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Research Article

EFFECT OF HOUSING CONDITION OF DAIRY ON FEEDING BEHAVIOUR AND COMFORT OF COW

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A R T I C L E I N F O

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A B S T R A C T

The behavior of dairy cows dependent on the interaction between the cow and their physical environment. The physical factors of facility impose baseline limitations on how the cows will interact with the housing conditions. Within these limitations the ability of cows to engage in natural behaviour is further dictated by management routines such as grouping strategy and stocking density. Social dominance, overcrowding and competition for feed impact feeding behavior and proper grouping strategy. These aspects of dairy management may affect not only cow comfort but also feeding and milk yield. This paper reports Common breeds of Cow Found in different Dairy Farms of Jabalpur Division, and their housing condition and management and its effect on feeding behavior of cow and milk production. Data were collected from different house pens, charitable, private and government dairy farms of Jabalpur Division (MP). Dairies were visited during month of December 2016 to January 2018. Total 785 cows were observed. The objective was conduct a survey of dairy management practices that have an effect on dairy cows well being.

INTRODUCTION

There are several aspects of the feeding environment that affect the cow's ability to access feed, including the amount of available feed bunk space per animal and the physical design of the feeding area. When cows are forced to compete for access to food, socially dominant cows spend more time eating than do herd-mates lower in social rank (Manson and Appleby 1990).Reducing the space available for cows to eat increases competition (Mentink and Cook 2006). For example, DeVries *et al*. (2004) showed that doubling feeding space from 0.5 m to 1.0 m per cow reduced by half the number of aggressive interactions while feeding. This reduction in aggressive behaviour allowed cows to increase feeding activity by 24% at peak feeding times, an effect that was strongest for subordinate animals. The physical design of the feeding area can also influence feeding behaviour. One of the most obvious features of the feeding area is the physical barrier that separates the cow and the feed, and research shows how some designs can reduce aggressive interactions at the feed bunk. Endres *et al*. (2005) compared the effects of a post-and-rail versus a headlock feed line barrier on the feeding and social behaviour of dairy cows and found that during periods of peak feeding activity (90 min after fresh feed delivery) subordinate cows had lower feeding times when using the post-and-rail barrier. This difference was likely due to positive effects of the headlock barriers in reducing competitive interactions; there were 21% fewer displacements at the feed bunk when cows accessed feed by the headlock barrier compared with the post-and-rail barrier. Huzzey *et al*. (2006) retested the effects of these two types of feed bunk barriers over a range of stocking densities: 0.81, 0.61, 0.41 and 0.21 m/cow (corresponding to 1.33, 1.00, 0.67 and 0.33 headlocks/cow). Daily feeding times were higher and the duration of inactive standing in the feeding area (waiting to gain access to the feed bunk) was lower when using a post-andrail compared with a headlock feed barrier. As well regardless of barrier type, feeding time decreased and inactive standing increased as stocking density at the feed bunk increased. Cows were displaced more often from the feeding area when the stocking density was increased, and this effect was greater for cows using the post-and-rail feed barrier. This effect was again greatest for the subordinate cow, particularly at high stocking densities.

Overstocking of free stall barns, defined as housing more cows within a pen than the available number of stalls and (or) providing less than the recommended 0.6 m (23 in) of linear feeding space per cow (Grant and Albright, 2001) is a practice commonly employed by dairy producers to expand herd size without increasing the facility investment (Bewley *et al.,* 2001).The natural behaviours that are most important to the health, welfare and productivity of cows are resting, feeding and rumination. Dairy Well-Being Initiative, which represents the dairy industry consensus on animal welfare, contains language that would require adequate resting space to be available for all animals housed within a pen. The basis for

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these recommendations is the recognition that health, productivity and welfare of dairy cows relies on their ability to meet their behavioural needs each day.

The current experiment was designed to compare housing condition and management of different types of dairy like house pens, charitable dairy farms, private dairy farms and Government dairy farms and its effect on feeding behavior of cows and milk production.

METHODOLOGY

Sampling site: The experiments were conducted at One Government, five private, two charitable dairy farms and ten house pens of Jabalpur division. Veterinary live stalk farm, Jabalpur, Private farm were surveyed from Pariyat Jabalpur, Gotegaon, Narsingpur and Chhindwara, two Charitable dairy Gopal trust and Geetadham trust were surveyed those are located at GwariGhat, Jabalpur and ten house pens from Narsingpur and Chhindwara District which is under the Jabalpur Division were surveyed.

Veterinary Live Stalk Farm, Jabalpur

A Private Dairy Farm, Pariyat

A House Pen, Narsingpur

Preparation of data

- Data were collected in month of December 2016 to January 2018.
- All the information about behavioral changes of cows and management was documented by dairy farm manager and staff and owner of house pen.
- Which breeds of cows exists in different dairy farms and house pens were surveyed.
- Total number of cows and number of cows per breed also surveyed.
- There were investigated different housing condition of dairy and its relationship with cow feeding behavior and comfort.
- There was calculated average daily gain (ADG) of milk by collecting data of milk yield per milking (Milking times and milk yield per milking).

Parameters will be used for analysis of behavioral changes of cows and management

- Feeding time, quantity of food provide and feeding rate
- Feed bunk size and design
- Stall design
- Floor type
- Lying/ resting time
- Rumination
- Space per cow

RESULTS

Common Breeds of Cow Found in different Dairy Farms of Jabalpur Division

Bos indicus breeds Sahiwal, Gir, Tharparkar, Hariana and Nimari and *Bos indicus* X *Bos taurus* (F1) breeds Holstein-Friesian X and Jersey X were found in different House pens, Charitable, Private and Government dairy farms in Jabalpur division during the survey.

Bos indicus breeds Sahiwal and Gir are outstanding breeds of Dairy or Milch breeds. Hariana and Nimari are first class (Type 1) general utility Breeds and Tharparkar is Type 2, an exotic dual- purpose breed has found. *Bos indicus X Bos taurus* (F1) breeds Holstein- Friesian X and Jersey X are exotic breeds of cow. Holstein- Friesian produces large quantities of milk.

Feed Bunk Space and Effect on feed intake of lactating cows

Standard Feed bunk space recommended by the National Bank of Agriculture and Rural Development (Nabard) – 0.8-1.0

Bunk Space	Effect on Feed Intake
< 0.20m	Reduced eating time and DMI
0.20 -0.51m	Increased competition with variable effect on DMI
>0.51-1.0m	Increased eating time and DMI

The house pen have bunk space less than < 0.20m reduced eating time and DMI of cow while the Charitable dairies and house pens which have bunk space of 0.20-0.51m increased competition with variable effect on DMI. Govt and private dairies having bunk space of >0.51-1.0m increased eating time and DMI.

Feed bunk made by log in A House Pen

Partitioned feed bunk in Veterinary Live Stalk Farm, Jabalpur

Feed bunk without partition in A Private Dairy Farm, Pariyat

Individual Feed Bunks per cow in A Private Farm

Floor Space/cow in Different Dairy Farms

Standard space recommended by the National Bank of Agriculture and Rural Development (Nabard) –
Covered Area-1.8-2.0 m^2 /cow
Open Paddock- 11.0-12.0 m^2/ cow

Type of Dairy	Floor Space/Cow (m^2)	
	Covered Area (m^2/cow)	Open Paddock (m^2/cow)
Govt. Dairy Farm	1.8-2.0	11.0-12.0
Private Dairy Farms	1.8-2.0	11.0-12.0
Charitable Dairy Farms	<1.8	= or >11.0
House Pens	<1.8	= or >11.0

Animal need more covered space than what is sufficient for what they physically occupy for comfort and protection from element. We found Govt and Private Dairy Farms are follow standard measurement for feed bunks and Floor space for per cow but Charitable Dairy farms and House pens are not follow these standards because of shortage of land and money so overcrowding is a problem in Charitable and house pens which affects the feed intake and feed intake affects milk production.

Open paddock of Veterinary Live Stalk Farm, Jabalpur

Open Yard of a Private Dairy Farm, Pariyat.

A House Pen at Narsingpur

Comparative Merits of Loose Housing and Cow Housing (Conventional Barns)

s.no	Parameter	Loose Housing	Conventional Barns
1.	Benefit of sunlight to cow	More	Less
2.	Comfort of cow	More	Less
3.	Benefits of exercise due to movements	Yes	No
4.	Health of cow	Better	Good

Govt. and Private we have found loose housing and conventional barns both. Cows spent 2-3 hours in loose housing at open area of dairy. In this area they gain benefit of sunlight, comfort and benefit of exercise due to movement. In House pens and Charitable Dairies we found there are insufficient place for loose housing. So they go for grazing outside of dairy. During grazing they can gain sunlight and benefits of exercise due to movement.

DISCUSSION

Group feeding of cattle inevitably results in some degree of competition for feed. Even with unlimited access to feed, cattle interact in ways that may give some individuals an advantage over others in the group (Olofsson, 1999). When a competitive situation exists at the feed bunk, dominant cows typically spend more total time eating than cows of lower social rank, resulting in greater DMI. Recently, Swedish researchers (Olofsson, 1999) evaluated the effect of increasing competition per TMR feeding station from one to four cows under conditions of unlimited feed. As competition per feeder increased, cows exhibited shorter average eating times and accelerated eating rates. Similarly, visits to the feeding station increased in direct proportion to greater aggression during feeding. However, DMI was unchanged. In contrast, when cows were offered limited quantities of feed, dominant cows consumed 14% more feed than submissive cows. This divergence increased to 23% as competition increased from one to three cows per feeding station. Therefore, under conditions of limited feed availability, competition escalated, and DMI of submissive cows suffered. The correlation between dominance, competition for feed, and performance is most pronounced in situations in which limited feeding space makes feed a defensible resource (Fraser, 1995). Fraser (1995) presented data with fish that showed that in small groups the dominant individuals can monopolize food resources to the point of reducing the weight gain of peers in the group. In large groups, there were so many challengers that the dominant individuals stopped trying to maintain control of the food resource and little aggression was observed. However, with intermediate-sized groups, the dominant individuals attempted to monopolize the food, but there were sufficient challenges that aggression continued unresolved. Clearly, caution is needed to extrapolate data from fish to cattle, but these data illustrate the complex relationships among dominance, group size, and competition. Similar research is needed with dairy cattle, particularly in on-farm settings where cows must compete with peers in their group for feed and other resources.

CONCLUSION

Feeding is normally the predominant behavior in dairy cattle; rumination can take precedence only when it has been abnormally restricted. Dairy cattle consume feed efficiently whether at a feedbunk or grazing. However, grouping strategy will impact the cow's ability to express aggressive eating

behavior. Within a group of cow, social hierarchy, competition for feed, water, space, and feed availability will determine feeding behavior and DMI. Feed accessibility to every cow within the group when she desires to eat may be the most important factor influencing the attainment of maximum DMI, productivity, and well-being.

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