



Sulphur management trial – 3 year rotation

Aim:

To establish sound practices of managing sulphur over a medium term time frame (3 years) in both sand dune and clay loam swale environments

Background:

In the past decade in the NSS region, various crops have suffered from sulphur deficiency due to off take being more than input. With Sulphate of Ammonia (SoA) and gypsum being readily available sources of sulphur, this trial aims to establish product, rates and timings suitable to achieving the most economic return for managing sulphur deficiency.

Details:

Location:	Bute, Northern Yorke Peninsula, SA.
Researcher:	Leighton Wilksch.
Co-operators:	SAGIT, NSS, Garrett Bettess
Planting Date:	7 th May
Application date:	All sulphur products applied pre-planting on 6 th May
GSR:	190mm.
Soil:	Red brown sandy clay loam in swale and red sand on dune with low soil moisture at planting
Trial Details:	Sown with Conserva Pac tynes on 260mm spacings. Herald XT Lentils planted @ 40kg/ha with MAP @ 90kg/ha. Triflur + Avadex + Terbyne @ 1.0 + 1.6 + 0.3kg/ha applied pre-plant. Terbyne + Chlorypyriphos @ 0.1kg + 0.4L/ha applied PSPE. ZMC + Pyrinex Super + Clethodim @ 0.8 + 0.4 + 0.8L/ha applied 24 th June. UAN top-up/balance treatments applied 24 th June. Clay loam replicated 4 times, sand dune replicated 3 times. Harvested plot size, 11 x 1.5m
Assessments:	Early vigour – no significant difference. NDVI, 3 rd Sept, - no significant difference. Yield – see below table



Photo 1. NSS trial tour of site, early September 2015.



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Results:

Table 1. Summary of clay loam lentil yield assessments

Trt. No.	Treatment	Rate kg/ha	2015	2016	2017	Yield T/ha	Yield % of UTD
3	gypsum	3000	√			1.15 a	117
9	SoA	150	√			1.08 ab	110
10	SoA	75	√	√		1.06 ab	107
8	SoA	100	√	√	√	1.05 ab	107
5	SoA	300	√			1.05 ab	106
4	gypsum	1000	√	√	√	1.05 ab	106
6	SoA	150	√	√		1.04 b	105
7	SoA	150	√		√	1.03 b	104
2	gypsum	1000	√			1.03 b	104
11	SoA	75	√		√	1.02 b	104
12	SoA	50	√	√	√	1.02 b	103
1	nil					0.98 b	100
Co-efficient of Variation						9.8%	
LSD 5%						0.11	

- Means followed by the same letter do not significantly differ

Table 2. Summary of sand dune lentil yield assessments

Trt. No.	Treatment	Rate kg/ha	2015	2016	2017	Yield T/ha	Yield % of UTD
9	SoA	150	√			0.94 a	109
11	SoA	75	√		√	0.93 a	108
8	SoA	100	√	√	√	0.91 a	106
5	SoA	300	√			0.90 a	104
6	SoA	150	√	√		0.89 a	103
2	gypsum	1000	√			0.88 a	102
7	SoA	150	√		√	0.87 a	101
1	nil					0.86 a	100
10	SoA	75	√	√		0.86 a	100
3	gypsum	3000	√			0.85 a	99
4	gypsum	1000	√	√	√	0.83 a	96
12	SoA	50	√	√	√	0.83 a	96
Co-efficient of Variation						12.6%	
LSD 5%						0.19	

- Means followed by the same letter do not significantly differ

Discussion:

- Establishment was good, however, due to below average winter rainfall, the soil at no stage reached drained upper limit and it is unlikely that there would have been much leaching of sulphur.
- Lentils in 2015 in the region suffered extensively from warm & dry spring conditions. That being said, at the trial site, plot yields were slightly above district average; in the sand dune were 0.88 T/ha and in the clay loam swale were 1.05 T/ha, primarily due to early planting (7th May) and low planting rate (40kg/ha)



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- Variability in the sand dune plots was high (CV 12.6%) with mice damage & wild radish playing a part and thus yield responses should be viewed with caution.
- Generally speaking, sulphur treatments responded positively over the nil (untreated) with the response being less in the sand dune (no significant response) compared to the clay loam.
- Communication with experts (Nigel Wilhelm, Mike McLaughlin,) suggest that in a season with such a harsh finish, it is not surprising to see minimal nutrition response with limited soil moisture affecting root growth (low), leaching potential (low), soluble nutrition availability (low), plant requirement for nutrition for biomass & grain fill (below average)
- In the clay loam, generally speaking, the higher the gypsum rate/SOA rate, the better the response. The application of gypsum @ 3T/ha gave the only significant response above the nil (17% yield increase)
- At \$15/t + \$15/ha spreading cost, 3T/ha of gypsum costs ~\$60/ha which resulted in a 0.17T/ha yield increase in the lentils over the nil treatment. Even with the lentils @ \$1000/tonne, that equates to a \$110/ha return in year one.
- Residual benefits of gypsum @ 3T/ha expected to last a few years at least.
- Soil tests to be taken under specific plots in Feb, will indicate levels of residual sulphur (to be reported at AGM).
- 2016 rotation will be wheat.



Photo 2 shows harvesting of the plots.