

## **Saltbush in farming systems**

**Increasing the productivity and profitability of South Australian sheep enterprises from grazing saltbush plantations**

# ***Newsletter – Edition 2***

**June 2011**



## **Background:**

With funding provided by the South Australian Sheep Industry Fund, Productive Nutrition in collaboration with SARDI in their Caring for Our Country project with the Coorong LAP, are using their experience and expertise in livestock nutrition to assess the value of saltbush to livestock grazing systems and to answer and evaluate some critical production questions, including:

- whether it is cost efficient to establish saltbush
- the most cost effective supplementary feeding strategies for livestock grazing saltbush
- the recovery rate of saltbush after grazing
- the nutritive value of saltbush in a range of locations and seasonal conditions

Producers across three sites in South Australia including Carrieton, Coomandook and Point Pass are participating in this project. This edition of the newsletter provides a summary of the project's progress and an outline of trial results since the last newsletter published in December 2010.

## **Site 1: Carrieton**

John and June Parnell of Glenroy Estate, Carrieton SA have undertaken research comparing the performance of ewes grazing saltbush in response to several supplementation options. In 2010, two trial mobs supplemented with barley were run on saltbush and on a rotation of saltbush and native pasture (*Results can be found in the Edition 1 of the saltbush newsletter*).

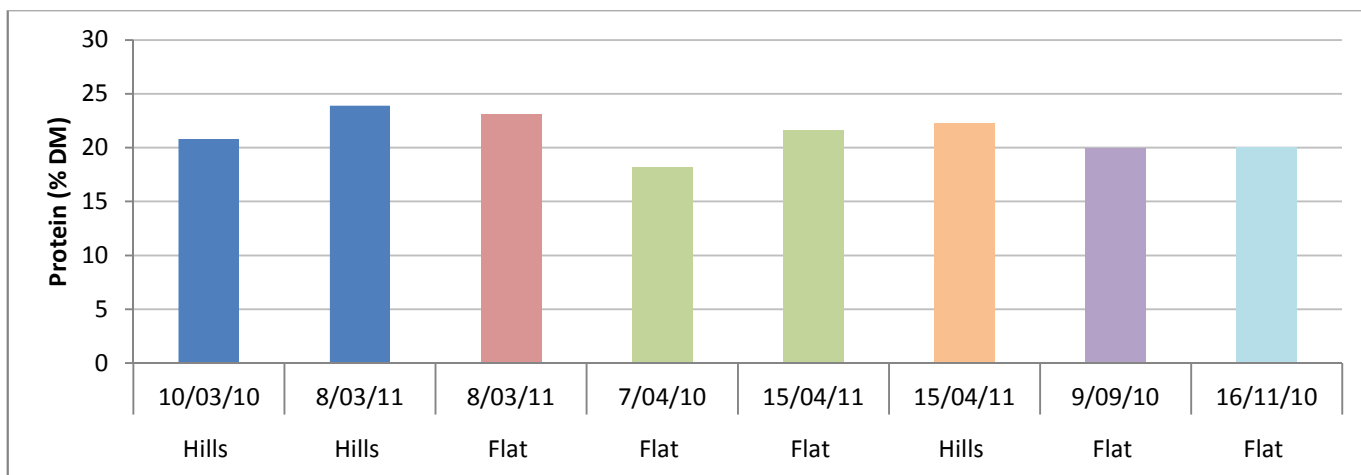
In 2011 an additional two trial mobs were included to assess the effect of two grain supplements, oats and lupins. These mobs were supplemented with grain such that all diets had comparable energy (ME) levels. Ewe live weight, body condition, plant dry matter production and nutritive value have been assessed in early pregnancy and late pregnancy so far in 2011; further measurements will be taken at marking in July.

### **Feed measurements – test results**

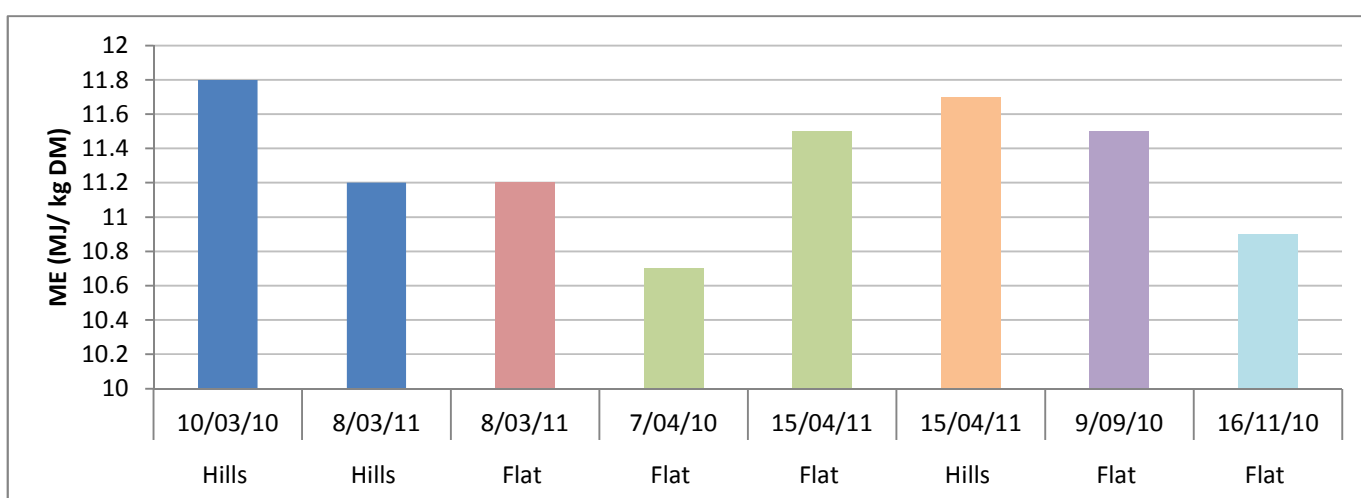
Analysis of saltbush, inter-row and pasture feed for nutritive value and minerals were taken throughout 2010, these analyses are being conducted again in 2011 to evaluate the value of the feed to livestock and to compare the variation in nutritive value across seasons and between years.

Saltbush nutritive value at Carrieton has been assessed at two sites, in a plot of saltbush on the side of a hill and in a plot on the flat across the property. These two sites are being used to assess the variation in saltbush nutritive value across the property and to determine whether it is feasible to limit the assessment of saltbush to one site in the future. Figure 1 and Figure 2 highlight the relative consistency of crude protein (CP) and energy (ME) of saltbush at both sites.

The main difference in nutritive value found was between sampling periods rather than across sites.



**Figure 1 Crude protein percentage of saltbush at two sites at Carrieton in 2010 and 2011**



**Figure 2 Metabolisable energy (MJ/kg DM) of saltbush at two sites at Carrieton in 2010 and 2011**

Particular mineral analyses of saltbush were significantly different to those analysed in 2010 (Table 1) however rainfall was significantly higher over summer in 2011 (130mm) compared with 2010 (21mm). Cobalt levels were deficient in March 2011 on the hills, but all other trace elements were within the normal range to address animal requirements.

**Table 1 Sodium and sulphur levels found in saltbush plant tissue in 2010 and 2011**

|                   | Sodium | Sulphur |
|-------------------|--------|---------|
| Required 70kg ewe | 0.10%  | 0.15%   |
| March 2010        | 7.33%  | 0.78%   |
| March 2011        | 5.3%   | 0.43%   |

The saltbush inter-row consisted of grasses, wards weed, medic and buck bush which made a significant contribution to the diet.

The crude protein content of the interrow feed taken in March 2011 (8.5%) was unchanged from that in 2010 (8.5%) however the variation in crude protein content between April 2010 (7.1%) and April, 2011 (22.3%) was representative of the above average summer rainfall experienced in pastoral country in 2010/2011 and is evidenced in Figure 3.

2010



2011

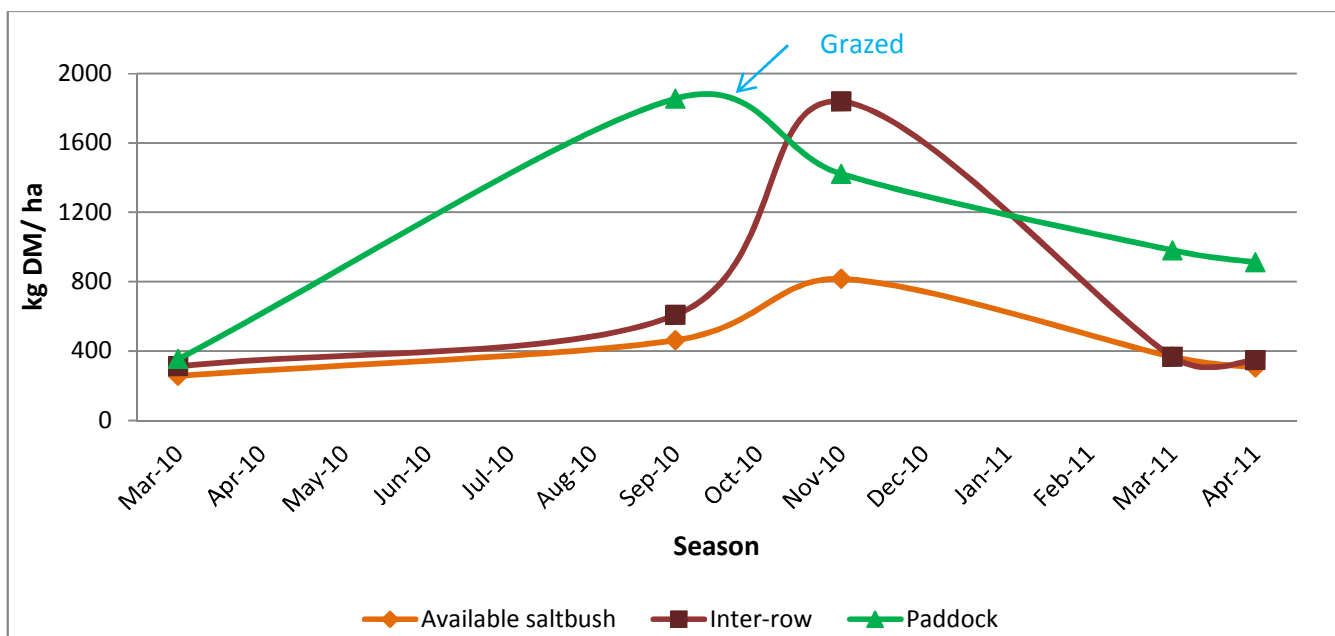


**Figure 3 Saltbush inter-row at Carrieton in April in 2010 and 2011**

The nutritive value of pasture paddocks at Carrieton also indicated that the native pasture responded well to summer rains, with increased CP and ME in 2011 compared to 2010. Two sites for monitoring nutritive value of native pastures were sampled in March 2011 where crude protein varied by 1.7% across sites and ME varied by 1.4 MJ/kg DM. Differences in nutritive value were more reflective of changes in seasonal conditions than was the case for the saltbush.

### **Dry matter production**

Dry matter production was measured throughout 2010 and 2011, with dry matter available in March 2011 being similar to results for 2010, with the exception of the native pasture which had increased dry matter available (980 kg DM/ ha) in 2011 (Figure 4).

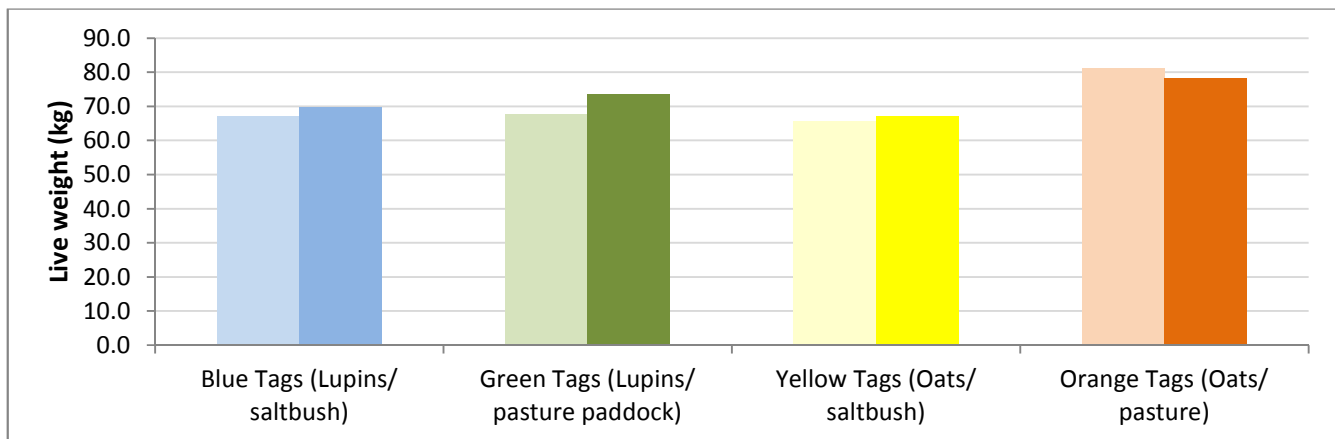


**Figure 4 Available saltbush, inter-row and paddock dry matter production at Carrieton, 2010 and 2011**

## **Ewe weight and body condition**

The 2011 trial included two trial mobs from 2010 (orange and yellow tags) for oat supplementation and an additional two trial mobs (blue and green tags) for lupin supplementation. Grain supplementation of the trial mobs began in early pregnancy (March) was formulated to 11.1 MJ ME per day. Weights and body condition of each mob was measured again in March and again at late pregnancy (6 weeks later).

All trial mobs experienced an increase in live weight over the first 6 weeks of the trial, except for the orange tags who lost 3.1kg (Figure 5). This weight loss could have been as a result of the ration being formulated to the 70 kg average LW of all mobs whereas the orange tags were heavier, weighing an average of 81kg at the start of the trial. The greatest increase in live weight was experienced by the green taggers at 6.2 kg. This increase in live weight also translated to ewe body condition as ewes achieved an average increase of half a body condition score. Body condition of all other trial mobs remained constant.



**Figure 5 Live weight of trial mobs during early and mid- pregnancy in March and April at Carrieton, 2011**

## **Wool measurements**

In April shearing took place at Glenroy Estate. Through the co-operation of both the Parnell's and the shearing contractors each trial mob was shorn and wool kept separate for individual testing. Observations during 2010 weight and body condition scoring of yellow and orange tags supplemented with barley suggested that there was more wool being produced in the orange tags. 2011 wool cuts revealed a similar trend with yellow tags producing on average 6.2kg of wool/ head and orange tags 6.9kg/ head.

Results also indicated that ewes run in the saltbush year round (yellow and blue tags) had the highest vegetable matter content in the fleece compared with the paddock mobs.

## **What's coming up...**

- *The next set of plant and animal measurements will be taken at lamb marking. Ewes in trial mobs will be weighed and condition scored and marking percentages will be recorded*
  - *To come up to Carrieton to get an overview of the project, meet the people involved and participate with some hands on exercises, please contact Lauren Costin [lauren@productivenutrition.com.au](mailto:lauren@productivenutrition.com.au)*
- *In September 2011 a "sub-trial" will commence to compare the growth rate and condition of two mobs of weaner lambs supplemented with lupins and run on either saltbush or grass pasture*

## **Site 2: Coomandook**



The Coomandook site has not been grazed since winter 2010. Productive Nutrition in collaboration with SARDI has been measuring the performance of crossbred and Merino lambs grazing saltbush with oat, barley and molasses supplementation on the Freak's property. The first trial at Coomandook has been completed and the second is in its final weeks and will be reported on in future newsletters.

**Figure 6: Setting up the Booderoo trial in March 2011, Hugh Drum Senior Agricultural Officer, SARDI**

### ***Booderoo***

The first Coomandook trial was held at Booderoo, the Freak's home property, where live weight gain and body condition score of crossbred lambs grazing saltbush with lucerne and veldt grass inter-row was measured. The lambs were split into 6 groups with 1 replicate per treatment and supplemented with oats, barley or molasses. Nutritive value and dry matter production data was collected for saltbush with lucerne and veldt grass in the inter-row.

### **Ration formulation**

The three saltbush supplements oats, barley and molasses were chosen to investigate animal response when ME is delivered in three different forms to complement saltbush. Metabolisable energy is predominantly derived from slowly digested fat in oats, rapidly fermented starch in barley and readily fermentable sugars in molasses.

Although the aim was to formulate to an equivalent dietary ME of 15.44 MJ per day across all treatments, the molasses supplemented lambs failed to achieve this level during the 2011 trial. The ME of the ration increased as the lambs became familiar with molasses and increased from 11.36 MJ/day for the first 21 days to a maximum of 14.73 MJ/day for the remaining 19 days.

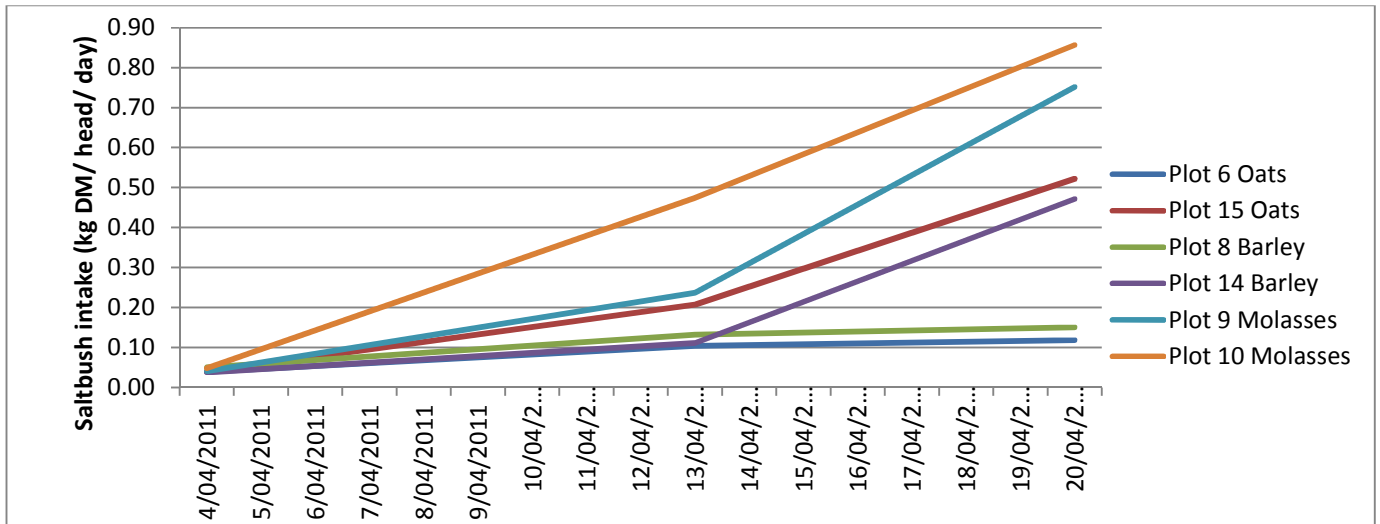
### **Feed measurements – test results**

Nutritive value analysis was conducted on saltbush and the lucerne and veldt grass inter-row in order to accurately assess the contribution of ME, CP and fibre (NDF) to the ration. The nutritive value of saltbush at Coomandook was below that of the saltbush at Carrieton at 15.2% CP and 10.7 MJ ME/ kg DM in March 2011.

Two of the trial plots at Booderoo contained River Saltbush as well as Oldman Saltbush and although similar in crude protein content, the River Saltbush was significantly lower in ME (9.75 cf 11.4 ME); the lambs consumed a greater proportion of the Oldman Saltbush. The nutritive value of lucerne in the interrow was comparatively low during March and April at an average of 8% crude protein and 6.3 ME. No mineral analyses were carried out at the Coomandook sites.

### **Dry matter production**

Dry matter disappearance was measured at Booderoo to provide an estimate of intake of saltbush and inter-row feed of the trial mobs. Combining saltbush intake data and lucerne and veldt inter-row measurements indicated that the molasses mobs compensated for lower ME and fibre in their ration by increasing their intake of saltbush. Figure 7 shows that both molasses mobs consumed significantly more saltbush at all times during the trial than the other supplements, at an average of 0.86 kg DM/ head/ day.



**Figure 7 Saltbush intake at the Booderoo site for the various trial plots**



By the conclusion of the trial, saltbush disappearance in all plots was observed to just above head height (Figure 8), especially in plots where saltbush shrubs were facing south on the downhill slope. In plots where both Oldman Saltbush (OMSB) and River Saltbush were present, OMSB was preferred.

**Figure 8 Disappearance of saltbush foliage to head height**

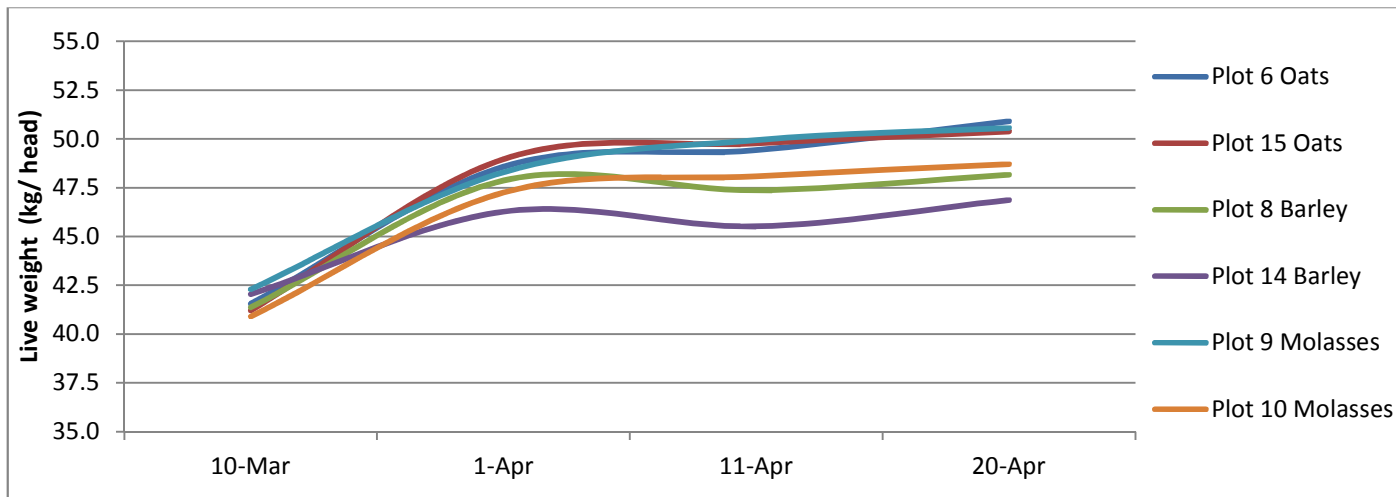


Inter-row selection by each trial mob was observed; visually it appeared that lucerne was being preferentially selected over veldt grass. However, inter-row disappearance measurements indicated that more veldt grass was being consumed by all trial mobs.

### **Lamb weight and body condition**

Crossbred lambs grew at an average growth rate of 300 g/head/ day in the first 22 days of the trial, after which growth rates slowed as saltbush intake increased and inter-row availability and nutritive value declined (Figure 9).

Lambs supplemented with molasses in one plot achieved the highest growth rates in the first 22 days at an average of 318g/ head/ day whereas the replicate molasses group had the lowest growth rate at 205g/ head/ day. All the lambs demonstrated peak growth rates in the first 22 days. Over the remaining 19 days, growth rates declined despite slow but continual weight gain. Overall growth rates were highest in the molasses supplemented groups followed by oats and barley with one barley replicate group growing at less than 85g/day (Table 2)



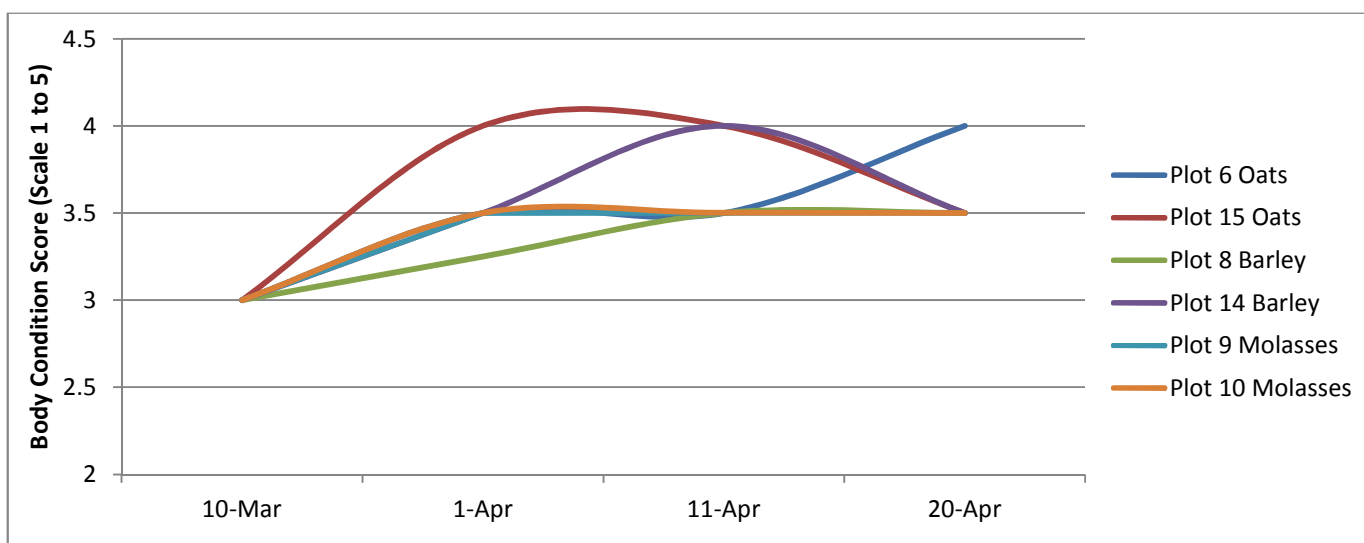
**Figure 9 Average liveweight gains of lambs in each trial plot (kg/ head)**

Faecal egg samples of all trial mobs were taken on the 11<sup>th</sup> April, 2011 as some lambs were scouring. The barley supplemented lambs in Plot 14 had the highest worm egg count, but at 125epg was unlikely to have been a cause of scouring and weight loss. This was then attributed to acidosis during the introductory period to grain and subsequently settled.

**Table 2 Lamb growth rates (kg/d) at Booderoo autumn 2011 trial**

| <b>Growth rate (kg/ head/ day)</b> | 10/03/2011 to 1/04/2011 | 1/04/2011 to 11/04/2011 | 11/04/2011 to 20/04/2011 | Average |
|------------------------------------|-------------------------|-------------------------|--------------------------|---------|
| Plot 6 Oats                        | 0.273                   | 0.125                   | 0.083                    | 0.160   |
| Plot 15 Oats                       | 0.341                   | 0.050                   | 0.056                    | 0.149   |
| Plot 8 Barley                      | 0.250                   | -0.050                  | 0.056                    | 0.085   |
| Plot 14 Barley                     | 0.216                   | -0.150                  | 0.111                    | 0.059   |
| Plot 9 Molasses                    | 0.205                   | 0.225                   | 0.139                    | 0.189   |
| Plot 10 Molasses                   | 0.318                   | 0.050                   | 0.139                    | 0.169   |

Body condition score of lambs in all trial mobs increased or remained constant for the duration of the trial, except for lambs in Plot 15 supplemented with oats and Plot 14, supplemented with barley (Figure 10). The body condition score of these two groups increased until the 11<sup>th</sup> of April when they lost a half a condition score.



**Figure 10 Average body condition score of lambs in each trial plot throughout the trial**

## What's coming up...

The second Coomandook trial has now been completed at the Freak's Mt Russell property. This trial measured Merino lamb performance whilst grazing saltbush with a spear grass understorey and supplemented with either barley or oats.

- Trial results will be presented in the 3<sup>rd</sup> Edition of Saltbush in farming systems newsletter in December 2011
- Further information and invitations to upcoming field days at the Coomandook site will be emailed in the coming months

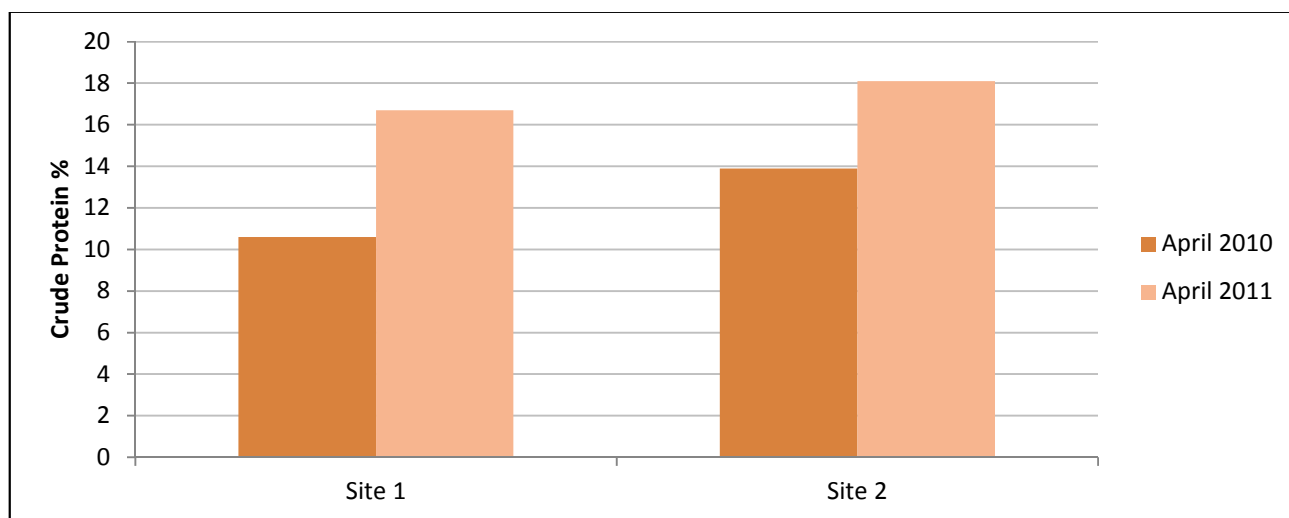
## Site 3: Point Pass

At the Point Pass site, owned by the Schultz family, twice yearly measurements of dry matter production and nutritive value (NV) on two sites (saline & non-saline) are being taken from saltbush to compare with the NV of saltbush on the other two trial sites.

Crude protein levels were higher in April 2011 than in 2010 and varied by 2-3% between sites (Figure 11).

There was little variation in ME between years or across sites (11.1 – 11.9 MJ/kg DM). Potassium levels were excessively high on both sites (>2%) and were significantly higher than those at Carrieton.

Sodium levels were lower in April 2011 than 2010 but still in excess of animal requirements and high enough to significantly reduce dry matter intakes. Copper and zinc were deficient for grazing animals although there was little difference between the saline and non-saline sites. Cobalt was deficient in April on the non-saline site in 2011.



**Figure 11 Comparison of crude protein levels in saltbush at Pt Pass in April 2010 and 2011**

## Conclusion

Further measurements of saltbush dry matter production and nutritive value will be taken throughout 2011 as the sheep and lamb trials continue. The next newsletter will be published in December 2011.

For further information please contact Lauren Costin at Productive Nutrition at any time at [www.productivenutrition.com.au](http://www.productivenutrition.com.au)