Understanding milking temperament – a farmer preferred trait under Indian smallholder dairy farming system

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Introduction

Dairy farming plays a crucial role in the subsistence and livelihood of smallholder farmers in India. The country ranks first in global milk production, with a growth rate of 6.5% annually. Cattle and buffaloes are the primary milk-producing species, contributing 97% of the total milk supply. However, multiple factors affect the milk yield from the animals, majority of which are of management and genetics of the animal. The behavioral response of the animal, which could considered as the combination of its genetics and management practices, plays an important role in deciding the overall milk yield of the animal.

Commonly known as Milking temperament, it is defined as the animal's behavioral response during the milking process. It is a crucial trait affecting milk let-down, handling ease, and farm safety. In the Indian smallholder dairy farming system, where cattle and buffaloes are managed in family-based setups, temperament plays an even more significant role. Unlike highly industrialized nations where automated milking systems are common, India's dairy sector relies heavily on manual milking by small-scale farmers, predominantly women.

Animals with aggressive temperament during milking pose significant welfare concerns for both humans and animals. They are difficult to handle, leading to increased stress, injuries, and economic losses due to reduced milk let-down and production. Additionally, such animals may require additional labor and time for handling, further impacting farm efficiency. Given these challenges, it is crucial to select animals with favorable milking temperament for breeding to ensure ease of management, improved milk production, and overall herd welfare. Recording milking temperament on a large scale is necessary to identify superior animals with docile behavior, leading to better breeding decisions.

Material and methods

A survey was conducted where farmers were asked about traits they considered important, focusing on those with economic and management significance. The survey pointed to the fact that Milking Temperament could be one of the important traits that affected overall welfare of the animal, humans and the production from the animal. After conducting field surveys and trials on data collection methodologies, it was decided that since farmers interact with their animals daily, incorporating their perception of temperament into performance recording can provide valuable insights.

The trait was collected as a qualitative or categorical trait. A five-point scale, adopted from Sewalem et. al., 2011, with minor modifications to suit Indian conditions, was used. Each score had a term and a brief description of the response of the animal during milking. The five point scale is given in Table 1.

Table 1. Five point scale of the traits collected in the survey.

Score	Term	Description
1	Very Calm	Extremely docile during preparation and milking procedure; the animal stands quickly, rarely moves except to raise or lower head; generally not affected by whole procedure.
2	Calm	The animal stands quickly and cooperates in the stall; not bothered by the preparation of milking; but may move; shifting weight from side to side; may flick tail occasionally; gives very less trouble.
3	Average	The animal moves frequently; may be restless and flicking tail often; may lift feet occasionally during preparation; but does not kick; may be stubborn.
4	Nervous	The animal is very restless during preparation; moves around a lot; may lift feet occasionally during preparation and milking, but does not always kick; when hand is placed on the back, flicking tail frequently.
5	Very Nervous	The animal is aggressive during the preparation of milking; kicks at milker; attacks by butting; moves from side to side; very difficult to handle; bellows and froths at the mouth.

Field performance recorders were trained to ask appropriate question to farmers to ensure accurate perception-based recording on the five-point scale. The question and the responses were translated in local languages for ease of data recording. To minimize non-genetic and environmental influences, only animals in their first lactation were recorded, as temperament may be affected by multiple factors in later lactations. Additionally, temperament was recorded once every two months to observe any changes during the course of lactation. The recording was done in a completely digitalized online recording portal developed by BAIF, Pune.

Results

The data recording for milking temperament began in May 2024 and spanned 13 states in India and data of multiple breeds of buffalo and cattle was recorded. A total of 4138 records from 2436 animals have been collected as of February 2025. These consist of different breeds of Indigenous cattle and buffalo, graded cattle and buffalo and HF and Jersey crossbreds. The box-plot (figure 1) shows average of Temperament scores of different breed types and the distribution of the data. Percentage of animals classified as ‘calm’ (scores 1 and 2) was 72%, ‘average’ was 23% and that of ‘nervous/ reactive’ (scores 4 and 5) was 6%. Indigenous cattle was considered most aggressive with average score of 2.27 by the farmers whereas HF crossbreed animals are considered most docile with average score of 1.63.

Conclusion

Preliminary trends suggest that crossbred cattle (Figure 2) are considered docile by farmers, whereas indigenous cattle and indigenous buffaloes (Figure 3 and 4) exhibit some degree of aggressiveness during milking. This behavioral difference may have a direct impact on management practices and milk yield. This large-scale data collection provides a comprehensive understanding of milking temperament variations in Indian cattle and buffaloes. Further analysis is required to correlate temperament with other

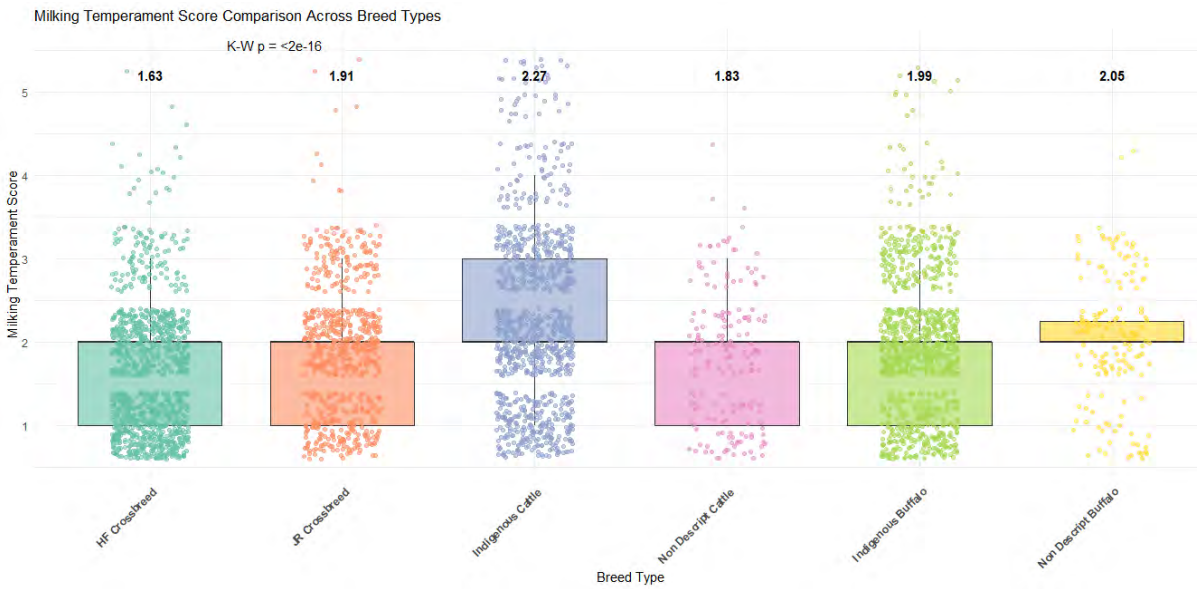

Figure 1. Average of Temperament scores of different breed types and the distribution of the data

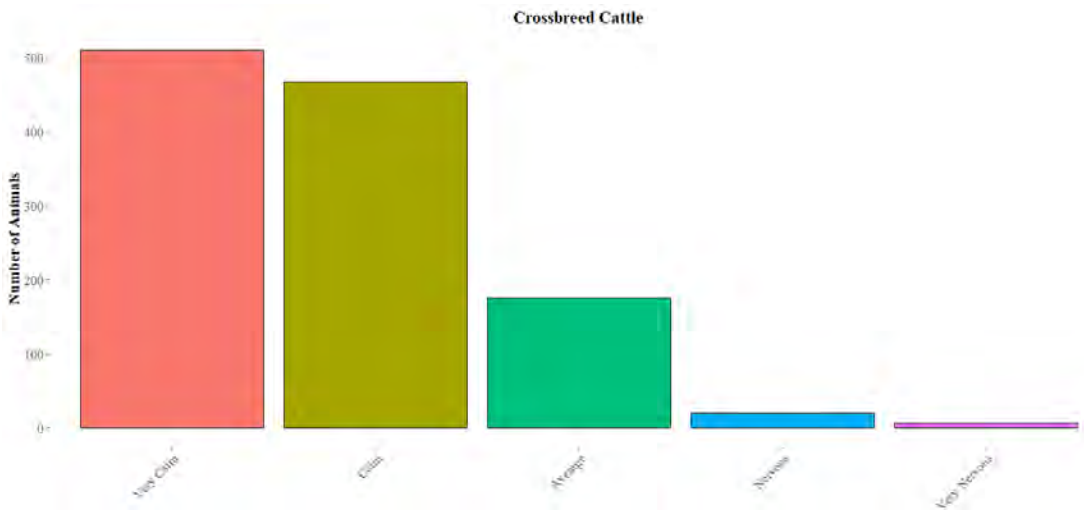

Figure 2. Evaluation of crossbreed cattle.

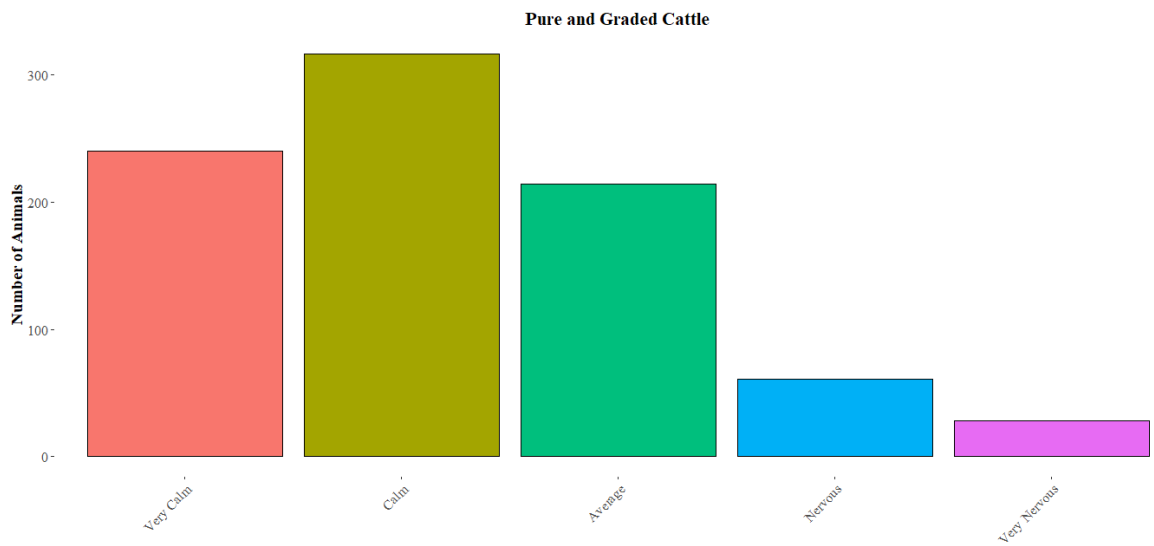

Figure 3. Evaluation of pure and graded cattle.

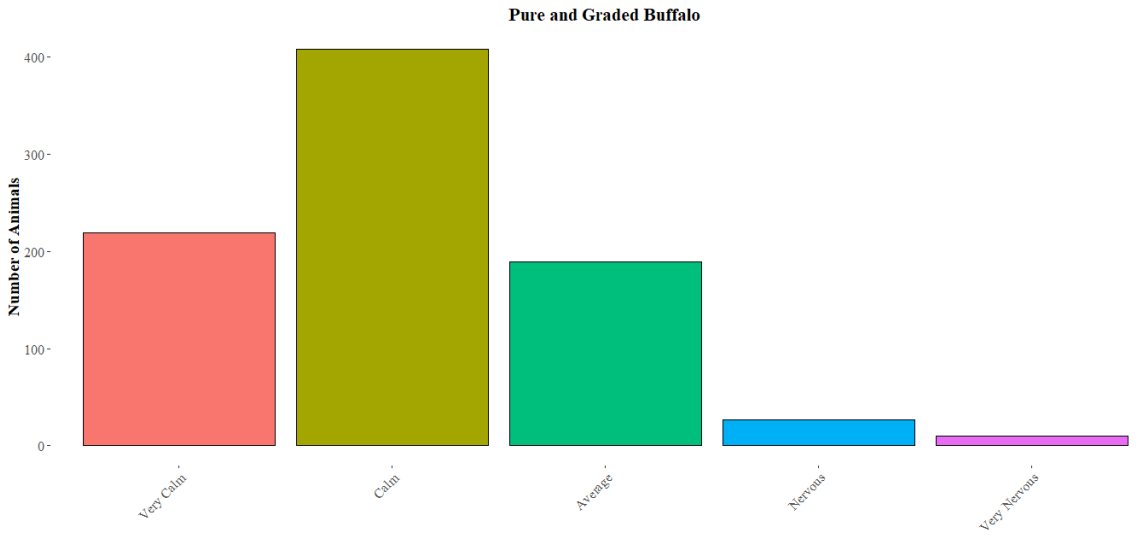

Figure 4. Evaluation of pure and graded buffaloes.

production parameters to develop strategies for improving dairy farming efficiency through selective breeding.

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