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## Feeding behaviour, intake and digestion of the *Camelus dromedarius* at pasture

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**SUMMARY** - This study aims at gathering information on voluntary intake, degradability, nutritive value, feeding value and selection of plants in the dromedary. Dromedaries avoid grazing during hot hours. They select plants rich in protein and consume 1 kg of dry matter per 100 kg of live weight, producing  $6.4 \pm 1.3$  kg of faeces with 56.7% humidity. Mean apparent digestibility of organic matter is  $41.3 \pm 12.5\%$ .

**Key words:** Dromedary, feeding behaviour, nutritive value of pasture.

**RESUME** - "Comportement alimentaire, consommation et digestion du *Camelus dromedarius* au pâturage". Cette étude vise à recueillir des informations sur l'ingestion volontaire, la sélection des plantes, leur dégradabilité et leur valeur nutritive et la valeur alimentaire chez le dromadaire. Le dromadaire évite de pâturer pendant les heures chaudes de la journée. Il sélectionne les plantes riches en protéines et consomme 1 kg de matière sèche pour 100 kg de poids vif, produisant  $6,4 \pm 1,3$  kg de fèces avec 56,7% d'humidité. La digestibilité apparente moyenne de la matière organique est de  $41,3 \pm 12,5\%$ .

**Mots-clés** : Dromadaire, comportement alimentaire, valeur nutritive du parcours.

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### Introduction

Camel's food behaviour on pasture is not well known. Two pilot studies were undertaken at the ESA Mateur experimental farm in order to observe nutritional behaviour and rhythm activities of camel. This research is meant to verify the camel's diet selection, and the nutritive value and digestibility of its intake during the dry season (June-September), in order to estimate the supplement requirements to meet different physiological needs.

The first study concerned the female camel "Negga" behaviour (Kamoun and Levrel, 1991) and the second was about young male camel "Gueoud" behaviour. The synthesis of the last study is quoted below.

## Methodology

The observations were made on different rangelands of the farm (17 hectares) during the dry season. The vegetation is typically Mediterranean. The studies were carried out on six male camels (Table 1).

Table 1. Body weight (BW)

Birth date	Gueoud no.	BW at 01/08/91	BW at 31/08/91
06/09/89	8906	442	417
05/04/89	8902	440	442
11/03/89	8901	431	433
02/02/88	8803	513	507
27/01/88	8802	508	502
22/12/87	8801	445	415

The animals under study were herded together with other camels and they were watered at the end of the day. During a 2 week-period adaptation, the camels received 2 kg of food concentrate at 06:00 h, they arrive on pasture at 06:30 h and went back voluntarily around 17:30 h. At the same time, they became accustomed to the presence of observers and bags. Afterwards, we stopped concentrate distribution. In this experimental period, they arrived on pasture at 06:50 h and left it voluntarily around 17:00 h. Faeces were collected on camels deprived of concentrate for 7 days.

We determined:

- i. The plant composition, the nutritive value and the productivity of rangeland during the dry season.
- ii. Chronometric measurement of time spent by each animal (with or without concentrate distribution) in: consuming vegetation at ground level; consuming big tree vegetation; moving from place to place; ruminating and resting.
- iii. Dry matter intake (composition, quantity and quality). To determine ingestion speed, dry matter composition and quality on natural pasture, we used the owner collection technique (Guerin, 1984). Then, at the highest grazing period, in close proximity to the animal, we imitated his feed intake patterns 10 minutes per hour per animal. Plant species and plant parts consumed by the camel were collected in bags, respecting bite numbers and bite size. The collection was weighed and analyzed.
- iv. Apparent digestibilities. During 6 days, faeces were collected in bags attached

to the animals with harnesses. Faeces were collected 3 times a day. Collections were weighed and chemically analyzed.

## Results

The productivity of rangeland at dry season was 5180 kg DM ha<sup>-1</sup>. The plant species composition was: 25% tree (80% *Acacia*, 20% *Olea*); 75% annual grasses (70% Gramineae, 25% Compositae)

Camels graze during the morning and late afternoon. They avoid grazing during the hot time from 10:00 to 14:00 h (Fig. 1) and they spend 66.3% of their time grazing (Fig. 2a). The grazing time was influenced by age (Fig. 2b) and concentrate supplementation (Fig. 2c).

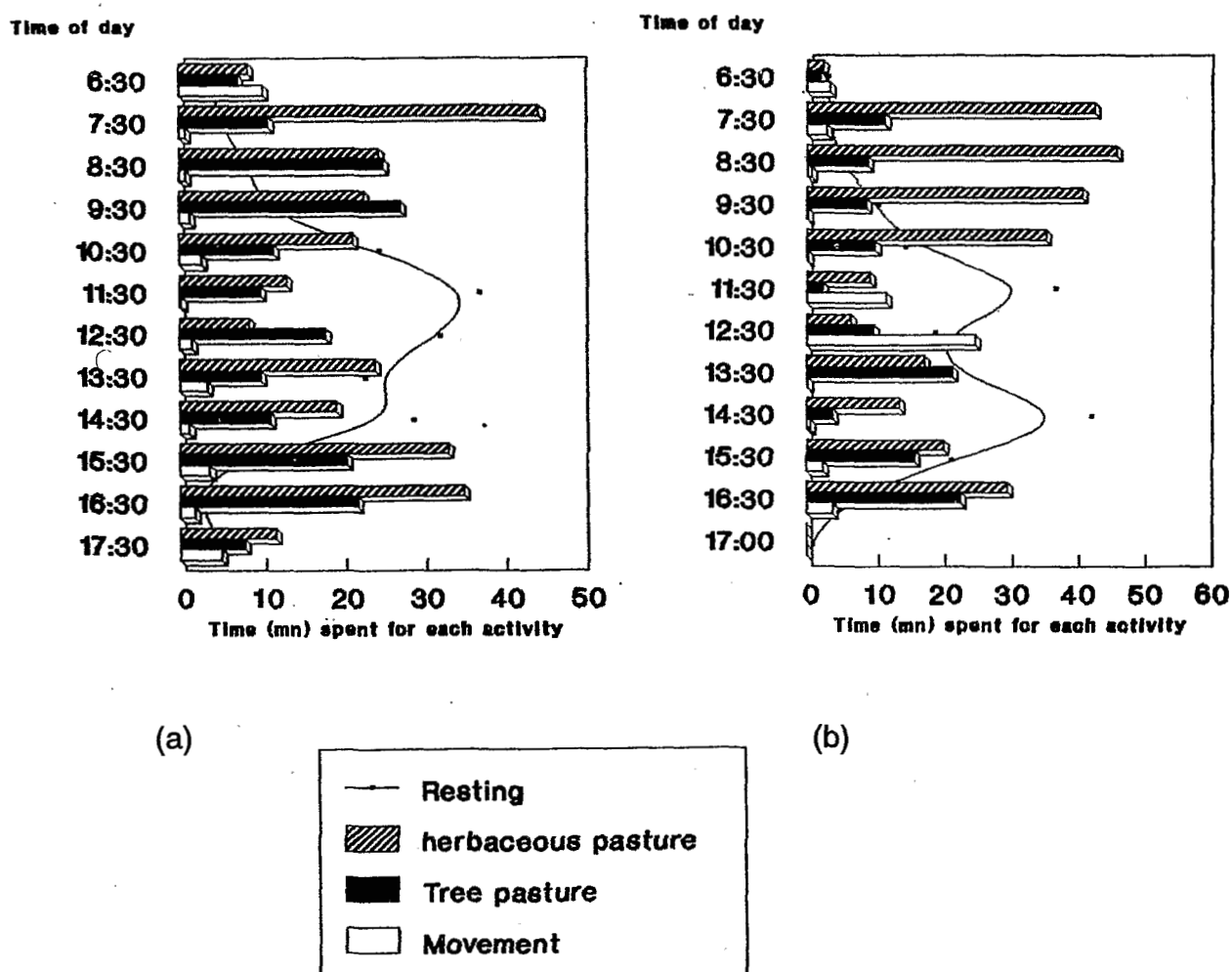
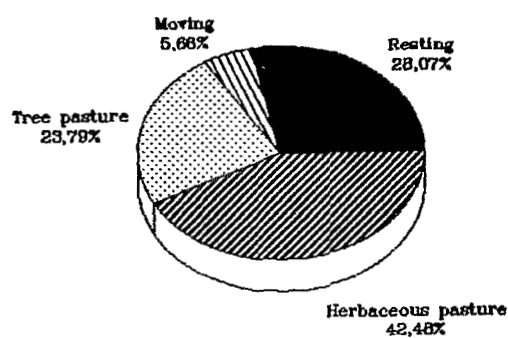
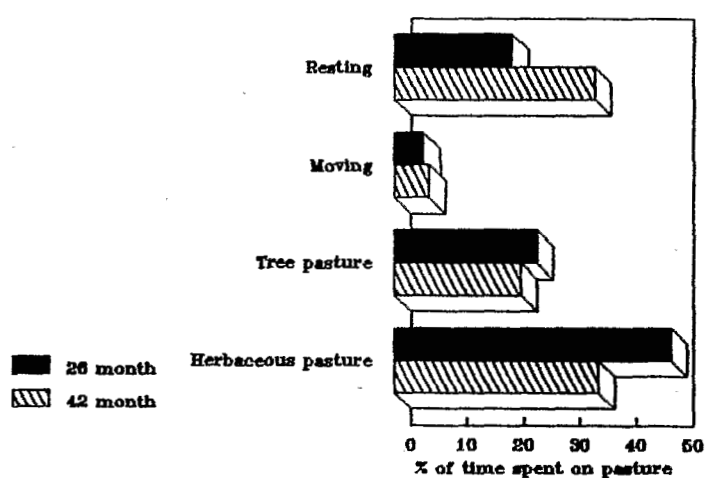


Fig. 1. Behaviour of camels at pasture. (a) Camels receiving food concentrate. (b) Camels deprived of food concentrate.

a: The group means



b: Influence of age



c: Influence of food concentrate

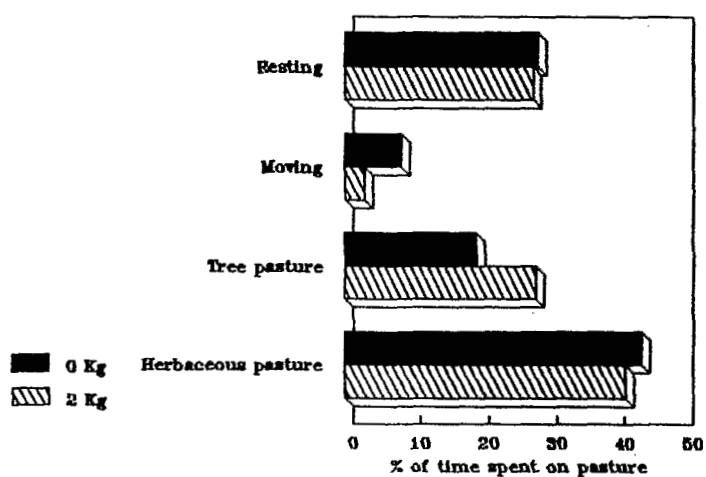
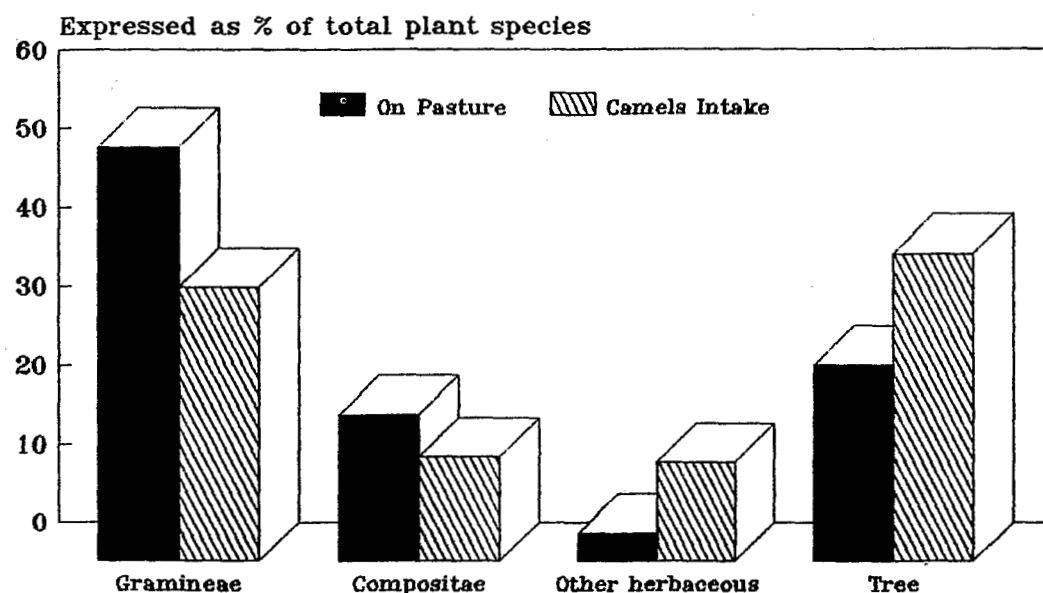
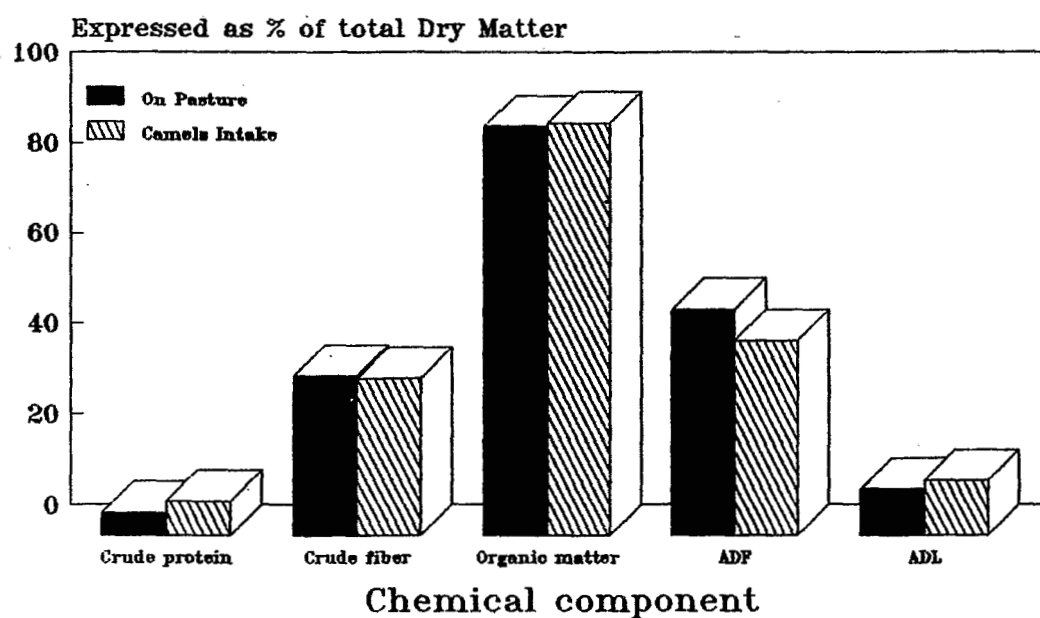


Fig. 2. Time spent on different activities (expressed as % of total pasture time).

Dietary contributions of plant species and groups of species are reported in Fig. 3. Camels are able to select plant species with a high crude protein content.



(a)



(b)

Fig. 3. Characteristics of the diet. (a) Plant species selected by camels. (b) Chemical composition of camels diet.



Table 2. Dry matter intake and faeces collected per day

Body weight (kg)	458 ± 42
Grazing time (min)	404 ± 49
Ingestion rate (g DM h <sup>-1</sup> )	652 ± 149
Dry matter intake	
Total kg	4.39 ± 0.54
kg per 100 kg BW	0.97 ± 0.19
Faeces collected	
Weight (kg)	6.4 ± 1.3
% DM	43.3 ± 3.2

Total intake is calculated as the product of the rate of ingestion (g DM per h) and the grazing time. On pasture, dromedaries consume about 1 kg DM per 100 kg BW (Table 2) and they eject about 6.4 ± 1.3 kg of faeces with 56.7% humidity.

Apparent digestibilities of DM, OM, CP, CF, ADF and ADL are given by Table 3. The values of DM digestibility are comparable to those reported by Gauthier-Pilters (1977).

Table 3. Apparent digestibility

Camel no.	8801	8802	8803	8901	8902	8906	Mean
d (DM)%	51.9	22.7	16.8	39.1	37.1	52.7	36.7 ± 13.5
d (Protein)%	34.8	-0.9	-5.4	15.4	08.1	36.9	14.8 ± 16.3
d (Fibre)%	49.0	28.4	19.6	38.7	39.2	54.3	38.2 ± 11.7
d (OM)%	55.5	27.8	23.3	44.2	41.5	55.8	41.3 ± 12.5
d (ADF)%	39.3	03.1	-1.1	23.6	21.9	43.6	21.8 ± 16.6
d (ADL)%	-24.1	-49.9	-63.1	-24.3	-32.9	05.1	-31.5 ± 21.5

## Final conclusion

This study tried to answer conclusively questions about the diet selection, voluntary intake, nutritive value and digestibility of camel feed during the dry season (June-September), in order to estimate the camel's supplement requirements in this period.

This study provides preliminary information to facilitate the future off-station

investigations, preceded by on-station investigations which include "*in vivo* digestibilities". Finally, in order to respect the seasonal variations influence, measurements must be repeated during dry, intermediate and green seasons.

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