

Research article**HUSBANDRY PRACTICE, HEALTH, PRODUCTIVE AND REPRODUCTIVE STATUS OF LULU CATTLE IN MUSTANG, NEPAL****G. Gautam^{*1} and P. B. Oli²**¹Agriculture and Forestry University, Rampur, Chitwan, Nepal²Purbanchal University, Bharatpur, Chitwan, Nepal

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ABSTRACT

Lulu is the only indigenous cattle of taurine (*Bos taurus*) breed that is reared in northern part of central to western Nepal. There have been no recent studies on husbandry practice, health status, productive and reproductive performance of Lulu cattle in Nepal. Therefore, this study was conducted to know the husbandry practice, health, productive and reproductive status of Lulu cattle in Mustang district. Household survey was conducted in Lulu cattle rearing households (n=183) in Mustang; fecal sample of Lulu cow was collected from each household and examined for endoparasitic infection. Body condition score (BCS), hair coat, anemic and milk production status were recorded only from lactating cows (n=242). All of the respondents kept their cows in loose housing system. Among them, 90.2% grazed their cattle, 21.3% provided some cultivated pastures, 3.3% supplemented commercial feed and none of the farmers fed mineral supplementation to their cattle. All the milk produced was used only for home consumption. Only 22% of respondents dewormed their cattle regularly and 29% never dewormed; only 12% vaccinated against foot and mouth disease (FMD) every year and 25% never vaccinated. Cattle of 79.8% households had endoparasitic infection. Among 242 lactating cows, 13.2% cows had poor BCS (<2.75), 95.5% had rough hair coat and 20.4% had anemic (pale) eye mucous membrane. Total 8.3% cows had the history of abortion. Mean (\pm SD) peak milk yield and lactation length were 2.01 \pm 0.30 liter/day and 9.84 \pm 0.86 months, respectively. Most of the cows calved in summer (72%) followed by autumn (12%), spring (11%) and winter (5%). Mean (\pm SD) age of first calving, calving to conception interval, inter-calving interval, dry period and the number of services per conception were 36.0 \pm 0.48 months, 3.99 \pm 0.68 months, 12.97 \pm 1.34 months, 2.71 \pm 0.45 months, and 1.47 \pm 0.77, respectively. In conclusion, Lulu cattle has the potentiality to increase its productive and reproductive performance through improved health and husbandry practices.

Key words: Indigenous cattle, endoparasitic infection, body condition score, calving season**INTRODUCTION**

There are different indigenous breeds of cattle found in Nepal; documented indigenous breeds of cattle are Lulu, Achhami, Siri, Khaila, Yak, Terai and Pahadi (Neopane et al., 2002). Lulu cattle are the only indigenous cattle of taurine breed (*Bos taurus*) in Nepal (Fujise et al., 2003; Takeda et al., 2004). These cattle are reared in north-western parts of Nepal mainly in Mustang and some parts of Manang and Dolpa districts (Rana et al., 1996; Neopane et al., 2002). The total population of Lulu cattle as reported by District Livestock Services of Jomsom, Mustang in year 2016/17 was 7,843. The Lulu breed is well adopted to the agro-climatic conditions at 2800 m to 4000 m above sea level; these might have become acclimatized to low oxygen pressure (Pradhan et al., 1998; Sherchand et al., 2000). Although Lulu cattle produces on an average of 1.6 kg milk per day in an average lactation length of 195 days (Neopane & Pokharel, 2005), they can thrive in severe highland environment and can produce under low input system (Rana et al., 1996). Therefore, local people have been keeping the Lulu cattle as their tradition under a fairly simple and extensive management system in order to obtain the protein requirement of the family, and for fuel and manure to their farmlands.

Although there were very limited old reports regarding the phenotypic and productive traits of Lulu cattle (Rana et al., 1996; Neopane & Pokharel, 2005), there have been no recent studies on husbandry practice, health status, productive and reproductive performance of Lulu cattle in Nepal. Therefore, this study was conducted to understand the recent husbandry practice, health, productive and reproductive status of Lulu cattle in Mustang district.

MATERIALS AND METHODS

Study site

This study was conducted at ward numbers 1, 4 and 5 of Baragung Muktichhetra Gaupalika in Mustang district of Gandaki Province located at northern part of western Nepal. The district is one of the remotest areas in Nepal and is second in terms of the sparsity of population (Craig, 1996). The district straddles the Himalayas and extends northward onto the Tibetan plateau. Baragung Muktichhetra is located on the southern part of the Mustang district; it elevates from 2,800 m to 5,310 m above the sea level. It had a human population of 2,844 with 725 households and the population of Lulu cattle was 2,210. (DLSO, 2017).

Household survey

A household survey was conducted in 183 households from three villages of Baragung Muktichhetra Gaupalika (Table 1). A questionnaire format was developed and face to face interview was conducted from January to March 2018 to collect data regarding husbandry practices, health, productive and reproductive status of Lulu cattle from the purposively selected households. Each Lulu cattle rearing household of above mentioned wards was visited and the data were collected until the number of households reached at least 25% of total households in the Gaupalika (i.e. 181.25/725).

Table 1. Number of Lulu cattle rearing households surveyed in three villages of Baragung Muktichhetra Gaupalika, Mustang

Name of village	No. of household
Muktinath	50
Kagbeni	100
Tiri	33
Total	183

Fecal sample collection and examination

Since the cows were kept in loose housing system in all households, one freshly defecated fecal sample of cattle was collected from each household. Sample was collected from the ground using rubber gloves and kept in plastic bags. Each sample was labeled clearly with date, name of owner and place of collection and then transported to the laboratories of Livestock Sub-centers (Jhong and Kagbeni), where each of the samples was examined under microscope (x100 magnification) by sedimentation method for the presence of endoparasites' eggs, if any.

Determination of body condition score (BCS), hair coat and anemic status

Only lactating cows (n=242) were examined to assess their body condition score (BCS), hair coat and anemic condition, and. BCS was recorded on 1-5 scale with 0.25 increment as developed for Holstein cows (Edmonson et al., 1989; Elanco, 1996). Hair coat was determined by visual observation and classified as smooth or rough. Anemic condition was determined by visualizing the conjunctival mucous membrane, and classified as normal or anemic (pale).

Statistical analyses

A data sheet in MS Excel was prepared from the findings of questionnaire and from results of fecal examination. Descriptive statistics were used to show the means (\pm SD), range and percentages (proportions) of various parameters. To study the season of calving, whole year was divided into four seasons as follow: spring (March-May), summer (June-August), autumn (September-November) and winter (December-February).

RESULTS

Husbandry practice

Among 183 households studied, the total number of cows and breedable cows per household (mean±SD) were 3.99±2.05 (range 1-10) and 2.64±1.47 (range 1-8), respectively. All the farmers kept their cows indoor in loose housing system. Among them, 90.2% used to graze their cows during day time, and 9.2% kept their cows 24-hours indoor. Only 21.3% farmers fed cultivated pastures to their cattle whereas 78.7% did not provide any cultivated pastures. Similarly, only 3.3% of farmers supplemented commercial feed to their Lulu cattle and 96.7% did not provide any commercial feeds. None of the farmers fed mineral supplementation to their cattle. None of the farmer sold milk; all the milk produced was used only for home consumption.

Only 10% farmers used anthelmintics against endoparasites at every 4 months, 12% at every 6 months, 49% occasionally and 29% never dewormed their cattle (Fig 1). Total 12% of farmers vaccinated their cows annually and 63% vaccinated occasionally and 25% never vaccinated against foot and mouth disease (FMD).



Figure 1. Deworming frequency against endoparasites adopted by Lulu cattle farmers in Mustang

Health status

Among 242 lactating cows, 86.8% had good BCS (2.75-3.50) and 13.2% had poor BCS (<2.75); 95.5% had rough hair coat and 4.5% had smooth hair coat; 79.6% had normal (pink) and 20.4% had anemic (pale) eye mucous membrane. Total 8.3% cows had history of abortion. There was no history of vaginal prolapse, uterine prolapse and repeat breeding.

Among 183 households' cattle fecal samples examined, 79.8% households had endoparasitic infection in their cattle. Of them, the prevalence of cestodes, trematodes and nematodes was 8.2%, 27.3% and 44.3%, respectively (Fig. 2). Among cestodes, all were *Moniezia* spp. Among trematodes, 71.1% were *Fasciola hepatica* and 28.9% were *Paramphistomum* spp. Among nematodes, 39.4% were *Ascaris* species, 33.9% were *Hemonchus* species, 17.4% were *Trichostrongylus* species and 9.2% were *Ostertagia* species.

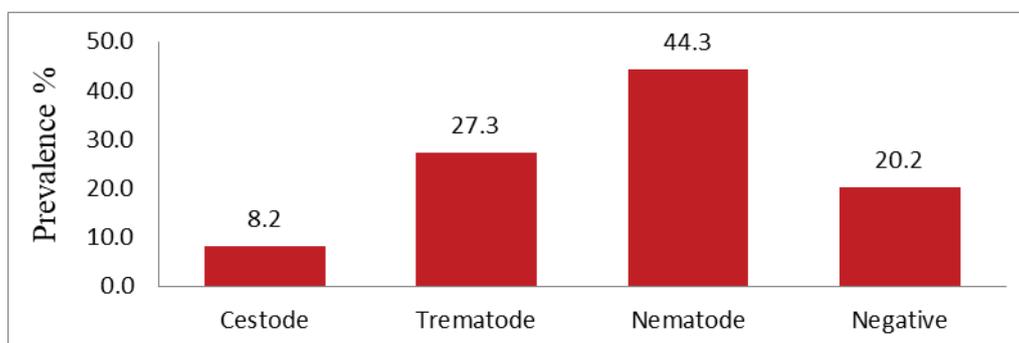


Figure 2. Prevalence of endoparasitic infection in Lulu cattle in Mustang

Productive and reproductive status

Mean (\pm SD) peak milk yield and lactation length were 2.01 ± 0.30 (range 1.5-2.5) liter/day and 9.84 ± 0.86 (range 7-11) months, respectively. Most of the cows calved in summer (72%) followed by autumn (12%), spring (11%) and winter (5%) seasons (Fig. 3). Mean (\pm SD) age of first calving, calving to conception interval, and inter-calving interval were 36.0 ± 0.48 (range 33-42 years) months, 3.99 ± 0.68 (range 3-5) months and 12.97 ± 1.34 (range 12-15) months, respectively. Similarly, mean (\pm SD) dry period and the number of services per conception were 2.71 ± 0.45 (range 2-3) months and 1.47 ± 0.77 (range 1-3), respectively.

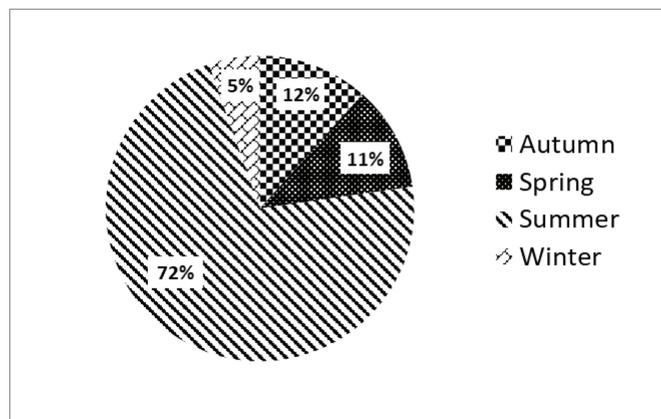


Figure 3. Season of calving of Lulu cattle in Mustang

DISCUSSION

The present study determined the recent husbandry practice, health status, productive and reproductive status of Lulu cattle in Mustang area. Average number and number of breedable Lulu cattle per household in Baragung Muklichetra Gaupalika were 4 and 3, respectively. All households kept their cows indoor in loose housing system and 90.2 % farmers grazed their cows during day time. This might be due to cold climatic condition of this area and availability of sufficient grazing land. Only 3% farmers provided commercial feed to their cows and no households provided mineral supplementation. About 30% households never dewormed their animals and 25% households never vaccinated their animals against FMD. All households obtained quite low milk production; so, they used milk only for their home consumption and nobody sold milk for commercial purpose. From this study it is clear that farmers were keeping Lulu cattle only as subsistence based farming, i.e. not for commercial purpose.

The present study revealed that about 95% lactating cows had rough hair coat. It has been reported that the body coat of Lulu cattle is hairy (Shrestha and Shrestha, 1998). Almost 13% Lulu cattle had poor BCS and 20% were in anemic condition. This might be due to poor nutritional and health management as indicated by only 3% households provided concentrate feeds to their animals and only 22% households regularly dewormed their cows. The high incidence of endoparasitic infection (79.8%) might be due to no or only occasional deworming of their animals against endoparasites by 78% households. Nematodes were the major endoparasites followed by trematodes and cestodes.

Regarding production status of Lulu cattle, this revealed that average peak yield was about 2 liter per day (range 1.5- 2.5 lit.) with lactation length of about 10 months (range 7-11 months). The milk production in this study was higher and the lactation length was longer than those reported by Neopane and Pokharal (2005). Thus, further detailed study is recommended to explore and confirm the potentiality of this breed for milk production.

Normally cows are not seasonal breeders (Senger, 2003). However, from this study there was interesting finding that nearly three-fourth of Lulu cattle calved during summer season. It indicated that autumn season was the good breeding season for Lulu cattle which was similar to the seasonality pattern of breeding in Nepalese buffaloes (Devkota and Bohora, 2009; Devkota et al., 2012). Probably this is the first

report regarding seasonality of calving in Lulu cattle. Regarding reproductive performance, the age of first calving of Lulu cattle in this study was 36 months which was quite younger than that (52 months) reported earlier (Rana et al., 1996). Similarly, calving to conception interval and inter-calving interval of Lulu cattle in this study were also shorter than those reported earlier (Rana et al., 1996). The reason of lower age of calving and shorter calving to conception and inter-calving intervals in the present study as compared to previous studies was not clear. The number of services per conception in this study was 1.47, which is good reproductive performance indicator. This was also supported by the findings that there was no history of repeat breeding in Lulu cattle. There were no previous reports regarding number of service per conception. Likewise, probably this is the first study that determined the incidence of reproductive diseases in Lulu cattle; this study revealed that about 8% Lulu cattle had the history of abortion. This shows the possibility of abortion causing diseases in Lulu cattle in this area. Further detailed study is recommended to rule out the occurrence of abortion causing diseases in Lulu cattle. However, there was no incidence of vaginal and uterine prolapse in Lulu cattle.

CONCLUSION

In conclusion, Lulu cattle were being reared by the local community as a tradition of subsistence farming without any commercial purpose. However, it seems that their productive and reproductive performance have been improved over the years. Thus, there is good potentiality of this smallest taurine breed of cattle to improve its productive performance in harsh environment through improved health and husbandry practices.

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