DIET SELECTION OF FOUR FREE RANGING BREEDS OF SMALLSTOCK I: CHEMICAL COMPOSITION

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ABSTRACT

The diet selections of four free ranging breeds of small stock, Angora goats, Dorper-, Karakul- and Merino sheep, were determined at Koppieslaagte Production Farm. Five fistulated animals per breed were used to collect data over a period of 12-months, May 1987 to April 1988. Samples were collected on four consecutive days during the first week of each month. Simultaneously daily samples were collected from the veld in the areas of the camp where the animals were grazing. Significant differences ($P<0.05$) occurred between the breeds as well as between the breeds and cut samples of the veld. The Angora goat and Dorper were found to be much more selective grazers than the Karakul and Merino, selecting diets significantly higher in crude protein, energy, digestible organic matter (DOM) and lower in acid detergent fibre (ADF).

INTRODUCTION

The collapse of the Karakul industry during the 1980's forced small stock producers in the south of Namibia to diversify into other branches of the small stock industry. As a consequence, other breeds of small stock were introduced and the number of Angora goats, Merino sheep and Dorper sheep escalated sharply.

Little is known about what animals graze, how effectively animals graze the available species and their intake of the different species. Torell (1954) found that the selective grazing habits of animals present problems when representative samples from animals are sought. Each animal has characteristics that are immanent of their species and/or breed (Botha, 1981).

The most prominent factors in the nutritional value of a pasture are its chemical composition, digestibility and voluntary intake. When the nutritional value of a pasture is determined, the interaction between the animal and the pasture is actually evaluated. Nutritional value of a pasture should not be seen as a single parameter, but rather as a complex of parameters which influences the intake of nutritional substances by ruminants (Van Schalkwyk, 1978). Cut samples collected in the veld may be representative of the chemical composition of the veld, but do not represent what is actually grazed by the animals. Representative samples can only be collected by sampling from the grazing animal (Weir et al., 1959).

The use of bio-mass as a method to calculate stocking capacity, as propagated by Visser (1987), was a help in as much as that it gave producers a guideline for the number of animals that could be stocked. It had been realized that Karakul could not be replaced on a 1:1 basis, but still no answers were available as to how the breeds compare or differ in their selection of the veld. With this in mind a project was started at Koppieslaagte Production Farm, where the diet selections of Angora goats, Dorper-, Karakul- and Merino sheep were determined.

MATERIALS AND METHODS

Five two tooth whethers of each Angora, Dorper, Karakul and Merino were fistulated for sample collection, according to the technique described by Botha (1981). Three additional whethers of the same age per breed, were placed in the group to act as controls during the monthly weighings. These 32 animals grazed a single camp of ± 240 ha for the duration of the project, May 1987 to April 1988. The reason for using only one camp was to eliminate variation that might exist between camps. The chosen camp was representative of the veld type and species found on the farm. The animals grazed the camp continuously and samples were collected on a monthly basis.

Samples were collected for four consecutive days during the first week of the month. The animals were penned every night in a mobile pen, which was shifted around the camp to prevent possible localized spot selection. Every morning the fistulas were removed and the collection bags fitted to the animals, after which the animals were put out to graze for an hour before being caught again for the removal of the bags. During this period a sample was collected in the area grazed by the animals, containing both grass and bush material.

The sample collected from each animal was divided into two portions. The one portion was frozen for chemical analysis later. The samples of each animal, to be chemically analyzed, were pooled at the end of the week. The other portion of each individual sample was mixed with the samples of the other animals of the breed to form a composite sample. From this composite sample a sub-sample was taken and used to determine species selection.

Phosphorus (P), crude protein (CP), acid detergent fibre (ADF), digestible organic matter (DOM), organic matter (OM) and metabolizable energy (ME) was determined for the selected diet of each breed and for the cut samples collected from the veld. The data were statistically analyzed using Sigmastat.

RESULTS AND DISCUSSION

Contrary to the results found by Obioha et al. (1970), no differences were found between the animals used in each

Table 1. The average phosphorus, crude protein, acid detergent fibre, digestible organic matter, organic matter and metabolizable energy of the diets selected by the different free ranging breeds and the cut samples

Species/breed	P (%)	CP (%)	ADF (%)	DOM (%)	OM (%)	ME (MJ/kg)
Angora	0.230	11.485	41.840	58.950	86.065	8.125
Dorper	0.195	10.505	39.650	57.455	86.860	8.230
Karakul	0.160	8.470	44.615	57.080	89.110	7.700
Merino	0.170	9.465	44.315	56.845	88.475	7.520
Cut Sample	0.150	6.290	49.050	52.760	82.805	6.070

breed. Table 1 presents the average phosphorus (P), crude protein (CP), acid detergent fibre (ADF), digestible organic matter (DOM), organic matter (OM) and metabolizable energy (ME) of the diets selected by the different breeds and the cut samples collected in the veld.

These results are in accordance with those of Weir et al. (1959) in that the samples selected by animals were found to be higher in crude protein and lower in crude fibre than the cut samples. All four breeds differed significantly ($P<0.05$) from the cut sample for all the criteria.

The selected a diet with a significantly ($P<0.001$) higher P content than that of the other breeds or the cut sample. This is probably due to the Angora goat primarily being a browser. There were significant differences ($P<0.05$) for the P percentage between breeds in their respective diets and between the breeds and the cut sample.

The Angora goats selected a diet with the highest crude protein content. The diets of the Angora and Dorper did not differ significantly (($P>0.05$) but did differ from those of the Merino, Karakul and cut samples. The diets of the Karakul and Merino did not differ significantly ($P>0.05$) but did differ from the cut samples. The high protein content in the diets of the Angora and Dorper could be due to the fact that both breeds utilized browse to a greater extent than what the other species did.

The fibre content in the diets of the four breeds differed significantly ($P<0.05$) from the fibre content of the cut sample that was much lower. The low fibre value determined for the Dorper could be attributed to their grazing habits. It was observed that they selected much finer and greener material than the other breeds.

The digestible organic matter fraction in the diets of the four breeds differed significantly ($P<0.05$) from the cut sample. The Angora had the highest DOM content and differed significantly ($P<0.05$) from the Merino, but not significantly ($P>0.05$) from the Dorper and the Karakul. The Dorper, Karakul and Merino did not differ significantly ($P>0.05$). The low DOM percentage obtained for the cut sample is a reflection of the high fibre content.

The percentage OM in the diets of the four breeds differed significantly ($P<0.05$) between breeds and from the cut sample. The high value of the Dorper could be partly due to the very low percentage ADF in their selected diet. The low OM value that was found for the cut sample is a reflection of the high fibre and low DOM percentage of the available grazing.
The energy values of the selected diets of the four breeds differed significantly ($P<0.001$) from the cut sample. The Angora and Dorper did not differ significantly ($P>0.05$) from one another, neither did the Karakul and Merino. However, these two groups did differ significantly ($P<0.05$) from each other.

Significant differences ($P<0.05$) occurred between breeds with–in months for all the criteria, except for the percentage P, where significant differences were only recorded for the months of September/October 1987 and January/February 1988. With-in breed, between month, differences were significant for all the breeds.

As experienced by Aucamp & Nell (1974), problems occurred with the fistulation of the Angora goats. They were very sensitive to the anesthetic and took long to recover after the operations. Their thin skin produced excessive amounts of connective tissue, which resulted in the fistula openings closing. Twice the number of goats required had to be fistulated to obtain the desired number of experimental animals.

CONCLUSIONS

From the chemical analyses and observations made during the project, it is clear that the Angora and Dorper are very selective grazers. The Dorper was observed to select fine and green plant material when compared to the fistula samples of the other breeds, which contained dry, brown material. These observations are confirmed by the high crude protein, low fibre and high energy contents of their respective selected diets. In contrast it seems that the Karakul and Merino are not such selective grazers, as was reflected in the lower energy, crude protein and DOM values and higher OM values of their selected diets.

The significant differences found between sheep breeds is in contrast to the statement of Tribe (1952, as quoted by Botha, 1981), who stated that breeds of the same species will differ little in their diet selection. These differences might be explained by the fact that the sheep breeds differ in their produce, and thus their nutritional needs could differ. The Dorper produces mutton, the Karakul produces pelts and the Merino produces wool.

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