

Impact of Herd Size on Production, Reproduction and Nutritional Status of Cross-Bred Cows in Etmadpur Block of Agra District

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Abstract

Present study was conducted with aim to indentify impact of herd size on production, reproduction and nutritional status of cross-bred cows in Etmadpur block of Agra District of Uttar Pradesh. The study was based on primary data which were collected 80 randomly selected farmers scattered in 5 villages by personal interview method in different herd size groups and found that per lactation milk yield was greater in small herd size groups than medium & large herd size, significantly ($p \leq 0.05$). The lactation length and intercalving period was also significantly more in small herd size than medium and large herd size. The same trend was observed in body weight of cross-bred cows. The DM, DCP and TDN requirement was significantly greater in small herd size than medium and large herd size. The availability of DM, DCP and TDN was significantly poor in large herd size than small and medium herd size groups. It is observed from the study that the production, reproduction and nutritional status was significantly much poor in large herd size groups than small and medium herd size groups. The production as well as nutrients (DM, DCP and TDN) availability was decrease with increasing herd size, significantly.

Keywords: Cross-Bred Cows, Dry Period, Lactation Period, Milk Yield, Nutritional Status.

Introduction

The Government of India launched the technology mission on dairy development (TMDD) programme to support and supplement. The efforts of operation Flood and to enhance rural employment opportunities and income generation through dairying. The milk production is influenced to a great extent by the feeding pattern, the quality of feed and ingredients in feed. The feeds and fodders accounts for 50 to 75 percent of total cost depending upon the condition under which the milch animals are kept for milk production. Feed consists of green fodder, including pasture grass and tree lopping, dry fodder, concentrates and balanced cattle feed.

Cross-bred cows are more productive than either indigenous cows or buffaloes. The Indian dairy industry is poised for dramatic growth in the coming decades. The population growth, urbanization, income growth, high income elasticity of demand and change in food habits that fuelled the increase in milk consumption are expected to continue well into the new millennium, creating a varitable livestock revolution, environmental sustainability, public health and ethical concerns about the treatment of animals. The cross bred cows which has low higher milk yield potential, it is being preferred now by the rural milk producers. The serious constraint faced by the milk producer, however, is the shortage of feeds and fodders.(2,3,4).

To Assess the impact of herd size on production, reproduction and nutritional status of cross-bred cows; the first consideration is given the capacity of the appetite of the animals which measured by the total amount of Dry matter in the ration which an animal can consume usually which varies with the live weight of the animal and nature of production. Milch cows generally eat 2.5 Kg D.M. per 100 Kg. live weight. Next important information required is the quantity of DCP and TDN which the ration must supply.

Review of Literature

Bhaskar (2016) has reported that the nutritional requirement and its availability in cross-bred cows and Murrah buffaloes in terms of DM, DCP and TDN were assessed and found that the nutritional status of these ruminants was very poor as they did not get the required amount of nutrients through their ration. The herd size had significant effect on nutritional status of both ruminants as increasing the herd size, the availability of nutrients (DM, DCP and TDN) were decrease, significantly ($p \leq 0.01$).

Bhaskar and Singh (2017) have studied and reported that the lactational milk yield of 60 cross-bred cows and 55 Murrah buffaloes were found to be 2863 ± 44 and 2386 ± 39 , 2781 ± 41 and 2303 ± 38 and 2597 ± 36 and 2114 ± 34 litres in small, medium and large herd size groups, respectively. The per day milk yield of these ruminants was 8.57 ± 0.34 and 7.50 ± 0.38 , 8.48 ± 0.29 and 7.28 ± 0.40 and 8.09 ± 0.31 and 6.80 ± 0.36 litre in above herd size groups, respectively. The study showed that the effect of herd size on lactational milk yield was significant ($p \leq 0.01$). The greater milk yield was recorded in small as well as medium herd size groups. The study further indicated that the effect of herd size on lactation period was insignificant in both ruminants.

Aim of The Study

1. To determine impact of herd size on production and reproduction performance of cross-bred cows.
2. To determine impact of herd size on quality of Milk of Cross-bred cows.
3. To determine impact of herd size on nutritional status of cross-bred cows.

Research Methodology

The present study was conducted in five selected villages of Etamadpur block of Agra district U.P. After selection of village, a list of families having cross-bred cows was prepared. In all 52 dairy farm were selected for this study. There were 80 animals' studies which belongs to different lactation number and herd size groups. Herd size was divided into three groups viz:

1. Small (having one animal),
2. Medium (having two animals)
3. Large (having more than two animals)

To evaluate and compare the impact of herd size on production, reproduction, quality and nutritional status of cross-bred cows, the observations regarding milk yield, lactation period, dry period, body weight and nutritional status of these cows were obtained from selected farmers through face to face interview with the help of a well structured and pretested questionnaire and by personal observations. Fat was determined by the standard Gorber's method as recommended (1) and body weight by the following formula. It comprised milk yield, feeding pattern, quantity of feed and fodder offered during 24 hours, recording body weight and collection of concentrate, wheat straw and green fodder. Besides this, the amounts of nutrients available to the animals from other fodders were calculated by considering average nutritive value of the respective fodders (Ranjhan, 1998).

$$\text{Body weight (Kg.)} = \frac{\text{Length (cm)} \times \text{Heart girth (cm)}}{A, B \text{ and } C} \times 0.367$$

where, A = 22.85, B = 21.60 and C = 20.30 for the hearth girth below 165, between 165 and 200 and above 200 cm; respectively.

The milch cow consumes generally 2.5 Kg dry matter/100 Kg live weight. About 2/3 or more dry matter (DM) to be consumed should come from the roughage quota of the ration and rest from the concentrate. In case of DCP and TDN, the ration of milch animals is calculated on the basis of extra maintenance requirement plus that for the daily milk yield. The extra nutrients required for milk production also vary with the fat content of milk and level of milk production. The maintenance and production ration of each animal was computed according to the feeding standard (6) the data were statistically analysed (7).

Finding and Suggestions

The impact of herd size variation on different components of milk production, reproduction, quality of milk, body weight and nutritional aspects of cross-bred cows was studied in depth and the salient features are abridged hereunder :

It is clear from the Table-1 that the average milk yield per lactation and per day of 80 cross-bred cow (32 small, 30 medium and 18 large herd size groups) were 2947 ± 55 and 8.72 ± 0.42 , 2788 ± 63 and 8.63 ± 0.24 and 2514 ± 59 and 8.08 ± 0.39 litre in small, medium and large herd size groups, respectively. These results showed that the milk production was greater upto medium herd size group, but if we increase herd size further, the production was decrease significantly. The lactation length and dry period of cross-bred cows was found to be 338 ± 6.61 and 73 ± 1.7 , 323 ± 6.18 and 61 ± 1.20 and 311 ± 7.14 and 90 ± 1.81 days in small, medium and large herd size groups, respectively. The lactation length was decrease with increase in herd size whereas dry period was increase with increase herd size, significantly. The fat percentage was not affected by herd size groups. The body weight of cross-bred cows in small, medium and large herd size groups was also concluded and found to be 438.3 ± 4.9 , 424.5 ± 5.6 and 406.0 ± 5.10 Kg., respectively. Our results indicated the body weight was decrease with increase herd size, significantly ($p \leq 0.01$). It is due to decreasing availability of nutrients with increase in herd size. The table further indicated that the dry matter requirement and availability of these cows was found to be 10.95 ± 0.60 and 10.31 ± 0.49 , 10.61 ± 0.75 and 10.03 ± 0.52 and 10.15 ± 0.69 and 9.40 ± 0.40 Kg. per day per animal, respectively in small, medium and large herd size groups. These results indicated that the DM requirement and availability was decrease with increase herd size significantly. It is also observe from the study that DM requirement was much higher than that of its availability in all herd size groups. This was due to inadequate feeding of roughages and concentrate to the cross-bred cows which results in lower milk production. Roughages are the cheaper ingredient to form the bulk of the ration which fulfil the DM requirement of the animals. The deficit supply of DM indicated that the animals remained under fed which affected their productivity.

Table 1: Production, Reproduction and Nutritional Status of Cross-Bred Cows In Different Herd Size Groups.

| S.No | Items | First (Small) | Second (Medium) | Third (Large) | Overall Average | Variance ratio |
|------|----------------------------|---------------|-----------------|---------------|-----------------|---------------------|
| 1 | No. of Animals | 32 | 30 | 18 | 80 | |
| 2 | Milk yield/Lact. (lit.) | 2947±55.0 | 2788±63 | 2514±59 | 2750±59 | 4.147 ⁺ |
| 3 | Milk yield/day (lit) | 8.72±0.42 | 8.63±0.24 | 8.08±0.39 | 8.47±0.35 | 1.83 ^{NS} |
| 4 | Lactation length (days) | 338±6.61 | 323±6.18 | 311±7.14 | 3.24±6.64 | 3.675 ⁺ |
| 5 | Dry period (days) | 73±1.7 | 61±1.20 | 90±1.81 | 75±1.43 | 5.173 ⁺⁺ |
| 6 | Intercalving period (days) | 411±3.69 | 384±3.11 | 401±3.96 | 399±3.56 | 6.217 ⁺⁺ |
| 7 | Fat percentage | 4.08±0.06 | 4.11±0.04 | 4.09±0.04 | 4.09±0.05 | 0.984 ^{NS} |
| 8 | Body weight(kg.) | 438.3±4.9 | 424.5±5.6 | 406.0±5.10 | 422.9±5.20 | 4.169 ⁺⁺ |
| 9 | D.M. Requirement (kg.) | 10.95±0.60 | 10.61±0.75 | 10.15±0.69 | 10.57±0.68 | 4.096 ⁺ |
| 10 | D.M.Availability (kg.) | 10.31±0.49 | 10.03±0.52 | 9.40±0.40 | 9.91±0.47 | 5.683 ⁺⁺ |
| 11 | D.M.Status(kg.) | -0.64±0.005 | -0.58±0.006 | -0.75±0.008 | -0.66±0.006 | 5.312 ⁺⁺ |
| 12 | DCP requirement (kg.) | 0.662±0.003 | 0.656±0.002 | 0.629±0.003 | 0.649±0.002 | 4.180 ⁺ |
| 13 | DCP Availability (kg.) | 0.620±0.002 | 0.614±0.002 | 0.580±0.001 | 0.604±0.002 | 5.631 ⁺⁺ |
| 14 | DCP status (kg.) | -0.042±0.0003 | -0.042±0.0004 | -0.049±0.0003 | -0.045±0.0002 | 4.604 ⁺⁺ |
| 15 | TDN Requirement (kg.) | 6.08±0.86 | 6.00±0.76 | 5.68±0.82 | 5.92±0.81 | 5.069 ⁺⁺ |
| 16 | TDN availability (kg.) | 5.63±0.63 | 5.60±0.56 | 5.03±0.66 | 5.42±0.616 | 5.136 ⁺⁺ |
| 17 | TDN status (kg.) | -0.45±0.081 | -0.40±0.002 | -0.65±0.003 | -0.50±0.002 | 4.046 ⁺ |

NS = Non - significant

+ = Significant at $p \leq 0.05$ ++ = Significant at $p \leq 0.01$

The table further revealed that the DCP requirement and availability of cross-bred cows in small, medium and large herd size groups was found to be 0.662±0.003 and 0.620±0.002, 0.656±0.002 and 0.614±0.002 and 0.629±0.003 and 0.580±0.001 Kg/day/animal, respectively. It is obvious from these results that the requirement and availability of DCP was decrease with increase in herd size groups, significantly. The results further talkative that the availability of DCP was much lower than that of requirements. The paucity of DCP in ration of these animals was due to scarce supply of leguminous feeds, fodders and concentrates, which are exact source of DCP. The higher cost of concentrates was a major constraint. The same trend was observed in TDN requirement and availability of cross-bred cows in all herd size groups. The observations further indicated that the nutritional status of these cows was significantly ($p \leq 0.01$) affected by herd size variation. Small herd size was better than medium and large herd size groups. The productivity of animals could be raised by feeding adequately with leguminous forages and some concentrates and decreasing herd size.

Conclusion

It is concluded that productive and reproductive performance of cross-bred cows was significantly ($p \leq 0.01$) affected by herd size whereas quality of milk was not affected. If we increase herd size, the production and lactation period was decrease. The nutritional status of cross-bred cows was also affected by herd size significantly ($p \leq 0.01$). The nutritional status become poor with increasing

herd size. It can be raised by feeding adequately with feeding of leguminous forages and some concentrates and decreasing herd size. According to above findings, small herd size is better than medium and large herd size.

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