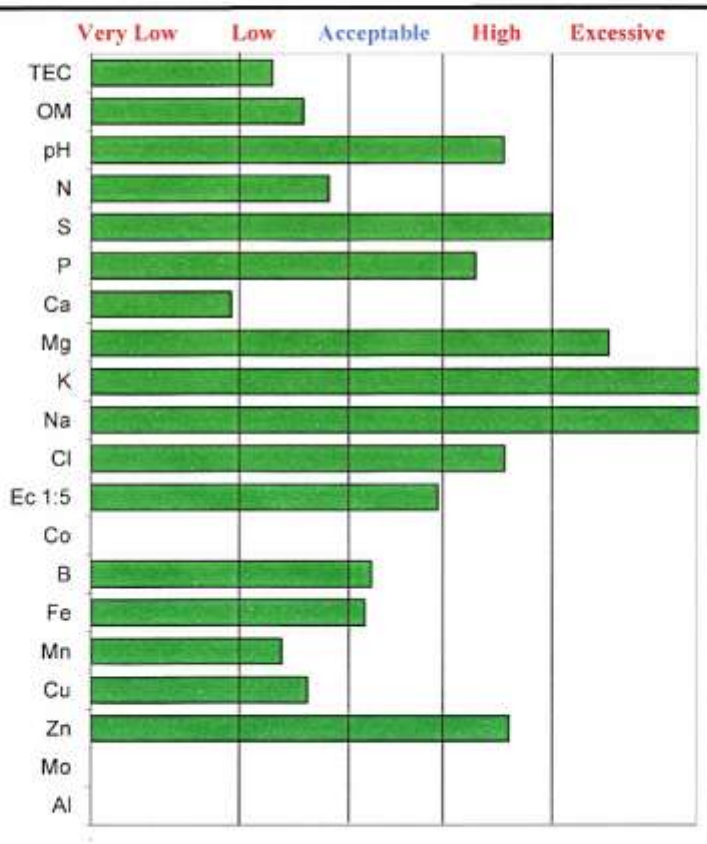
Crop: CAPSICUMS

Control 20554

Lab No.: A0022

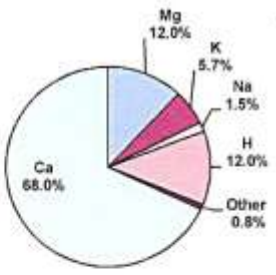
Date: 5-Aug-11

		Unit	Desired Level	Level Found
	Total Exchange Capacity (TEC)	12-25		8.45
	Colloidal Organic Matter %		4.0 - 6.0	3.30
	pH (Water)		6.0 - 6.5	7.70
Anions	Nitrogen (N)	kg/ha	90 - 120	83
	NO 3	ppm		*
	NH 3	ppm		*
	Sulphate (S)	ppm	20 - 30	106
	Olsen (P)	ppm	55-65	43
	Phosphorus (Bray 2)	kg/ha	324	363
	Deficit	kg/ha	Units P	0
	Phosphate Recovery	%	100	68
Cations			ppm	kg/ha
	Calcium (Ca)	Desired	1149	2581
		Found	607	1363
		Deficit		1218
	Magnesium (Mg)	Desired	121	273
		Found	211	474
		Deficit		0
	Potassium (K)	Desired	189	424
		Found	625	1405
		Deficit		0
	Sodium(Na)	Found	399	897
	Chlorides (Cl)	ppm	<200	297.0
	Salinity EC 1:5	dS/m	<0.15	0.49
Trace Elements	Cobalt (Co)	ppm	>1.5	*
	Boron (B)	ppm	>1.5	1.38
	Iron (Fe)	ppm	100 - 400	190.07
	Manganese (Mn)	ppm	80 - 140	59.29
	Copper (Cu)	ppm	>2.0	1.68
	Zinc (Zn)	ppm	>8.0	23.99
	Molybdenum (Mo)	ppm	0.8 - 1.2	*
	Aluminium (Al)	ppm	<2.0	*
Base Saturation %	Ca:Mg RATIO		5.67	1.73
	Calcium	% Ca	68.0	35.90
	Magnesium	% Mg	12.0	20.80
	Potassium	% K	5.7	19.00
	Sodium	% Na	1.5	20.60
	Other Bases	%	0.8	3.70
	Exchangeable Hydrogen	% H	12.0	0.00

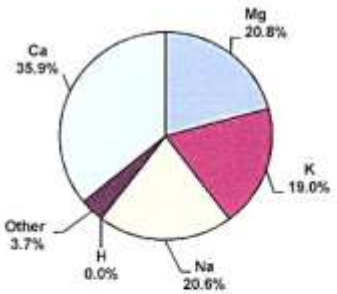


Base Saturation Percentages

Desired



Found



Additional Comments:

The following show the kg/ha of deficient elements required to bring the soil to the ideal level:

PHOSPHORUS	nd	BORON	0.2	COBALT	n req
MAGNESIUM	nd	IRON	nd	MO	n req
POTASSIUM	nd	MANGANESE	nd		
CALCIUM	1218	COPPER	0.6		
SULPHUR		ZINC	nd		

* This test is available but not requested by client.

nd = not deficient

n req = not requested

APAL, PO Box 327, 489 The Parade, MAGILL, SA 5072. Tel. 08 8332 0199 Fax. 08 8361 2715

FERTILISER RECOMMENDATION

BASE FERTILISER . . . APPLY (1/t.mix) (in base)	KG/HA	KG/TONNE	(% of elements)
COPPER SULPHATE (24%)	10	11	0.26% Cu
MANGANESE SULPHATE (28%)	50	55	1.54% Mn
M.A.P. (NPK 10-22-0)	250	275	
ORGANIC BASE (humates/manure)	600	659	
Total kg/Ha	**910**	**1000**	
One tonne will treat approx.		1.10 Hectares	
Total tonne/s required = total hectares divided by		1.10	

LIME Total deficiency per hectare (for application rate see below)	**3.0 Tonne/s**
Gypsum application … Apply per hectare	**1.0 Tonne/s**

COMMENTS:

This is a moderately alkaline, light sandy soil so it should be possible to create a good rootzone for your crops. Organic matter is low so additions of compost will be beneficial before planting - also blend fertilisers with an organic base. Calcium is very low and magnesium is high which will tend to tighten the soil up and reduce root penetration and drainage. Potassium is very high and may have an impact on the uptake of magnesium and calcium - leaf test to check. Phosphorus is good but still add some available P in the pre-plant fertiliser for establishment and early root growth. Trace elements manganes and copper need attention.

RECOMMENDATIONS

Lime & Gypsum - apply **3tonne/Ha of Ag Lime** & **1tonne/Ha of Gypsum** as soon as possible and incorporate .

Deep Rip - deep rip thoroughly to open the soil up and allow effective leaching of salts.

Leach Salts - thoroughly leach the area using fine overhead sprinklers at a slow soaking rate.
The soil should not become waterlogged or boggy so monitor the leaching regularly by digging to watch the progress of thewetted front. Stop watering if it reaches a non-draining layer.
Use **200 litre/Ha of N-Ca**l to help remove the salt - spray on the soil surface early in the leaching process.

Organic Matter and Pre-Plant Nitrogen - 2 to 3 weeks before planting spread at least **20 m3/Ha** of **Compost or Manure** and incorporate it with **150 kg/Ha of Urea** and **10 litre/Ha of Molasses**
Soil microbial activity will utilise the nitrogen to break down the organic matter and the nutrients will be available when the crop is planted.

Fertiliser: Apply the recommendations 7 to 10 days prior to planting and shallow work.

Fertiliser : no base fertiliser is needed.

Trace Elements : can be applied through the overhead sprinklers onto the soil surface 1 week before planting and lightly incorporated. Apply the Copper Sulphate, Zinc Sulphate, Manganese Sulphate, Ferrous Sulphate, Borax in this way.

Seasonal Nitrogen Apply additional nitrogen as needed based on crop growth and vigour.

Tissue Test - sample early in the new crop to formulate a foliar fertiliser program. **** contact Pro Ag Consulting for a Leaf Test Kit (0417 925824)***

Foliar Sprays - apply a good general foliar every 10 to 14 days and add elements according to the leaf test.
Potassium is in excess. This will suppress plant magnesium, calcium and boron. Crops can produce excess growth with reduced flowering or fruiting. Quality and storage life can be reduced.
Magnesium and boron should be added to foliar sprays ie: **1 kg/Ha Solubor Boron**
3 kg/Ha Magnesium Sulphate