

Potential use of fertilisers and trace elements on Tumby Bay Hills SheepConnect SA focus farm

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DEMO

Searching for Answers



Location:

Tumby Bay
Emie Borthwick and sharefarmer
Andrew Cabot
SheepConnect Focus Farm

Rainfall

Av. Annual: 500 mm

Paddock History

Perennial pastures

- Cocksfoot/clover
- Native and annual grasses

Soil Type

Variable from non wetting sandy loam with high gravel content to light sandy loam over gravelly clay loam

Soil Test

Soil chemical analysis

Plot Size

High and low P demonstration plots
(20 m x 8 m)

Control demonstration plot
(20 m x 4 m)

Yield Limiting Factors

Demonstration sites not grazed during growing season
Copper spray not applied at the optimum time due to season

Livestock

Enterprise type: Sheep and cropping

Type of stock/breed: 1800 merino ewes (37% joined to a terminal state)

- Applying phosphorus to perennial pastures will increase pasture production and carrying capacity.

Why do the trial?

A fertiliser demonstration site was established on the property Pillaworta, Tumby Bay as part of the SheepConnect SA focus farm project. Initial soil tests undertaken from the property indicated that soils were deficient in phosphorous, zinc and copper.

Pillaworta did not have a strong history of fertiliser use and therefore provided the ideal opportunity to demonstrate the response of pasture and native grasses to different rates of fertiliser and trace element application.

How was it done?

Two paddock demonstration sites were selected, one consisting of cocksfoot/clover pasture the other native and annual grasses. Each site was established to determine pasture response to high phosphorus application @ 30 kg/ha, low phosphorus @ 10 kg/ha and three trace elements, sulphur @ 10 kg/ha, zinc @ 1 and 2 kg/ha and copper @ 100 gm/ha. The type of phosphorus used was 18:20 and zinc and copper were applied as foliar sprays.

Pasture cuts were taken throughout the demonstration period to measure pasture response to fertiliser application through the production of dry matter. Visual assessments were made regarding changes in pasture composition. Feed tests were also taken to determine the nutritional benefit of dry matter

produced to grazing livestock.

What happened?

Cocksfoot/clover results

Phosphorus and sulphur were applied to the demonstration site on 17 June, zinc on 27 June and copper on 7 September. Visual observations were noted over August, September and October and are summarised in Table 1.

The application of high phosphorus, copper and zinc applied @ 1 kg/ha recorded the highest dry matter result of 3.2 kg DM/ha. The application of copper and zinc @ 2 kg/ha had a significant reduction in the amount of dry matter produced. On the high phosphorus site, copper and zinc applied @ 2 kg/ha reduced the amount of dry matter produced to 2.4 kg DM/ha.

The cocksfoot and clover demonstration site had not been grazed since 17 June. Grazing pressure can influence pasture composition and density during the growing season. Had the site been grazed over the winter/spring grazing season, an increase in the amount of dry matter produced would have resulted.

All demonstration sites recorded an average of 20% crude protein and an average of 9 ME (MJ/kg). 20% protein is adequate for grazing sheep but 9 ME may be limiting for lactating ewes and further supplementation may be required.

Key messages

- Soil testing is the most accurate and beneficial way to determine soil deficiencies and limitations.
- Demonstration showed reduced cocksfoot/pasture growth when zinc was applied at 2 kg/ha.
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Table 1 Visual observations of cocksfoot/clover pasture after application of high phosphorus, low phosphorus and three trace elements

Date of observation	Observation Noted
25 August	Pasture has responded to high and low P application with the high P demonstration site showing denser pasture growth. There was a small response in density and composition to zinc at 1 kg/ha but a negative response to zinc @ 2 kg/ha with less dense, shorter growth of pasture. Clover and capeweed appeared to have poor growth. The lack of response was evident across high, low and no P plots. There appeared to be a response from the clover and capeweed to sulphur @ 10 kg/ha across all demonstration plots.
7 September	Appeared to be a lack of capeweed flowering on the zinc @ 2 kg/ha demonstrations plots. On inspection, there was noticeably less biomass – capeweed and clover was missing, cocksfoot had less growth and more bare ground between plants. The capeweed was well advanced and flowering across the rest of the site.
10 October	A response to both high and low P with no trace elements was noted. The plots with sulphur @ 10 kg/ha still appeared fresher and denser. As the site had not been grazed the Haresfoot clover, Cape weed and Salvation Jane were out-competing the clover. Density of Haresfoot clover varied across the site. The plots with zinc @ 2 kg/ha continued to show less biomass. There appeared no results from copper @ 100 gm/ha however that could be due to the warm dry conditions immediately after application.

Table 2 Visual observations of native grasses/annual grass pasture after application of high phosphorus, low phosphorus and three trace elements

Date of observation	Observation Noted
25 August	There appeared to be more clover and capeweed on the high P (30 kg/ha) site compared to other demonstration sites. Sulphur @ 10 kg/ha had a slightly better response compared to no sulphur across the site.
7 September	Capeweed and clover were more evident in the high P plots. Sheep have selectively grazed the clover and capeweed on the site but they were not putting enough pressure to have any impact the grasses. The grasses across the site have started to go to head. The sheep were excluded again from the site from 7 September.
10 October	Although significant visual responses were hard to observe, in walking through the site it was evident that the capeweed and clover in the high P and sulphur plot were still fresh.

Native grasses/annual grass pasture results

Phosphorus and sulphur was applied to the demonstration site on 17 June, zinc on 27 June. By September grasses such as wild oats, silver grass and *Austrostipa* sp had already started to go to seed therefore applying a copper foliar spray would have little impact. Visual observations were noted over August, September and October (Table 2).

The application of high phosphorus, copper and zinc applied @ 1 kg/ha recorded the highest dry matter result of 3.4 kg DM/ha. The application of copper and zinc @ 2 kg/ha had a significant reduction in the amount of dry matter produced. On the high phosphorus site, copper @ 100 mg/ha and zinc applied @ 2 kg/ha reduced the amount of dry matter produced to 2.5 kg DM/ha.

The demonstration site had limited grazing from 25 August to 7 September. High grazing pressure would need to be applied early in the season to reduce the annual grasses when they are more palatable. Palatability dramatically reduces once silver grass, soft brome and wild oats go to head. *Austrostipa* sp (spear grass) a perennial native grass needs to be grazed before it goes to head to reduce seed contamination. To increase the percentage of native grasses, grazing pressure needs to occur in early - mid spring to reduce competition and seed set from annual grasses.

The crude protein from the native grasses/annual grasses site varied from 13-20% and recorded an average of 8 ME (MJ/kg). 8 ME may be limiting for lactating ewes and further supplementation may be required. The native grasses/annual grass site also lacked sufficient calcium and magnesium to maintain lactating ewes.

What does this mean?

This work was undertaken purely for demonstration purposes, but some conclusions can be made about the results. A soil test is the best way of determining soil deficiencies and therefore fertiliser application rates. Over the long term, this can save money by only applying what is required by the plants.

All demonstration sites showed a response in pasture growth to low or high phosphorus application. This was not surprising due to the limited fertiliser application history of the demonstration sites.

High rates of zinc (2 kg/ha) resulted in significant reduction in the growth of cocksfoot pasture and burnt the leaves of clovers. It was also noted the area of bare ground was increased. We could conclude that this level of application can limit pasture production.

Zinc foliar sprays were used in the trial to determine an instant response to zinc in pasture growth, as we have seen a direct response to zinc pellets, which are a more traditional and effective way of applying zinc to pastures.

The fertiliser demonstration will continue in 2012. It is intended that grazing pressure will be increased to get a better indication of pasture response and to determine the

amount of dry matter which can be produced during the growing season.

Results from the demonstration will be discussed during the SheepConnect sheep groups which meet regularly throughout the year on Eyre Peninsula.

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Eyre Peninsula Natural Resources
Management Board

• **australian wool**
innovation
• **limited**

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