

Managing Sodic Soils for Profit



- the Good Dirt Story

Dugald & Rachel Buchanan



Background

- Family farm
 - Lethbridge & Meredith, approx 2000ac owned and leased.
 - Prime Lamb enterprise – white dorper-suffolk composites
 - No cash crops
 - Drivers are GRASS GRASS GRASS and more grass
 - Pastures comprise
 - 1500ac native pastures (1500-2000kg DM/ha)
 - 500ac arable /improved pasture ((8-9000kg DM/ha)

The Problem – in the paddock

- Performance – productivity
 - Pasture/crop
 - livestock
- Cultivation issues = Sunday soils
- Large cracks = stock losses
- Stressed plants = root depth



The Problem – in the soil

- Poor soil structure
- Wet and sticky in winter
- Dry and hard as concrete in summer
- Why?
- Soil test results
 - pH = 5.0 (water) = acidic
 - Olsen P = 10 to 15
 - Calcium = 30%
 - Magnesium = 20 %
 - Potassium = 2 %
 - Sodium = 7 to 8 %
 - CEC = high
 - Organic matter = low to medium



What are sodic soils

- What are sodic soils
 - Sodium in excess of 6%
 - What does this do?
 - Poor calcium:magnesium ratio
 - What is a poor ratio and why is it a problem?
 - Low levels of organic matter & carbon
 - What is important about OM & C
 - Function of Microbiology

What did we try?

- Cultivation – deep ripping, one-way ploughs
- Zero tillage...
 - No real positive gain
 - Chemical resistant ryegrass
- Were using standard DAP/MAP/Triple P as part of the sowing/fert program
- Raw manures (Broiler litter)
- Lime (1t/ac)
- Compost
- Compost with gypsum blended in
- DID IT WORK?

Zero tillage sowing





What worked – soil

- Compost with Gypsum
- Reduce use then try and stop use of chemicals
- No insecticides
- Reduce traffic and cultivation
- Do things that promote soil microbes
- Rotational grazing
- Build Carbon



Why did it work?

- Build humus in soil
- Increase organic matter
- Soluble calcium from gypsum
- Support microbiology
- Improve soil structure
- More oxygen in soil
- Deeper root systems

Example of Sodid Soil

AGRICULTURAL & TURF - SOIL EVALUATION SERVICE

KEYCROBE

Sample No: 1231

Ref: S2677

Sampled At: Meredith Block

Date Sampled: 11/03/03

Crop: Grain/Sheep/Hay

Soil Type: Clay Loam

Hectares: 35

Soil Analysis By

AGLAB SERVICES PTY LTD

	Nutrient		Laboratory Analysis Data		Evaluation		
					Units	Results	Desirable
Soluble Tests Reams Bray P ₁	Calcium	Ca	ppm	183	Kg/Ha	365	686
	Magnesium	Mg	ppm	68	Kg/Ha	137	94
	Phosphorus	P	ppm	7.4	Kg/Ha	15	43
	Potassium	K	ppm	29	Kg/Ha	58	137
Calcium/Magnesium Ratio					Ratio	2.7:1	7:1
Ammonium Acetate & Bray P ₂	Calcium	Ca	cmol ⁺ /kg	1.98	Kg/Ha	792	1838
	Magnesium	Mg	cmol ⁺ /kg	1.34	Kg/Ha	322	263
	Phosphorus	P	ppm	22.3	Kg/Ha	45	86
	Potassium	K	cmol ⁺ /kg	0.17	Kg/Ha	133	275
	Sodium	Na	cmol ⁺ /kg	0.48	ppm	110	46
Water Soluble Tests	Nitrate	N	ppm	18	Kg/Ha	36	20
	Sulphate	S	ppm	12.8	Kg/Ha	26	32
	pH (Water)		units	5.26		5.3	6.3
	PH (CaCl ₂)		units	4.26		4.3	
	Conductivity	Ergs	µS/cm	102	µS	102	118
	Organic Matter		%	4.29	%	4.3	3.4
	Aluminium		ppm	12	ppm	12	
CEC	Cation Exchange Capacity		cmol ⁺ /kg	6.73		6.7	6.7
Percent Base Saturation	Potassium	K	%	2.53	%	2.5	5.2
	Calcium	Ca	%	29.44	%	29.4	68.3
	Magnesium	Mg	%	19.92	%	19.9	16.3
	Hydrogen	H	%	40.98	%	41.0	7.2
	Sodium	Na	%	7.14	%	7.1	3.0
Micronutrients	Zinc	Zn	ppm	0.32	ppm	0.3	3.9
	Manganese	Mn	ppm	4.00	ppm	4.0	18
	Iron	Fe	ppm	87.96	ppm	88.0	18
	Copper	Cu	ppm	0.34	ppm	0.3	1.6
	Boron	B	ppm	0.33	ppm	0.3	1.4
	Cobalt	Co	ppm	0.37	ppm	0.4	1.0
	Molybdenum	Mo	ppm	0.26	ppm	0.3	1.0
	Selenium	Se	ppm	<0.01	ppm	<0.01	0.1

10/04/03

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K1231-D Buchanan-I Hanger-CCS 03Apr03

10/04/03
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K1231-D BUCHANAN-I HAWKES-CCB 03AP03

A photograph of a sheep in a field. The sheep is in the foreground, looking towards the camera. It has a white face and a thick, brownish-grey woolly body. The background is a blurred green field with other sheep visible in the distance.

Bottom line

- Reduce fertiliser input costs
- Reduce reliance on chemicals
- Less plant pests and diseases
- Increase total dry matter production
- Run more stock for longer
- Able to finish lambs
- Less costs more money

GDC Supply Bokashi Fertiliser



GDC

- Biologically active compost



Fodder = weight gain



COMPOST 'TOTALS' ANALYSIS REPORT

2 samples supplied by The Good Dirt Company on 12th July, 2013 - Lab Job No. C7471.

Analysis requested by Dugald Buchanan.

				Sample 1	Sample 2
Block ID:				Bokashi Sample 1	Bokashi Sample 2
Crop:				N/G	N/G
Client:				The Good Dirt Company	The Good Dirt Company
	Nutrient	Units		C7471/1	C7471/2
Macronutrients	Nitrogen	N	%	3.37	4.06
	Phosphorus	P	%	1.75	1.55
	Potassium	K	%	2.20	2.00
	Sulphur	S	%	0.64	0.55
	Carbon	C	%	24.7	26.4
	Calcium	Ca	%	8.76	8.68
	Magnesium	Mg	%	0.74	0.66
	Sodium	Na	%	0.30	0.29
Micronutrients	Copper	Cu	mg/kg	84	64
	Zinc	Zn	mg/kg	420	354
	Manganese	Mn	mg/kg	603	522
	Iron	Fe	mg/kg	10,280	14,704
	Boron	B	mg/kg	30	25
	Molybdenum	Mo	mg/kg	6.8	6.4
	Cobalt	Co	mg/kg	5	4
	Silicon	Si	mg/kg	3,558	2,961
Calculations	Nitrogen : Sulphur Ratio	units		5.3	7.3
	Nitrogen : Phosphorus Ratio	units		1.9	2.6
	Nitrogen : Potassium Ratio	units		1.5	2.0
	Carbon : Nitrogen Ratio	units		7.3	6.5
	Crude Protein ^{see note 5}	%		21.1	25.4
	pH (1:5 water)	na		7.2	7.0
	Electrical Conductivity (1:5 water)	dS/m		11.2	11.4
	Moisture ^{see note 6}	%		30.2	36.5

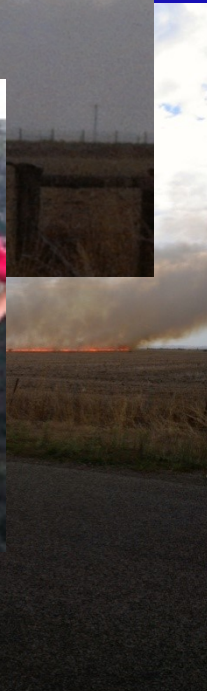
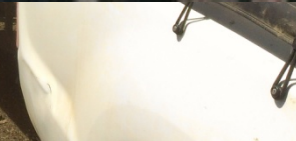
Notes:

GDC supply custom blends



Drought, fire and sodic soil....

- Sometimes farming sux!



Farming can...

- make you smile too!

