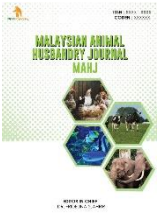
ZIBELINE INTERNATIONAL™ PUBLISHING

ISSN: 2805-5500 (Online)
CODEN: MAHJAQ

Malaysian Animal Husbandry Journal (MAHJ)

DOI: http://doi.org/10.26480/mahj.01.2022.19.21



REVIEW ARTICLE

A REVIEW: LACTATION EFFICIENCY OF GADDI BUFFALO OF NEPAL

Prativa Sharma[a*], Prabha Adhikari[a], Himal Adhikari[b], Surya Sharma Bhatta[a]

[a]Institute of Agriculture and Animal Science, Lamjung Campus, Nepal
[b]Agriculture and Forestry University, Rampur, Chitwan, Nepal
**Corresponding Author Email: sprativa21@gmail.com*

ARTICLE DETAILS

Article History:

Received 13 February 2022
Accepted 18 March 2022
Available online 29 March 2022

ABSTRACT

Livestock contributes 12.5% of Agricultural GDP in Nepal. Out of which 6% comes from buffaloes. Indigenous breeds of buffaloes identified in Nepal are Lime, Gaddi and Parkote. Although Gaddi breed is superior to other indigenous breeds, their pure breeds are rarely found in the country. The production traits reviewed were Lactation length, Colostrum period, Days to reach peak milk yield, dry period, calving interval, average daily milk production, peak milk yield, lactation milk yield which were found to be 420 days, 3-4 days, 105 days, 228 days, 702 days, 3.5 liters, 5.3litres, 1222.6litres respectively. This data reveals better lactation efficiency of Gaddi breed. Due to poor management practices, lack of awareness of farmers, lack of appropriate breeding policies and negligence of the government on its proper conservation, they are about to be extinct. Therefore, appropriate selection program within the breeds and establishment of the nucleus herds, application of advance breeding tools such as artificial insemination, initiation of community-based conservation should be adapted as soon as possible in order prevent them from extinction.

KEYWORDS

Gaddi, Lactation efficiency

1. INTRODUCTION

Livestock plays an inevitable role in Nepalese agriculture. Human beings depend upon livestock for milk, meat, eggs, fertilizers, wool, hides, biogas fuel, draft power, and so on. Livestock farming has been one of the major sources of cash income in Nepal, especially in hills and mountains. Agriculture and forestry contribution to National GDP is 26.50% which is equivalent to 777,177 million rupees. Around 12.5 % of the contribution comes from the livestock sector of which 6% comes from the buffaloes (MOAD, 2020). In the Nepalese diet, milk and milk products reflect the key source of animal protein where buffaloes are the major source of milk and meat. At present, there are 5.277 million population of buffalo is recorded in Nepal with their annual milk production of 1.372 million metric tones which accounts for 63.312% of the total milk production.

The contribution of buffalo in meat production is 188 thousand five hundred seventy-four metric-tones per year that accounts for 52.809 percent of the total meat production of the country (MOAD, 2020). They have religious, social, and cultural values in certain ethnic community. Due to their versatile nature and multiple prospects, they are appropriately called Black-gold of Nepal. About 48.5% of the households keep buffaloes for regular farm activities (Kumar and Raj, 2007). About two-thirds population of the buffalo are indigenous and the remaining are found to be exotic; either pure or crossbreeds (Sherchand, 2001; Neupane et al., 2007; Paudel, 2017). The indigenous breeds identified are Lime, Parkote and Gaddi. Apart from these, the occurrence of some non-descript breeds are also suspected in Terai and hills of the country (Neopane et al., 2007). Gaddi buffaloes are distributed in far-western hilly regions of Nepal. They are found in an area of 5482 Km^2 ranging from an elevation of 1500 to 4500 masl (Kumar and Raj, 2007).

Gaddi buffaloes are easily distinguishable from the indigenous buffaloes. They are heavier, better in milk production, bigger in size, lengthier, docile in temperament and adaptable in harsh feeding system. Out of 101,500 total buffaloes in the area, Gaddi are reported to be only 16,000 (Neopane et al., 2007). Due to declining population at faster rate, there is rare occurrences of pure male Gaddi breeds (Pokharel and Neopane, 2005). The genetic resources of Gaddi buffalo have been exploited to a narrow scale. Due to lack of proper documentation of available information, research and maintenance of herd records, there is inadequate information on indigenous Animal Genetic Resources (AnGR). This has seriously leaded to a restricted use of indigenous AnGR in the country. The peculiar innate qualities in Gaddi breeds needs to be sustained and secured for which they deserve special attention and proper research. The review aims to study the lactation efficiency of the Gaddi breed of buffalo that can generate information for the study materials in further research works.

2. CHARACTERIZATION OF THE BUFFALO BREEDS

2.1 Molecular characterization

The cytogenic study identified Lime, Parkote and Gaddi breeds of buffaloes revealed that all the breeds are riverine type consisting of 25 pairs chromosomes (2n=50). Gaddi buffalo belongs to the riverine type with 50 chromosomes (2n=50). There are three metacentric, 7 sub-meta-centric and 38 acrocentric autosomes. In male, X chromosome is large acrocentric and Y chromosome is the smallest among the acrocentric where as in female, both X chromosomes are large acrocentric. (Indigenous Buffalo Of Nepal, 2007.Pdf, N.D.)

Quick Response Code	Access this article online	
	Website: www.mahj.org.my	DOI: 10.26480/mahj.01.2022.19.21

Cite The Article: Prativa Sharma, Prabha Adhikari, Himal Adhikari, Surya Sharma Bhatta (2022). A Review: Lactation Efficiency of Gaddi Buffalo of Nepal. *Malaysian Animal Husbandry Journal, 2(1): 19-21.*

Breed	Sex chromosomes		Autosomes				Total Acrocentric
	X	Y	Acrocentric		X	Y	
Lime	Acrocentric	Acrocentric	38	Lime	Acrocentric	Acrocentric	38
Parkote	Acrocentric	Acrocentric	38	Parkote	Acrocentric	Acrocentric	38
Gaddi	Acrocentric	Acrocentric	38	Gaddi	Acrocentric	Acrocentric	38

Source: Pokharel, P. K., and Neopane, S. P. (2005)

2.2 Phenotypic characterization

- Gaddi buffalo is black in color. Occasionally, they are also found in brown and light brown in color.
- It has white round patches on the forehead.
- They have long face and flat head.
- Horns are curved.
- They are compact and massive with angular body shape and sloped hip position.
- Average body length, height at withers; height at hip bone and heart girth of this breed is 141±1.63cm, 131±1.1cm, 123±1.07cm and 195±1.8cm respectively
- The adult weight of this buffalo is 452.5 kg (Pokharel and Neopane, 2007)
- This breed is the heaviest among other identified indigenous buffaloes of Nepal.
- They have well developed udders and prominent milk veins demonstrating the milch type morphological characteristics (Pokharel and Neopane, 2005)

3. DISCUSSIONS

3.2 Lactation Length

Overall time period of milk release from the mammary glands once parturition until next calving is known as lactation length. The total of 305 days is considered as ideal lactation length in case of buffaloes (Lamsal et al., 2020). The average lactation period for Gaddi breeds to be 420 days (Pokharel and Neopane,2007). Murrah buffalo is reported to have the lactation length of 305 days (Pawar, 2012). Similarly, the overall mean for the lactation length is reported to be 285 days in case of Parkote breed whereas of Lime buffaloes is found to be 276 days (Shrestha et al., 2005). This shows that lactation length of Gaddi buffalo is higher than that of other indigenous breeds as well as Murrah breed that represents positive aspects of Gaddi breeds in lactation efficiency.

3.3 Colostrums Period

It is considered that the colostrums period of 3-5 days is customary that results in normal milk composition (Lamsal et al., 2020). Colostrums' days of Murrah buffalo is found in the range 2-11 days with overall mean of 5 days (Poudel et al., 2017). Similarly, range of colostrums' days is 1-7 days for Lime and Parkote breeds of buffalo (Sharma et al., 2017). Colostrums' period of Gaddi buffalo is stated to be 3-4 days (Yogi and Sharma, 2018). This represents normal days of colostrums' period in all the breeds of buffaloes.

3.4 Days to Reach Peak Milk Yield

Total time taken for the highest amount of milk production after calving is referred to as days to reach the peak milk yield. Earlier the peak milk production is achieved; it is regarded to be more economically profitable with the constant level of persistency in milk yield. Days to reach the peak milk yield of Gaddi buffalo is reported to be 105 day (Yogi and Sharma, 2018). In case of Murrah, days to reach peak milk yield is stated within the range of 10-45 days (Poudel et al., 2017). Similarly, it is reported that days to reach peak milk yield of Lime and Parkote to be around 13 days in the range of 4-30 days (Sharma et al., 2017). This shows that Gaddi buffaloes require more days to reach at peak milk yield in comparison to indigenous breeds of buffalo. It also represents positive aspect of milk yield of Gaddi buffalo in terms of milk efficiency since it remains in constant peak yield for longer period in comparison to other indigenous breeds of buffalo.

3.5 Dry Peroid

The dry period (DP) of Gaddi buffalo is reported to be 228 days (Yogi and Sharma, 2018). In the study done, total dry period ofMurrah buffalo is reported to be 110 days within the range of 30-300 days (Poudel et al., 2017). Similarly, the dry period of Lime is reported to be around 363 days and that of Parkote is reported to be 360 days (Sharma et al., 2017). This shows that Gaddi buffalo has lower dry period than that of Lime and Parkote whereas higher dry period than that of Murrah buffalo.

3.6 Calving Interval

The total time period in between two calving is known as calving interval. The average calving interval of Murrah is reported to be 545 days. The calving interval of Lime and Parkote is reported to be 600 and 604 days respectively (Shrestha et al., 2005). Similarly, the calving interval of Gaddi is quantified to be 23.4 months (702 days) (Pokharel and Neopane, 2005). However, further verification should be done by conducting research to find out the exact results.

3.7 Average Daily Milk Production

Average daily milk yield of Lime buffalo is 3 liters. Parkote buffalo is reported to have average milk production of 2.77 liters. The average milk production of Gaddi buffalo is 3.5 liters (Pokharel and Neopane, 2005). Similarly, average milk production of Murrah buffalo is recorded to be 9litters. This data reveals that average milk production of Gaddi buffalo is higher than that of all other indigenous breeds and is lower than that of the Murrah breeds.

3.8 Peak Milk Yield

Highest amount of milk production per day in the lactation period of buffalo is known as peak milk yield. Principally, average milk yield is considered to be the 65% of peak milk production. Average daily milk yield of Gaddi buffalo is reported to be 3.5 liters (Neopane et al., 2007). On this regard, peak milk yield can be calculated as 5.3 liters. Moreover, the peak milk yield of Gaddi buffalo is reported to be 3.1 liters (Kumar and Raj, 2007; Yogi and Sharma, 2018). However, more research is needed to be conducted in order to analyze the average and peak milk yield of Gaddi breed of buffalo.

3.9 Lactation milk yield

Total milk yield per lactation is the single most significant features for dairy buffaloes. The total milk yield in lactation of Gaddi buffalo is approximately 1222.6 liters at the lactation length of around 420 days (Pokharel and Neopane, 2007). Likewise, the lactation yield of Lime and Parkote is reported to be 962 liters and 1022 liters respectively (Shrestha, 2002). This data reveals that in terms of lactation milk yield, Gaddi buffalo seems more efficient among indigenous buffalo breeds.

4. PROBLEMS

Following are the major problems in maintaining the Gaddi buffalo:

- Poor management practices.
- Lack of awareness of farmer. Farmers are hardly convinced about the need of recording for the genetic improvement.
- Since the pocket area of Gaddi breeds is located in far-western region where there is low accessibility of roads which hinders the execution of the research and implementation of conservation plan. Similarly, extremely small and scattered herd of buffalo increases recording cost
- Illegal export of the Gaddi buffalo for meat production in India from Far-western region and crossbreeding with Murrah and other buffalo breeds.
- Poor research activities.
- Lack of clear-cut policies of government in its conservation and proper utilization (hardiness, adaptability to local harsh environment conditions and production at low input systems).
- Lack of appropriate breeding policies.

- Lack of guarantee of funds for long term buffalo conservation scheme.

5. Way Forward

- Awareness, education, training programs among the farmers.
- Strong and effective formulation of the policies on the conservation of Gaddi buffaloes.
- Establishment of the government farms of Gaddi buffalo in its pocket area especially far-western region of Nepal (in-situ conservation).
- Analysis of limiting factors and identification of a strategy for overcoming them in relation to proper conservation and optimum utilization of Gaddi buffalo.
- Germplasm collection and conservation of Gaddi buffalo (Ex-situ conservation).
- Initiation of community-based conservation and its proper utilization.
- Further in-depth researches for genotypic and phenotypic characterization of Gaddi breed should be carried out by National Agriculture Research Council (NARC). At the same time, the government of Nepal should take the initiation for its patent rights.
- Appropriate selection program within the breeds and establishment of the nucleus herds.
- In the context of climate change, appropriate health management (vaccination, drenching, treatment etc), feeding practices and shed management for the Gaddi buffaloes should be adopted.
- Application of the advanced breeding tools such as Artificial Insemination and development of conservation plan.

6. Conclusion

Among all the indigenous breeds of Nepal, Gaddi buffaloes are found to have higher production. However, due to lack of awareness on breeding, illegal export to India for meat production and poor management practices its productivity and numbers of purebred animals are declining at faster rate. The qualities found in Gaddi breeds are important animal genetic resources of the country. They should be considered as national assets and organized scheme for conservation and improvement needs to be identified and implemented as soon as possible. In order to upsurge the productivity of Gaddi buffalo and to control the declining population, an awareness and training programs among the farmers is indispensible. Appropriate selection program within the breed, inauguration of government farms, appropriate management practices, literacy, awareness on overall buffalo management, mainstreaming of advance breeding tools like artificial insemination with fresh and frozen semen in the areas, and a conservation plan especially for breeds in risk are some of the activities which definitely resolve the problem.

References

Kumar, P.P., Raj, T.M., 2007. Gaddi buffalo: An indigenous breed of Far-western Nepal. Italian Journal of Animal Science, 6 (SUPPL. 2), Pp. 1230–1233. https://doi.org/10.4081/ijas.2007.s2.1230

Lamsal, S., Subedi, D., Kaphle, K., 2020. Buffaloes Production and Reproduction Efficiencies as Reviewed for Parity in Nepal. International Journal of Applied Sciences and Biotechnology, 8 (1), Pp. 1–6. https://doi.org/10.3126/ijasbt.v8i1.27802

MOAD. 2020. Statistical Information on Nepalese Agriculture 2075/76 [2018/19], Pp. 1–437. https://www.moald.gov.np/

Neopane, S.P., Gorkhali, N.A., Pokharel, P.K., 2007. Indigenous buffalo of Nepal. Food and Agriculture Organization of the United Nations.

Neupane, S.P., Gorkhali, N.A., and Pokharel, P.K., 2007. Indigenous buffalo of Nepal. Animal Breeding Division.National Animal Science Research Institute. Nepal Agricultural Research Council.

Paudel, L.N., 2017. Breed improvement through intensive local selection of indigenous buffaloes for food andnutritional security and livelihood improvement in mid-hills of Nepal. In: Proceeding of the InternationalBuffalo Symposium, Chitwan, Nepal, Pp. 134.

Pawar. 2012. Effect of Year, Season and Parity on Milk Production Traits in Murrah Buffaloes. Journal of Buffalo Science, Pp. 122–125. https://doi.org/10.6000/1927-520x.2012.01.01.22

Pokharel, P.K., Neopane, S.P., 2005. Indigenous Nepalese Buffaloes with Special Reference to Gaddi. 8 (2001).

Pokharel, P.K., Neopane, S.P., 2007. Nepal Joumal of Science and Technology, 8, PP. 41-47. http://nkcs.org.np/nast/elibrary/pages/download.php?ref=28&size=&ext=pdf&k=&alternative=-1&usage=-1&usagecomment=

Poudel, D., Bhattarai, N., Kaphle, K., Sapkota, S., 2017. Effect of Parity on Lactational Efficiency of Murrah Crossbred Buffaloes (Bubalus bubalis L.) in Central Nepal. International Journal of Agriculture and Forestry, 7 (6), Pp. 140–144. https://doi.org/10.5923/j.ijaf.20170706.04

Sharma, S., Bhandari, P., Bhattarai, N., 2017. Effect of Non-Genetic Factors on Lactational Efficiency of Indigenous Buffaloes at Different Stage of Parity in Western Hills of Nepal.

Sherchand, L., 2001. Herd Composition of Cattle, Buffalo, Goat and Sheep in Nepal. Proceedings of the 4th National Animal Science Convention. Nepal Animal Science Association (NASA), November 29–December1, 2000. Kathmandu, Nepal, G P O Box 8975 EPC 1566. Pp. 161-166.

Shrestha, B.S., Amatya, N., Singh, R.M., Jha, P.K., Acharya, B.R., Gurung, K.B., 2005. Production Performances of Indigenous Buffaloes int the Western Hills of Nepal. Nepal Journal of Science and Technology, 6, Pp. 121–127.

Shrestha, N.A., 2002. Improvement of Indigenous buffaloes in the Western hills of Nepal. In Proceedings of 5th National Workshop on Livestock and Fisheries Research, Pp. 123–131.

Yogi, J.N., Sharma, S., 2018. Study Of Lactation Efficiency Of Gaddi Buffalo In Mid-Western Hill of Nepal [UndergraduatePracticum Assessment, Insitute of Agriculture and Animal Science, Lamjung Campus, Lamjung , Nepal]