

EVALUATION OF FEED CONVERSION RATIOS AND GROWTH PERFORMANCE OF VARIOUS GOAT BREEDS IN A COMMERCIAL GOAT FARM SETTING IN KATHMANDU, NEPAL

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ABSTRACT

The study was conducted to evaluate the feeding status, Feed Conversion Ratio (FCR) of different breeds of goat at commercial farm's condition at Dakshinkali municipality-7, Kathmandu, Nepal from April 2022 to June 2022. A total of 32 goat kids aged approx. 3months and body weight 11 ± 2 kg were selected on the basis of Purposive sampling technique and categorized into 4 study group on the basis of breed i.e. B \times K (50%), B \times K (75%), B \times J (50%) and B \times J (75%). Feed and forage containing 13% Crude Protein per dry matter, 1.35kg Dry Matter per head per day and 12.1MJ energy per day were provided to study population and weekly weight gain of goat was recorded. The average daily weight gain was found to be 40 ± 2 gm and the Cumulative Feed Conversion Ratio (CFCR) was found to be 33.592, FCR of overall male was lower than female of study population (i.e. FCR of male = 30.006, FCR of female = 38.151). Among the breed and sex, B \times K (75%) male had the lowest FCR (22.055) while B \times K (75%) female had the highest FCR (47.726). Comparison based on breed revealed B \times K (75%) had the least FCR (30.169) whereas, B \times J (75%) had the highest FCR (36.593). Cumulative body weight gain was not uniform leading to highest on third week (21kg) while 2.8kg fall in body weight was seen on tenth week. The rise and fall in weekly body weight gain was caused due to poor farm management, parasitic infestation, seasonal change and respiratory disorder caused due to unknown viral infection.

Key words: FCR, goat, Boer, infection, weight gain

INTRODUCTION

Goat is a multipurpose livestock species that provides meat, milk, manure, fiber, and power for the transportation. There are four indigenous goat breeds in Nepal, namely Terai, Khari, Sinhal, and Chyangra, and exotic goat breeds such as Jamunapari, Barbari, Beetal, Boer and their crossbreeds (Neupane *et al.*, 2018).

Feed resources in Nepal for most of the ruminants include roughage, crop residue, concentrates, grazing and cut and carry, grain, grain by products and green fodder. Feed conversion ratio or FCR is the rate or degree at which a farm animal converts feed served into the desired output. In practical term, it is the amount or quantity of feed farm animal will eat to attain a live weight of 1kg or yield a unit of the desired product. This parameter is what determines whether a livestock farm makes a profit or otherwise. As a profit-oriented farmer, it is very important to understand the FCR of the farm animal so as to plan budget before production. It is quite irrational to just feed your farm animals without paying proper attention to the conversion ratio of the feed you are supplying them. FCR of farm animal is one of the main parameters that depict how profitable the farm is (Kharel, 1997). Since, FCR is the ratio of input and output, less the value of FCR more is the profitability. So, it is important to keep the FCR as less as possible.

This study aimed at assessing the feeding status, crude protein, gross energy, and dry matter of feed, along with the Feed Conversion Ratio (FCR) in a commercial goat farm.

MATERIALS AND METHODS

Experimental site and information of the goat farm

The experimental site was Mata Dakshinkali Agro Farm (MDAF) at Dakshinkali-7, Kathmandu, Nepal. Study was conducted from 5th April, 2022 to 7th July, 2023 for the total of 90 days. The farm is situated in Kathmandu district at geographical line of 27°35'58.5"N latitude and 85°16'11.5"E longitude at an altitude of 1644 masl. Farm had adopted semi-intensive system of rearing. Brief information of the farm is tabulating in table 1.

Population, Sample and Sampling and sampling techniques

MDAF has accommodated 250 goats among them 150 adult goats, 45 kids of age between 3-4 months and 55 kids less than 3 months of age. Boer, Khari and Jamunapari and their crosses with different blood. The study population was taken on the basis of Purposive sampling technique where 32 kids were selected on the basis of their similar body weight and age. Eight samples from each group of animals i.e. Boer Khari 50%, Boer Khari 75%, Boer Jamunapari 50%, Boer Jamunapari 75% were selected (Figure 57, 58, 59) with equal number of male and female (i.e. female: male = 1:1). The average individual body weight was approximately 11±2kg at the time of sampling (Table 2).

Table 1. Brief information of the farm

SN	Particular	Information
1	Temperature	0-18 ⁰ C in winter and 14-32 ⁰ C in summer season.
2	Direction of wind flow	South to North in day time North to South in night time
3	Orientation of the farm	South facing
4	Sunrise and sunset	5:30 am – 6:30 pm in summer; 7:30 am – 5:00 pm in winter
	Shade	Night shift shed : 80 × 30 ft Day shift shed : 143 × 20 ft, 100 × 25ft Open space : 200 × 40 ft Average Space per animal: 9.6 sq. ft
5	Waterers	Two waterers of each dimension: 8 × 2 × 1 ft Twelve waterers of each dimension: 6 × 1.5 × 1 ft One waterer of each dimension: 8 × 2.5 × 1.5 ft
6	Feeders	20 feeders of each dimension : 6 × 1 × 1 ft
7	Sanitation	Regular cleaning with jet of water at morning time.
8	Ventilation	Well-ventilated with twelve windows each on north and south face
9	Quarantine	A quarantine shed having dimension of 25×20 sufficient for 50 goats.
10	Biosecurity	Normal biosecurity measures applied

Table 2. Number of samples from each breed of goat in the farm

Breed	B×K (50%)	B×K (75%)	B×J (50%)	B×J (75%)	Total
Number of samples	8	8	8	8	32

Where, B × K (50%) = Boer Khari cross (50% blood level of Boer)

B × K (75%) = Boer Khari cross (75% blood level of Boer)

B × J (50%) = Boer Jamuna Pari cross (50% blood level of Boer)

B × J (75%) = Boer Jamuna Pari cross (75% blood level of Boer)

Feeds and Fodder used in the experimental farm

Feed ingredients given to the animals during the course of the study were Rice straw, Rice bran, Maize flour, Mustard cake, Wheat bran, Chickpea, Karu, Lentil pod husk, Molasses, Ipil-Ipil, Khanyu and adlib water. All the feed ingredients used were locally produced and concentrate feed were prepared in the farm premises. Nutritional parameters such as Dry Matter (DM), Crude Protein (CP) and Gross Energy were analyzed in National Animal Feed and Livestock Quality Management Laboratory, Harihar Bhawan, Lalitpur.

Feeding Schedule of the experimental farm

The animals were fed with calculated amount of feedstuffs on specific time period of the day (Table 3). Feed given to the animal at a specific time of the day is composed of mixture of different feed ingredients in a fixed proportion (Table 4, 5 & 6).

Table 3. Feeding schedule of the farm.

S.N.	Time	Feed
1	6:00 am	Khole
2	7:00 am	Bhusa
3	10:30 am	Lentil pod husk
4	2:00 pm	Green forage

Percentage contribution and composition of feed ingredients in bulk feed

Data collection

Individual body weight was taken every week at dusk after feeding green forages. Feed and feed ingredients were weighted daily and given to study population. Both the data of feed and body weight of animal was taken up to 13th week.

Data analysis

Collected data were listed, thus obtained data were analyzed and presented in bar graph and line chart using Microsoft Excel Tools.

Table 4, 5 & 6: Composition and percentage contribution of various feed ingredients

Table 4

BHUSA	% Contribution
Rice straw	34.03
Rice bran	16.9
Maize flour	8.47
Mustard cake	16.9
Wheat bran	8.47
Chickpea	3.38
Karu	3.38
Molasses	8.47

Table 5

Fodder tree	% Contribution
Ipil-ipil	50
Khari	50

Table 6

Musuro khosta	% Contribution
Musuro chokar	50
Maize flour	50

RESULTS AND DISCUSSION

On the basis of the data collected for 13 weeks on parameters; body weight and dry matter of the feed have, following results were obtained (Figure 1).

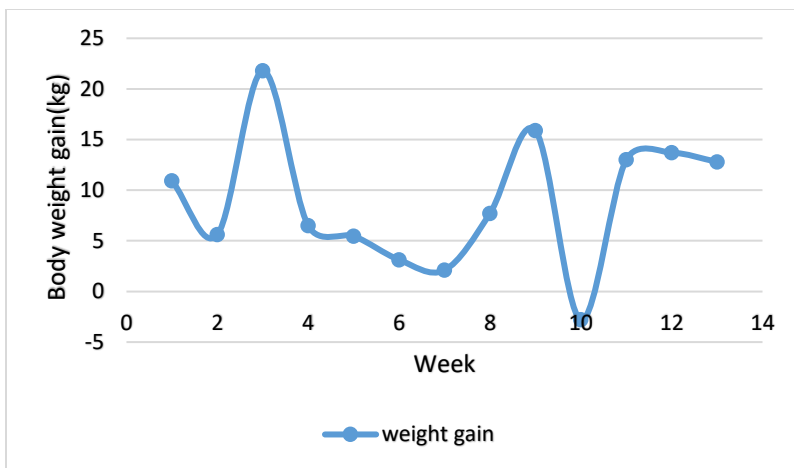


Figure 1. Weight gain of overall study population

Cumulative Feed Conversion Ratio (CFCR) of whole study population was found to be 33.5922.

Breed wise Feed Conversion Ratio

Among the breeds, Boer cross with Khari goat with the blood level of 75% i.e. (B × K (75%)) had the least FCR. The order of FCR among the breeds from least to highest is B × K (75%) < B × J (75%) < B × K (50%) < B × J (50%) (Table 13). There was not much significant difference between FCR of B × K (50%) and B × J (50%).

Table 7 (A) Breed-wise FCR

Breed	Feed Conversion Ratio (FCR)
B × K (50%)	36.15844
B × K (75%)	30.16942
B × J (50%)	36.59376
B × J (75%)	32.31436
Average	33.80

Table 7 (B) Sex wise FCR

Sex wise	Feed Conversion Ratio (FCR)
B × K (50%) male	32.42207098
B × K (50%) female	40.8681567
B × K (75%) male	22.0558306
B × K (75%) female	47.72630664
B × J (50%) male	31.99546478
B × J (50%) female	32.63966877
B × J (75%) male	38.65906715
B × J (75%) female	34.73793319

Breed wise FCR of study population

Sex wise Feed Conversion Ratio

FCR of overall male of study population was 30.006; FCR of overall female of study population was 38.151. Analyzing the obtained data, it was found that FCR of overall male population of study population was significantly lower than that of the female group which suggested that male animal utilized the feed materials efficiently than females. Also, FCR of B × K (50%) male was significantly lower than female of the same group which suggested male were more efficient in utilizing feed stuffs and the same scenario was found in B × K (75%) and B × J (75%) also (Table 7 B).

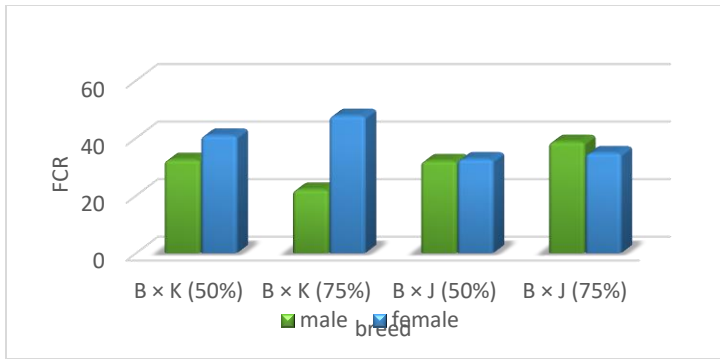


Figure 2. Graph showing breed and sex- wise FCR

The FCR was recorded highest (143) on seventh week whereas lowest on third week

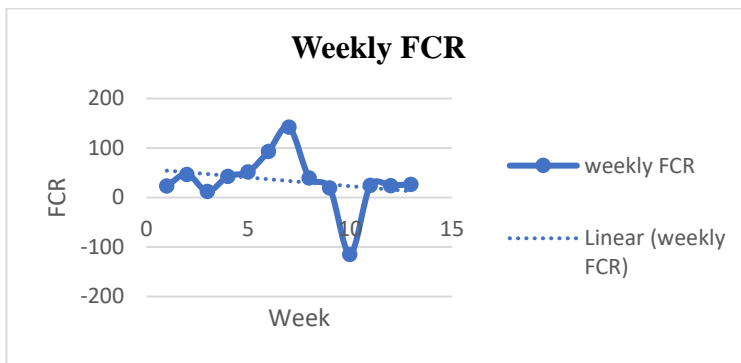


Figure 3. Line chart showing weekly FCR

The nutrient supply to the study population consists of 13% crude protein per dry matter, dry matter 1.35kg per head per day and 12.1 Megajoules of Metabolisable Energy (MJME) per day which closely resembles the requirements of Boer goats for growth and exhibits the best production characteristics. Diet with 12.0 MJME energy, 14% crude protein per kg dry matter and 1.3 kg dry matter was best for production in boer goats and their crosses (Brand *et al.*, 2017).

Although the growth patterns of goat should be uniform, it was not such due to various reasons like poor farm management, parasitic infestation, seasonal change and respiratory disorder caused due to unknown viral infection (Figure 54,55)

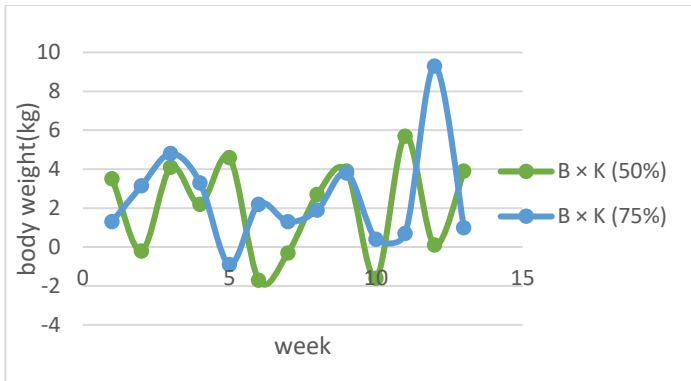


Figure 4. Chart showing growth pattern of B x K goat

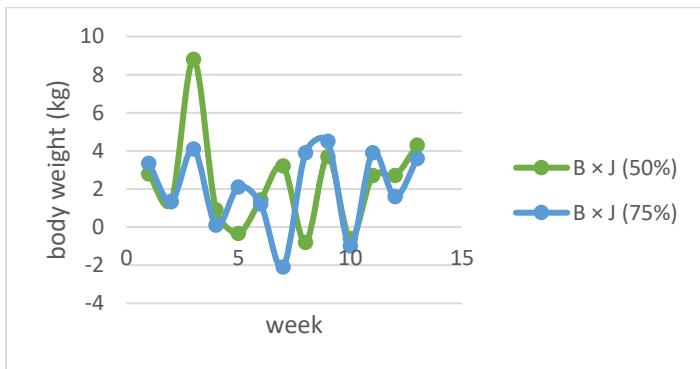


Figure 5. Chart showing growth pattern of B x J goat

Discussion

The Cumulative FCR was found to be 33.5922 which is way more than 10.83 determined in a study by Gipson *et al.* (2007) fed with Lucerne whereas it is also suggested that goat have an average FCR of 4.5 on high concentrate feed, 5.5 on good forage diet and 30 on straw ration (Admin, 2022). Although all the nutrients are provided in proper amount; health condition, disease, seasonal change led to poor feed utilization causing FCR value to increase. According to a study done by Patil *et al.*,(2014), the average daily weight gain was found to be 70±3 gm while in this study it was 40±2g.

The weight gain decrease in second week was found probably due to flea and ticks' infestation. The treatment for ticks with 2% Cypermethrin was found effective and desirable weight gain was achieved in third week. Again, following

fourth week weekly weight gain was falling up to seventh week. Later the cause was found to be respiratory distress caused due to probably unknown viral mass infection which was treated using anti-biotics, spray of inhalants for relieving cough. The treatment was found worthy and good weight gain was seen in week nine. Another major depression in body weight gain was seen after ninth week which was later found to be due to feeding of succulent and premature fodder crops and grasses evoke enterotoxaemia and grain overloading which resulted in major weight loss during tenth week. The problem was solved by avoiding such crop and minimizing grain and use of buffer (tri- sodium silicate) in concentrate feed. At the same time, though deworming was done at the start of the study the problem of *Hemonchus spp.* was seen which was another cause of major depression of body weight after ninth week after that the body weight gain was in increasing trend (Figure 1).

CONCLUSION AND SUGGESTIONS

Poor management practices, feeding and health condition of animals suppress FCR which ultimately decreases the profitability of farm. It is found that FCR value is way more than advisable due to many reasons like ill health conditions, seasonal influences, and improper feed formulation, though nutritional requirement of goats in term of energy and protein came from concentrate diet which led to problems like grain overloading and enterotoxaemia.

It is suggested that proportionate nutritional requirements, proper feed ingredients along with good farm management practices should be provided. Furthermore, anthelmintic as per diagnosis of parasitic organisms should be done in time.

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