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ASPAC
A member of the Australasian Soil and Plant Analysis Council

REPORT ON SAMPLE OF SOIL

FILE NO : 1712131404 **DATE ISSUED :** 19/12/2017

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REFERENCE : LARRY PALMER
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DATE RECEIVED : 14/12/2017
ANALYSIS REQUIRED : Full (ST-1) TP

SAMPLE ID : HOME PADDOCK (0.78HA)
DEPTH OF SAMPLE (cm): 0 to 10
LAND USE : PASTURE

ITEMS			RESULTS	DESIRABLE LEVEL
pH(1:5 Water)†			7.1	5.5-7.5
pH(1:5 0.01M $CaCl_2$)†			6.61	
Electrical Conductivity†	EC	µS/cm	163	< 300
TOTAL SOLUBLE SALT	TSS	ppm	537.9	< 990
AVAILABLE CALCIUM†	Ca	ppm	3580	3903
AVAILABLE MAGNESIUM†	Mg	ppm	530.4	517
AVAILABLE SODIUM†	Na	ppm	34.5	< 330
AVAILABLE NITROGEN	N	ppm	15.8	26
AVAILABLE PHOSPHORUS†	P	ppm	2.59	35
AVAILABLE POTASSIUM†	K	ppm	323.7	350
AVAILABLE SULPHUR†	S	ppm	4.02	16 - 20
AVAILABLE COPPER†	Cu	ppm	6.8	2
AVAILABLE ZINC†	Zn	ppm	5.91	7
AVAILABLE IRON†	Fe	ppm	36	> 30
AVAILABLE MANGANESE†	Mn	ppm	25	> 20
AVAILABLE COBALT	Co	ppm	1.35	> 1.0
AVAILABLE MOLYBDENUM	Mo	ppm	0.28	> 1.0
AVAILABLE BORON†	B	ppm	0.38	=> 1.0
TOTAL ORGANIC MATTER†	OM	%	11	> 10
TOTAL ORGANIC CARBON†	OC	%	5.5	> 5
TOTAL PHOSPHORUS†	TP	ppm	1280	
EXTRACTABLE ALUMINIUM†	Al	ppm	not required	
TOTAL NITROGEN†	N	%	not required	
TOTAL CALCIUM	Ca	ppm	not required	
TOTAL MAGNESIUM	Mg	ppm	not required	
CHLORIDE	Cl	ppm	not required	
AVAILABLE SILICA	Si	ppm	not required	

†This laboratory has been awarded a Certificate of Proficiency for specific soil and plant tissue analyses by the Australiasian Soil and Plant Analysis Council (ASPAC). Test for which proficiency has been demonstrated are highlighted in this report.

FILE NO : 1712131404 **LAND USE:** PASTURE

ITEMS			RESULTS	DESIRABLE LEVEL
EXCHANGEABLE CALCIUM	Ca	meq/100g of soil	16.96	17.86
EXCHANGEABLE MAGNESIUM	Mg	meq/100g of soil	4.19	4.12
EXCHANGEABLE SODIUM	Na	meq/100g of soil	0.14	< 1.37
EXCHANGEABLE POTASSIUM	K	meq/100g of soil	0.79	1.37
EXCHANGEABLE HYDROGEN	H	meq/100g of soil	10.9	
ADJ. EXCHANG. HYDROGEN	H	meq/100g of soil	5.4	< 4.12
CATION EXCHANGE CAPACITY	CEC		32.98	
ADJUSTED CEC	Adj.CEC		27.48	
EXCH. SODIUM PERCENTAGE	ESP		0.42	< 5
CALCIUM / MAGNESIUM RATIO	Ca/Mg		4.05	2 - 4
BASE SATURATION PERCENTAGE	BSP		68	

ITEMS		PERCENTAGE OF ADJUSTED CEC	DESIRABLE LEVEL
EXCHANGEABLE CALCIUM	Ca	61.7	65-70%
EXCHANGEABLE MAGNESIUM	Mg	15.2	12-15%
EXCHANGEABLE SODIUM	Na	0.5	0.5-5%
EXCHANGEABLE POTASSIUM	K	2.9	3-5%
EXCHANGEABLE HYDROGEN	H	19.7	<20%

PREVIOUS APPLICATIONS (IF APPLICABLE)		DATE OF APPLICATION
GYPSUM APPLIED	t/ha	
LIME APPLIED	t/ha	
DOLOMITE APPLIED	t/ha	
Magnesium Sulphate	kg/ha	

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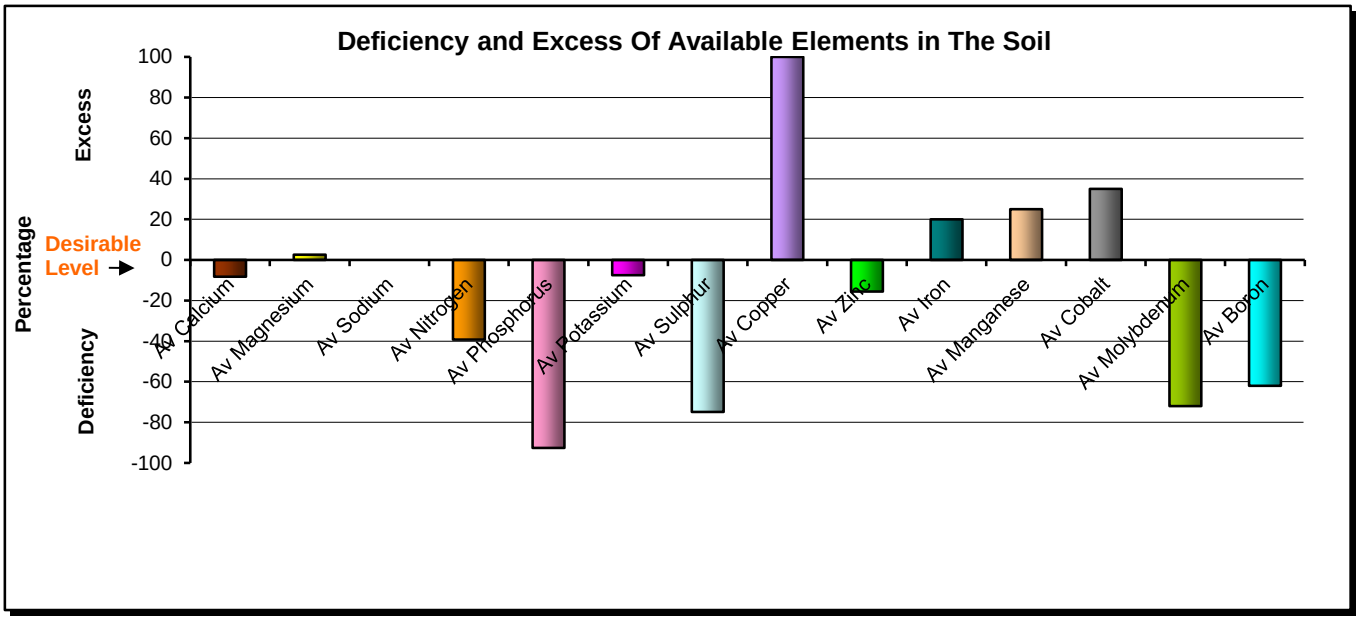
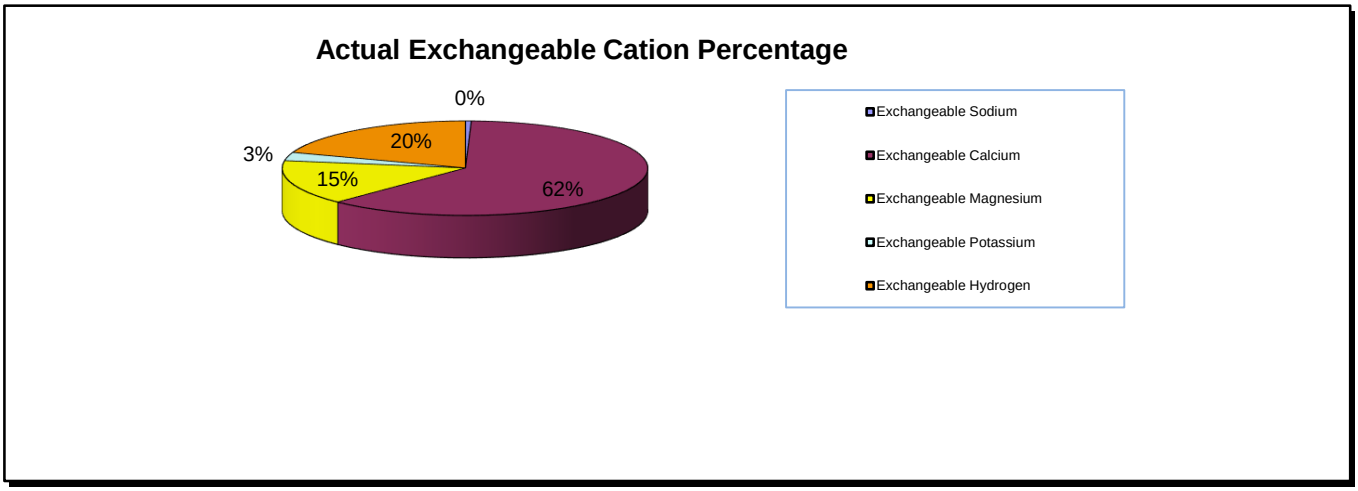
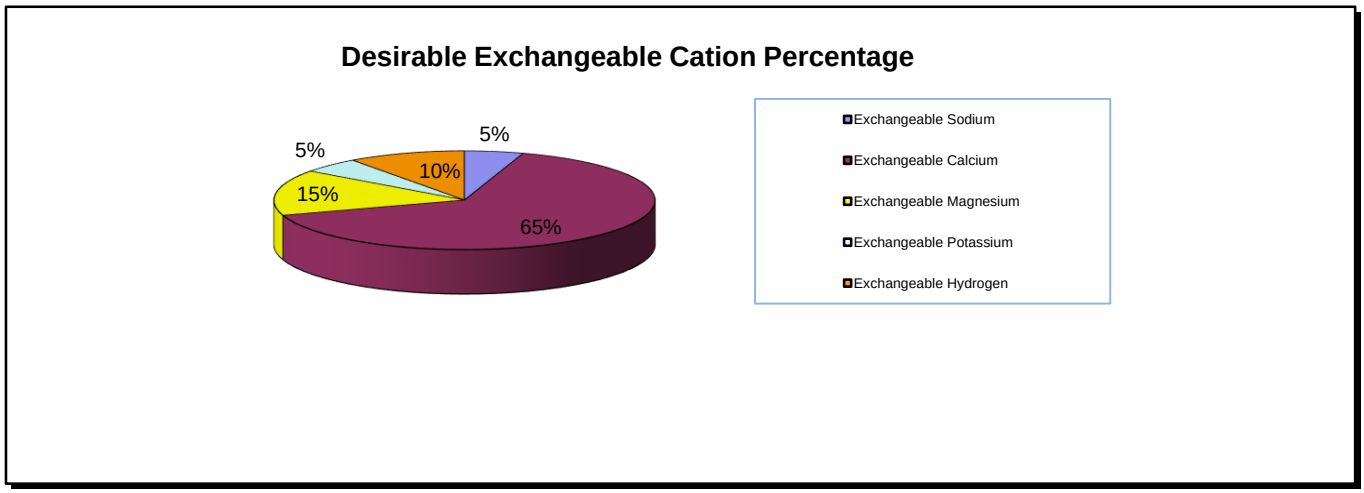


- Phosphorus fixation effects if Iron is more than 300 ppm
- Manganese will be at toxicity level if it reaches 500 ppm





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RECOMMENDATION

181 kg of Calcium is needed to raise the Available Calcium to 68% and/or Exchangeable Calcium to 65%

GYPSUM REQUIREMENT	**0.11** t/ha			
LIME REQUIREMENT	**0.39** t/ha			
DOLOMITE REQUIREMENT	**0** t/ha			
MAGNESIUM SULPHATE	**0** kg/ha	or	MAGNESIUM OXIDE	**0** kg/ha

TOTAL FERTILISER REQUIREMENT (kg/ha)	N	P	K	S
	10	**32**	**26**	**25**

with Trace Elements:

COPPER	**0.5** kg/ha
ZINC	**2.7** kg/ha
COBALT	**0** kg/ha
MOLYBDENUM	**0.05** kg/ha
IRON	**0** kg/ha
MANGANESE	**0 - 2** kg/ha
BORON	**1.5** kg/ha

- Gypsum Requirement is to increase the Calcium and Sulphur and decrease the Exchangeable Sodium and or the Exchangeable Magnesium in the soil. For best results, use only 'Grade 1' Gypsum.

- Lime Requirement is to increase the Calcium and decrease the hydrogen in the soil
- Lime Requirement is based on Lime containing 40% Calcium.
- We advice that Lime should be applied first in Autumn then followed by Fertiliser in Spring.

We recommend that 25 kg/ha of Potassium should be applied after cutting of Hay.

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Desirable levels for Exchangeable Cations (Ca, Mg, Na, K and H) is directly related to the constant desirable level percentages (see pie graph page 3) and the soil's Adjusted CEC. The other elements vary in relation to the soil's CEC, landuse, leaching requirement and yield.

If soil pH (water) is below 5.7, trace elements should not be applied until Lime and/or Dolomite applications have had time to raise the pH to this level. For soils with pH (water) of 8.0 or more, apply trace elements as foliar spray only.

The recommendations for Gypsum/Lime/Dolomite/$MgSO_4$ on page 4 are essential to the process of achieving optimum soil balance. All other recommendations in this report (NPKS & trace elements) have been formulated on the assumption that the Gypsum/Lime/Dolomite/$MgSO_4$ have been applied and given sufficient time for their effects to develop. In most cases, six months will be required between application of cation balance correction and fertilisers, however, more time may be required in lower rainfall zones or dry seasons. In areas with shallow saline watertables and NO subsurface drainage, no Gypsum should be applied (even if recommended here) until adequate drainage can be provided. It should also be noted that the amounts recommended depend, in part, on the stated sample depth.

For all required materials - Gypsum/Lime/Dolomite/Magnesium Sulphate/Magnesium Oxide (where surface application is necessary and irrigation is not available), the total application should be limited to roughly 2.5 t/ha per year. This limitation does not apply where materials can be cultivated or irrigated into the soil.

Important note: For all reports that have landuse as "Pasture". If molybdenum is needed to be applied, then copper needs to be applied as well even if available copper is high. Copper and molybdenum are antagonistic to each other so if molybdenum is applied without copper, molybdenum will deplete copper leading to copper deficiency in animals. The main problem occurs when animals graze treated pasture soon after application. For this reason, if you are worried about applying copper when there is enough in your soil, you can apply molybdenum alone BUT you MUST keep animals off the pasture for at least 6 weeks (longer if there has been little or no rain).

SWEP does not recommend or promote specific products, so all recommendations are given in kg/ha of actual nutrient. These must be converted into applications of fertiliser. For assistance in doing this, consult your local supplier.

ANALYTICAL METHODS

Items	Methods
pH (1:5 Water)	4A1
pH (1:5 CaCl2)	4B1
Electrical conductivity (1:5 Water)	3A1
Total Soluble Salts	Calculation from Electrical conductivity
Exchangeable Calcium, Magnesium, Sodium, Potassium	15D3 or 15A1
Exchangeable Hydrogen	Barium Chloride-Triethanolamine method*
Available Nitrogen	Copper-cadmium reductor column at a pH of 8.0
Available Phosphorus	Olsen extractable, 9C2a
Available Sulphur	KCl 40, 10D1
Available Copper, Zinc, & Cobalt	EDTA, 12B1
Available Molybdenum	Ammonium Oxalate-Oxalic acid-di-iso propyl ether
Available Iron & Manganese	method of E.H. Mikhail (1981)
Available Boron	12C2
Total Organic Matter	modified Walkley & Black, 6A1
Total Phosphorus, Calcium, Magnesium	Acid digestion
Extractable Aluminium	15G1
Total Nitrogen	Dumas method, 7A5
Chloride	5A1
Available Silica	Dithionite-Citrate method**

NB. For available Iron and Manganese, SWEP uses the method developed by E.H. Mikhail (1980) due to the tendency for the standard EDTA method to produce erroneously high results.

For numbered test methods:
Rayment, G.E. & Lyons, D.J. (2011). Soil Chemical Methods - Australasia. CSIRO Publishing, 150 Oxford Street, Collingwood Vic 3066, Australia.

*Peech, M., Cowan, R.L. & Baker, J.H. (1962). Soil Science Society American Procedures, A critical studyof the Barium chloride-Triethanolamine and ammonium acetate methods for determining exchangeable Hydrogen of soils.

** Ross, G.J. & Wang, C. (1993). Soil Sampling and Methods of Analysis, CRC Press, Boca Raton, Florida, USA.

AQIS Approved Quarantine Site.
Victorian DPI acccreditation to receive samples from PIZ and PCN infested zones.

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