

Distribution, Management, Milk Production and Health of Dairy Cows in Jabalpur, India

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Abstract: Dairy cows have a natural daily eating pattern. Feeding and management systems must be carefully developed to take advantage of high milk production potential without coming into conflict with natural patterns of eating and selection. Factors that must be taken into account include the inborn pattern of eating and rumination and the effects that the lighting, water supply, time and quantity of meal and preference of ration ingredients. These aspects of feeding management may affect not only cow health, but also milk yield and milk composition. This paper reports different breeds of dairy cows, factors that affect the feeding behaviour and milk production and some common diseases which may affect not only cow health but also milk yield. Data were collected from different house pens, private and government dairy farms of Jabalpur Division (MP). Dairies were visited during the winter, month of November to February, year 2016-17. The objective was to conduct a survey of dairy management practices that have an effect on dairy cows well being.

Keywords: Feeding management, Feeding behaviour, Dairy management, Milk production, Cow health

1. Introduction

Animal behavior refers to how animals react to other animals of the same species, other beings and the environment. In the farm animal feeding behaviour is an important topic due to its direct effect on growth, production and income (Yazdan S, 2013). The behavioural differences between breeds exist because farmers select each breed for a specific purpose (Le Neindre, 1993). Cattle need to maintain their energy through food intake which includes carbohydrate, fats and protein. There are both external and internal factors motivating feeding behaviour. Smell of feed, seeing other animals eating and sound of other eating are examples of external factors (Mephram, 1995). Feeding behaviour can be affected by many aspects such as climate, teeth condition, competition and food quality. Generally, feed consumption has a reverse relation with temperature and during normal circumstances, an increase in temperature causes lower feed consumption (Kilgour, 1984). Water counts as an indispensable factor for the survival and well-being of an animal. The body of a cow contains 50-60% water. The need for water is even more essential for dairy cows since milk contains about 87% water.

The effect of weather condition is reflected in the chemical composition of the herbage throughout the different growing seasons. Winter grazing provides a useful means for increasing the proportion of grazed herbage in the annual diet of dairy cows. This season is characterized by low herbage growth rate, low herbage allowance and low herbage intake and hence greater needs for supplements to supply the requirements of lactating dairy cows. In addition, supplementary preserved forages such as grass silage and concentrates are needed to maintain total DMI (dry matter intake) when offered as buffer food for a short period of the day (Miguel et al, 2016). Consequently, grass development in winter is based on vegetative growth, and characterized by high concentration of crude protein (CP) and low amounts of non-structural carbohydrates and DM (dry matter). Therefore, the factors limiting milk production under autumn-winter grazing systems are low herbage DM intake, low energy intake and lack of synchrony in the

release of nutrients in the rumen (Sotelo *et al.*, 2012; Pulido *et al.*, 2010; Morales *et al.*, 2014).

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

Changes in feeding behaviour have long been used to help identify when animals become ill (Weary *et al.*, 2009). Recent research has shown that these changes can also be useful in detecting illness in dairy cattle, especially during the transition period when cows are most vulnerable to metabolic and infectious diseases. There are a number of feeding behaviours that are related to milk yield, feed intake and rumination time. Cows may tend to eat a large meal following light availability after a long period of darkness. This may cause digestive upsets (David *et al.*, 2000).

The current experiment was designed to compare different breeds and factors that affect feeding behaviour and health of dairy cows.

2. Methodology

Sampling site

The experiments were conducted at two dairy farms and three house pens of Jabalpur division. Veterinary live stalk farm, Jabalpur, Private farm Balhera Dairy, Pariyat and three house pens of Narsingpur District which is under the Jabalpur Division were surveyed.

Preparation of data

- Data were collected in winter season month of November to February year 2016-17.
- All the information about feeding behavior 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 feeding behavior in different breeds and its relationship with management.
- There was calculated average daily gain (ADG) of milk by collecting data of milk yield per milking (Milking times and milk yield per milking).
- Feeding behavior of diseased cow and healthy cow was also compared.

Parameters will be used for analysis of feeding behavior of cows and management

- Feeding time, quantity of food provide and feeding rate
- Lying/ resting time
- Rumination
- Water supply
- Lightning system
- Hygienic condition
- Management activities
- If any disease

3. Results

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, Private and Government dairy farms in Jabalpur division during the survey.



Gir and Sahiwal breeds in Live Stalk Farm, Jabalpur



Holstein- Friesian X breed in a Private Dairy Farm, Jabalpur



Jersey X breed in a Private Dairy Farm, Jabalpur



Tharparkar breed in a House Pen Jabalpur

Table 1: Breeds of milking cows those exists in different dairy farms in Jabalpur Division (MP)

S.No.	Breeds of Cow	Lactation length (Days)	Maximum yield in India (In KG)
<i>Bos indicus</i> breeds			
1	Sahiwal	282-306	1548-2283
2	Gir	252-301	1312-1804
3	Tharparkar	274-286	1456-2177
4	Hariana	230-251	721-1436
5	Nimari	-	915-965
<i>Bos indicus X Bos taurus</i> (F1)			
1	Holstein- Friesian X	297-392	2242-3128
2	Jersey X	287-417	2162-2979

Bos indicus breeds Sahiwal, Gir, Tharparkar, Hariana and Nimari and *Bos indicus X Bos taurus* (F1) were found in

different House pens, 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.

Table 2: Comparison of Average milk yield in different breeds of cows in India and Jabalpur division (MP)

S. No	Breeds of Cow	Average daily gain (ADG) in India (in Kg)	Average daily gain (ADG) in Jabalpur division (in Kg)		
			In Govt. Dairy farms	In Private Dairy farms	In House Pens
Bos indicus breeds					
1	Sahiwal	9-10	10-12	Absent	8-10
2	Gir	4.50-7.05	10-12	Absent	4-5
3	Tharparkar	7.05	Absent	Absent	10-12
4	Haryana	4.05	Absent	Absent	8-10
5	Nimari	-	Absent	Absent	2-3
Bos indicus X Bos taurus (F1)					
1	Holstein-Friesian X	46	16-18	15-30	10-12
2	Jersey X	46	Absent	13-25	7-8

4. Health Results

During the survey 225 cows were observed and 50% cows were found suffering from mastitis (*Than phuka*) which is common disease in cattle. 2% cows were found suffering from Pneumonia. One cow was suffered from Foot-and-Mouth disease or FMD. Mastitis and Pneumonia are infectious diseases in which cattle affected caused by Bacteria. Foot-and-Mouth disease or FMD is disease caused by filterable viruses in cattle.



Cow suffered from Foot-and-Mouth disease treated by veterinary doctors



Mastitis infected udder of cow in a house pen

5. Discussion

The behaviour of dairy cows is dependent on the interaction between cows and physical environment. The physical factors of the facility (stall design, flooring type, feed bunk design, environmental quality) impose baseline limitations on how cows will interact with housing conditions. The natural behaviours that are most important to the health, welfare and productivity of cows are resting, feeding and rumination (Krawczel *et al.*, 2008). Much of non-dietary

effects on productivity may be related to the behavioural effects of stocking density and the importance of each of these behaviours in maintaining cow health and well being (Wechsler, 2007). The reduction of resting time by overcrowding is the most likely explanation of the reduction in performance associated with stall availability. The priority for rest over feeding was evident in a recent research trial. Cows were housed in pens containing an isolation area and a resource area for various portions of the day (Munksgaard *et al.*, 2005). All cows are highly motivated to access freshly delivered feed (DeVries *et al.*, 2005) but when feeding space is inadequate, some cows may be prevented from feeding at the time of fresh feed delivery and consequently they may be forced to shift their feeding time. Several researchers have shown that cows will sort a TMR (total mixed ration) and thus feed quality declines throughout the day (Bal *et al.*, 2000; Kononoff *et al.*, 2003; DeVries *et al.*, 2005; Leonardi *et al.*, 2005). Hence cows that are forced to delay their feeding time due to overcrowding may consume a poorer quality diet, and these cows may be unable to maintain adequate nutrient intake to maintain high levels of milk production.

Cows also need to ruminate to fully and efficiency digest their feed. Cows prefer to ruminate while lying down (Phillips *et al.*, 1986; Cooper *et al.*, 2007). Increased lying behavior is also associated with a reduction in lameness and increased blood flow to the udder, so maximizing lying time may ultimately increase longevity, reduce health costs, increase productivity, and improve cow welfare. As high-producing dairy cows generally need to spend more time eating to achieve high energy intakes to support increased milk production, there will be less time available for lying and other activities, and under some conditions, cows may not be able to fulfill their needs for eating and lying time. This may have serious implications for dairy cow health, welfare, and productivity.

Changes in feeding behaviour have long been used to help identify when animals become ill. Recent research has shown that these changes can also be useful in detecting illness in dairy cattle, especially during the transition period when cows are most vulnerable to metabolic and infectious diseases. Patterns of feed intake differ for healthy cows and cows diagnosed with mastitis. Urton *et al.* (2005) showed that cows diagnosed with acute mastitis after calving spent less time feeding during the prepartum period, perhaps because cows with lower intakes have poorer immune function (Hammon *et al.* 2006). Huzzey *et al.* (2007) found that cows diagnosed with severe mastitis 7 to 9d post partum consumed less feed and spent less time at the feed bunk during the 2-wk period before calving, nearly 3 wk before the first clinical signs of disease. The odds of have severe mestitis increased by 1.72 for every 10 min decrease in feeding time during the week before calving, and the odds increased nearly threefold for every 1 kg decline in dry matter intake (DMI). Mastitis and Pneumonia are common infectious diseases caused by bacteria in cattle. *Streptococci*, *Staphylococci* and *Corynebacterium phogenes*, *Mycobacterium tuberculosis* are responsible for Mastitis. Non infectious mastitis is due to improper milking, injury, burns, chilling etc. Bacteria transmitted from dirty floor, milkers hands, cow's body etc enter into udder through

injuries on udder and teats. Principal symptoms of mastitis are, uneasiness in cow when milked, udder swollen, hot and painful in acute cases, milk whey-like with milk clots or even blood clots, temperature of cow rises. Numerous causes, many microorganisms, inhalation of poisonous gases, inhalation of water or medicine drenched by untrained persons are causes of Pneumonia in cow. Foot and Mouth disease is caused by small filterable virus of 3 to 4 or more types. It is transmitted contact with infected animals or maternal contaminated with discharge from lesions. Principal symptoms of Foot and Mouth disease are salivation, sore on feet, tongue and inside of mouth, stamping of feet, lameness, off- feed, drop in production.

A good animal health program calls for full cooperation between the herdman and veterinarian. Generally, animals are born free of diseases or parasite. But they usually acquire these maladies either through contact with diseased animal or improper sanitation, feeding, care and management.

6. Conclusion

An improved understanding of feeding behaviour is helping to avoid practical problems such as competition at the feed bunk and excessive sorting. This research is also showing how changes in management can have facilitate feed access, particularly for the subordinate cow, and how changes in feeding behaviour can be used to evaluate cow health. More generally, we argue that changes in feeding behaviour can provide insight into how well a cow is able to function within the physical and social environment she is provided. In the studies reviewed it is not clear if the changes in feeding behaviour increase the risks of illness or if illness cause changes in behaviour, experimental research is now required to separate cause and effect.

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