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# 1975 Phosphorus and sulphur sources trials

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DEPARTMENT OF AGRICULTURE

WESTERN AUSTRALIA

SUMMARY 1975 SEASONAL RESULTS  
PHOSPHORUS AND SULPHUR SOURCES TRIALS

by M.D.A. BOLLAND  
PLANT RESEARCH DIVISION

1. SULPHUR SOURCES TRIALS

(a) Newdegate Gypsum Trials:

Yarloop	75YA3/2684EX
Bridgetown	75BR10/2684EX
Busselton	75BU6/2684EX
Alexandria Bridge	75BU7/2684EX

(b) Gyplap - FeSO<sub>4</sub> Trial:

McAlinden	75BY4/3178EX
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2. PHOSPHORUS SOURCE TRIALS

E. Chittering	75NO7A/3340EX
E. Chittering	75NO7B/3340EX

## 1. SULPHUR SOURCES TRIALS

### (a) NEWDEGATE GYPSUM TRIALS

- INTRODUCTION:** A large deposit of gypsum near Newdegate could provide an alternative sulphur source to superphosphate and Wyalkatchem gypsum, the most common sulphur fertilizers used in the State at present. At the request of the Western Australian Farmers' Union, the Department conducted simple trials to assess Newdegate gypsum as a source of sulphur to pasture by comparing the short term S supply of Newdegate gypsum to Wyalkatchem gypsum and superphosphate.
- TITLE:** Newdegate Gypsum Trial, 75YA3/2684RX  
(D.P. Eckersley, Yarloop)
- AIM:** To compare the short term S supply to pasture of Newdegate gypsum, Wyalkatchem gypsum and superphosphate.
- SOIL TYPE:** Deep Sand
- SITE HISTORY:** New land, cleared for 2 years. 360 kg super/ha in 1973 and 180 kg super/ha in 1974.
- RESULTS:** 40 kg/ha of Dinninup subclover was spread ontop of the surface of the established pasture at the commencement of the trial to ensure adequate pasture growth. 24 kg/ha of Aeroplos was added to the site to ensure adequate P. However, by springtime the clover had disappeared completely from the trial site, leaving only flatweed. Obviously the clover to the trial site should have been innoculated and lime coated. The trial was finally abandoned.
- TITLE:** Newdegate Gypsum Trial, 75BR10/2684EX  
(R. Beard, Bridgetown)
- AIM:** To compare the short term S supply to pasture from Newdegate gypsum, Wyalkatchem gypsum and superphosphate.
- SOIL TYPE:** Deep Sand (up to 120 cm) with humus in the top 15 cm.
- SITE HISTORY:** Old land, large super history.
- RESULTS:** There was no response to any of the treatments indicating the soil had adequate sulphur and it was therefore impossible to make any comparison between the sources.

TITLE : NEWDEGATE GYPSUM TRIAL. 75BU6/2638EX (B.J. OATES, BUSSELTON)

AIM : To compare short term S supply pasture from Newdegate gypsum, Wyalkatchem gypsum and superphosphate.

SOIL TYPE : Busselton sand, clay at 91 cm.

SITE HISTORY : Old land, 40 years superphosphate history.

RESULTS : Assessed October 1975.

Treatment Number	Source	kg S/ha	kg P/ha	Time of Application	Dry Weight Yield (kg/ha)
1	Nil	Nil	Nil	-	3349 (1 Rep)
2	Newdegate Gypsum	4	Nil	Spring	4391 (2 Repts)
3	"	8	Nil	"	4033 (2 Repts)
4	"	16	Nil	"	3796 (1 Rep)
5	"	32	Nil	"	3862 (2 Repts)
6	"	8	Nil	Autumn	3460 (3 Repts)
7	Wyalkatchem Gypsum	8	Nil	Spring	4209 (1 Rep)
8	Superphosphate	8	6.7	"	3548 (2 Repts)
9	Aerophos	Nil	6.7	"	3360 (3 Repts)

10 plots were waterlogged, and the yields from these plots were not included in calculating the mean dry weights shown in the table. The number of reps used to calculate the mean yields is shown in brackets after the results.

The site was only marginally responsive and very little can be concluded from the results.

TITLE : NEWDEGATE GYPSUM TRIAL. 75BU7/2638EX (J.R. Bell,  
Alexandria Bridge)

AIM : To compare the short term S supply to pasture of  
Newdegate gypsum, Wyalkatchem gypsum and superphosphate.

SOIL TYPE : Deep grey sand.

SITE HISTORY : Old land. Cleared for 10 years with large past  
dressings of superphosphate.

RESULTS : Assessed October 1975

Treatment Number	Source	kg S/ha	kg P/ha	Time of Application	Dry Weight Yields (kg/ha)
1	Nil	Nil	Nil	-	4472
2	Newdegate Gypsum	4	Nil	Spring	5686
3	"	8	Nil	"	6142
4	"	16	Nil	"	6142
5	"	32	Nil	"	6217
6	"	8	Nil	Autumn	5231
7	Wyalkatchem Gypsum	8	Nil	Spring	5838
8	Superphosphate	8	6.7	"	5610
9	Aerophos	Nil	6.7	"	5003

1. Newdegate gypsum is equally effective as a sulphur source as Wyalkatchem gypsum and superphosphate on an equivalent S basis. There is no response above 8 kg S/ha.
2. The spring application of sulphur was superior to the autumn application (compare yields from Treatment Nos. 3 and 6).
3. Superphosphate was slightly inferior to both Newdegate gypsum and Wyalkatchem gypsum. However, this difference may not prove to be statistically significantly different. The supply of sulphate from commercial superphosphate granules has been found to be very slow and to be severely restricted when the size of the granule is 2 mm or greater (Williams and Lipsett, 1969, Aylmore et al 1971\*).
4. The dry weight pasture yields from the aerophos plots is about 9-10% greater than the nil plots indicating a marginal response to current phosphorus dressings.

\* Williams, C.N. and Lipsett, J. 1969. Aust. J. Agric. Res. 20:265-278

Aylmore, L.A.G., Karim, M. and Quirk, J.P. 1971. Aust. J. Soil res. 9:21-32

GENERAL CONCLUSIONS TO THE NEWDEGATE GYPSUM TRIALS

Of the 4 trials, one was abandoned, one was unresponsive, and of the remaining 2 trials, only one (75BU7) yielded reasonable results. However from 75BU6 and 7 it can be generally concluded that:

1. Newdegate gypsum appears as effective as Wyalkatchem gypsum and superphosphate as a sulphur source to pasture.
2. Spring applications of sulphur was superior to the autumn treatment as measured in October.
3. There was no response to sulphur above 8 kg S/ha.

(b) GYPLAP - FeSO<sub>4</sub> TRIAL: 75BY4/3178EX (SHERRY, M<sup>C</sup>ALINDEN)

AIM: To compare 2:1 Gyplap, DeSO<sub>4</sub> and Wyalkatchem gypsum as sulphur sources for pasture.

TIME OF APPLICATION: All the sulphur treatments were applied in the spring (28 August 1975)

SOIL TYPE: Deep Sand

SITE HISTORY: Old land

RESULTS ASSESSED 21-10-1975

kg S/ha	DRY WEIGHT YIELDS (kg/ha)		
	WYALKATCHEM GYPSUM	2:1 GYPLAP MIK	FeSO <sub>4</sub>
Nil	2756	3176	3269
4	4156	3969	4856
8	4250	4576	4856
12	4576	4530	4623
16	4390	4530	4156
24	4483	4623	4763
48	4203	4903	4483
72	4856	4530	4716

The site was sulphur responsive up to 8 kg S/ha, there being no response to additional sulphur above this level. There was no difference between three sulphur sources on an equivalent S basis.



## 2. PHOSPHORUS SOURCES TRIALS

TITLE: 75NO7A/3340EX (D.J. Gillespie, E. Chittering)

AIM: To compare the short term and long term P supply to pasture from superphosphate, calciphos 500 and calciphos 900.

SOIL TYPE: Coarse leached white sand over gravel (50-90 cm)

SITE HISTORY: New Land 1975

NATIVE VEGETATION: Banksia, Jarrah, Black Boy

TRIAL COMMENCED: 23rd July 1975

1975 RESULTS: Assessed 27-10-1975.

Kg P/ha	DRY WEIGHT YIELDS (kg P/ha)		
	SUPERPHOSPHATE (water soluble P source)	CALCIPHOS 500 (citrate Soluble P source)	CALCIPHOS 900 (Acid soluble P source)
50	1073	533	433
100	1173	1007	587
200	967	1140	580

Nil plots yielded 73 kg/ha dry matter

'DECIDE' PARAMERES		
SOURCE	C	A
Superphosphate	0.08	1200
Calciphos 500	0.014	1200
Calciphos 900	0.026	600

$$X_s \rightarrow X_{cs} \quad \boxed{\times 2.5} \quad X_s \rightarrow X_{as} \quad \boxed{\times 5}$$

WHERE:  $X_s$  = kg P/ha as Super  
 $X_{cs}$  = kg P/ha as Citrate Soluble P  
 $X_{as}$  = kg P/ha as Acid Soluble P

The trial got off to a late start owing to the late arrival of the Christmas Island sources. The high rate of superphosphate had burnt off some clover, hence the depressed yield (the sources were applied on top of soil in which sub clover seedlings had germinated). The plots were potash deficient and potash will be applied in autumn and spring in the future.

More detailed results will be obtained next year.

TITLE: 75N07B/3340EX (D.J. Gillespie, E. Chittering)

AIM: To compare the short term and long term P supply to pasture from superphosphate, calciphos 500 and Calciphos 900.

SOIL TYPE: Gravel sand to 3 feet (60% gravel)

SITE HISTORY: New Land 1975

NATIVE VEGETATION: Jarrah, Red Gum and some Dryandra

TRIAL COMMENCED: 23rd July 1975

1975 RESULTS:

ASSESSED 27-10-75

Kg P/ha	DRY WEIGHT YIELDS (kg/ha)		
	SUPERPHOSPHATE (water soluble P source)	CALCIPHOS 500 (citrate soluble P source)	CALCIPHOS 900 (acid soluble P source)
50	1967	187	93
100	2880	293	193
200	3200	607	280

Nil plots yielded 40 kg/ha dry matter

SUPERPHOSPHATE: C = 0.02 A = 3,200

The trial was started late (23 July) due to the late arrival of the Christmas Island sources. The clover was just starting to show responses to the water insoluble P sources by the end of the season, and little can be said about the results until the trial has a full season. Consequently only 'Decide' C and A values for superphosphate are considered meaningful and so are listed.

More detailed results of both the short term (from the nil plots) and residual P supply of the three sources should be obtained next year.