ABSTRACT

The present study was conducted to find out the present status of available cattle in Bangladesh. Their rearing system, productive and reproductive performance. Data was collected from thirty local cows and heifers were taken under this study from 17 farmers. Age , number of calving, conception ratio, gestation period, post partum heat period, milk production, birth weight of calves, age at first calving. So considering the age at first parturition of cross(HF),cross(Shahi) and desi were 3.71±0.75 years, 3.66±1.15 years and 3.54±3.54 years respectively, average daily milk yield of cross(HF),cross(Shahi) and desi were 4 ± 1.41 L,2.66±1.15 L and 1.64±o.65 L respectively, number of calving of cross(HF),cross(Shahi) and desi were 2.714±1.112, 2.667±2.082, 2.88±1.727 repectively, conception ratio of cross(HF),cross(Shahi) and desi were 1.285±0.487, 2.5±0.707, 1.478±0.926 respectively, calf weight of cross(HF),cross(Shahi) and desi were 23.571±4.157, 25±5, 18.6±2.244 respectively , parameters indigenous cows rearing under rural condition was a profitable practice in selected areas minimizing effect of climate stress and thrives well in hot and humid temperature maintaining phenotypic and productive performance of Bangladesh.

Key words: Cattle, Productive & Reproductive performance, Village condition

INTRODUCTION

Livestock plays an important role in Agriculture as well as in national economy in Bangladesh. Cattle are valuable components of livestock sector in Bangladesh. Dairying is a biological efficient system that converts large quantities of inedible roughage to milk, the most nutritious food known to human. Milk is renowned as an almost complete as well as natural nutritious food for all mammals including human being (Debnath et al., 2014) It is more efficient and intensive system in term of nutrient and protein production for human consumption. Indigenous cattle are exposed to stressful climatic condition, which influence their productivity and welfare. These indigenous zebu (*Bos indicus*) cattle are adapted and tolerance to the hot environments because of low metabolic rate and great sweating capacity (Hansen, 2004), but generally they exhibit low productive and reproductive performance (Ageeb et al., 1991). Cross breeding of cattle has been adopted for blending the adaptability of tropical cattle with the high milking potential of exotic breeds. However, the local environment can sustain only composite genotypes of a moderate level Bos tauras blood (Musa et al., 2008). Friesian crossbreds were noted to be the suitable for their adaptability in addition to their high milking capacity. Adaptation to tropical environment has been reduced when the local Butana and Kanana cattle were crossbred with high producing non adapted Holstein-Friesian breed. Furthermore, selection for high milking was reported to reduce the heat tolerance of cows which magnifies the seasonal depression in productivity caused by climatic stress (Al Katanani et al., 1998) accordingly, high yielding cows are more sensitive to hot environment compared to low yielding cows (Igono et al., 1990). Exposure of dairy cows to hot environment during summer could stimulate thermoregulatory mechanisms and produce reduction in the rates of metabolism, feed intake and productivity (Armstrong, 1994). Heat stress influences reproduction and represents a major factor for lower fertility during summer in tropical environments. It reduces the length and intensity of estrus (Jordan, 2003.). The competence of oocyte for fertilization and subsequent development is reducing times of the year associated with heat stress (Al-Katanani et al., 2002.) and depression in conception rate in hot environment has been documented (De Rensis et al., 2003). Hence the present study was undertaken with the following objectives:

i) To know the productive & reproductive performance indigenous cattle reared in the selected area

ii) To recommend the farmers about the rearing and management practice to be applied at extensive cattle farm.

MATERIALS AND METHODS

Study area

One typical village named Hatil which is about thirty two kilometer away from Bangladesh Agricultural University; Mymensingh Campus had been chosen and selected for this study. The villagers are mostly resource poor farmers (small holder farmers). And some of them were landless but every family has some indigenous cattle. The village was well communicated from the town; the farmers were really cooperative and much interested for this type of study. The cows of villagers are generally used for multi-purpose such as dairy, draught and meat. Rice straw was the main source of feed for the animals as residual part of crop. Very little roadside green grass used as succulent feed. Wheat bran, oil cake and common salt were fed to the animals by the comparatively better off farmers. Animals are mainly stall feed and sometimes tethered.

Number of animals in study

Seventeen individual farmers having totaled 30 indigenous cows and indigenous heifers were taken for this study. Baseline data were collected having 30 animals through direct interviewing with 17 farmers. The animals received as usual feed supplied by the farmers of that area on the basis of availability.

Time of data collection

The data were collected during the period from 15 November 2019 to 25 December 2019.

Data collection procedure

A pre-designed questionnaire was used for collecting the information.

Productivity and fertility indices

Cows were milked once in the morning. Calves were usually tied up at night and they had free access to their dam during the whole day. Productivity had been monitored by supplied International Atomic Energy Agency (IAEA) draft data sheets for measurement of milk production and changes in live weight, condition score (1-5) and from various reproductive indices e. g. at first parturition, interval between parturition and start of sexual cycle/conception, conception rate, number of calves boned/ weaned etc.

Methods of Feeding

Cows were fed as usual traditional system by the villagers. Most of the animals were mainly stall fed and sometimes tethered in the field surrounding of household farmers. Green grass and rice straw is the main source of the study animals. Fresh water supplied for the trial animals were ad libitum.

Climatic conditions

Ambient temperature, rainfall and relative humidity were collected from the meteorological station situated at BAU campus, Mymensingh. Mean value of ambient temperature (T) and relative humidity (RH) recorded during the experiment period were calculated. The temperature-humidity index (THI) was calculated using the following equation by (Ravagnolo et al., 2000). THI= (1.8*T+32) - [(.0.0055*RH) *(1.8*T-26)].

Feed sample analysis

Determination of Dry matter (DM), crude protein (CP) and Ash were done according to AOAC (1984) in the laboratory of Department of Animal Nutrition. RDP, UDP, digestibility of CP and DM were done according to Scottish Agricultural College bulletin (1984).

Statistical Analysis

Data were analyzed by descriptive statistics such as number, range, percentages, mean and standard deviation. A number of tables were prepared keeping in view the objectives of the study.

RESULTS AND DISCUSSION

Physical and morphometric characteristics in indigenous cattle

Initial baseline data summarized from 30 cattle, their calves and heifers which are summarized in Table 1. A number of factors may influence the body weight. Genetic makeup is main thing which influences this factor.

Balanced nutrition, environmental condition, parasitic infestation, care and management may also affect body weight. Condition of body status and health of animal may influence these factors. Birth weight of local calves was found in case cross (HF) 23.57±4.15 kg, cross(Shahi) 25±5 kg and desi 18.6±2.24 kg. Nahar et al (1992) observed the average weight of Sahiwal X Local calves under rural condition was 17.6±0.3 kg. Hossain et al.,(1982) reported that the birth weight of Pabna milking cows' calves was 16.37±2.20 kg. So, within breed selection of individual superior sire could be an important factor of improving birth weight of calves. Bhuiyan et al. (2012) reported that average birth weight of Red Chittagong Cattle (RCC) calves was 14.21 ± 0.27 kg. There are several factors which influence birth weight of calves. Genetic background is the most important among them. Nutritional status of pregnant dam and body condition also has remarkable effect on this trait. Sex of calf, twining and season of birth also affect the weight of calves. Season and weight of the animal may also influence this factor.

Table 1. Summary(Mean ± SD) of base line information for cows, calves and heifers ,

Parameter	Age (Y)	No. of calving	Conception ratio	Gestation period (D)	Post partum heat period(D)	Milk production(L)	Calf weigt(Kg)	Age at first calving(Y)
Cross(HF)	**6.71428 ±1.70433**	**2.71428 ±1.11269**	**1.28571 ±0.48795**	**274.28571 ±20.7019**	**70.71428 ±25.56504**	**4 ±1.41421**	**23.57142 ±4.15760**	**3.71428 ±0.75592**
Cross (Shahi)	**6.66666 ±3.05505**	**2.66666 ±2.08166**	**2.5 ±0.70710**	290 0	**110 ±34.64101**	**2.66666 ±1.15470**	25 ±5	**3.66667 ±1.15470**
Desi	**6.4 ±2.07846**	**2.88 ±1.72788**	**1.47826 ±0.92640**	**283.2 ±58.8367**	**96 ±40.47221**	**1.64 ±0.65604**	**18.6 ±2.24499**	**3.54 ±3.54**

Productive and reproductive traits

Average daily milk yield of cross(HF),cross(Shahi) and desi were 4 ± 1.41 L, 2.66± 1.15 L and 1.64± o.65 L respectively (Table 1). Initial data shows that the average milk production was minimum under present situation. Animals were mainly under feed. Cows in the research area were milked only in the morning once daily. So, the actual milk production could have been higher than that of present average figure. Ali (1994) reported that milk production varied according to season and area. He conducted the experiment on local cattle using data collected from four different areas of Bangladesh and highest milk was observed in winter season (1.93 kg per day). He also found the highest milk yield in Pabna cows (20.50 kg per day). Bhuiyan et al.,(1994) studied the performances of local cows under rural condition and average milk yield was 1.63 kg. Bhuiyan et al. (2012) reported that daily average milk yield of RCC was 1.98± 0.08 kg. There are several factors which influence milk production of cows like quality and quantity of feed, ambient temperature, humidity and care of the herd. Little information is available on fat content of local cow's milk. Islam (1990) studied milk composition of local cows from Manikganj district and fat was found 46.9 g\ kg of milk. Fat content of local cows were greater than that of exotic and cross bred cows due to straw based diet intake of local cows. On the other hand, production of local cows is low. Fat percentage may be affected by the quality of feed, number of lactation, stage of milking, exercise of animals, season of year as well as quantity of milk yield. Calves were ties up at night. Calves were free access for suckling to their dam throughout the day which is good feeling for the farmers for the better health of calves. It is revealed from Table 1 that the indigenous cows in the village condition of feeding and management usually show their first reproductive performance late as compared with exotic, pure and cross bred animals. Age at first calving was also high. Age at first calving was calculated from data of birth to the date of first calving in months. It was found that the age at first parturition of cross(HF),cross(Shahi) and desi were 3.71±0.75 years, 3.66±1.15 years and 3.54±3.54 years respectively. Ghosh et al, (1977) studied some reproductive parameters of milking cows and reported that age at first calving for Red Chittagong heifers was 39.96±3.96 months. Islam et al., (1993) reported that average age at first calving of local cows was 48.72±7.56 months. Genetic makeup is the main factor which influences this trait remarkably. Level of nutrition supplied during the growing period is another important factor which affects this trait directly. Environmental condition, parasitic infestation, low quality roughage, care and management may also affect this trait. Season of birth also have an indirect affect on age at first calving. Actual calving interval could have been even earlier of the present average figure 417 days, because calves sucked the cows which have an effect on start of estrus cycle of cows after calving which ultimately lengthen the present calving interval. Bhuiyan

et al. (2012) reported that calving interval of RCC was 509.89 ± 15.37 days. Islam et al., (1993) found average calving interval was 525.0 ± 87.9 days. Various factors like breed, nutrition, age, parity, milk yield, suckling, year and season may influence calving interval ,Sharma et al., (1980). In zebu cattle calving interval ranged from 366-789 days (Koul, 1987). Moreover, most of animals were infested by parasites that could be one responsible factor for less milk production and poor fertility. Suckling blood and damaged liver cause anemia and abnormal physiology of body. It has been reported in the literature that parasites usually suck 10-15% of the host nutrients.

Feed Intake of cows

Daily feed intake has been measured at village level of cows. Table 3 shows the feed intake of village level feed. Measurement of daily intake of feed was not always possible during rainy season due to muddy roads of the village. From Table 2, highest amount of DM, RDP, UDP and CP were found in rice straw and lowest in wheat bran (DM) and in road side grass of other composition.

Average daily intake of feed at the village of indigenous cows.

Ingredients	Fresh wt.(kg/day)	DM (kg/d)	RDP (g /d)	UDP(g/d)	CP(g/d)
Rice straw	7.5	6.38	255	83	338
Roadside grass	4.5	0.90	47	18	65
Wheat bran	0.5	0.44	50	18	68
Total	12.5	7.72	352	119	471

Climatic conditions

Berman (2005) estimated that effective environmental heat loads above 35° C activate the stress response systems in lactating dairy cows. The depressing effect of high temperature is much greater for high yielding cows than that of low milking cows. The larger cows are more sensitive to environmental temperature. The critical temperature at which the depressing effect of milk production, feed consumption and on body weight becomes evident is 23.9° C to 26.66°C for Holstein and 26.66° to 29.44°for Jersey cattle. On reducing temperature from 10°C to 15.55°C feed consumption and milk production promptly returns to normal. The decline in milk production and feed consumption are more pronounced for Holstein than for Jersey. The greater sensitiveness of Holstein cattle to higher environmental temperature is shown not only by their greater rate of decline in milk production, feed consumption and body weight but also by a greater rate of increase in rectal temperature and respiratory activities. The greater sensitiveness is not due to breeds as such but rather to their greater body weights. The amount of body surfaces per unit body decreases with increasing body weight and the rate of heat dissipation per unit weight must decrease with consequent steeper rises in body temperature in large animals as compare to

small ones. Our local cows can survive easily in hot and humid temperature and resistant to fluctuate temperature and disease control. Their production moreover was same in our ambient temperature, rainfall and relative humidity but their production falls somehow during heavy rainfall due to supply of insufficient roadside green grass. Supplying of rice straw and small amount of concentrates and UMMB their production may be kept same. So, it was observed during the study period that production and growth of calves does not hamper in hot and humid temperature. In normal feeding and management condition of indigenous cows in the village usually shows their first reproductive performance late as compared to exotic and cross- bred cattle. Age at first parturition is high and calving interval between parturition is also high. Initial data shows that average milk production is also minimum. Moreover; most of the animals were infested by Fasciolosis which could be important factors for less milk production and poor fertility. Overall the performances of cows, calves and heifers under traditional management are not satisfactory. Feed supplementation with other interventions is needed to increase the production level of local cows. UMMB supplementations have already been introduced in project areas for development strategies of improvement of phenotypic, productive and reproductive performance of local cows.

CONCLUSIONS

In conclusion, above reveals show that performance of indigenous cattle regarding morph metric characterization, productive and reproductive traits, blood parameters and climate effect (temperature, rainfall and relative humidity etc) as considering the trial parameters indigenous cows rearing was a profitable practice in selected areas coping with hot and humid temperature. As a result, it is possible to improve the phenotypic and production performance of indigenous cows in hot and humid temperature conditions in selected areas of Bangladesh.

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