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Evaluation of milk yield and composition in nomadic yak and yak crosses

T GYELTSHEN[1] and N DORJI[2]

Department of Animal Science, College of Natural Resources, Royal University of Bhutan, Lobesa, Bhutan

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In Bhutan, yak thrives at an altitude above 3,000–5,000 m above sea level (masl) from Haa (west) to Trashigang (east) district. The community (nomads) in this region depend mainly on yak for food, cloth, shelter, income and overcome the extreme climatic conditions. Dairy products are the main source of income and are sold to neighbouring villages and Arunachal Pradesh (India). Raw milk is processed to butter and cheese varieties and is sold to neighbouring villages and Arunachal Pradesh (India).

Nomads have adapted to local environmental condition. For example, family migrates along with the herd to lower altitudes in winter. Another strategy is crossing yak with bovine species to obtain hybrid vigour expressed at F_1 generation. F_1 females (locally called *zom*) are valued for higher milk yield with high fat content than the yak cow. Males (locally named *zo*) are infertile but, *zo* is a powerful pack animal that can carry family's load to lower altitudes than yak. Consequently, yak hybrids are found in almost all yak breeding areas of Bhutan.

Bhutanese nomads prefer to cross yak cow with Goleng bull (thought to have originated from Tibet) as this progeny produces enough milk for the family even under poor husbandry condition compared to female yak. But, due to unavailability of quality goleng breeding bull, herder use yak bull to cross with jatsham and it has become a common breeding practice. Therefore, the objective of this study was to compare the milk yield and composition among yak and yak hybrids in Merak block, Trashigang district. The main scope of the study is to provide baseline information whereby herders can make the best choice of animal.

Sample size and data collection: A total of 26 cows; yak (YK, n = six) and hybrid of yak cow cross goleng bull (YG, n = ten), and yak bull cross jatsham (YJ, n = ten) were collected in winter 2013 (Fig.1). Jatsham is a female hybrid from siri cow and mithun bull. Cows consisted of different parities. Thus, they were classified into two categories; parity group one consisting of first to fifth and group two of above fifth.

Cow were milked twice daily (morning and evening) in an aluminium bucket. But, female yak were milked once. Daily milk were collected and weighed by spring balance for a week. About 20 ml sample milk were collected in a clean and sterilized vial from a milking bucket to determine the milk composition using ultrasonic milk analyzer.

Fig 1. Morphology of population of yak crosses.

Data analysis: Data were transformed to log10 anchored at 1 (Osborne 2010). An independent sample t-test and analysis of variance was used to compare milk yield and composition, respectively by SPSS 16.

YK cows were not milked in winter because they have to survive on alpine pastures. This allows cow and her calf to maintain body condition during harsh condition. There was no significant ($P < 0.05$) of difference on milk yield and composition among the population both parity groups. Hybrid YJ yield more average milk than the YG in all parity groups (Table 1). YK and YJ hybrid milk contains the highest fat percentage and the lowest, respectively in first group parity.

Present address: [3]Extension officer, MoAF (tandingyeltshen2006@yahoo.com),

[2] Lecturer (nepdorpion186@yahoo.com/nedup@cnr.edu.bt), Department of Animal Science, College of Natural Resources, Royal University of Bhutan, Lobesa, Bhutan.

Table 1. Milk yield (kg) composition (in %) based on populations (mean±standard error of mean)

Population	Group	Milk yield	Fat	Solid non fat	Lactose	Protein
Yak (6)	Parity first to fifth parity	-	9.52±0.73[a]	9.12±0.09[a]	4.95±0.04[a]	3.30±0.05[a]
Yak cow cross Gelong bull (n = 4)		1.08±0.21[a]	8.43±1.71[a]	9.25±0.33[a]	4.73±0.28[a]	3.23±0.11[a]
Yak bull cross Jatsham (n = 5)		1.76±0.19[a]	8.32±0.71[a]	9.52±0.31[a]	5.18±0.17[a]	3.56±0.13[a]
Yak cow cross Gelong bull (n = 6)	Above fifth parity	1.07±0.34[a]	8.18±1.07[a]	9.30±0.28[a]	5.07±0.16[a]	3.37±0.11[a]
Yak bull cross Jatsham (n = 5)		1.69±0.28[a]	7.22±0.38[a]	8.80±0.27[a]	4.78±0.15[a]	3.18±0.12[a]

[a] superscript indicates level of significant difference across the column ($P < 0.05$).

During our visit, YG hybrids were managed and reared at higher altitude where the forage resources were scarce. Hence, feed quality and herd location might be the reason for lower milk yield and protein content in YG. This is in line to Gurmessa and Melaku (2012) and Sudhakar *et al.* (2013) study. Similarly, Gurmessa and Melaku (2012) mentioned that the milk yield and fat is negatively correlated. Solid non fat, lactose and protein content were the highest in YJ milk in first group parity. On contrary, YG milk contains more solid non fat, lactose and protein content than the YJ in second group. We could not explain for this. The advantage of yak-jatsham cross hybrids to adapt to lower attitude, this population would be suitable for nomadic lifestyle.

SUMMARRY

Milk yield and composition of yak and hybrids of yak cow cross Goleng bull, and yak bull cross jatsham reared by nomads were investigated. There was no difference in milk yield and milk constituents among populations. However, hybrid of yak-Jatsham cross yields more milk than the yak-goleng cross in all groups. Yak and yak-Jatsham hybrid's milk contains the highest (9.52%) and the lowest (8.32%) mean fat per cent, respectively. Yak-jatsham hybrid's milk compositions were the highest in the first parity group except, fat per cent. Yak-jatsham hybrid should be encouraged to herders because of high milk yield and it's adaptable to lower altitudes.

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REFERENCES

Gurmessa J and Melaku A. 2012. Effect of lactation stage, pregnancy, parity and age on yield and major components of raw milk in bred cross Holstein Friesian cows. *World Journal of Dairy food Science* **2** (7): 146–49.

Osborne J W. 2010. Improving your data transformations: Applying the Box-Cox transformation. *Practical Assessment, Research and Evaluation* **15** (12): 1–9.

Sudhakar K, Panneerselvam S, Thiruvenkadan A K, Abraham J and Vinodkumar G. 2013. Factors effecting milk composition of crossbred dairy cattle in southern India. *International Journal of Food, Agricultural Veterinary Science* **3** (1): 229–33.