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# GRAZING BEHAVIOUR OF FOUR SHEEP BREEDS IN RUBBER PLANTATIONS

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# GRAZING BEHAVIOUR OF FOUR SHEEP BREEDS IN RUBBER PLANTATIONS

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**ABSTRACT**

Grazing behaviour was observed in 24 animals of 4 breeds; Sumatra (S), S x Barbados Blackbelly crossbred, S x St. Croix crossbred and S x Javanese Fat Tail crossbred. Two groups, each with 3 animals of each breed, were observed for five days. The parameters observed were grazing, walking, ruminating, resting and others. There were no significant differences between breeds for all parameters. The flock movement was probably the greater determinant of behaviour than breed.

# TINGKAH LAKU MERUMPUT PADA EMPAT BANGSA DOMBA DIBAWAH PERKEBUNAN KARET

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ABSTRAK

Telah dilakukan penelitian tingkah laku merumput, pada 24 ekor domba, terdiri dari 4 bangsa: Sumatra (S), persilangan S x Barbados Blackbelly, persilangan S x St. Croix dan persilangan S x domba Ekor Gemuk. Sampel diamati pada dua tempat padang penggembalaan, setiap bangsa diamati 3 ekor selama 5 hari. Prameter yang diamati meliputi; tingkah laku merumput, berjalan-jalan, memamahbiak, istirahat dan lain-lain. Dari hasil pengamatan pengaruh bangsa tidak berbeda nyata terhadap semua parameter yang diamati. Perpindahan lokasi padang penggembalaan kenungkinan besar lebih mempengaruhi tingkah laku merumput dibandingkan pengaruh bangsa.

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## INTRODUCTION

The Small Ruminant Collaborative Research Support Program (SR-CRSP) breeding project in Sungai Putih, North Sumatra was initiated in 1985 with emphasis on improving Sumatran sheep grazing forages in rubber plantations. Two simultaneous breeding plans were implemented; 1) establishment of a nucleus of Sumatran sheep (S) for selection and 2) development of a productive strain of hair sheep with superior genetic potential for resistance or tolerance to internal parasites, good adaptation to the climate and available feed resources of the (sub-)humid tropics, and suitable for a variety of management systems. For this second plan, three crosses were used: S x Barbados Blackbelly, S x Javanese Fat Tail and S x St. Croix.

A number of comparisons of these breeds have been conducted, including relative growth rates in response to improved nutrition, relative productivity and resistance to internal parasites. However nothing is known about the grazing behaviour of these genotypes. Part of the variation in the capacity of ruminants to consume feed has a genetic basis (Weston, 1982). Grazing behaviour, which is one component of this genetic

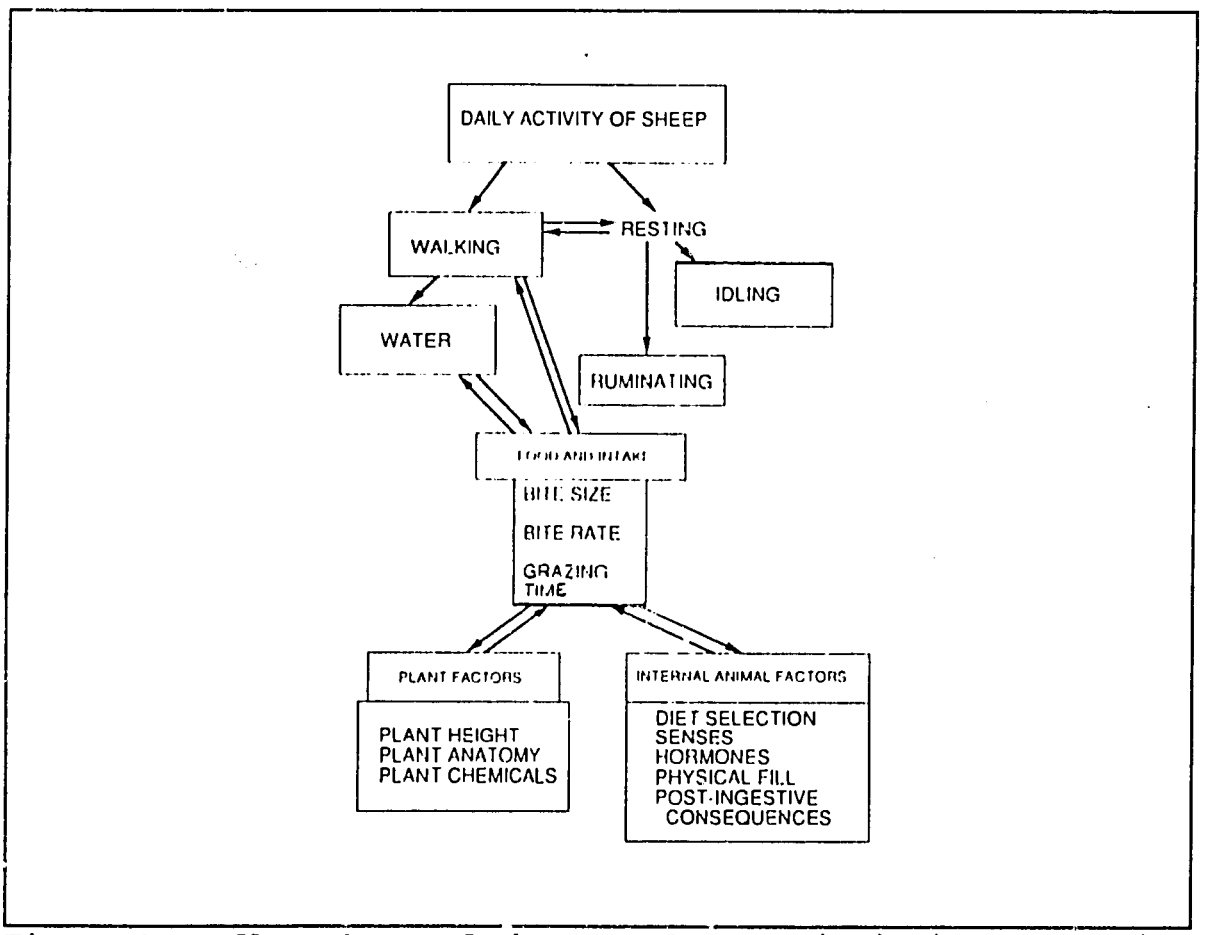


**Figure 1** A flow chart of the many factors impinging on grazing behaviour.
Source: Lynch *et al.*(1992).

variation, can be a very important determinant of voluntary feed intake. For sheep raised in villages in North Sumatra, insufficient grazing time is sometimes a limitation to production. A breed which satisfies its dry matter intake requirements in a shorter time could be advantageous. Therefore, the main objective of this trial was to compare the grazing behaviour of the four genotypes grazing under rubber at Sungai Putih.

Grazing behaviour in this study is defined as only the activity of sheep during the grazing period excluding factors as bite size and bite rate (see Figure 1). Next to the actual grazing (the voluntary feed intake) the sheep were also ruminating, resting, walking, scratching and fighting.

## METHOD AND MATERIALS

The study was conducted with four genotypes: Sumatra (S), Barbados Blackbelly crosses (B1), Fat tail crosses (E1) and Virgin Island hair sheep crosses (H1). The B1 is a crossbreed between Barbados Blackbelly (from the Caribbean) and S. The E1 is a crossbreed between Javanese Fat tail (also called Ekor gemuk) and S. The H1 is a crossbreed between St. Croix (from the Caribbean) and S.

Data analysis of a preliminary study which lasted two days indicated that 24 sheep were sufficient for comparison of the different genotypes (based on the variance of grazing time percentages). The 24 sheep used consisted of 6 randomly selected animals from each breed. They were divided into two equal groups with three sheep from each breed in each group. The two groups

| Time | Sheep | Activity 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| 8.00 | S,1 | | | | | |
| 8.01 | H1,1 | | | | | |
| 8.02 | B1,1 | | | | | |
| 8.03 | E1,1 | | | | | |
| 8.04 | S,2 | | | | | |
| 8.05 | H1,2 | | | | | |
| 8.06 | B1,2 | | | | | |
| 8.07 | E1,2 | | | | | |
| 8.08 | S,3 | | | | | |
| 8.09 | H1,3 | | | | | |
| 8.10 | E1,3 | | | | | |
| 8.11 | B1,3 | | | | | |
| 8.15 | S,1 | | | | | |
| etc. | etc. | | | | | |

**Table I** Recording schedule

were observed in their usual flocks to avoid disturbing normal behaviour. Each flock consisted of approximately 100 animals. Weaned lambs and ewes with young lambs (less than 2 weeks old) were housed separately and did not join the flock to graze. Grazing lasted for 7 to 7½ hours per day. The sheep were painted with different coloured numbers on their sides for identification. Each colour represented a breed and the individual sheep were numbered 1, 2 or 3.

The recording schedule is shown in Table I. Every 15 minutes each sheep in one group was recorded (i.e. each sheep was recorded 4 times every hour). The sheep were surveyed for 10 days; 5 days per group. For each day the percentage of time spent in each activity was calculated for every animal, giving 30 percentages per activity per breed over the 10 days.
The categories of grazing behaviour were:
1- grazing; standing or lying down,
2- ruminating; standing or lying down,
3- resting,
4- walking,
5- others; such as scratching, playing and fighting.

The percentages of time spent in each category were summarized using Lotus 123. The mean percentages of time spent grazing were analysed using SAS release 6.03.

## RESULTS

The analysis of grazing time data showed that there were no significant differences (P>0.05) between breeds. Table II shows the range of the percentages and the standard errors for all the parameters measured. There were no significant differences between the breeds for each parameter. The grazing percentages varied between 70.0% (H1) and 71.6% (E1).

| Activity | Range of percentage(%) | Standard error of mean percentage ($SE_x$) |
|---|---|---|
| Grazing | 70.0 - 71.6 | 1.2 |
| Walking | 9.8 - 12.3 | 1.1 |
| Ruminating | 14.9 - 16.9 | 1.0 |
| Resting | 1.7 - 2.4 | 0.4 |
| Others | 0.5 - 0.8 | 0.3 |

**Table II** Range of percentages and standard error of five parameters.

## DISCUSSION

The lack of a significant breed effect on the percentages of time spent grazing could be due to the fact that there is either no measurable breed effect or individual behaviour is influenced more by flock dynamics than any breed effect. To detect true breed effects, behaviour would have to be measured in single breed flocks, so that flock behaviour is representative of the breed behaviour. The differences between breeds could then be analysed by considering the differences between flocks. However, based on these results, it is our opinion that further behavioural studies should not be a high priority for research at Sungai Putih.

Giving the results, the length of grazing time is a more important determinant of dry matter intake than the breed differences. The length of grazing time depends on the grazing system used by the farmer, e.g. herding or a mixed system (both herding and fed cut forage), which is itself determined by the availability of labour to look after the grazing animals. A study by Merkel *et al.* (1992) showed that 4 hours grazing was not sufficient to meet the dry matter intake requirements of sheep in rubber plantations. Farmers involved with the SR-CRSP Outreach Research Project at Sungai Putih herd their animals for about 4 hours in the afternoon and provide supplementary cut forage and/or tree legume leaf to the animals in the barn. A study is now being conducted to see if dry matter intake under these conditions is adequate.

The aim of this study was to see if there were any breed behavioural differences which might affect feed intake. Although no behavioural differences between breeds were detected, two other characteristics might affect feed intake need to be considered in future. They are:

1) Differences in capacity to use energy between breeds.

   Given no dietary or environmental constraints, feed intake by sheep will be strongly determined by each breeds' maintenance energy requirement. Results quoted by Weston (1982) point to a difference of at least 15 percent in feed intake between two breeds of sheep that is attributable to differences in the two breeds' capacity to use energy. Such differences between the breeds at Sungai Putih need to be investigated.

2) Differences in liveweight between breeds.

   Gatenby *et al.* (1993) showed that the St. Croix crossbred ewes are considerably heavier than the Sumatran ewes (30.2 kg compared with 23.1 kg). Assuming no genetic differences in capacity to use energy, feed intake will be directly related to metabolic body size. Therefore, to satisfy basic dry matter intake requirements, heavier animals will

require longer grazing times. It is suggested that a future study examines feed intake differences between the breeds expressed as a proportion of metabolic body weight. The amount of time required to satisfy feed intake requirements could than be measured for all breeds. While a larger breed may have "prestige value" in villages, it has yet to be seen whether the greater feed intake requirements per head will limit live weights below genetic potential.

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