

COWPEAS AS FODDER CROP FOR LACTATING EWES

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Introduction

Cowpea (*Vigna unguiculata*), a crop of ancient African origin, is a summer growing annual legume which is very popular amongst farmers in South Africa, for human and animal consumption. Literature as early as 1923 mentioned the commercial use of cowpeas and in the 1950's it was described as one of the most important legume plants in SA (Dannhauser 1991; 2002; Donaldson 2001; Van Zyl 1990).

Plant breeders have, over time, selected specific cultivars from the original genetically diverse species Chapman (1989)

Since this is a good and hardy quality fodder crop, farmers have used it for both grazing and haymaking. Pods are normally produced during late summer and this adds to the nutritional value of the plant. This coincides with the decrease in veld quality, or even planted pastures such as kikuyu, during late summer and autumn. Ewes lambing in autumn or late summer need good quality grazing and the value of cowpeas as a fodder crop for these sheep should not be underestimated. In spite of all the positive characteristics, it is a fact that there is presently a shortage in seed and a lack of available cultivars. There is also a feeling that more research should be done on its value as animal feed.

Table 1: The 2003/04 monthly rainfall (mm/month-1), compared to the long-term average monthly rainfall for Dundee

	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	Total
2003/04 mm	6.3	19.5	97.9	67.1	55.3	91.7	132.4	3.1	0.6	473.9
Long Term mean mm	33.6	77.0	108.8	131.0	135.0	110.5	82.4	42.7	20.9	741.9

Evaluation

In December 2003 cowpeas were planted on Aalwynkop, in the Dundee district, a farm of Mr Hendrik Klopper. It is a neighboring farm to the Dundee Research Station, which falls in the Sandy Sourveld of northern KwaZulu-Natal (KZN). The veld in the area is well known for its sharp decrease in quality in late summer. The cultivar used was Bechuana White, which was planted at a rate of 50kg/ha. It was established during December, in 900 mm rows, with 150 kg of superphosphate per hectare. This was a maximum seeding rate; less seed can be used according to rainfall.

Seventy-seven Mutton Merino ewes (with their lambs), which grazed on veld during the previous summer and lambed on Kikuyu pasture in autumn, were used to graze the 15 ha of cowpeas. Grazing commenced on the 5th April 2004 and ended on the 1st June 2004, when all the available grazing material was utilized. Due to abundant material, an additional 140 dry sheep were added during the last part of the grazing period.

Commercial 25 kg energy blocks were supplied (Protein supplement 150g & energy 8.8 MJ ME/kg *ad lib*).

Rainfall

The total rainfall for the summer season of 2003/04 was 473.6 mm, well below the long term average (Table 1).

Fairly good showers fell in November, when seedbed preparation started. The monthly precipitation was below average until March, when above average rainfall was measured. During April and May the precipitation was very low again (Table 1).

Production and nutritional value

The dry matter yield of the cowpeas (total plant) was 5.8t/ha, meaning that the cowpeas produced 12.9 g DM/mm of rain. (In comparison with veld which produced in the same 5.3 g DM / mm of rain for this season).

The nutritional value of the cowpeas (whole plant) are given in Table 2.

Table 2: The chemical analysis* of the cowpea crop (whole plant).

ADF (%)	NDF (%)	Crude Protein(%)	Ca (%)	P (%)
29.07	43.50	15.46	0.74	0.25

*Chemical analysis by Feed laboratory, Cedara

The relatively low ADF and NDF value of the cowpeas are an indication that the energy value and digestibility of the crop were high and explain the good intake that was observed. Pods were already formed when the samples were taken and they contributed to the high crude protein value. The Ca and P values can be described as normal and adequate. Analysis of cowpea leaves, done by other researchers, showed high levels of iron, selenium, vitamins A, C and E, which all contributed towards the high performance of the animals (Anon 1995).

Animal performance and carrying capacity

The sheep grazed for 57 days on the 15 hectares of cowpeas and were withdrawn when it was decided that all available material was grazed sufficiently. The performance of the ewes with their lambs is given in Table 3.

Table 3: Growth performance of ewes and lambs on cowpeas (expressed per hectare)

Parameters	Ewes		Lambs	
	5/4/04	1/6/04	5/4/04	1/6/04
Total mass (kg)	4878.5	5049.0	781.7	1881.7
Total mass gain (kg)	170.5		1100.0	
Average mass (kg/animal)	64.2	66.4	11.3	27.3
Average gain (kg/animal)		2.2		15.9
Average daily gain (g/day)		38.6		278.9

Lambs grew at an average rate of 278.9g/day for the duration of the trial, which is very acceptable for lambs on this type of dryland pasture. Although lactating, the ewes also managed to gain weight (38.6 g/day), which will contribute to their body condition in the next breeding season.

Due to the abundance of grazeable material, 140 adult sheep (wethers and dry ewes) were added to the camp on April 19, 2004. They spent 43 days on the fodder crop. Unfortunately their starting masses were not taken, but their numbers were taken into account in determining the carrying capacity.

Carrying capacity

The calculated carrying capacity in small stock units (SSU) for a two-month (60 days) grazing period on Alwynkop was 15.1 SSU/ha/60 days. The following assumptions were made in the calculations:

- The ewes, with an average mass of 65.3 kg, were taken as the equivalent of 1.28 SSU
- The average mass of the lambs was 19.3 kg, which was taken as 0.51 SSU
- The mass of the additional dry sheep that were not weighed was taken as 47 kg, thus the equivalent of 1 SSU.

Financial analysis

The total input costs on the 15 ha was R18446.25. This includes machinery costs, labour, seed and fertilizer (R1229.75/ha).

Income

- Value of lambs at the end of trial was R18 817.00 (881.7 kg x R10/kg)
- Value of mass the lactating ewes gained, was R1 705.00 (170.5 kg x R10/kg)
- Value of estimated gain of the additional dry sheep was R6 971.12.

According to previous experience, by researchers, it was estimated that these dry sheep gained 115.8 g/day over a period of 43 days, which represents a gain of 697.12 kg x R10/kg.

- Total value of live mass produced on 15 ha cowpeas was R27 493.12.

The profit margin is an indication of the financial efficiency of this system as part of the bigger enterprise. Lambs were not yet ready to be marketed at the end of the trial and only the value of the added mass of the other sheep was converted to a financial value. It could be argued that the sheep were bought in before commencement of the trial and sold for the same price/kg afterwards.

“Margin” above allocatable costs:
 $R27\,493.12 - R18\,446.25 = R9\,046.87/15\text{ha}$
 or $= R603.12/\text{ha}$

This compares well with a budgeted maize gross margin of R641.75 at a maize price of R900 per ton and a production of 5t/ha.

Conclusions

Cowpea is a well-adapted and reliable fodder crop.

For small-scale farmers cowpeas can be used not only for grazing, but as a vegetable as well. Early pods are suitable for using as green beans and the leaves can be cooked as spinach. Another advantage of this crop that is well recognized by farmers is its nitrogen fixing abilities, which contribute towards soil fertility. It is an excellent crop for intercropping between maize (Chapman, 1989).

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