Contents

The effect of group size on selection and feed intake in kids and lambs

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Summary

Thirty kids and 30 lambs were used in the same design in three periods. In each period, animals were randomly divided into 5 treatment groups according to different group sizes. The group sizes were 1) one animal per pen, 2) two animals per pen, 3) three animals per pen, 4) four animals per pen and 5) five animals per pen. The space allowance for each treatment was 0.73m^2 per animal. The diet consisted of 1% of initial body weight (BW) dry matter (DM) of concentrate and sugar cane respectively. Jackfruit was fed *ad libitum* at a level of 130% of the individual fresh intake the previous day. The time for each period was 21 days with the last seven days for data collection. Goats had a significant higher DM intake than sheep. The lowest DM intake was recorded at group size 1, moderate DM intake for group size 2 and the highest DM intake was recorded at group sizes 3 to 5. Sex and period effects were not significant and there was no interaction between animal species and group size for any of the variables.

Keywords: Individual, group, intake, sheep goat

Introduction

There is a general opinion among researchers that when animals are fed in a group the feed intake is stimulated by competition among individuals resulting in a higher feed intake than when animals are individually fed. If this is so the question is how many animals should there be in the group to get this effect. Is the competition from just one more animal sufficient stimulus or is more than one needed. The social relationships interact strongly with preferences and distribution when influencing foraging decisions. Social relationships are important to help the animal to cope with its environment, since social partners influence individual reaction to external events (Veissier et al., 1998). Phillips (2004) found that grass intakes were greater for groups of 3 calves than for individual calves, and calves in groups spent longer eating grass. According to O'Connell et al. (2003) increasing the group size of weaned pigs to between 10 and 20 animals reduced within-group variation in growth rate. Individual pens or group pens did not affect milk intake or daily weight gain of kids in week 1-12, but the labour requirements were generally lower for group housing (Goetsch et al., 2001).

The objective of this study was to assess the effect of different group sizes, of one to five animals, on feed intake and selection in kids and lambs.

Materials and methods

The study was conducted at the Goat and Rabbit Research Centre in Northern Vietnam. The animals were growing kids (Bachthao breed and F1 (Bachthao x Barbari) crossbred) and growing Phan Rang lambs with an average age of 3.5 months. The animals were vaccinated against pasteurellosis and enterotoxemia and were treated against internal parasites using Wormital (Albendazole) before commencement of the experiment.

The feeds used in the experiments were fresh foliage from Jackfruit, chopped sugar cane and a commercial concentrate. The foliage consisted of leaves and about 40 cm of stems. Jackfruit foliages were tied in the trough of each pen in one bunch for group sizes of 1 to 2 animals and in two bunches for group sizes of 3 to 5 animals. Whole sugar cane (chopped) and concentrate were fed in one trough for group sizes of 1 to 2 animals and in two troughs for group sizes of 3 to 5 animals. Water was fed in a bucket in each pen. The space allowance was 0.73 m^2 per animal. Each treatment group was housed adjacent to each other. The last wall of each treatment

group (group size) was completely covered. The animals were fed four times per day. Water and mineral lick blocks (73% minerals (70% stone meal, $Ca_3(PO_4)_2$ and 30% bone meal), 17% cement as a binding agent and 10% salt) were available at all times. Thirty kids and 30 lambs (50% males and 50% females) were used in the same design in 3 experimental periods. In each period, animals were randomly divided into 5 treatment groups according to group size. The group sizes were 1) one animal per pen; 2) two animals per pen; 3) three animals per pen; 4) four animals per pen and 5) five animals per pen. For each period there were 2 groups of each group size, one of each sex. Experimental time for each period was 21 days with the last seven days for data collection.

The diet consisted of 1% of initial BW dry matter (DM) of concentrate and sugar cane respectively. Jackfruit was fed *ad libitum* at a level of 130% of the individual fresh intake the previous day.

Feed offered, feed refused and water consumption were recorded daily during the data collection period. Samples of feed offered and refusals were also taken daily for analyses of DM, CP, neutral detergent fibre (NDF), acid detergent fibre (ADF), ash and total tannins. DM, CP, ADF and ash were analysed according to the standard methods of AOAC (1990). NDF was determined by the method of Van Soest et al. (1991) using sodium sulfite and amylase, and was expressed with residual ash. Total tannins were analysed according to the method of AOAC (1975) and were expressed as g/kg DM.

The data were analysed statistically by using the GLM procedure of Minitab Software, version 12.0. (Minitab, 1998).

Results and discussion

The CP content of Jackfruit (Table 1) was relatively high (141g per kg DM), while this value was very low for sugar cane.

Table 1. Chemical composition of feed offered[1] (3 samples of each feed).

Parameter	Jackfruit	Sugar cane	Concentrate
DM, g	346 (35.5)	202 (33.6)	897 (3.6)
CP, g/kg DM	141 (18.3)	25 (2.9)	176 (8.5)
Ash, g/kg DM	88 (12.4)	27 (7.9)	84 (1.5)
NDF, g/kg DM	493 (37.5)	409 (22.5)	314 (3.5)
ADF, g/kg DM	382 (44.0)	239 (25.0)	128 (9.7)
Tannins, g/kg DM	42 (10.6)	-	4.8 (1.7)

[1]Means and standard deviation

There was an effect of animal species on feed intake. The goats had significantly higher total DM intake (DMI) and DMI of Jackfruit (g/kg$W^{0.75}$) than sheep. However, the DMI of sugar cane by sheep was higher than that of goats. The concentrate was completely consumed in all groups. The differences in DMI of poor quality forage between goats and sheep have been reported by many researchers. According to Dulphy et al. in Abijaoude et al. (2000), goats had 21% higher intake than sheep when fed poor quality roughage. Darlis et al. (1999) found that intake of straw in goats was higher than in sheep. In the present study, intake was about 6% higher for kids than for lambs. However, Aregheore (1996) reported that the DMI in sheep was higher than in goats. This difference could be due to whether it was the intake of poor quality roughage or a complete diet that was compared. In generally, diets or feedstuffs containing high amounts of fiber will be consumed in higher amounts by goats.

There was a significant effect of group size on feed intake. The lowest DMI was recorded at group size 1, moderate DMI for group size 2 and the highest DMI was recorded at group sizes 3 to 5. The higher DMI in larger group sizes could be due to the stimulation by competition among individuals. Competition between two animals seems to be enough to get an effect.

Table 2. Daily DMI and proportion of stems on fresh basis in foliage consumed [1].

		g DM intake/kgW$^{0.75}$			g stems per
		Total	Jackfruit	Sugar cane	kg foliage
Animal species	Goats	132.5^{a}	103.7^{a}	3.1^{b}	88.3
	Sheep	125.5^{b}	89.0^{b}	10.3^{a}	79.8
	SE	*2.17*	*2.28*	*0.60*	*0.5*
Group sizes	1	95.5^{c}	69.8^{d}	5.54	116.1^{a}
	2	115.6^{b}	85.1^{c}	6.09	109.3^{a}
	3	133.3^{a}	99.8^{b}	7.32	75.3^{b}
	4	146.2^{a}	112.0^{ab}	7.81	69.5^{b}
	5	154.2^{a}	114.9^{a}	8.68	49.9^{b}
	SE	*3.43*	*0.29*	*0.96*	*4.2*
Sig. Levels	Species	*	***	***	NS
	Group size	***	***	NS	**

[1]Least squares means and standard error of means; [abc]; Means within columns and animal species or group sizes with different superscripts differ significantly (P<0.05).*** P<0.001; ** P<0.01 and NS=not significant (P>0.05)

The proportion of stems in Jackfruit offered was 325 g per kg fresh matter. Both goats and sheep consumed similar proportions of stem in Jackfruit (Table 2), while the stem proportion decreased significantly with increasing number of animals per pen. This could be an effect of the higher amount of leaves per animal offered in the larger group sizes.

Sex and period effects were not significant and there was no interaction between animal species and group sizes for any of the variables.

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