

# DIET SELECTION OF FOUR FREE RANGING BREEDS OF SMALLSTOCK II: SPECIES COMPOSITION

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## ABSTRACT

The diet composition 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 the month. Before the commencement of the project the composition of the veld was determined by means of the Wheel-point Method (Tidmarsh & Havenga, 1954). The Angora utilized the highest percentage (20%) of bush. All four breeds utilized the more nutritious grass species as the main component of their diet. The Angora utilized a higher percentage of grass in its diet than would be expected and thus competes with the sheep breeds for available grass. The breeds also compete for the same bush species.

## INTRODUCTION

Very little is known about the preference of different species of small stock for specific plant species. Knowledge of what different animals graze, and how much, is essential for the efficient management of both animal and veld (Laycock et al., 1972), especially if different breeds or species of livestock are involved. Due to the selective grazing of animals, cut samples cannot be used to accurately predict what animals will graze (Torell, 1954). Representative samples can only be obtained by collecting them from the grazing animal (Cook et al., 1958; Laycock et al., 1972; Rice et al., 1971).

In order to determine the influence of different breeds of

livestock on veld, it was decided to determine species selection as another component of the diet selection project at Koppieslaagte Production Farm.

## MATERIALS AND METHODS

The animals and the grazing system used and sampling were discussed in Part I. The botanical composition of the veld was determined before the commencement of the project, by means of the Wheel-point Method (Tidmarsh & Havenga, 1954). Each specie present was expressed as a percentage of the total botanical composition (2 000 points). It is not only important to know the plant species and the amount of each the animals grazed, but also the availability of the different species. Unfortunately, the shrubs and bushes were only identified and not included in the botanical composition, nor were they expressed in numbers per hectare.

The portion of each sample used for plant identification was placed in cheese cloth and most of the saliva pressed out by hand. Each sample was first rinsed with water and then with 2% acetic acid solution before being stored in FAA. At the end of each sampling week, the daily samples for each of the breeds were pooled to produce composite samples.

The composite samples were evenly distributed in a 28cm X 28cm tray and a systematic point method was used to collect 200 sub-samples for identification. The sub-samples collected were then micro-histologically analyzed and the plant species identified according to the technique of Botha et al. (1986). For this identification process, permanent keys were prepared beforehand.

Table 1. Botanical composition and frequency of plant species in the camp and the average monthly contribution of each to the selected diets of the four animal breeds

Grass species	Frequency	Angora		Dorper		Karakul		Merino	
<i>Cenchrus ciliaris</i> (Bloubuffel)	6.0	7.67	6	8.17	6	9.13	5	10.67	4
<i>Enneapogon scaber</i> (Klipgras)	1.0	1.76	13	2.59	11	2.92	9	2.40	11
<i>Stipagrostis namaquensis</i> (Steekwiet)	1.0	3.96	9	2.67	10	2.25	12	2.04	12
<i>Stipagrostis ciliata</i> (Langbeen Boesman)	21.0	<b>12.92</b>	<b>4</b>	<b>16.08</b>	<b>2</b>	<b>17.63</b>	<b>2</b>	<b>14.75</b>	<b>2</b>
<i>Eragrostis lehmaniana</i> (Kniëtjiesgras)	8.0	3.38	12	2.50	12	2.58	11	2.96	10
<i>Schmitia kalahariensis</i> (Kalaharissuurgras)	10.0	3.50	11	6.33	7	3.42	8	5.83	8
<i>Stipagrostis obtusa</i> (Kortbeen Boesman)	18.0	<b>14.38</b>	<b>3</b>	<b>18.46</b>	<b>1</b>	<b>18.58</b>	<b>1</b>	<b>16.88</b>	<b>1</b>
<i>Eragrostis porosa</i> (Windgras)	7.0	8.50	5	9.83	5	9.50	4	10.54	5
<i>Digitaria eriantha</i> (Wolvingergras)	4.0	7.37	7	<b>10.96</b>	<b>3</b>	<b>9.92</b>	<b>3</b>	<b>11.17</b>	<b>3</b>
<i>Stipagrostis uniplumis</i> (Blinkhaargras)	17.0	3.63	10	2.71	9	2.75	10	3.38	9
<i>Fingeruthia africana</i> (Vingerhoedgras)	4.0	5.88	8	6.33	7	7.33	7	6.00	7
<i>Aristida congesta</i> (Steekgras)	1.0	1.00	14	1.54	13	1.17	13	1.42	13
Unidentified	0.0	14.50	2	1.08	14	0.83	14	0.83	14
Shrubs and trees	unknown	<b>20.33</b>	<b>1</b>	<b>10.42</b>	<b>4</b>	<b>9.13</b>	<b>5</b>	<b>8.08</b>	<b>6</b>



## RESULTS AND DISCUSSION

Table 1 presents a summary of the grass species found in the camp and their frequency of occurrence, the average monthly percentage of these species in the diets of the four breeds and the ranking of the specific plant species in the diet of the each breed. All unidentifiable samples, of both grass and bush, were placed in the category 'unidentified', and all the bush species were pooled. As expected, the Angora, as a browser, had a significantly higher ( $P < 0.05$ ) intake of bush and shrubs than the sheep breeds, but still much lower than expected. Could it be that the browsing aspect of goats is over-estimated and that they consume more grass than what is believed to be the case, thus being in competition with other grazers for available grass? Or were the grazing habits of the goats influenced by the fact that different species grazed together? It was observed that the Angora chews the ingested material much finer than the sheep breeds before swallowing. This resulted in a high percentage of unidentified samples, which made up the second largest fraction of the Angora's diet.

*Stipagrostis ciliata*, *Stipagrostis obtusa*, *Stipagrostis uniplumis* and *Schmitia kalahariensis* were the most abundant species. The highly desirable species, *Cenchrus ciliaris*, *Digitaria eriatha*, *Eragrostis porosa* and *Fingeruthia africana* were present in small numbers.

No significant differences ( $P > 0.05$ ) were found between breeds concerning their selection of grass species. From Table 1 it can be seen that all four animal breeds had the same two plant species, *Stipagrostis ciliata* and *Stipagrostis obtusa*, as

the first and second choice on their list of selected species. *Stipagrostis obtusa* formed a larger part of the diet of the Dorper and the Karakul than what it formed part of the veld composition. Even though *Digitaria eriatha* contributed only 4 percent to the composition of the veld, it was third on the list of selected species of the three sheep breeds and formed an important part of their diet. The same applies for *Cenchrus ciliaris*, *Eragrostis porosa* and *Fingeruthia africana*. This is an indication that these species need to be monitored to determine whether a camp is being over utilized. Quantity- and quality-wise these species are important, for with the exception of *E. porosa*, these species produce tufts of high volume.

The higher than expected utilization of *Enneapogon scaber* is due to a breed and month interaction. All the breeds utilized this species very little, except in November, when it contributed between 7 and 19.5% of the selected diet. Though it was significant quantity-wise, it did not actually contribute much quality-wise, as it produces a small tuft with little weight.

Table 2 represents the average contribution of the different bush, shrub and tree species to the diet of the four breeds. *Salsola sp.* and the different *Zygophyllum sp.* were the woody species utilized the most throughout the year. *Aizoon schellenbergii*, *Antiphonia pinnatisecta*, *Hermania spinosa*, *Osteospermum muricatum*, *Pentzia spinescens* and *Psilocalon mentiens* were not utilized by any of the breeds during the sampling periods.

With-in breed and between breed, month x species interactions

Table 2. Average monthly consumption of bush species by the Angora, Dorper, Karakul and Merino

Bush species	Angora	Dorper	Karakul	Merino
Aizoon schellenbergii	0	0	0	0
Antiphonia pinnatisecta	0	0	0	0
Aptosimum albomartinatum	0.33	0	0	0.46
Aptosimum spinescens (Kankerblaar)	0	0.18	0	0
Blepharis mitrata	0	0.04	0	0
Eriocephalus ambiguus (Kapokbos)	0.13	0	0.16	0.21
Hermania spinosa	0	0	0	0
Geigeria pectidea (Vermeerbos)	0.08	0.2	0	0
Lycium oxycarpum (Kriedoring)	1.8	1.0	0.29	0.42
Leucas capensis	0	0.18	0.21	0
Monechma incanum (Netvetbossie)	1.3	0	0.04	0
Osteospermum muricatum (Draaibos)	0	0	0	0
Pentzia spinescens (Doringkarroo)	0	0	0	0
Polygala leptophylla	0	0.96	0	0
Psilocalon mentiens	0	0	0	0
Salsola sp. (Gannabos)	4.63	2.08	3.04	3.0
Tetragonia calycina (Klappiesbrak)	0	0.41	0	0
Tetragonia sp. (Klappiesbrak)	0.4	0.38	0	0
Thesium laciniatum (Swartstorm)	0	0	0.88	1.29
Zygophyllum simplex (Skilpadbossie)	1.42	0.33	0.16	0.33
Zygophyllum suffruticosum (Skilpadbossie)	7.5	3.21	2.58	1.42
Zygophyllum tenue (Skilpadbossie)	1.7	0.5	0.5	0
Rhigozum trichotomum (Driedoring)	0.4	0.75	0.13	0.71
Acacia erioloba (Kameeldoringboompitte)	0.08	0.29	0.33	0.25
Acacia hebeclada (Trassiebos)	0	0	0.79	0

were significant ( $P < 0.05$ ). Certain woody species were utilized during specific periods of the year. *Lycium oxycarum* was utilized by all the breeds during the period May to October. *Eriocephalus ambiguus* was utilized differently by the different breeds; the Angora utilized it during June and July, the Dorper during February, April and May, the Karakul during July, November, December and March and the Merino during February and March. *Zygophyllum suffruticosum* was utilized extensively by all the breeds, but the Angora was the only breed to utilize it every month.

The Angora consumed the highest percentage of bush during the period December to April (when the new coppice regrowth took place), the Dorper during June to October (the drier period of the year), the Karakul during August to December and the Merino during August and September and then again during February to April (two periods of bush utilization). This indicates a significant difference in the patterns of bush utilization for the different animal breeds.

## CONCLUSIONS

All four breeds utilized the more nutritious grass species as the main component of their diet, and thus compete with one

another for available forage. This will have to be taken into account in grazing management, should these breeds be found on the same farm. The Angora utilized a higher percentage of grass in its diet than was expected and thus competes with the sheep breeds for available grass. The different breeds also competed for the same bush species. Care should be taken that these desirable feed bushes do not get over utilized.

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