Use of local browse tree pods as dry season supplement for goats in the south-western region of Zimbabwe

J.L.N. Sikosana[1]. V.Maphosa[1] . T. Smith[2]. V. Mlambo[2]. E. Owen[2]. and I. Mueller-Harvey[2]
Matopos Research Station, Private Bag K 5137, Bulawayo, Zimbabwe[1]
School of Agriculture, Policy and Development, The University of Reading, Earley Gate, P O Box 237, Reading, RG6 6AR[2]

Introduction The importance of goats has increased in the last 20 years, especially in the drier areas of Zimbabwe (Department of Veterinary Services, 2000). Goat productivity is severely affected by high kid mortality and low growth rates. Most of the goats in these drier areas kid in the dry season, which ranges in length from five to seven months. During the dry season there is severe nutritional stress. In extreme cases this results in deaths of both young and adult goats. In the smallholder sector farmers loose more than fifty per cent of goat kids born in a year.

Dry season supplementation has been recognized as necessary. Supplementation of goats in the dry season supports high growth rates (Prasad *et al*, 1995; Sikosana *et al.* 1997), but most smallholder farmers do not have resources to purchase commercial feed and must seek local alternatives. Trees of *Acacia* and other leguminous species characterize much of the natural rangelands, of the drier areas of the country. These trees produce fruits, which are readily eaten by livestock and could be collected and used as dietary supplements during the dry season thereby increasing the livestock productivity. Most of the browse pods are rich in protein (Tanner *et al.*1990; Ncube and Mpofu, 1994).

To provide farmers in the region with information on advantages of using available feed resources a study was undertaken to assess the effect of supplementing does with browse pods on kid growth and survival and doe milk production.

Material and methods The study was carried out at Matopos Research Station (20°/23'S and 28°/28'E) in south-west Zimbabwe. The altitude of the site is 1340m, and mean day temperatures vary from 21°C in June to 29°C in October. Mean annual rainfall is 600mm, normally falling between November and May. The natural vegetation is dominated by thorny *Acacia* species and ground cover comprises perennial grasses with occasional annuals (Ward *et al.* 1979).

Sixty, 5 year old, indigenous female goats, of the Matebele type goat, were exposed to three male goats to kid during the dry season of 2001. Forty-five days before the expected kidding animals were divided randomly into four groups. Three groups were supplemented with crushed whole pods *of Acacia nilotica* (Treatment 1*)*, *Acacia nilotica* mixed with *Dichrostachys cinerea* (Treatment 2), *D. cinerea* (Treatment 3). The fourth group (Treatment 4) did not receive any supplement. Supplements were given at the rate of 200g/day/animal and offered 45 days pre- partum and 45 days post-partum.The estimated percentage of crude protein of the dietary supplement was 12.9; 15.3; and 17.9 respectively.

Animals were raised under semi-extensive conditions. The animals were allowed to graze for an average of eight hours. Animal were offered the supplements individualy in crates. Refusals were collected and weighed daily. Weights of kids were recorded at time of birth and thereafter monthly. Milking was done once a day in the morning, beginning seven days after parturition. Kids were allowed to suckle after milking. Milk yield was recorded daily for 12 weeks.

The period of study was from May 2001 to February 2002. Data collected was subjected to analysis of variance using the general linear model.

Results Mean live weights of does were 35.0 kg (s.e.1.65) and did not change significantly ($P>0.05$) in all treatments from kidding to weaning. The overall mean birth weight of kids was 2.97 kg (s.e.0.13). There was no significant treatment effect ($P>0.05$); however single born kids were heavier than twin born kids. (Table 1). Treatment differences in kid weaning weights and growth rates were not significant ($P>0.05$) but there were differences between singles and twins ($P<0.05$). Kid mortality was highest among twins in the non-supplemented group. Most of the animals died during the first two weeks of life. From the results it is evident that supplementation had an effect on the birth weight of kids and kid survival, and on the milk yield during the first four weeks of lactation.

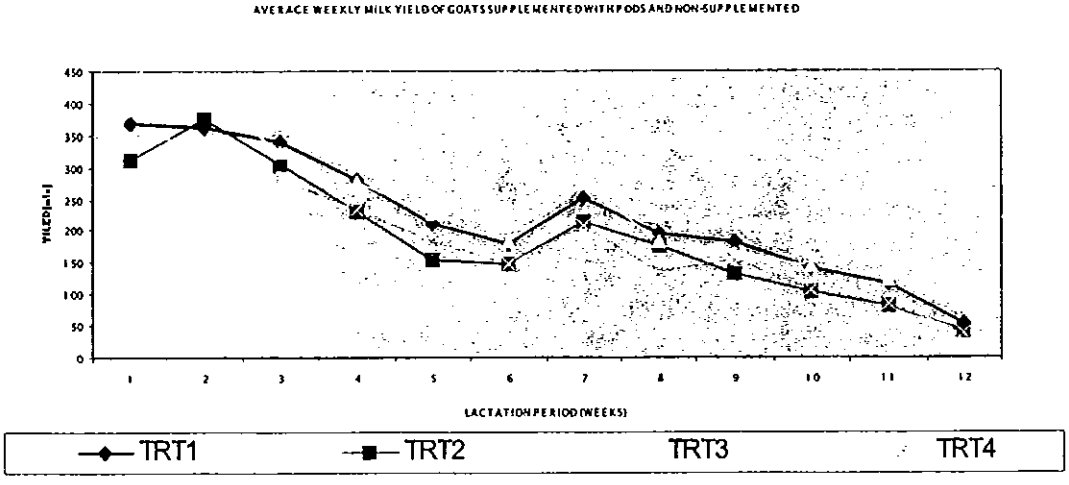
Overall total milk yield per animal during the first week of lactation ranged from 2546 mls (s.e.231.7) to as low as 503mls (s.e. 107.8) at the 12th week of lactation. The average weekly milk yield for each treatment is presented in Figure 1. Animals in treatment 3 had significantly higher ($P<0.05$) milk yields than the other treatments.

Table1 Birth weights (kg), weaning weights (kg) and average daily gains (g) of kids born from goats supplemented with browse pods and non-supplemented

Treatment	1	2	3	4
Birth weight (kg) singles	3.22(7)	3.38(6)	3.08(7)	3.16(8)
twins	2.69(12)	2.58(12)	2.93(12)	2.46(16)
s.e.	0.12	0.12	0.11	0.09
Weaning weights (kg) singles	12.08(6)	11.10(5)	11.25(6)	10.81(8)
twins	8.08(6)	9.00(8)	10.05(10)	9.43(7)
s.e	0.62	0.59	0.54	0.56
Average daily gain (g) singles	74.26	68.80	69.66	65.62
twins	46.33	53.75	59.70	57.28
s.e	0	0	0	0
Kid mortality % singles	14	16	14	0
twins	50	33	16	58

Numbers in parentheses represent the total number of kids accounted for.

Figure 1.



TRT1 = animals supplemented with *Acacia nilotica* pods TRT2= animals supplemented with a mixture of *A. nilotica* and *Dichrostachys cinerea* pods TRT3 = animals supplemented with *D. cinerea* TRT4 = animals not given a supplement

Conclusion The results of the present study demonstrate that browse pods from *A. nilotica* and *D. cinerea* are alternative feed supplements for goats during the dry season. Yield of goat milk can be increased, benefitting both kid survival and amount of milk available to the household. By collecting and storing the pods farmers are also increasing the efficiency of use of a natural resource that is locally available.

Acknowledgements We thank Matopos Research Station staff of the small ruminant unit for looking after the animals during the experimental period. This paper is an output from a research project funded by the United Kingdom Department for International Development (DFID) for the benefit of developing countries. The views expressed are not necessarily those of DFID (Project R7351, Livestock Production Programme).

References

Department of Veterinary Services, 2000. *Livestock census*. Ministry of Lands, Agriculture and Rural Resettlement, Harare.
Ncube, S.and Mpofu,D. 1994. The nutritive value of wild fruits and their use as supplements to hay.
Zimbabwe Journal of Agricultural Research **32:** 71-78.
Prasad, V.L., Chifamba, I.L.and Sithole, L. 1995. Characterization of indigenous goats and goat production systems in rural Zimbabwe: 3. Performance of kids and does as influenced by feed supplementation and frequency of watering during the dry season. *Division of Livestock and Pastures, Annual Report 1992-93.* DR& SS . Harare, 38-39.
Tanner, J.C., Reed, J.S. and Owen, E. 1990.The nutritive value of fruits (pods and seeds) from four *Acacia* species

compared with extracted noug *(Guizotia abysinica)* meal as supplements to maize stover for Ethiopian Highland sheep. *Animal production*, **53**: 27-38.
Sikosana, J.L.N. and Maphosa,V. 1995. Growth and carcass characteristics of young indigenous (Matebele) castrate goats grazing *Acacia* thornveld, and offered supplementary feed during the dry season. *Journal of the Zimbabwe Society for Animal Production* **VII**: 199-202.
Ward, H.K., Richardson, F.D., Denny, R.P. and Dye, P.J.1979. Matopos Research Station: a perspective. *Rhodesia Agricultural Journal* **76**: 5 -18.