Effect of foggers on production performance and feed intake of Mehsana buffaloes in summer season

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Abstract The trial was conducted on twelve early lactating Mehsana buffaloes for the period of three months (April-2012 to June-2012) at Livestock Research Station, S.D. Agricultural University, Sardarkrushinagar, Gujarat (India) during hot dry season when the average maximum temperature was 38.54°C (36.60 to 40.20°C) and relative humidity was 53.45% (46.00 to 60.00%). Buffaloes of Group I were kept under loose housing without foggers shed (Control), while buffaloes of group II were kept under loose housing with foggers shed (Experimental). The weekly mean of daily total milk yield (kg) in Mehsana buffaloes of foggers group (70.14 kg) was higher as compared to that of the control group (64.51), however, the difference between both groups was non-significant. The weekly overall mean values of milk fat percent was significantly higher (P<0.01) in foggers group (7.53%) as compared to control group (7.09%). The values of milk solids-not-fat and milk protein percent did not differ significantly. Weekly mean feed intake (kg/animal/day) on dry matter basis of Mehsana buffaloes in foggers group (12.66 kg/buffalo/day) was significantly (P<0.01) higher than that of control group of buffaloes (11.95 kg/buffalo/day). Dry matter intake increased by 5.94 % in foggers group as compared to control group. Therefore, it is concluded that the cooling through foggers on buffaloes in summer season, was beneficial in terms of body comfort of the animals as well as increasing the fat yield and feed intake.

Keywords: Buffalo, foggers, feed intake, milk fat %, milk yield

Introduction

Buffalo (Bubalus bubalis) is the second most important dairy species in the world. Buffaloes are more prone to physical distress when exposed to heat stress as compared to other farm animals because of the scarcely distributed sweat glands and dark body color render buffaloes with poor heat tolerance capacity (Das et al. 1999). Heat stress leads to increase rectal temperature and subsequent decrease in feed and energy intake and the average effects on reproduction, production and milk composition (Al Saied et al. 2000). The innate thermoregulatory mechanism in buffaloes is inadequate compared to cattle (Thahar et al. 1982). Availability of showers or water sprinklers over the lactating animals reduces heat stress and milk production can be enhanced (Singh and Mehla, 1999). Mehsana buffaloes are well reputed for regularity in breeding, persistence in milk and efficient in milk production (Singh, 1992) make it notable buffalo breed of Gujarat distributed in Mehsana and Ahmadabad districts and spread all over the nearby districts viz. Banaskantha, Sabarkantha and Kutch. The climatic condition of this region is arid to semi-arid type and the mercury rises above 65°C in summer. High ambient temperature also reduces feed intake. Since feed intake was closely associated with the production capacity of animals, some protective measures were, therefore, needed to maintain milk production of buffaloes in summer season and so as to observed the beneficial effects of foggers on the production performance of Mehsana buffaloes.

Materials and Methods

The trial was conducted on twelve early lactating Mehsana buffaloes for the period of three months (April-2012 to June-2012) at Livestock Research Station, S.D. Agricultural University, Sardarkrushinagar, Gujarat, India. The animals were divided into two groups of six each on the basis of body weight, average daily milk production and parity. The initial body weights of Group I was 504.17±32.08 kg whereas of Group II was 504.17±27.52 kg. Buffaloes of Group I were kept...
under loose housing without foggers (Control), while buffaloes of group II were kept under loose housing with foggers (Experimental). The foggers were operated daily during hot hours from 12:00 to 15:00 p.m. in experimental shed. The fogger cooling system was automatically controlled by an electronic timer and run for 3 min after an interval of every 2 min (36 min/hour) from 12:00 to 15:00 hours. The buffaloes were hand milked by the expert milker and the milk yield of individual buffalo was recorded at each milking. Weekly morning and evening milk samples of 100 gm. each from individual animals were collected in the respective milk sample bottle and were analysed for fat, solid-not-fat and protein content was determined by Automatic Ekomilk Analyzer@.

Feed intake was recorded at weekly interval from buffaloes of both the groups by recording the feed provided and the residue left on individual group basis. The concentrate feeding was given on the basis of average milk production and maintenance requirements as per ICAR (1998) feeding standards. The feeding was done twice daily at 10:00 to 11:00 a.m. and 5:30 to 6:30 p.m. The green and dry fodder intake was assessed by providing weighed quantities of fodder to individual buffalo and weighing the leftovers. The statistical analysis of the experimental data was carried out by using the two-sample 't' test with equal variances as per the methods suggested by Snedecor and Cochran (1994).

Results and Discussion

Production Performance

Milk yield: The weekly mean morning total milk yield of Mehsana buffaloes in control and experimental group were 33.54 and 36.58 kg respectively. The weekly mean evening total milk yield of Mehsana buffaloes in control and experimental group were 30.97 and 33.56 kg respectively. Weekly mean daily total milk yield (kg) of the Mehsana buffaloes in experimental group was 70.14 kg/animal. This was comparatively higher as compared to the milk yield of the Mehsana buffaloes in control group (64.51 kg/animal) but was not different statistically from each other. It was suggested that the provision of water cooling through foggers system during hot period had no direct effects on milk yield in Mehsana buffaloes but indirectly cooling effects of foggers during hot hours of days provide comfort zone for optimum body adaptation and regulates normal body mechanism of animals. The present findings are similar to those reported by Radadia et al. (1980) observed that total milk yield of Murrah buffaloes under cooling treatments were higher than that of control but the differences were non-significant. Similar findings were obtained by Fulsounder (1982) in Mehsana buffaloes; Aggarwal and Singh (2006) in Murrah buffaloes. However Ambulkar et al. (2011) who observed the average milk yield of Murrah buffaloes maintained under the high pressure fogger with fan was 5.630 ± 0.129 kg, significantly (p<0.05) higher than without cooling devices (5.321 ± 0.123 kg). The high pressure fogger with fan system increased the daily milk yield by 0.309 kg/day/animal.

Milk fat %: The weekly mean morning, evening and overall fat percent of milk were 7.44, 7.62 and 7.53, respectively in experimental group of buffaloes whereas the figures for control group were 7.25, 6.92 and 7.09, respectively (table 1). Weekly mean morning milk fat percent of Mehsana buffaloes did not differ significantly. Weekly mean evening milk fat percent of Mehsana buffaloes in experimental group was 7.62%, which was significantly (P<0.01) higher than that of the buffaloes maintained in control group (6.92%). The weekly overall mean milk fat per cent of Mehsana buffaloes in experimental group was 7.62%, which was significantly (P<0.01) higher than that of the buffaloes maintained in control group (6.92%). The weekly overall mean milk fat per cent of Mehsana buffaloes in experimental group was significantly higher (P<0.01) than that of control. This might be due to beneficial effect of water cooling through foggers system during hot hours and animals feel comfort. The present findings are in accordance with findings of Johnston (1958) and Moody et al. (1967) observed that elevated temperature resulted in a marked depression in milk yield and milk fat percent. Aggarwal and Singh (2006) observed that the milk fat was high in wallowing group (7.35 Vs. 7.23 %) in comparison to the control group of Murrah buffaloes.

Milk solids-not-fat %: The weekly mean morning, evening and overall SNF percent of milk were 9.07, 9.05 and 9.06,
respectively in experimental group of buffaloes whereas the figures for control group were 9.00, 8.89 and 8.94, respectively (Table 1). The weekly mean morning and evening milk SNF percent of Mehsana buffaloes did not differ significantly among both the groups. The weekly overall mean milk SNF percent of Mehsana buffaloes in experimental group was not significantly different than that of control groups of buffaloes. The effect of fogger was not found significant on milk solids-not-fat percent. The present findings are in accordance with report of Fulsounder (1982) in Mehsana buffaloes that observed the daily average percent S.N.F was higher in treatment-3 (two hours daily splashing of water from 12.00 to 13.00 and 14.30 to 15.30 hours) followed by treatment-2 (1 hour daily splashing of water from 12.00 to 13.00 hours) and treatment-1 (control). However, the difference was not significant. Thirumurugan and Saseendran (2008) also observed that solids-not-fat of milk did not differ significantly due to housing system and sprinkling of water in lactating crossbred cows. On the contrary, Radadia et al. (1980) observed highly significant effect in solid-not-fat percentage of milk in Murrah buffaloes due to shower and cool drinking water.

Milk protein %: The weekly mean morning, evening and overall protein percent of milk were 3.81, 3.82 and 3.82, respectively in experimental group of buffaloes whereas the figures for control group were 3.76, 3.71 and 3.73, respectively (Table 1). The weekly mean morning and evening milk protein percent of Mehsana buffaloes was not significantly different among the both groups. The weekly overall mean milk protein percent of Mehsana buffaloes in experimental group was not significantly different than that of control groups of buffaloes. It suggests that the fogger had no significant effect on milk protein percent of Mehsana buffaloes. The present findings are in accordance with Thirumurugan and Saseendran (2008) observed that the protein content of milk did not differ significantly due to housing system and sprinkling of water in crossbred cows.

Feed Intake: Weekly mean feed intake (kg/animal/day) on dry matter basis of Mehsana buffaloes of experimental group (12.66 kg/buffalo/day) was significantly (P<0.01) higher than that of control group of buffaloes (11.95 kg/buffalo/day). Fogging of water on buffaloes significantly increased the DM consumption. It may be due to increase ruminal motility and rumen fermentation with better enhancement of microbial population in rumen, which otherwise affect due to heat stress. Similar results were also obtained by Bharadwaj et al. (1992) who observed that the dry matter intake during night hours was also significantly higher as compared to intake during the day (1.69 kg Vs. 1.22 kg/100 kg body weight). This is indicative of the fact that feed intake increases during the cool hours and also reported by Aggarwal and Singh (2006) in Murrah buffaloes where observed the feed intake increased by 13.24% in wallowing group as compared to showers group.

Conclusions

It showed that fogging of water reduced the heat stress due to evaporative cooling effect of water and favors to increase milk yield and significantly increased fat percent and increased dry matter intake in Mehsana buffaloes during summer season. The results suggested that during the summer season, provision of water cooling through foggers may be practiced to reduce heat stress, increase feed intake and favors to increase milk yield and fat percent in Mehsana buffaloes. Therefore, it is concluded that the cooling through foggers on buffaloes in summer season, was beneficial in terms of body comfort of the animals as well as increasing the milk fat percent and increased feed intake.

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References