

Meningie East - Field Healthy Soils Farm Walk

Thursday 4th March 2021

10.30am - 3.00pm

Light lunch provided



REGISTRATIONS for catering;
tstrugnell@coorong.sa.gov.au or
text on 0427 750 050
Register by Friday 26th of Feb

PROGRAM

10.30am Midway – 1923 Cold & Wet Road

- ◇ Morning tea and catch up
- ◇ Soil Carbon and your soil carbon soil test results
What does this mean in our landscape?
- ◇ Soil test interpretation discussion

12.30 - 1pm LUNCH PROVIDED

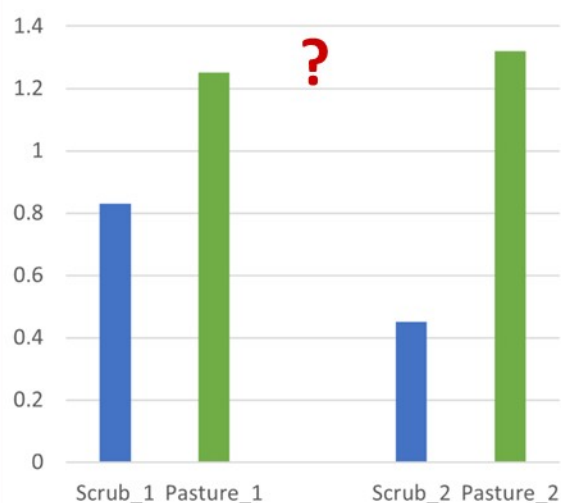
1.30pm NEW 4 YEAR PROJECT

- ◇ MLA Improved Grazing Production on Non Wetting Sands
- ◇ *What soil amendments do you want to try out?*

SPEAKERS

Amanda Schapel & Mel Fraser - Senior Soils Consultants—PIRSA Rural Solutions

Organic Carbon



Bednar Terraland Ripper soil level view - Ouyen 2019



Australian Government

National
Landcare
Program



LANDSCAPE
SOUTH AUSTRALIA



This project is supported by the Limestone Coast Landscape Board, through funding from the Australian Government's National Landcare Program

Meningie East – Field Healthy Soils Update

Thursday 4th of March *including lunch*

Nigel & Jo Williams – Midway - 3216 Yarindale Road

Handout page n#

10.30am Morning Tea and catch up

11.00am Soil Carbon & your
soil carbon results

Amanda Schapel – PIRSA

Senior Soils Consultant – carbon focus

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What does this mean in our landscape?

Out into the paddock

12.30 – 1pm **LUNCH PROVIDED**

1.30pm NEW 4 YEAR PROJECT

MLA - Improved Grazing Production
on Non Wetting Sands

Mel Fraser

PIRSA Rural Solutions

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What soil amendments do this group want to try out? *Out into the paddock*

3pm FINISH



Soil Carbon in SA Agricultural Soils

Meningie East – Field Healthy Soils Farm walk

Role of carbon in the soil

Physical	Chemical	Biological
better structural stability (aggregation) lower bulk density rapid infiltration of water better drainage better root growth less erosion improved water holding capacity	improved cation exchange source of nutrients continual release of nutrients sorption and deactivation of contaminants	increased biological activity increased diversity improved suppression of soil borne pathogens

Soil Carbon Tests

Carbon type	Method	Measures	Pros / Cons
Total C	High temperature combustion (Leco or Dumas)	Organic and inorganic C	In soils with carbonate can be difficult to measure change in organic C
Organic C	Wet oxidation (Walkley Black method)	Organic C	Incomplete test – measures only 55-80% of total OC
Inorganic C	Calcium carbonate equivalent	Inorganic C	Can be an inexact test.
Total Organic C	Wet oxidation (Heanes method)	Organic C	Complete test
Total Organic C	Pretreatment then High temperature combustion (Leco or Dumas)	Organic C	Need to ensure that have complete removal of inorganic C before combustion or results will be incorrect

Amanda Schapel

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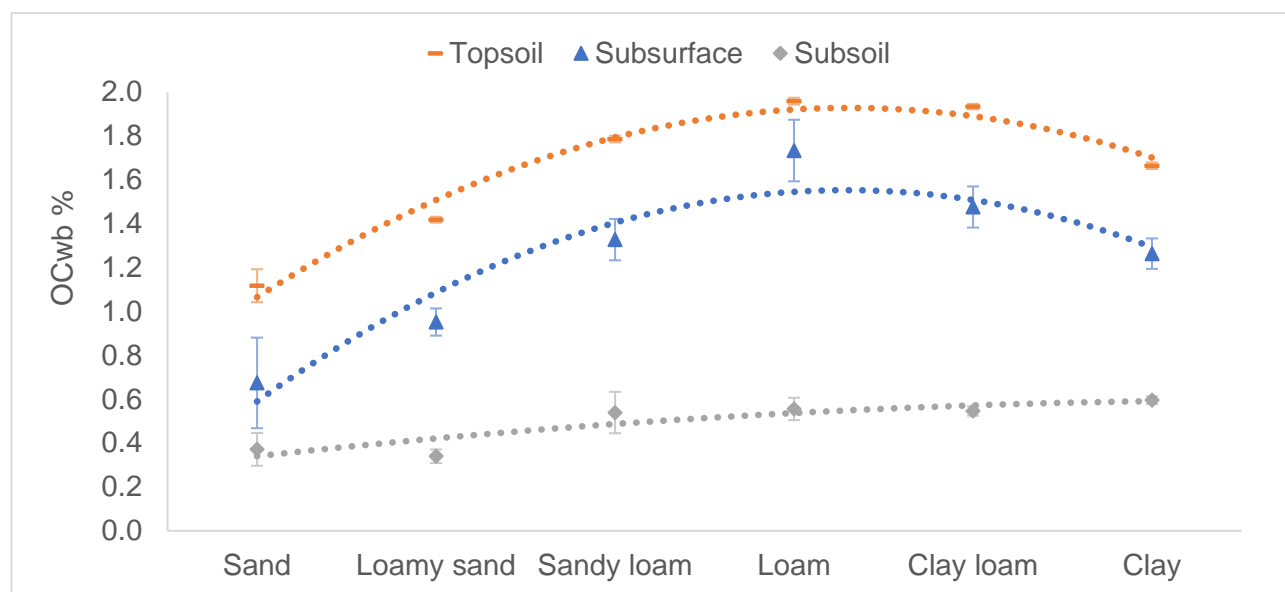
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Government of South Australia

Department of Primary Industries
and Regions

Average Organic Carbon Concentration of South Australia Agricultural Zone



Soil Organic Carbon Benchmarks for the Upper South East Agricultural District

Extracted from 'Soil Carbon in South Australia: Volume 3 – Benchmarks and Data analysis for the Agricultural Zone 1990-2007'. Schapel A, Herrmann T, Sweeney S and Liddicoat C (2021).

Benchmark topsoil OC (%) values for texture and land use displaying the mean and percentile values for the Upper South East compared to the mean for the Agricultural Zone.

	Ag Zone	Ag District Benchmarks						
Texture	Mean	Count	Mean	25%	40%	50%	60%	75%
Sand	1.12	23	1.08	0.90	1.05	1.12	1.19	1.31
Loamy sand	1.42	933	1.21	0.85	1.01	1.10	1.24	1.51
Sandy loam	1.79	636	1.43	0.96	1.20	1.35	1.50	1.80
Loam	1.96	437	1.66	1.20	1.40	1.50	1.70	1.97
Clay loam	1.93	308	1.81	1.40	1.59	1.74	1.87	2.13
Clay	1.66	288	1.63	1.00	1.26	1.40	1.60	1.92
Weighted Mean (all texture)	1.77	2625	1.45	1.02	1.22	1.33	1.49	1.77

Benchmark OC Concentration						District Prop (%)
Land use	Count	Mean	25%	50%	75%	
Orchard / Vineyard	235	0.98	0.58	0.87	1.30	12
Cropping	1084	1.50	1.06	1.43	1.86	54
Irrigated Pasture	20	1.54	1.10	1.41	1.86	1
Pasture	620	1.55	1.00	1.36	1.91	31
Vegetable	37	1.67	1.10	1.51	2.24	2

Meat and Livestock Australia - Improving Grazing production on Non-Wetting Sands



Project Title Improved Grazing Production on Non-Wetting Sands

Proposed start date 1st November 2020

Proposed end date 15th June 2026

Project Delivery PIRSA Rural Solutions

Project Background

Sandy dune soils are a common landscape feature in southern South Australia, Victoria and Western Australia. Traits in these sandy soils include low plant available water holding capacity, low organic matter, low nutrient availability, compaction, non-wetting and high risk for wind erosion.

Over the last five years GRDC has demonstrated improved crop biomass at research sites in South Australia by adding clay (spading) or deep ripping and pasture inversion for integration of organic matter and fertilisers to soil profiles. In 2018 Grassgro modelling for Keith-Meningie SA found combined deep ripping with surface applied nutrition (fertiliser, manure or organic matter or chicken litter) delivered increasing organic matter and increased root depth of pastures. Changing soil structure produced an increase in feed production of 1.88T/ha/year (from 3.52T/ha DM/year to 5.4T/ha DM/year) and increase in carrying capacity of 1.8 DSE/ha.

The findings will seek to confirm productivity can be substantially improved on infertile sandy soils when subsoil chemical, physical and biological constraints are treated. This project will test plant growth response, dry matter production, and feed nutrition values using a range of practices and treatments. Results will demonstrate the effectiveness of amelioration techniques in a local context and assess economic return within grazing systems.

Outcomes, Deliverables and Activities

1. Utilise new technologies and techniques being demonstrated to improve productivity in cropping systems on sandy soils and will test them in grazing systems to provide increased feed & livestock production.
2. At Coomandook, Field and Western Flat demonstrate methods of improving the grazing systems feed base to extend the growing season, increase pasture utilisation, optimise fertiliser use, and reduce the overall cost of production per hectare by producing more feed, converting to increased feed, increase carrying capacity & livestock production.
3. Increase producer understanding of opportunities to increase feedbase and red meat production by introducing, and testing the production response and cost effectiveness of the following treatments on sites across the project area.
4. Three demonstration sites will be established with core producers, with a site specific selection of three to five treatments.

EVIDENCE OF PRODUCTION INCREASES

From 2018 Grassgro Modelling for

Keith – Meningie SA in an average rainfall year (Decile 5)

Under a lucerne grass pasture – grasses unimproved grasses eg. barley, brome and silver grass

Sandy soil with low Plant Available Water (38mm)	SOIL AMENDMENT Increasing organic matter and / or breaking hard pan to increase root depth	Increased Plant Available Water / 'bucket size' to 55mm	RESULT: Increase in feed production of 1.88T/ha/year Increase in carrying capacity of 1.8 DSE/ha
Produced approx 3.52T/ha DM/year		Increased production to 5.4T/ha DM/year	

Assumptions: 70% efficiency in amount consumed = 1316 kg DM/ha/year extra that stock can eat (=3.6kg/day extra). A dry sheep (eg. 65kg) – can eat 3% of its bodyweight = 1.9Kg/day.

Source: Felicity Turner

From 2014 – 2018 GRDC Sandy Soils Project

GRDC Cadee SA

Under Crop

Unmodified Sandy Soil	SOIL AMENDMENTS Clay Spreading Clay spreading & spading Spaded clay & <u>lucerne</u>	6.4 tonne of grain/ha	RESULT: Transferring these techniques to livestock feed production will produce similarly impressive results
Produced 4.77 tonne of grain/hectare		7.29 tonne of grain/ha	
		9.3 tonne of grain/ha	

Source: Melissa Fraser – Rural Solutions SA, GRDC Sandy Soils Project

See attachment: Clay and hay increases yield on SE Sands

Eckert's clay spread and ripped cropping site 2018

Malinong SA

Under crop, side by side harvesting comparison

Clay Spread Sandy Soil	SOIL AMENDMENTS Deep Ripping to break hard pan and increase rooting depth	Produced 3.5 tonne of grain/hectare	RESULT: Transferring these techniques to livestock feed production will produce similarly impressive results
Produced 1.2 tonne of grain/hectare			

Source: Tim Eckert 2019

