



1984

Sulphur nutrition of pastures. Potassium nutrition of high rainfall pastures on deep sands

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DEPARTMENT OF AGRICULTURE
WESTERN AUSTRALIA

Summary of Field Experiments 1984

Sulphur Nutrition of Pastures
Potassium Nutrition of High Rainfall Pastures on Deep Sands

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Note on sulphur sources

- NCS : New coastal superphosphate (30%S, 3% sulphate) all elemental sulphur < 0.5 mm.
- AS3 : As for NCS.
- CKS : Crop King elemental sulphur (mixed particle size).
- LBCG : Coarse (mixed gypsum) 17%S.
- SF45 : Sulphur fortified superphosphate 45%S.
- ES : Elemental sulphur (< 0.15 mm).
- GYP : Fine gypsum 17%S (< 2 mm).
- SF25 : Sulphur fortified superphosphate 27%S.

Title: Sources, rates, time of application of sulphur to legume pastures.

Aims: To generate response curves for sulphur sources on legume pastures.

To assess the residual value of the sulphur sources in the second and subsequent years after application relative to currently applied superphosphate.

Trials and Site Characteristics:

Trial (4054EX)	Location	Soil
80AL1	Turner, Narrikup	0-10 cm grey sand 10-80 cm white sand 90 cm coffee rock
80AL4 80AL4B	Anderson, Cuthbert	0-10 cm grey sand 10 > 80 cm white sand

Basals: Nil basals for 80AL1 and 80AL4. 300kg /ha Aerophos and 100kg /ha KCl (split application) applied to 80AL4B.

Management: Flash grazing with sheep (all trials).

80AL1

RESULTS D.M. yield (kg /ha) 15/10/84 Mean of 3 reps. 60% clover

S rate (kg /ha)	Superphosphate applied					NCS 3/84	AS3 3/83	CKS 3/81	LBCG 5/80	SF25 5/80	SF45 5/80	ES 5/80
	5/80	3/81	2/82	3/83	3/84							
0	1770											
5	-	1780	1720	1460	1700	1590	1450	1470	-	1660	1620	1230
10	1830	1680	1470	1560	1880	1690	1650	1520	1460	2120	1440	1540
20	1580	1530	1550	1310	1740	1600	1560	1850	1500	1560	1550	1700
40	1770	1390	1420	1510	1620	1880	1190	1740	1670	1580	1480	1470
80	1750	1580	1560	1720	1530	1580	1490	1530	1840	1640	1630	1680

SUMMARY: Variable, no response to S.

1985: Trial to be terminated.

80AL4

RESULTS D.M. yield (kg /ha) 15/8/84 Mean of 3 reps. 90% clover

S rate (kg /ha)	Superphosphate applied					NCS 3/84	GYP 3/84	AS3 3/83	SF25 5/80	SF45 5/80	ES 5/80
	5/80	3/81	2/82	3/83	3/84						
0	1570										
5	-	-	1650	1790	1860	1640	1680	1700	-	-	-
10	-	-	1660	1550	1740	1790	1620	1640	1550	-	-
20	-	-	1850	1590	2000	1960	1730	1840	1550	1510	-
40	-	1770	1720	1960	2070	1850	1940	2100	1840	1690	-
80	-	1660	2030	2030	2170	2080	2140	1750	1930	1660	1790

D.M. yield (kg /ha) 18/10/84

Mean of 3 reps.

90% clover

S rate (kg /ha)	Superphosphate applied					NCS 3/84	GYP 3/84	AS3 3/83	SF25 5/80	SF45 5/80	ES 5/80
	5/80	3/81	2/82	3/83	3/84						
0	950										
5	-	-	900	1290	860	1010	840	1060	-	-	-
10	-	-	610	810	740	900	1130	680	-	-	-
20	-	-	860	800	1220	920	860	960	920	820	-
40	-	910	850	1010	1250	820	700	1120	970	760	-
80	-	600	980	1830	820	860	1170	1290	1080	1020	1200

SUMMARY: Variable, only small S response in 1984.

1985: Trial to be continued.

80AL4B

D.M. yield (kg /ha) 15/8/84

Mean of 3 reps.

90% clover

RESULTS

S rate (kg /ha)	Super applied	ES					GYP					
		3/83	3/84	< 0.15	0.15-	0.25-	0.50-	2-5	< 2	2-4	4-6	6-10
10-20				0.25	0.50	2.0						
0	1140											
5	1300	1350	1320	1270	1200	1120	1050	1330	1030	1340	1440	1100
10	1170	1380	1300	1480	1360	1210	1050	1160	1380	1160	1440	1350
20	1460	1570	1250	1310	1320	1280	1170	1270	1320	1490	1290	1250
40	1440	1460	1360	1450	1420	1120	1250	1320	1310	1340	1420	1300
80	1880	1470	1430	1350	1360	1530	1230	1470	1500	1430	1430	1570

S rate (kg /ha)	Super applied	ES	ES	ES	ES	ES	GYP	GYP	GYP	GYP	GYP	
												Particle size range (mm)
10-20	3/83 3/84	< 0.15	0.15-	0.25-	0.50-	2-5	< 2	2-4	4-6	6-10		
			0.25	0.50	2.0							
0	500											
5	490	530	700	680	560	510	560	760	500	860	720	480
10	700	740	680	670	600	780	570	990	760	550	760	700
20	760	880	650	840	470	530	660	630	820	760	680	560
40	750	620	700	730	730	510	560	560	870	970	790	850
80	920	850	640	690	990	650	700	740	880	820	750	890

SUMMARY: Variable, S responsive. Comparison of sources will be aided by S uptake data.

1985: Trial to be continued.

Title: Sulphur nutrition of pastures.

Aims: To compare superphosphate and AS3 (= new coastal super) as sources of sulphur in the year of application and one year after application.

Trials and Site Characteristics:

Trial (4054EX)	Location	Soil
83PE36	Dawe, Nth Dandalup	0-10 cm grey sand 10-50 cm sandy clay > 50cm mottled clay (Coolup sand)

Basals: 200kg /ha Aerophos and 200kg /ha KCl (split application)

Management: Mowing and removal.

S rate (kg /ha)	1983			
	Superphosphate		AS3	
	super +	1984 -	super +	1984 -
0	2450	2140		
5	2350	2100	2660	2110
10	2430	2040	2530	2290
20	2390	2160	2320	2170
40	2880	2200	2590	2470
80	2600	2230	2490	2430

+ = 1000kg /ha superphosphate 1984

SUMMARY: New coastal super had better residual value than super in the year after application. Interpretation will be needed by Suplike data.

1985: Trial to be terminated.

Title: S sources and rates on sandy soils of the high rainfall areas.

Aims: To determine the shape of the response curve to currently applied S for 5 consecutive years (2 S sources).

To compare superphosphate and new coastal super as S sources (current and residual value) for 6 years.

To determine a residual value function for each source.

Trials and Site Characteristics:

Trial (4054EX)	Location	Soil
84HA20	White, West Harvey	0-80 cm grey sand (new land)
84HA27	Alcoa, Pinjarra	0-10 cm grey sand 10-50 cm sandy clay > 50 cm clay (old land)

Basals: 300 kg/ha Aerophos, 200kg /ha KCl, 200kg /ha gypsum (split application) plus Cu, Zn, Mo and 1000kg /ha C500/GRP for all trials.

Management: Mowing and leaving clippings.

Results:

84HA20

No S response. Plant sampled. S uptake data not available.

1985: Trial to be continued.

84HA27

No S response. Plant sampled. S uptake data not available.

1985: Trial to be continued.

Title: Maintenance of S on pastures on sandy soil.

Aims: To determine maintenance (annual, fixed) rates of sulphate and elemental S (as new coastal super) applications to maintain various levels of pasture growth over a number of seasons (i.e. maintenance rate response curve).

To determine long term S leaching losses associated with various S sources and rates.

Trials and Site Characteristics:

Trial (4054EX)	Location	Soil
84AL35 New land	Denmark Agricultural	0-10 cm grey sand
	High School	10 > 80 cm white sand
84HA19 New land	White, West Harvey	0-80 cm grey sand
84HA26 Very old land	Alcoa, Pinjarra	0-10 cm grey sand) Coolup 10-15 cm sandy clay) sand > 50 cm clay)

Basals: 300 kg/ha Aerophos, 200kg /ha KCl, 200kg /ha gypsum (split application) plus Cu, Zn, Mo and 1000kg /ha C500/GRP for all trials.

Management: Mowing and leaving clippings.

Results:

84AL35

No S response. Plant sampled. S uptake data not available.

1985: Trial to be continued.

84HA19

No S response. Plant sampled. S uptake data not available.

1985: Trial to be continued.

84HA26

No S response (site supered in early 1984). Plant sampled. S uptake data not available.

1985: Trial to be continued.

Title: Rates of application of sulphur as superphosphate to pastures - low rainfall areas.

Aims: To generate response curves on pasture for currently applied and residual sulphur.

To generate data for use in predicting sulphur responsive situations in low rainfall areas.

Trials and Site Characteristics:

Trial (4054EX)	Location	Soil
82AL9	Miles, Sth Stirlings	0-60 cm grey/white sand > 60 cm gravelly clay
82KA4	Eckersley, Woodanilling	0-50 cm grey/white sand 50 cm gravelly clay

Basals: 300kg/ha Aerophos and 200kg/ha KCl.

Management: Mowing and removal/grazing with sheep.

82AL9

RESULTS D.M. yield (kg /ha) 23/8/84. Mean of 4 reps.
30% Clover

S rate (kg /ha)	Superphosphate applied		
	3/82	3/83	3/84
0	1180		
5	1090	1120	1150
10	1030	1220	1140
20	1060	1330	1110
40	1220	1120	1030
80	1170	1190	970

SUMMARY: No S response, poor pasture.

1985: Trial to be continued.

82KA4

1984: Trial not assessed.

1985: Trial to be continued.

Title: Sources, rates, time of application of potassium fertilizers to legume pastures on sandy soils of the high rainfall areas.

Aims: To generate response curves for two potassium sources on pasture residual sulphur.

To assess the residual value of the K sources in the second and third year after application, relative to currently applied KCl.

Trials and Site Characteristics:

Trial (4054EX)	Location	Soil
80AL6	Anderson, Cuthbert	0-10 cm grey sand 10 > 80 cm white sand

Basals: 100kg /ha super (split application)

Management: Flash grazing with sheep.

80AL6

RESULTS	D.M. yield (kg /ha) 15/8/84.				Mean of 3 reps.			
	70% Clover							
K rate (kg /ha)	KCl applied				SKCl			
	5/80	7/80	9/80	3/81	3/82	3/83	3/84	5/80
0	2120							
25	-	-	2040	2290	2200	-	2260	-
50	-	2220	2140	2040	2110	2320	2230	2000
100	2090	1940	1950	1960	2220	2320	2170	2130
200	2200	2260	-	2200	2450	2630	2340	2470

RESULTS	D.M. yield (kg /ha) 18/10/84.				Mean of 3 reps. 70% Clover			
	70% Clover							
K rate (kg /ha)	KCl applied				SKCl			
	5/80	7/80	9/80	3/81	3/82	3/83	3/84	5/80
0	1720							
25	-	-	1770	1710	1540	-	1710	-
50	-	1540	18d70	1760	1930	1660	1890	1630
100	1910	1850	1410	1550	1560	1610	1610	1650
200	1810	1790	-	1650	1540	1560	1770	1650

SUMMARY: No response to K.

1985: Trial to be terminated.