Mixed Grazing Between Bali Cattle and Kacang Goats on Native Pastures

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ABSTRACT: An experiment to study the carrying capacity of native pasture for continuous grazing of growing cattle and goats grazed concurrently was conducted in Gowa Sub Research Institute for Animal Production, South Sulawesi. Twenty four Bali steers (1.5 -2 years) were divided randomly into six groups where each group was kept continuously in a 4-ha paddock of native pasture (1 animal/ha). Into three of the paddocks, 15 male Kacang kids (4 - 6 months) were also grazed for 8 hours/day. During one year observation covering the rainy and dry seasons, pasture forage production in the paddocks fluctuated along with changing of rainfalls in the area. Daily forage dry matter production was in the range of 28.2 - 42.7 kg/ha, averaging 40.9 kg/ha and 29.2 kg/ha, respectively, for the rainy and dry season. Grazing managements (cattle alone or cattle with goats) did not affect (P>0.05) the average daily gain (ADG) of cattle, averaging 289 g and 64 g, respectively, for the rainy and dry season. The ADG of goats were 52 g in the rainy season and 17 g in the dry season. It is concluded that carrying capacity of native pasture for continuous grazing of growing cattle with stocking rate of 1 animal/ha may be increased with addition of goats at 3.75 head/ha. To maintain the optimum growth of the animals, feed supplementation is suggested in the dry season.

Key Words: Cattle, Goats, Mixed Grazing, Native Pasture, Carrying Capacity

Introduction

Native pastures are the backbone of cattle farming in South Sulawesi. This province has the second highest cattle population in Indonesia with the density of 89 cattle/100 ha farm lands (Anonymous, 1989). Although pasture forage production is abundant in the rainy season, the relatively high grazing pressure may cause overgrazing, especially in the dry season. As a guideline, the suggested carrying capacity of native pastures for continuous grazing is 0.8 adult cattle/ha (Ditjen Nak, 1978).

It has been reported that mixed grazing between cattle and sheep increases the carrying capacity of pastures since sheep consume different parts of forage plants than cattle (Scott, 1983). This likelihood may also be true for mixed grazing between Bali cattle and goats. Additionally, in contrast with sheep, there is no evidence of goats being a vector of contagious *Malignant Catarrhal Fever* (MCF) disease in Bali cattle. Furthermore, results of previous study in South Sulawesi by Prabowo et al. (1992) has demonstrated that in the rainy season, the carrying capacity of native pastures for growing Bali heifers with stocking rate of 1.25 animal/ha may be optimized with addition of Kacang goats at 3.75 head/ha.

The objective of the present experiment is to study the carrying capacity of native pastures for continuous grazing of Bali steers and Kacang goats grazed concurrently. This was done in an effort to obtain methods for optimizing the use of native pastures.

Materials and Methods

The study was conducted in the experimental farm of Gowa Sub Research Institute for Animal Production (*Sub Balai Penelitian Ternak Gowa*), South Sulawesi for one year from October 1991 to September 1992. Twenty four Bali steers (1.5 - 2 years) were divided randomly into six groups where animals in each group were kept continuously in a 4-ha paddock of native pasture (1 animal/ha). Into

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three of the paddocks, 15 male Kacang kids (4 -6 months) were also grazed for 8 hours/day, from 09:00 to 17:00.

Observations were made on pasture forage production and the average daily gain (ADG) of cattle and goats. As supporting data, the average monthly rainfall and number of rainy day during the study period are plotted and presented in Figure 1. Pasture forage production was estimated from forage production in three 1 x 1 m exclosures (cages) for each paddock, sampled every 56 day. The average forage production in those three cages was calculated and then converted for the production of each paddock. Weight gain data were obtained by weighing cattle every 28 day and goats every 14 day.

Data were analyzed separately for the rainy (October-March) and dry (April-September) seasons using one-way analysis of variance (Steel and Torrie, 1980) with the SAS computer statistical program (SAS Institute Inc., 1987).

Table 1. Average daily forage dry matter production for each paddock in the rainy and dry seasons of 1991 - 1992

Grazing Management	Paddock	Season	
		Rainy (Oct - Mar)	Dry (Apr - Sep)
		---------- kg/ha ----------	
Cattle (alone)	1	42.7	28.7
	2	39.2	28.2
	3	40.4	30.7
Cattle + Goats	4	42.1	29.4
	5	40.5	28.4
	6	40.6	29.8
Average		40.9	29.2

Table 2. Predominant species of forages in the pastures and the composite chemical analysis

Forage species	
- *Imperata cylindrica* - *Cynodon dactylon* - *Paspalum conjugatum* - *Axonopus compressus* - *Drymaria cordata* - *Panicum* sp.	
Chemical analysis	--- % ---
- Crude Protein	7.6
- NDF	64.4
- Calcium	.33
- Phosphorus	.16

Results and Discussion

In the study area the rainy season started in October. The highest rainfall was in January and then decreased until the dry season which started in April (Figure 1). In South Sulawesi, the pattern of rainfall has been reported to affect significantly the annual pasture forage production (Anonymous, 1989). Pasture forage production in this study, estimated from production of forages in the cages which were sampled every 56 day is presented in Table 1. The predominant species of forages and the composite chemical analysis is presented in Table 2.

The calculated daily forage dry matter (DM) production for each paddock were 40.9 kg/ha for the rainy season and 29.2 kg/ha for the dry season, averaging 35.1 kg/ha over the year. With the estimated daily requirement of ± 8 kg DM/animal suggested by Reksohadiprodjo (1984), the forage production in the 4-ha paddock will still be able to support the DM need of the four cattle. In the dry season, however, pasture forage dry matter production dropped to about three quarters of those in the rainy season. The average pasture forage production obtained in this study are higher than

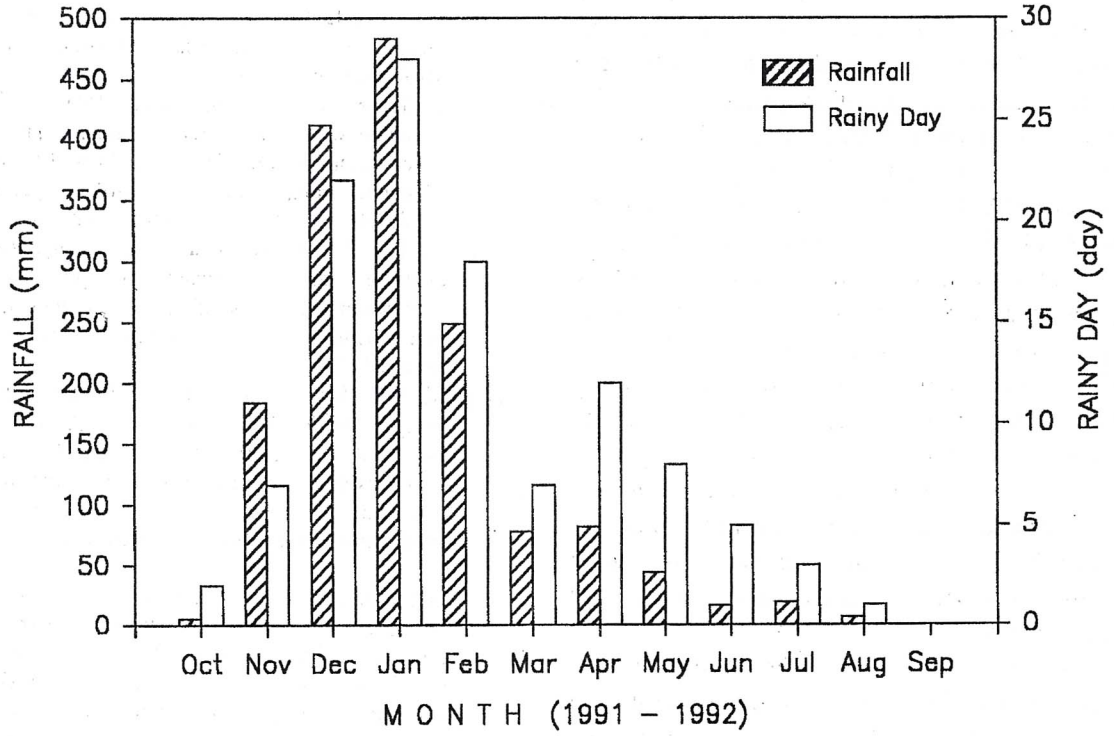

Figure 1. Monthly rainfall and number of rainy day during the study period (October 1991 - September 1992)

Table 3. Average daily gain of grazing cattle and goats in the rainy and dry seasons of 1991 - 1992

Grazing Management	Cattle		Goats	
	Rainy	Dry	Rainy	Dry
	---------- g/head ----------			
Cattle (alone)	291	66	-	-
Cattle + Goats	287	62	52	17
Average	289	64	52	17

results reported by Nulik et al. (1990) from their study in the Timor island, East Nusa Tenggara, which were less than 32.4 kg/ha. This situation may be explained primarily by the fact that average rainfall and number of rainy day are relatively lower in East Nusa Tenggara than those in South Sulawesi.

Statistical analysis on data of live weight changes during the one year study period, covering the rainy and dry seasons showed that grazing managements (cattle alone or cattle with goats) did not affect ($P>0.05$) the average daily gain (ADG) of cattle. Table 3 shows the ADG for grazing cattle and goats in the rainy and dry seasons. Averaged over the year, the ADG were 177 g for cattle and 35 g for goats. The ADG of cattle in this study were similar to results of previous studies cited by Santoso and Harmadji (1990) for grazing cattle, and even higher than the result of a study reported by Wirdahayati (1988). As demonstrated previously by Prabowo et al. (1992) in a similar study using Bali heifers in the rainy season, the results of this study can be interpreted as that the carrying capacity of native pastures for growing Bali steers with stocking rate of 1 animal/ha is able to give an optimum growth. Furthermore, addition of goats into the same paddocks without affecting the growth performance of cattle is another fact that the carrying capacity of native pastures can be increased. The ADG of goats was also in the range considered as normal for animals raised on a forage based diet (Rangkuti, 1983).

In the dry season, however, as the pasture forage production dropped the ADG of cattle and goats were also dropped to an average that almost no growth were observed. In addition to the drop in forage production, this situation may also be attributed to the nutritive contents of the forages (Table 2) which are considered as marginal, especially for the crude protein content (Milford and Minson, 1966). Therefore, to maintain the optimum growth of the animals, feed supplementation is suggested in the dry season.

Conclusions

From results obtained in this study, it is concluded that:

The carrying capacity of native pastures in South Sulawesi for continuous grazing of Bali steers with stocking rate of 1 animal/ha may be increased by addition of Kacang goats at 3.75 head/ha.

Mixed grazing between Bali cattle and Kacang goats resulted in an ADG of 177 and 35 g, respectively, for cattle and goats.

To maintain the optimum growth of the animals, feed supplementation is suggested in the dry season.

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