

6. PASTURE TRIALS

6.1 Different sowing and topdressing options in annual pasture for grazing systems - Dunkeld, Vic

Location: Dunkeld Research Site.

Funding:

This trial was funded by Incitec Pivot Fertilisers

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Acknowledgements:

Southern Farming Systems for site selection and preparation, Stuart Kemp from Pasturewise for sowing the trial.

Summary of findings:

- There were good dry matter responses to starter fertilisers at either 16 or 32 kg/Ha of P although only certain treatments gave a significant dry matter increase when raising P rate from 16 to 32 kg/ha (move the bottom dot point below this so they connect)
- The best dry matter response was from Green Top which supplied all the nutrients lacking in the soil test report
- Potassium seed burn was not apparent possibly due to the relatively wet conditions
- Both DAP and Greentop grew over 70 kg DM/Ha/kgP at the lower rate of 80 kg/Ha, which supplied 16 kg/Ha of P
- Only GreenTop, Croplift and Superfect+Mo increased yields with increasing rate of application indicating they supplied the lacking nutrient required to make use of the extra available P.

Background/Aim:

The aim of this pasture trial, which initiated on May 26 2010 at the SFS Dunkeld site, is to compare a range of starter fertiliser and topdress options for pasture production.

Table 1: Initial Soil test results summary

Soil Test Analyte	Result
Sample Depth To	0-10cm
Annual Rainfall	600mm
pH (1:5 Water)	5.6
pH (1:5 CaCl ₂)	4.7
Elec. Cond. (Sat. Ext.) dS/m	0.6
Chloride (mg/kg)	18
Nitrate Nitrogen (NO ₃) mg/kg	3
Ammonium Nitrogen (KCl) mg/kg	4.8
Phosphorus (Colwell)	22
Phosphorus Buffer Index (PBI-Col)	160
Available Potassium (mg/kg)	160
Calcium (Amm-acet.) Meq/100g	4.7
Calcium/Magnesium Ratio	1.8
Cation Exch. Cap. Meq/100g	8.13
Sodium % of Cations (ESP) mg/kg	3.6
Aluminium Saturation %	1.5
Copper (DTPA) mg/kg	0.43
Iron (DTPA) mg/kg	440
Manganese (DTPA) mg/kg	21
Zinc (DTPA) mg/kg	0.32
Boron (Hot CaCl ₂) mg/kg	1.5
Sulfate Sulfur (KCl40) mg/kg	7.6
Organic Carbon (OC) %	2.8
Soil Colour	Brown
Soil Texture	Clay Loam
Disp. Index, Loveday/Pyle	6
Slaking 2Hrs	Partial

Trial information

The trial initiated on the 26th of May 2010. The soil analysis results from the site are presented in Table 1. The plots were sown with a tetraploid annual ryegrass (*cv. Zoom*) at 30kg/Ha and various sowing starter fertilisers as indicated in Table 2.

The fertiliser treatments were determined using two different rates, either 16 or 32 kg/Ha of applied P. Due to most fertilisers containing more than one nutrient, their analysis, and rate of application developed around the desired rate of P is presented in Table 2. There were two control treatments, the first had topdress N only, whereby the second received no additional nutrients. There were five harvests taken, on the dates 3rd and 29th of September, 12th and 29th of October and the final and fifth harvest on the 19th of November 2010, totalling 178 days from May 26 inclusive.

Table 2. Treatments and nutrients rates (kg/Ha)

Sowing Fertiliser Product	%N	%P	%K	%S	Product kg/Ha	Starter N kg/Ha	P kg/Ha	K kg/Ha	S kg/Ha
Control OP + Topdress N	-	-	-	-	-	-	-	-	-
Control OP ON	-	-	-	-	-	-	-	-	-
CROPLIFT 13 16P	13	16.4	0	7.1	98	12	16	0	6.9
CROPLIFT 13 32P	13	16.4	0	7.1	195	25	32	0	13.9
TSP-S 16P	0	19.6	0	9.7	82	0	16	0	7.9
DAP 16P	18	20	0	1.6	80	14	16	0	1.3
DAP 32P	18	20	0	1.6	160	29	32	0	2.6
DAP-S 16P	16	17	0	12	94	15	16	0	11.3
DAP-S 32P	16	17	0	12	188	30	32	0	22.6
GRANULOCK 15 16P	14	12	0	10.5	133	19	16	37.5	14.0
GRANULOCK 15 32P	14	12	0	10.5	267	38	32	0	28.0
Green Top NPKS 19-8-10-6 16P	19	8	10	6	200	38	16	20	12.0
Green Top NPKS 19-8-10-6 32P	19	8	10	6	400	76	32	40	24.0
MAP 16P	10	21.9	0	1.5	73	7	16	0	1.1
MAP 32P	10	21.9	0	1.5	146	15	32	0	2.2
MAP-S 16P	12	19	0	11.6	84	10	16	0	9.8
MAP-S 32P	12	19	0	11.6	168	20	32	0	19.5
MES10 16P	12	18	0	10	89	11	16	0	8.9
MES10 32P	12	18	0	10	178	21	32	0	17.8
Super Mo0.025 16P	0	8.8	0	11	182	0	16	0	20.0
Super Mo0.025 32P	0	8.8	0	11	364	0	32	0	40.0
SUPERFECT 16P	0	8.8	0	11	182	0	16	0	20.0
SUPERFECT 32P	0	8.8	0	11	364	0	32	0	40.0
TRIPLE SUPER 16P	0	20.7	0	1	77	0	16	0	0.8
TRIPLE SUPER 32P	0	20.7	0	1	155	0	32	0	1.5
GRANULOCK 15 32P + Urea	14	12	0	10.5	267	38	32	0	28.0
GRANULOCK 15 32P + Cal-Gran N	14	12	0	10.5	267	38	32	0	28.0
GRANULOCK 15 32P + EasyN	14	12	0	10.5	267	38	32	0	28.0
GRANULOCK 15 32P + Gran-Am	14	12	0	10.5	267	38	32	37.5	28.0
GRANULOCK 15 32P + Potash	14	12	0	10.5	267	38	32	37.5	28.0
TSP-S 32P	0	19.6	0	9.7	163	0	32	37.5	15.8

Results and discussion:

The soil test results presented in Table 1, indicate that the clay loam soil is low in P. This can largely explain the dry matter response to applied fertiliser. The soil was also low to adequate for sulphur and potassium and therefore requiring maintenance applications. The other soil properties appeared reasonable, although dispersion suggested some Gypsum may be required.

As expected there was a dry matter response to the application of fertiliser. Grass was cut dried and weighed to determine the dry matter grown per hectare and is listed in Table 3. The control, which received no fertiliser, grew around 2000kg DM/Ha over the trial period, and where fertiliser was applied this yield rose to over 3500kg DM/Ha for topdress nitrogen and over 5300 kg DM/Ha where starter fertiliser was also included (Table 3).

The most efficient starter fertiliser combination was proven to be 16kg/Ha of P. The two outstanding treatments were 'DAP' and 'Green Top' which produced over 70 kg DM/kg applied P. Doubling the rate of Green Top, Croplift and Superfect+Mo significantly increased dry matter production, however other treatments, gave no additional response suggesting that other factors were more limiting.

Top-dress N treatments were similarly effective, with Cal-Gran slightly better than the other topdress treatments as compared using Granulock 15 as the base starter fertiliser (Table 3). Is the LSD for the topdress treatments different to the LSD for the starter treatments?

Table 3: Cumulative Dry Matter over five harvests and Extra Dry Matter grown vs. Kg of Applied fertiliser P

Tr. Name	Cumulative DM kg/Ha	Extra kgDM/kgP	Cumulative DM kg/Ha	Extra kgDM/kgP
P Rate (kg/Ha)				
DAP	4799 bh	79	4528 dk	31
Green Top NPKS 19-8-10-6	4683 bi	72	5372 a	57
MES10	4474 dk	59	4846 ag	41
TRIPLE SUPER	4417 ek	55	4302 gk	24
GRANULOCK-S	4367 fk	52	4963 ae	45
MAP-S	4364 fk	52	4657 cj	35
MAP	4320 fk	49	4698 bi	36
CROPLIFT 13	4318 fk	49	5115 ac	49
GRANULOCK 15	4256 hk	45	4763 bh	38
Super Mo0.025	4152 ik	39	5011 ad	46
TSP-S	4117 jk	37	4377 fk	26
SUPERFECT	4080 kl	34	4465 dk	29
GRANULOCK 15 + Cal-Gran N	-	-	5229 ab	53
GRANULOCK 15 + Gran-Am	-	-	4967 ae	45
GRANULOCK 15 + Urea	-	-	4865 af	42
GRANULOCK 15 + Potash	-	-	4815 ah	40
GRANULOCK 15 + EasyN	-	-	4786 bh	39
Control OP	3533 l			
Control OP ON	2109			
Mean	4508			
CV%	9			
LSD	558			

Summary:

The trial demonstrated the usefulness of soil testing in identifying deficiencies and devising effective nutrient programs. The absence of this information could lead to the application of unnecessary nutrients or the failure to realise potential.