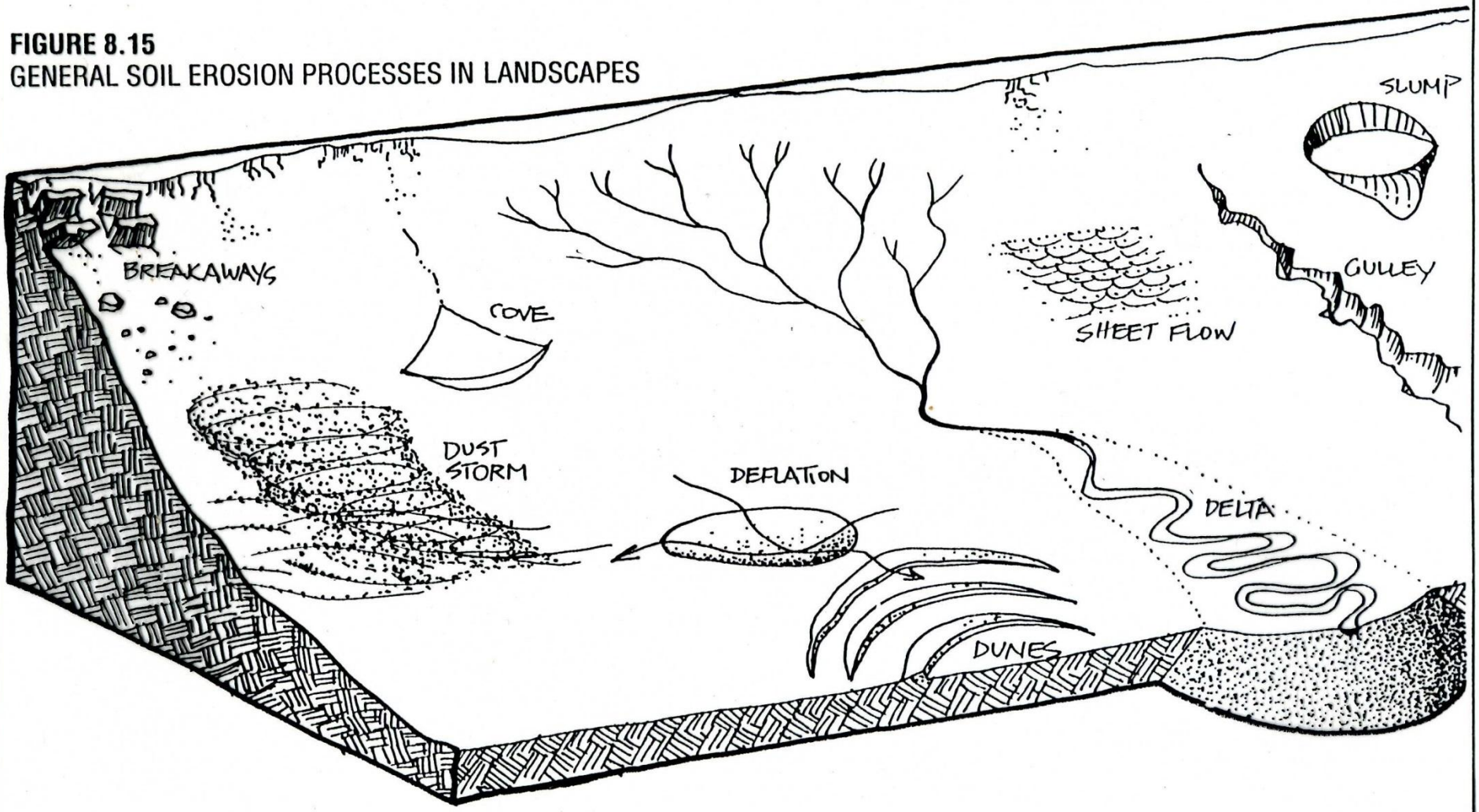
Land capability and decision making

- Water
- Soils (rock, clay, sand deposits?)
- Reading the landscape
- Flora and fauna

Other

- Access, power, improvements and fencing
- Markets, transport, services
- Clients' aims, experience and resources
- Information sources, documentation and equipment

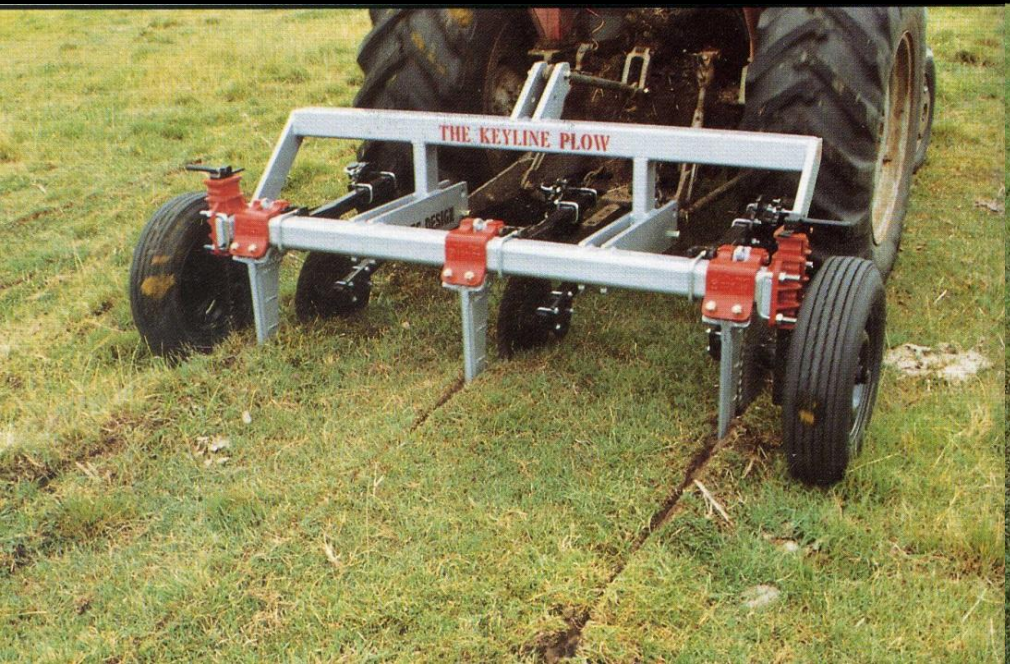
FIGURE 8.15
GENERAL SOIL EROSION PROCESSES IN LANDSCAPES



Soils

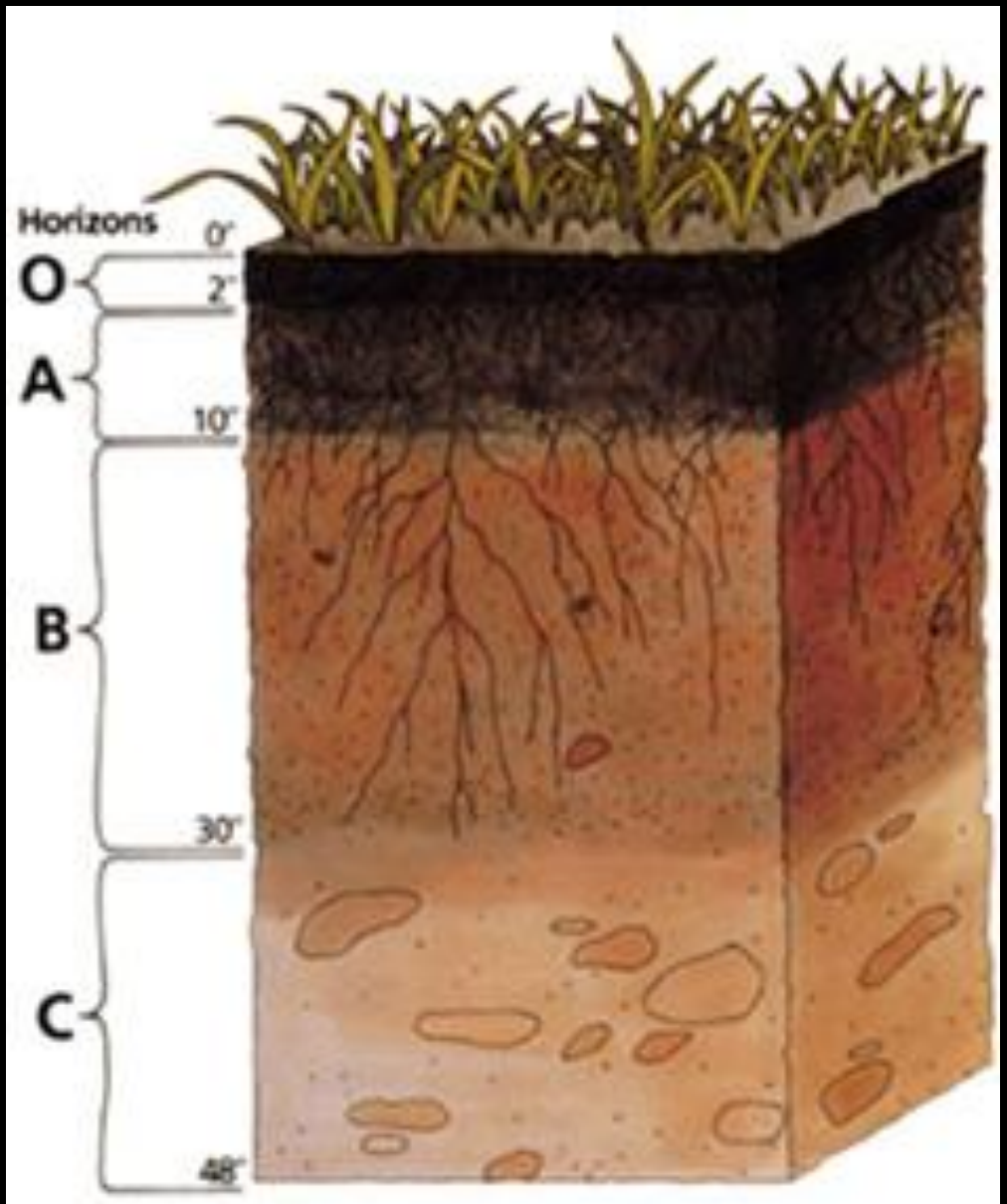
- Land formation processes
- Soil origin – 2-4 tonnes per hectare pa
- Soil loss – up to 500 tonnes pa
- Sick soil and rehab

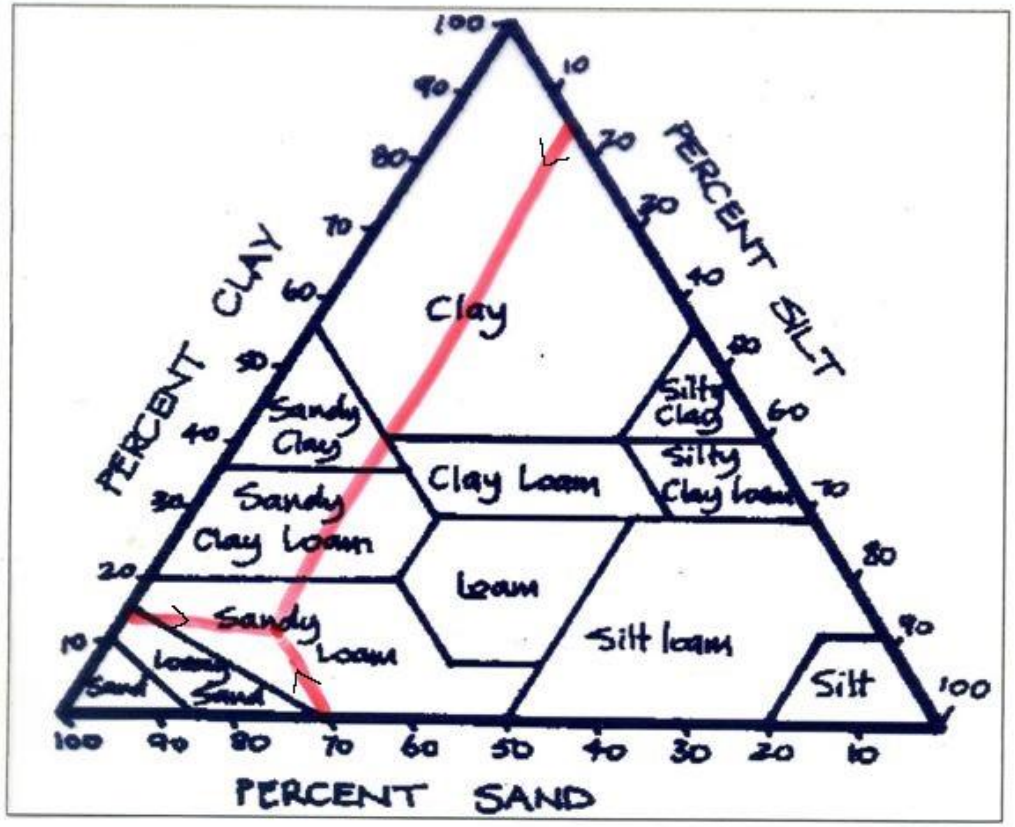
Structure - remedial work with chisel ploughing, agro-ploughing, gypsum, compost, biochar and minerals



Difficult soils

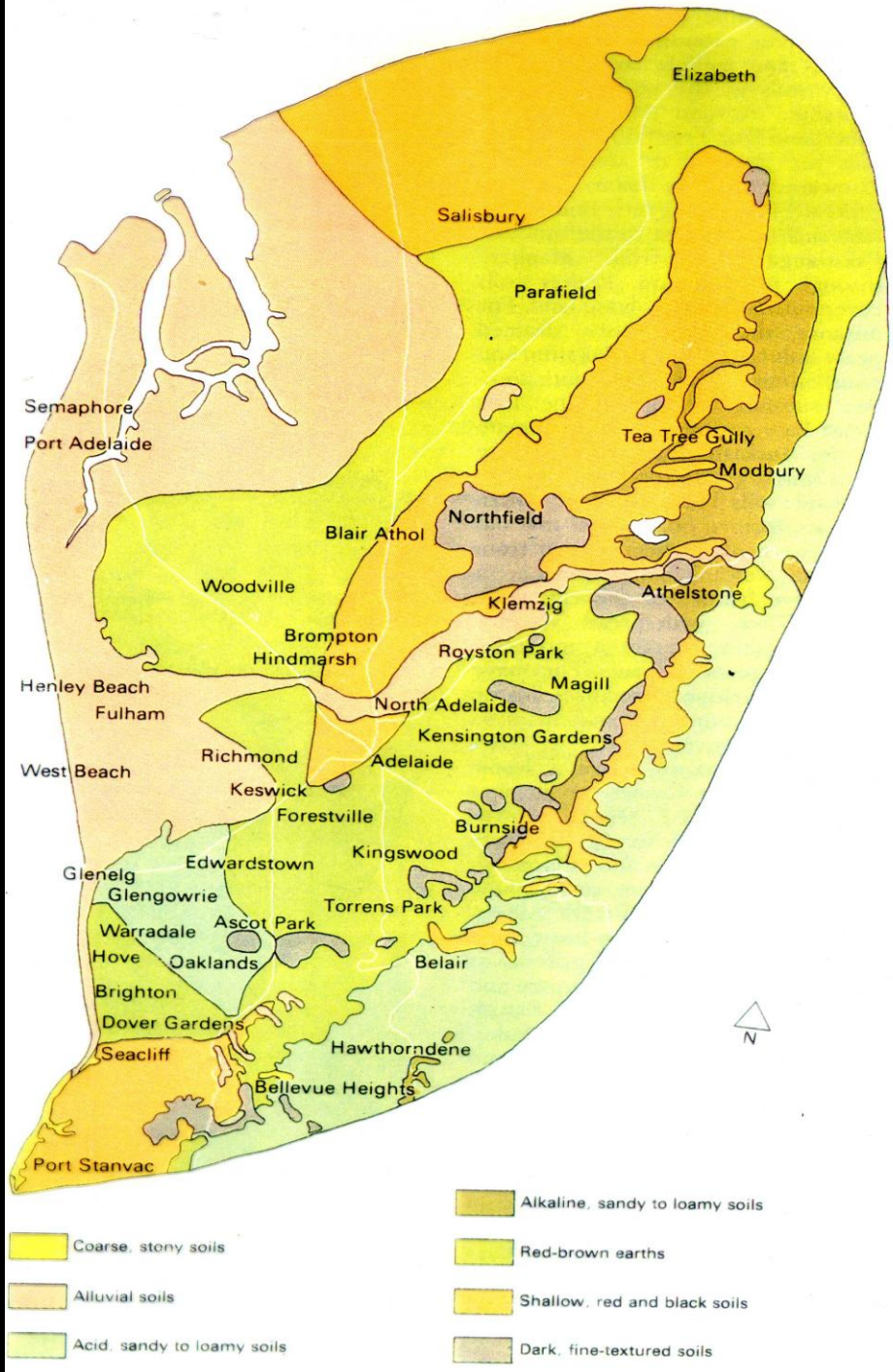
- Non-wetting,
- Calcrete,
- Plastic clay
- Toxic chemistry
- Profiles

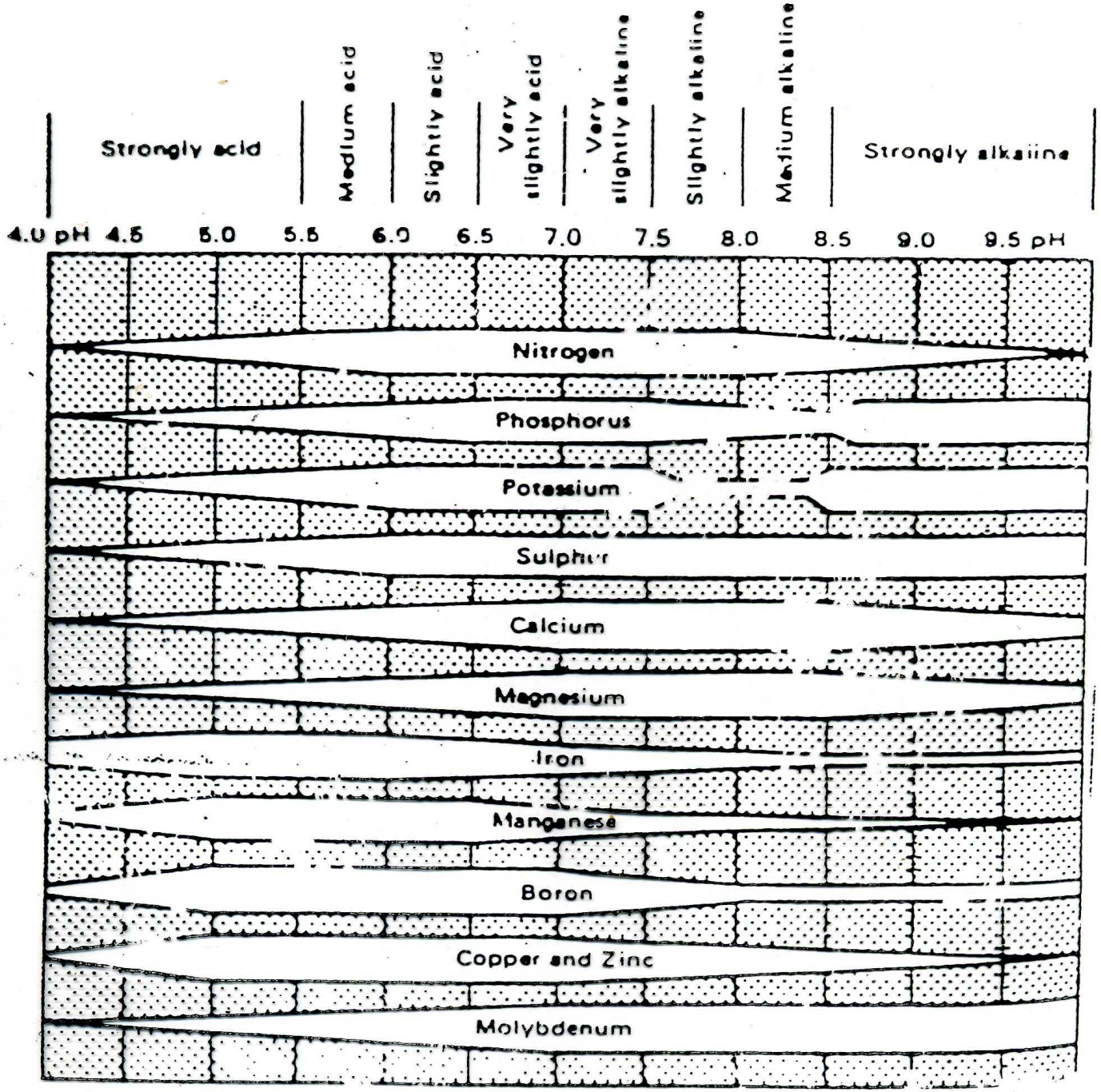

Horizons
0"
O
2"
A
10"
B
30"
C
48"



The Soil Texture Triangle

Using the proportions derived from your Jar Test you can place your soil on the Soil Triangle; so if you had a sample with 15% clay, 70% sand and 15% silt you've got a sandy loam. (the imaginary line representing the **clay is drawn across parallel to the Sand Axis**, the **sand percentage is drawn parallel to the Silt Axis** and the **silt percentage is drawn across parallel to the Clay Axis**.


Elizabeth
Salisbury
Parafield
Semaphore
Port Adelaide
Tea Tree Gully
Modbury
Northfield
Blair Athol
Woodville
Athelstone
Klemzig
Brompton
Hindmarsh
Royston Park
Henley Beach
Magill
Fulham
North Adelaide
Kensington Gardens
Richmond
Adelaide
West Beach
Keswick
Forestville
Burnside
Kingswood
Edwardstown
Glenelg
Glengowrie
Torrens Park
Ascot Park
Warradale
Hove
Oaklands
Belair
Brighton
Dover Gardens
Seacliff
Hawthorndene
Bellevue Heights
Port Stanvac
N
Coarse, stony soils
Alluvial soils
Acid, sandy to loamy soils
Alkaline, sandy to loamy soils
Red-brown earths
Shallow, red and black soils
Dark, fine-textured soils



Maximum availability is indicated by the widest part of the bar

Plants Tolerant of Acid Soils

All these plants are tolerant of acid soils

Firs	*Abies* spp
Alders	*Alnus* spp
Bearberry	*Arctostaphylos uva-ursi*
Birch	*Betula* spp
Heather	*Calluna* spp
Common sedge	*Carex nigra*
Broom	*Cytisus* spp
Heather	*Erica* spp
Alpine strawberry	*Fragaria vesca*
Gaultheria	*Gaultheria* spp
Broom	*Genista* spp
Rushes	*Juncus* spp
Juniper	*Juniperus communis*
Larch	*Larix* spp
Liquidamber	*Liquidamber styraciflua*
Bog bean	*Menyanthe trifoliata*
Bog myrtle	*Myrica gale*
Marjoram	*Origanum tundifolium*
Wood sorrel	*Oxalis acetosella*
Pines	*Pinus* spp
Tormentil	*Potentilla erecta*
Primula	*Primula* spp
Cloudberry	*Rubus chamaemorus*
Willow	*Salix* spp
Rowan	*Sorbus aucuparia*
Thyme	*Thymus caespititius*
Trapaeolum	*Trapaeolum speciosum*
Blueberry	*Vaccinium corymbosum*

Appendix 3

SWEP PTY. LTD. ANALYTICAL LABORATORIES
A.C.N. 005 031 569
UNIT 47/174 BRIDGE ROAD, KEYSBOROUGH, VIC.3173 AUSTRALIA
POSTAL ADDRESS: P.O.BOX 59D NOBLE PARK VIC.3174
TELEPHONE: (03) 9701 6007 FAX: (03) 9701 5712
email: tmswep@connexus.apana.org.au

18/04/2000

REPORT ON SAMPLE OF :Soil

FILE NO : 000412137

DATE RECEIVED : 13/04/2000

CLIENT : THE FOOD FOREST
ATT:GRAHAM T BROOKMAN
PO BOX 859
GAWLER, SA 5118

CLIENT ID : THE003

PHONE : 08 85226450

REFERENCE :

REF. ID :

SAMPLE ID : SAMPLE #1/SOIL

LAND USE : WALNUTS

ANALYSIS REQUIRED : Full

ITEMS			RESULTS	DESIRABLE LEVEL
COLOUR : DARK GREY BROWN				
TEXTURE : SILTY CLAY LOAM				
PH(1:5 Water)			6.1	6.0-7.0
PH(1:5 0.01M Ca Cl)			5.6	
ELECT. CONDUCTIVITY	EC	µs/cm	524	<315
TOTAL SOLUBLE SALT	TSS	ppm	1729.2	<1040
AVAILABLE CALCIUM	Ca	ppm	2060	2203
AVAILABLE MAGNESIUM	Mg	ppm	156	233
AVAILABLE SODIUM	Na	ppm	121.9	< 186
AVAILABLE HYDROGEN	H	ppm	32	32
AVAILABLE NITROGEN	N	ppm	19.4	50
AVAILABLE PHOSPHORUS	P	ppm	128.9	40
AVAILABLE POTASSIUM	K	ppm	339.3	250
AVAILABLE SULPHUR	S	ppm	5.5	3 - 5
AVAILABLE COPPER	Cu	ppm	04.30	2
AVAILABLE ZINC	Zn	ppm	15.60	3 - 5
AVAILABLE IRON	Fe	ppm	21	> 20
AVAILABLE MANGANESE	Mn	ppm	61	> 20
AVAILABLE COBALT	Co	ppm	02.80	0.5-0.7
AVAILABLE MOLYBDENUM	Mo	ppm	00.50	0.5-0.7
AVAILABLE BORON	B	ppm	00.50	0.4-0.6
TOTAL ORGANIC MATTER	OM	%	2.9	3 - 4
TOTAL PHOSPHORUS	TP	ppm	NR	
EXTRACTABLE ALUMINIUM	Al	ppm	NR	
TOTAL NITROGEN	N	%	NR	
CHLORIDE	Cl	ppm	NR	

NR = Not Required

LAND USE : WALNUTS

RECOMMENDATION

61 Kg of Magnesium to raise the exchangeable Magnesium to optimum of 15%

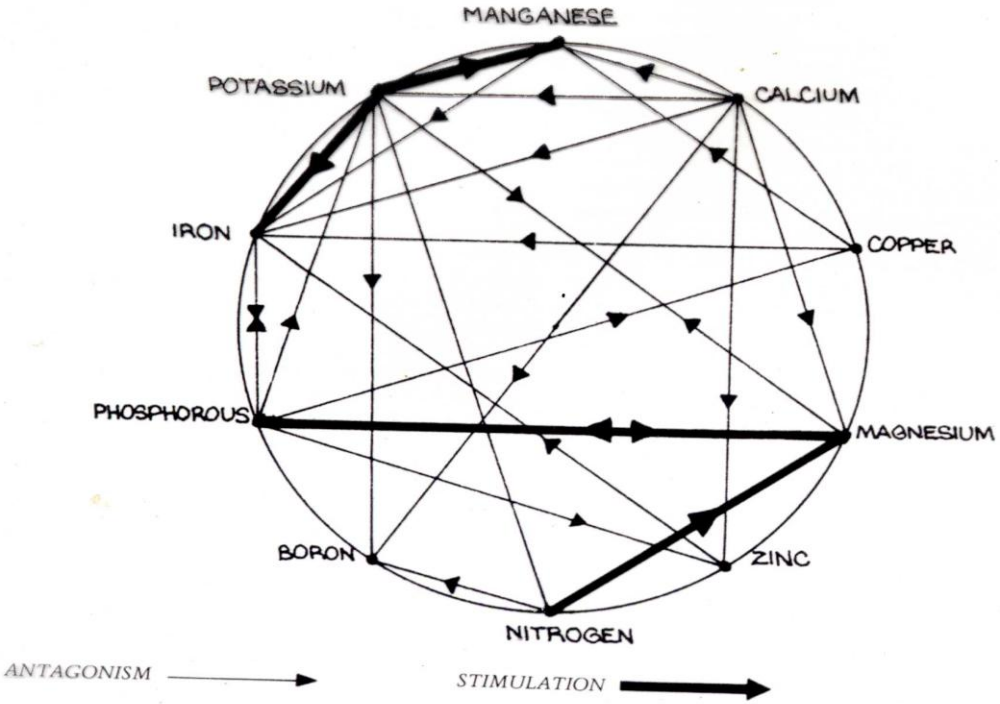
GYPSUM REQUIREMENT (t/ha) : 00.00
LIME REQUIREMENT (t/ha) : 00.00
DOLOMITE REQUIREMENT (t/ha) : 0
MAGNESIUM SULPHATE (kg/ha) : 60.948

TOTAL FERTILIZER REQUIREMENT (kg/Ha) :

N	P	K	S
81			6

WITH	COPPER	0.00 kg
	ZINC	0.00 kg
	COBALT	0.00 kg
	MOLYBDENUM	0.00 kg
	IRON	0.00 kg
	MANGANESE	0.00 kg
	BORON	0.20 kg

Mulder's Chart



Take the case of iron availability. It is reduced by the presence of too much calcium zinc, manganese, copper or phosphorus but is enhanced by more Potassium. Think of the poor citrus tree looking chlorotic in a calcium-rich limestoney soil.

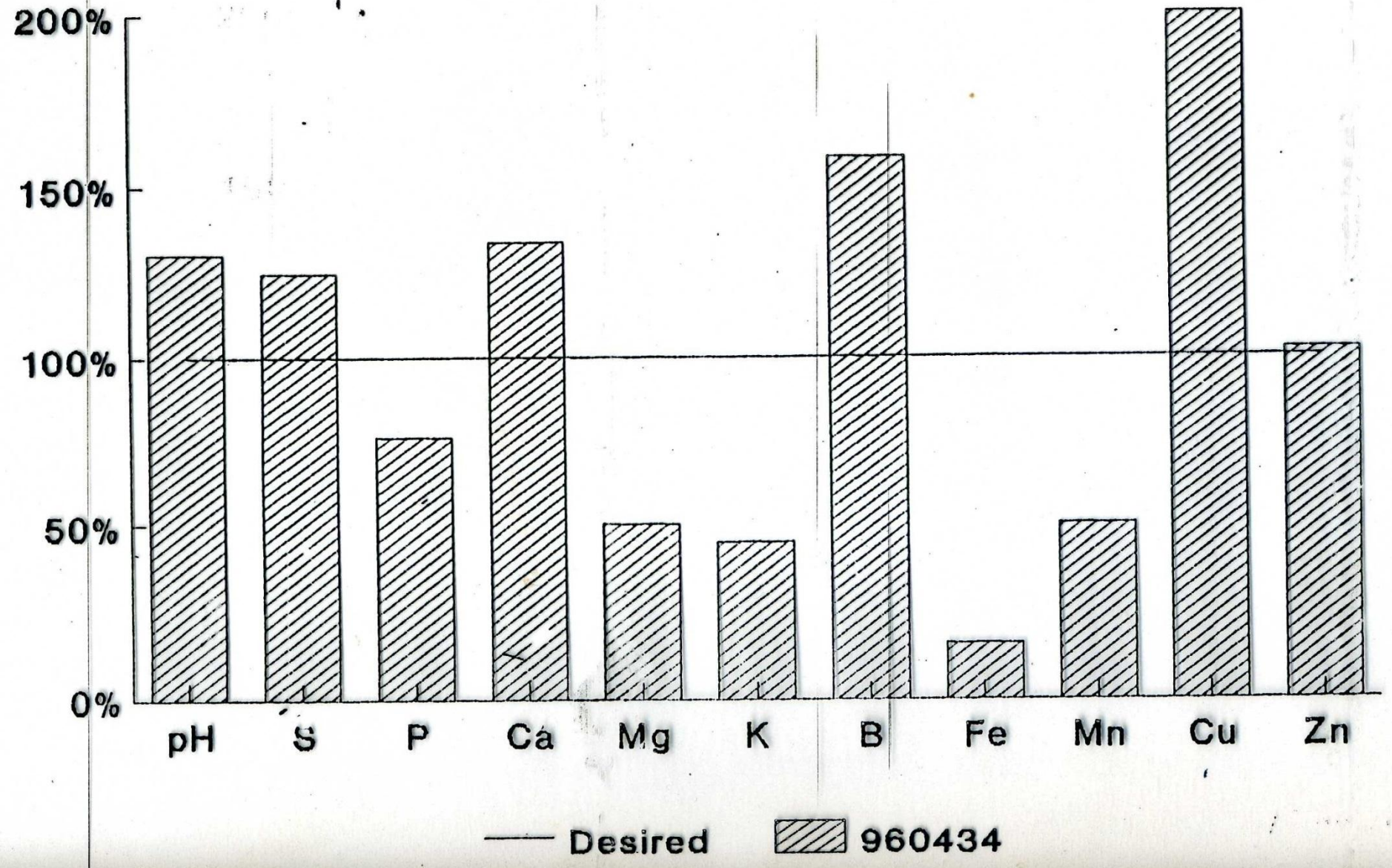
Phosphorus and magnesium enhance each other's availability whilst excessive iron antagonises phosphorus.

Some plants are good indicators of deficiencies eg cauliflowers show up boron availability problems (which may arise if one has just applied a mix of fertilizers including calcium, nitrogen and potassium).

Potassium and Magnesium are direct antagonists

I. Lillington

Soil - Vegetables



Soil Test Prices

[Back]

Tests:	*per sample*
1. Standard Soil Balance Analysis pH, EC, Available Calcium, Magnesium, Sodium, Potassium, Hydrogen, Phosphorus, Nitrogen, Sulphur, Copper, Zinc, Iron, Manganese, Cobalt, Boron, Molybdenum, Total Organic Matter, Exchangeable Calcium, Magnesium, Sodium, Potassium, Hydrogen, and Cation Exchange Capacity	$110.00
2. Complete Soil Balance Analysis As for the Standard soil balance analysis, but with the inclusion of Total Phosphorus, Total Nitrogen, C:N ratio and Active soil biology analysis: - Photosynthetic bacteria - Lactic acid bacteria - Actinomycetes - Yeasts - Cellulose utilisers - Fungi	$385.00

Optional tests:	*per element, per sample*
Total Phosphorus, Extractable Aluminium	$11.00
Cadmium, Lead, Nickel, Total Nitrogen, Total Chloride and Available Silica	$16.50
Mercury, Arsenic, Total Silica	$55.00
Optional biology tests:	*per sample*
Nematode count*	$55.00

* The nematode count is also available as a separate test on its own for $82.50 per sample (incl. GST). The result gives only numbers of nematodes, no identification of pathogenic species is provided. For more details, see Special tests.

Essential Nutrients for Plants and Their Sources

Used in Relatively Large Amounts		Used in Relatively Small Amounts
Mostly from air and water	*From soil solids*	*From soil solids*
C	N	Fe
H	P	Mn
O	K	B
	Ca	Mo
	Mg	Zn
	S	Cl
		Co

Soil fertility

- Soil and tissue testing – fertiliser requirements
- Lime
- Gypsum
- Rock dust
- Ash
- Compost
- Manure (ok if dropped by grazing animals) Cert org issue
- Rock phosphate, Guano
- KMag,
- Select ash
- Trace elements


WEW-462
GUANO

microbiology laboratories australia
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MICROBE WISE

Name: **Food Forest-Graham Brookman** Sample: **Food Forest-Compost Treatment** Analysis no.: **608-1** Date: **5/12/2013**

Key Microbe Groups

Group	Biomass (mg/kg) Yours	Guide
Total microorganisms	77.0	50.0
Total bacteria	10.5	15.0
Total fungi	62.5	33.8
Bacteria		
Pseudomonas	1.636	1.000
Actinomycetes	0.998	1.000
Gram positive	8.201	11.250
Gram negative	2.317	3.750
True anaerobes	BDL*	0.005
Eukaryotes		
Protozoa	3.986	1.250
Mycorrhizal fungi (including VAM)	11.244	10.000

*BDL = Below Detectable Limit (0.001 mg/kg)

Useful indicators	Yours	Guide
Microbial diversity	64.5	80.0
Fungi : Bacteria	5.9	2.3
Total : Anaerobic bacteria	N/A	3000

Nutrients held in microbes	Concentration (mg/kg) Yours	Guide
Nitrogen (N)	3.973	3.450
Phosphorus (P)	2.311	1.500
Potassium (K)	0.770	0.500
Sulphur (S)	0.770	0.500
Calcium (Ca)	0.385	0.250
Magnesium (Mg)	0.385	0.250
Carbon (C)	33.392	22.688

Key

Poor | Fair | Good

Comments (Detailed Custom Report available - see Order Form)

The total mass of microbes in your sample was good. Biomasses of other key desirable groups were also good, except for Total bacteria and Gram negative bacteria, which were fair to good. All soil indicators were good, indicating that this soil is benefiting from most of the functions of the main microbial groups. However, with this microbial levels, Nitrogen needs to be monitored as high amounts of this element are kept in the microbial biomass itself. True anaerobes were below detectable level, which indicates that this soil has not been recently waterlogged, or compacted. Microbial diversity was good, but could be improved. The fungi to bacteria ratio was elevated due to higher fungi compared to bacteria. Similar ratios are common in permanent pastures where the high amount of organic residues favour fungi populations. Management practices should initially focus on building bacteria biomass. Re-test periodically, and once biomass has improved concentrate on building microbial diversity and biomasses of any key desirable groups that remain low.

Explanations

The Microbe Wise test measures the biomasses of key microbial groups directly from your sample. It uses molecular ('DNA type') technology to analyse the unique cell membrane 'fingerprint' of each microbe type to identify and quantify key groups important to soil processes. This method is more accurate and precise than other methods, such as direct microscopy or plate culture, because it uses chemical extraction to remove the maximum amount of microbial material from the sample and is repeatable to 0.01% between replicate analyses. It measures organisms that are alive or recently dead (within a few days). Always compare your results with a control sample. Guide values are included as a help, but because a large number of factors affect microbiology the guide levels may not be optimal for your specific conditions. Visit www.microbelabs.com.au for more information.

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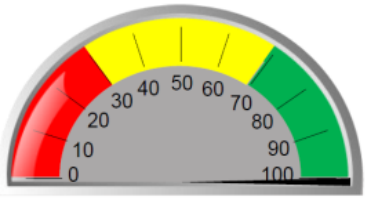
MICROBE WISE

Food Forest-Graham Brookman Sample: Food Forest-Compost Treatment Analysis no.: 608-1 Date: 5/12/2013

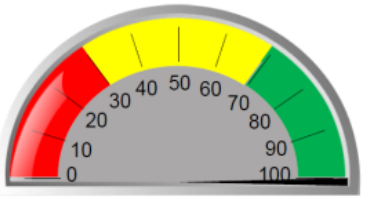
ɔmer name	Food Forest-Graham Brookman	**Sample date**	5/12/2013
ɪt or treatment name		**Received date**	5/12/2013
ɒle or replicate name	Food Forest-Compost Treatment	**Agent**	Microbe Labs Australia
or type	Vineyard	**Authorised by**	Dr Ash Martin
ks after emergence		**Analysis no.**	608-1

Soil Indicators

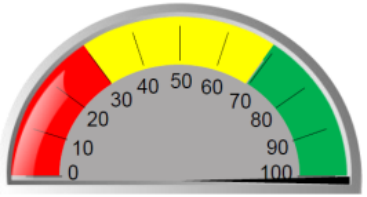
Nutrient solubilisation rate



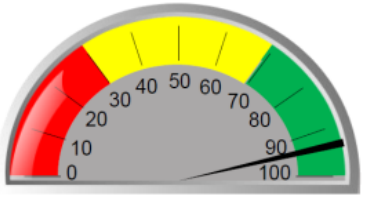
Nutrient cycling rate



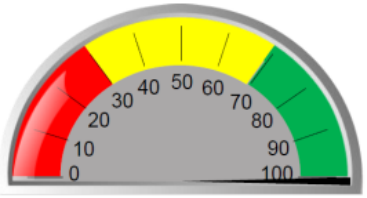
Disease resistance



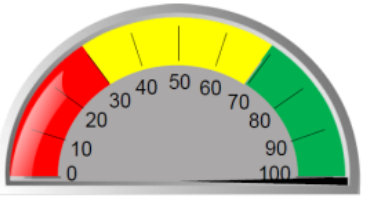
Drought resistance



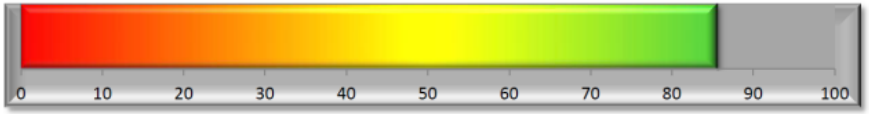
Nutrient accessibility (VAM)



Residue breakdown rate



Overall microbial balance



For more information about these indicators visit us at www.microbelabs.com.au

Labs

- APAL
  489 The Parade, Magill SA 5072
  PO Box 327, Magill SA 5072
  ph 08 8332 0199

- Microbiology Laboratories Australia
- Laboratory – 1/7 Adelaide Terrace ST MARYS SA 5042
- Postal – PO Box 230 MELROSE PARK DC SA 5039
- Ph 87127 8982
-

Composting

- Feedstock and its nutrient profile
- Carbon:Nitrogen ratio - min 30:1
- Critical mass
- Moisture
- O2
- Grinding and chopping
- Temp control – weed seeds and pathogens


YMCA

Learn from an experienced compost maker








60-66


230
220
210
200
190
180
170
150
140
130
120
110
100
110
100
90
80
70
60
50
40
30

‘cultured compost’

Typical Analysis w/w (dry basis)

Nutrients and trace elements are derived from natural ingredients used

- Organic Carbon 35%
- Total Nitrogen (N) 2.0%
- Total Phosphorus (P) 0.4%
- Total Potassium (K) 1.0%
- Total Sulphur (S) 0.39%
- Total Calcium (Ca) 1.4%
- Total Magnesium (Mg) 0.35%
- Total Iron (Fe) 0.39%
- Total Manganese (Mn) 0.01%
- Total Copper (Cu) 0.01%
- Total Zinc (Zn) 0.01%

Garlic, compost and mulch


COTTAGE MULCH, NITRA MULCH, POTTING MIX
Aldinga rd, Willunga www.peatssoil.com.au phone, 08 8556 5295
PEATS SOIL
& garden supplies
COTTAGE MULCH, NITRA MULCH, POTTING MIX
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PEATS SOIL
& garden supplies

Compost spreading equipment

Fine tuning machinery for compost spreading in tree rows

Applied 15mm thick - in the row

Spreading

Benefits of Compost

- Increase moisture infiltration and holding capacity – often 100%
- 20% irrigation savings
- Increase root, vegetative growth and yield 40-100%
- Increase biological life and Cation Exchange Capacity
- Increase predator activity on pests such as thrip
- Decrease root disease
- Sustained action
- Investment often returned in the 1st year
- Keeps your feet warm on cold mornings and clears the nostrils

Application on trees and vines

Spread just before planting of annual crops and every couple of years for trees and vines (we spread 15 tonne/hectare every 2 years as well as growing carbon in the inter-row)

Fine compost - 2 cubic metres = approx 1 tonne

- If to be incorporated in soil - max 30 tonne per hectare broad-acre
- Up to 100 tonne/ha on rip lines pre planting of trees and vines
- If to be used as mulch 10-20mm thick, say 40-80 tonne/hectare equivalent biennially.

Coarse composted mulch - screened through 25mm screen

- If to be used 20-50mm thick - approx 30-80 tonne/hectare

On Vegetable areas we apply 15mm of fine compost twice per year (about 150 tonne/ha annually). This grows 3 crops