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Dynamics of Milk Yield, Body Weight, and Feed Intake in Murrah Buffaloes during Early Lactation: An on-Farm Study

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Abstract— *The study combines management (feed/fodder) and performance (milk yield) to provide a thorough understanding of nutritional input-output efficiency, which is crucial for assessing dairy herd responses. Milk output during the first 15 days following calving was examined since it is crucial to record metabolic changes during this time. Data on buffalo were documented daily after calving, with particular attention paid to body weight, parity, milk production, and feed/fodder consumption. This routine monitoring allows for dynamic evaluation of the animal's reaction both throughout the postpartum period and during successive lactations.*

The mean milk yield increased from about 2.5–3 liters to 6–7 liters by day 15, in tandem with increased feed intake from around 1.5–2 kg to roughly 3.5–4 kg. All animals show an increasing trend in milk yield from day 1, peaking typically between days 35 and 60, followed by fluctuations. There is a close alignment between the trends of increased feed input and rising milk output throughout the study period. Regression analysis revealed a strong positive correlation ($r = 0.65$) between daily feed intake and milk yield, with each kg increase in feed associated with approximately 0.98 L increase in daily milk production ($R^2 = 0.45$, $p < 0.001$).

Keywords— Buffalo, Body weight, Milk yield, Feed intake, Lactation dynamics.

I. INTRODUCTION

One of the most significant dairy buffalo breeds in India is the Murrah buffalo, which has a high potential milk yield and adapts to a variety of agroclimatic conditions (Singh et al., 2020). Improving dairy productivity and resource efficiency requires an understanding of the factors that affect their lactation performance. Buffaloes' milk production is influenced by a number of physiological, nutritional, and managerial factors, especially in the early post-calving period when the animal experiences major hormonal and metabolic changes (Rao and Reddy, 2019).

Postpartum care and feeding influence lactation significantly. The first two weeks following calving are a transitional period during which voluntary feed intake is still recuperating, but nutrient requirements for milk synthesis increase drastically (Haque et al., 2021). Effective dietary assistance in the first two weeks after calving can encourage higher milk yield throughout lactation. It has long been known that body weight plays a significant role in determining productive performance; larger animals often have higher prospective milk yields because of their increased metabolic reserves and feed intake capacity (Kumar et al., 2018). Similarly, the efficiency of nutrient conversion is supported by the direct effects of feeding intensity and fodder quality on milk synthesis.

Few field-based studies have examined the relationship between daily variations in feed supply and body weight and milk yield patterns in Murrah buffaloes raised on farms, despite well-established physiological principles (Patil and Kumar, 2022). The

dynamics of early lactation and the relationship between nutritional input and output efficiency can be better understood by continuously monitoring body weight, feed intake, and milk production.

The present study was carried out to investigate the relation between milk yield, body weight, and feed intake in Murrah buffaloes during the first 15 days after calving and sustained lactation. The results are intended to improve early-lactation management techniques and precision feeding for increased milk yield efficiency in Murrah buffaloes.

II. MATERIALS AND METHODS

2.1 Study Location and Period:

An experiment was conducted to study the milk yield of Murrah buffaloes in response to feed and fodder intake 15 days after calving and beyond at Dr. D. Rama Naidu Vignana Jyothi Institute of Rural Development, Tuniki village, Medak District, Telangana state.

2.2 Experimental Animals and Data Collection:

Data were recorded daily after calving, with distinct tracking of milk yield, feed/fodder intake, body weight, and parity on six Murrah buffaloes (Table 1). Such consistent monitoring allows for dynamic evaluation of animal response postpartum and over successive lactations. The daily milk yield data of each animal was collected both morning and evening, besides intake of fodder and feed from 1 day after calving till 94 days after calving.

2.3 Feeding Management:

The feed mixture was given as per the recommended practice containing broken rice, rice bran, wheat bran, cotton cake, groundnut cake, sunflower cake, mustard cake, maize gluten/soya dal, jaggery and chickpea husk. The dry fodder of rice straw was given at the rate of 4 kg per animal and green fodder (Super Napier/ Para grass) was given at 18 kg per animal in addition to dry fodder.

2.4 Statistical Analysis:

The correlation and regression studies were performed to analyze the relationship between feed intake and milk yield. Data were analyzed using appropriate statistical software, and significance was tested at $p < 0.05$ level.

III. RESULTS

3.1 Body Weight, Milk Yield, and Feed Intake:

The body weight of the buffaloes varied between 382 and 601 kg per animal (Table 1). There was clear indication that milk yield tended to be higher with increase in body weight of the animal. There were clear increases in milk yield and feed intake with advancing lactation and parity. The dataset reveals the expected biological progression in milk yield post-calving and the positive correlation between body weight and production. Further, the daily milk yield was higher with an increase in the number of calvings from one to two or three.

TABLE 1
BODY WEIGHT, MEAN DAILY MILK YIELD, AND MEAN DAILY FEED INTAKE OF INDIVIDUAL MURRAH BUFFALOES

Animal ID	Body Weight (kg)	Mean Milk Yield per Day (L)	Mean Daily Feed Intake (kg)
105352-787657	601	8.24	4.49
105352-787806	525	7.32	4.2
105352-787566	473	5.41	3.38
105352-787794	382	5.76	3.45
105352-787407	443	5.28	3.43
105352-787588	489	5.79	3.29

3.2 Individual Animal Variability:

Individual buffaloes started at different baseline yields, but all showed improved output as feed increased. Lower-performing buffaloes (e.g., first calvers, lighter body weight) had lower baselines and slightly slower ramp-up, despite similarly increased feed. The proportional response supports standard nutritional physiology—more nutrient intake post-calving spurs milk output.

3.3 Milk Yield and Feed Relation: First 15 Days Post-Calving:

Both milk yield and feed intake curves rose from day 1, with mean milk yield increasing from about 2.5–3 liters to 6–7 liters by day 15. Feed intake also increased in tandem, from around 1.5–2 kg to roughly 3.5–4 kg. The shape of both curves was nearly parallel, indicating a proportional relationship: as feed and fodder were increased, buffaloes rapidly enhanced their milk production. The synchrony between feed and milk curves across both early and sustained lactation phases highlights effective ration management. Early, steady feed escalation post-calving is crucial for achieving optimal peak milk yield.

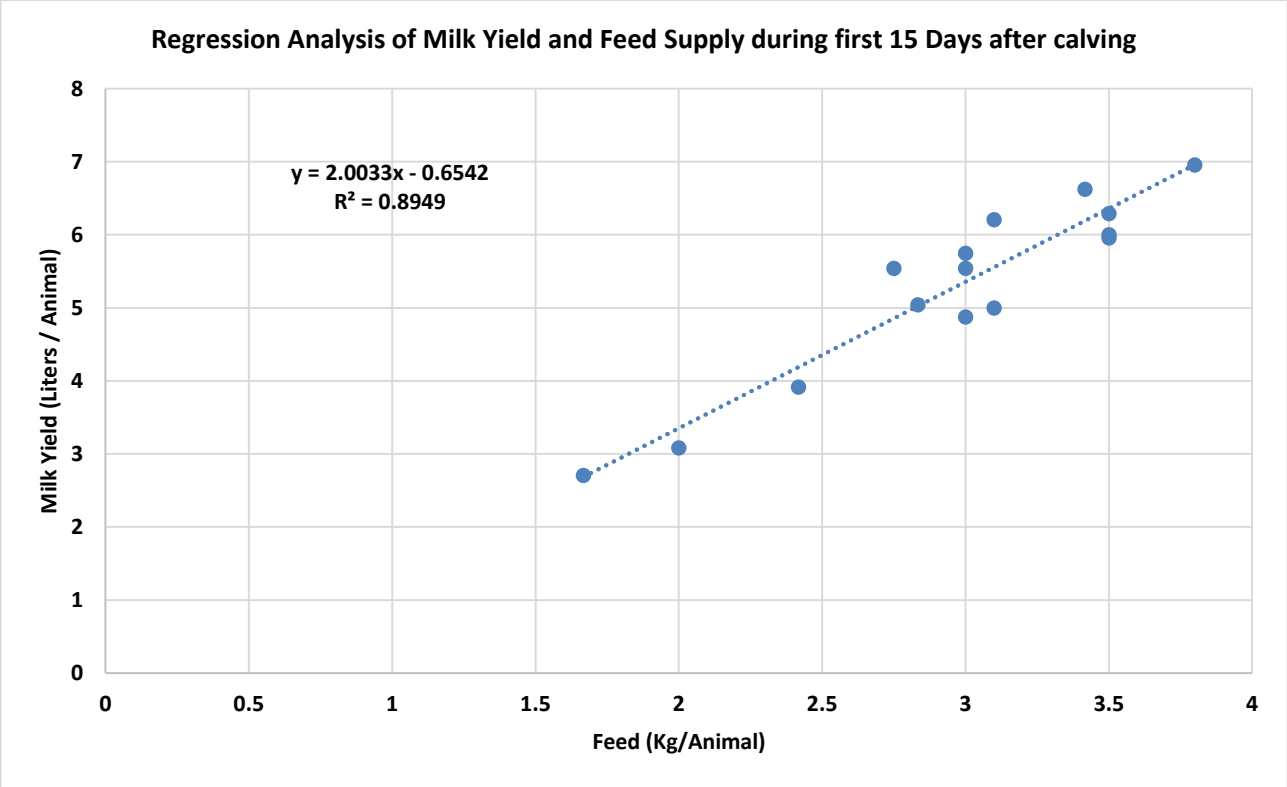

FIGURE 1: Regression analysis of milk yield and feed supply during first 15 days after calving

3.4 Milk Yield and Feed Relation: Entire 94-Day Period:

All animals showed an increasing trend in milk yield from day 1, peaking typically between days 35 and 60, followed by fluctuations and a mild decline in later days. The mean daily yield per animal rose consistently during the first month, stabilized, and showed some downtrend or variability towards the period's end.

Feed intake for most buffaloes increased rapidly in the first 15 days from ~2 kg to ~4 kg, mirroring the initial rise in milk yield. After stabilization, feed levels plateaued (around 3.5–4.5 kg/day) for most animals, with minor peaks when milk yield reached its highest. The mean daily feed line followed a similar shape to mean milk yield—moderate rises, a sustained plateau, and stable intake.

There was close alignment between the trends of increased feed input and rising milk output, especially as both ramped up within the first month post-calving. Downward deviations in milk yield often coincided with reduced feed input, highlighting nutritional influence on lactational performance.

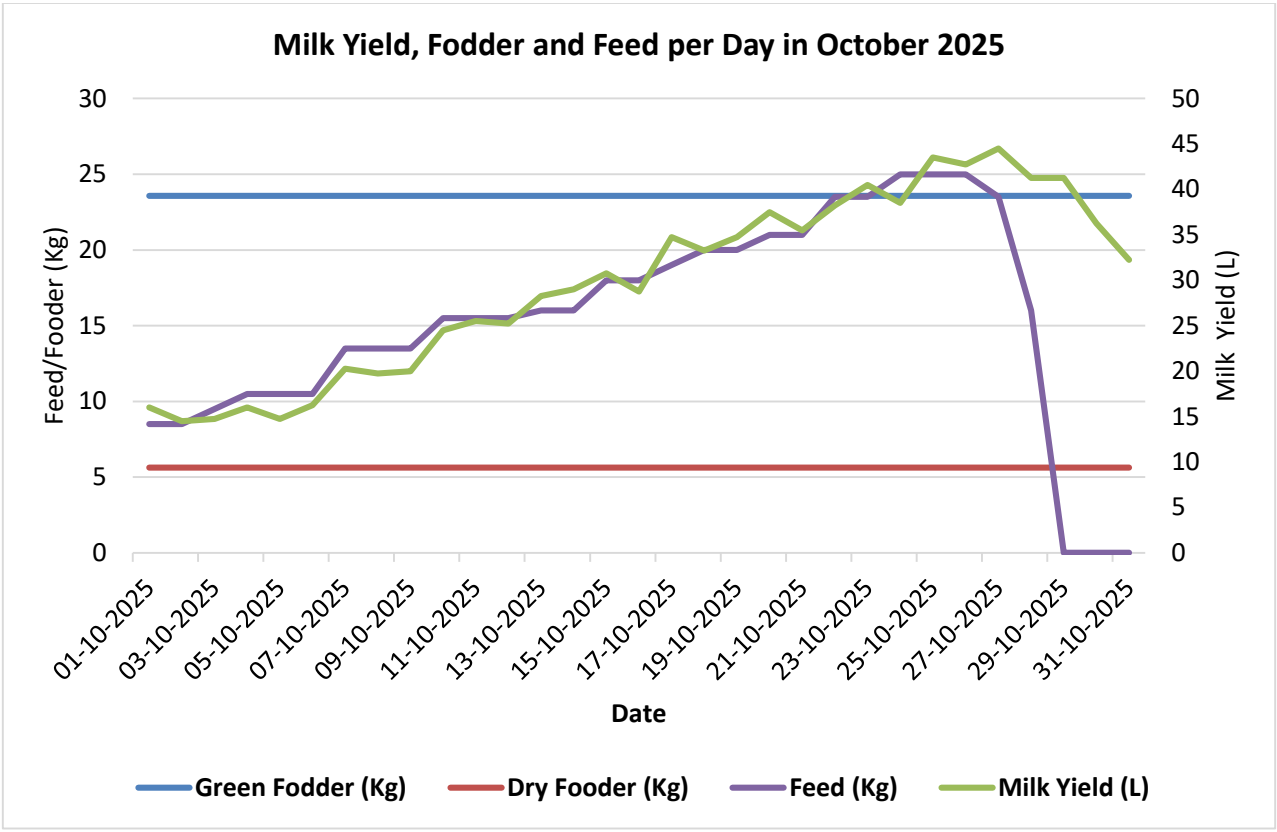

FIGURE 2: Milk yield, fodder and feed supply during first 15 days after calving

3.5 Correlation Analysis:

The statistical analysis showed a strong positive correlation between daily feed intake and milk yield, both for the entire period and for the first 15 days after calving (r = 0.65). The strength of correlation suggests feed management strategies have a substantial impact on milk output, especially during early and peak lactation phases.

3.6 Regression Analysis:

There was a robust, positive effect of feed on milk yield, with feed being a major (but not sole) determinant. The explained variance (R^2) suggests other factors (genetics, environment, health) also impact yield. These results quantitatively confirm the graphical and descriptive findings, supporting the importance of timely feed management to maximize lactation performance.

Regression equation:

- Coefficient of determination (R^2): 0.45
- About 45% of the variation in milk yield was explained by the amount of feed provided
- Slope: 0.98 (each kg increase in feed was associated with nearly 1 extra liter of milk per day per animal, on average)
- P-value was highly statistically significant ($p < 0.001$)

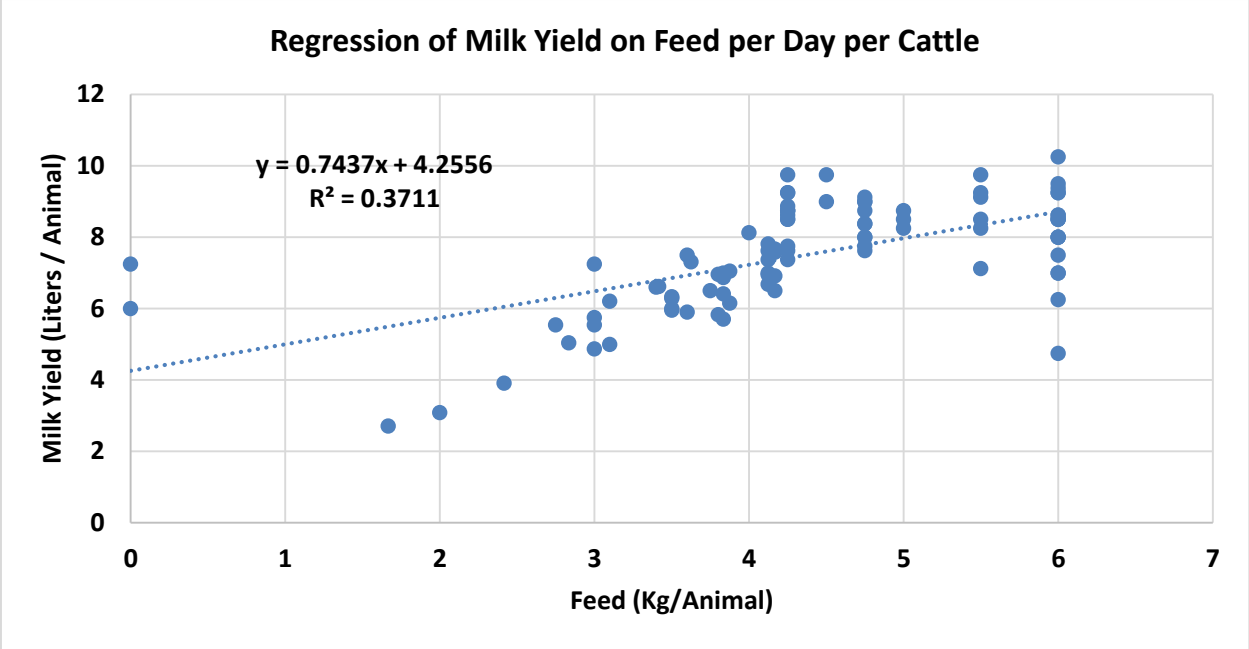

FIGURE 3: Regression analysis of milk yield and feed supply during entire period

IV. DISCUSSION

4.1 Feed-Milk Relationship:

The strong positive correlation (r = 0.65) between daily feed intake and milk yield observed in this study aligns with established nutritional principles. The finding that each kilogram increase in daily feed intake was associated with approximately 0.98 liters of additional milk production demonstrates the direct impact of nutritional management on lactational performance. This relationship was particularly evident during the first 15 days post-calving, when both feed intake and milk yield rose in parallel. Similar relationships have been reported in dairy cattle, where nutrient intake during early lactation is critical for supporting the metabolic demands of milk synthesis (NRC, 2001). The methyl-donor role of specific feed components may also contribute to enhanced hepatic metabolism and nutrient partitioning toward milk production.

4.2 Body Weight and Milk Production:

The tendency for heavier animals to produce more milk observed in this study is consistent with established physiological principles. Larger animals typically possess greater metabolic reserves and higher feed intake capacity, enabling them to sustain higher levels of milk production (Kumar et al., 2018). However, the relationship was not absolute, as evidenced by animal 105352-787794 (382 kg body weight) producing 5.76 L/day, which was comparable to some heavier animals. This suggests that factors beyond body weight, including genetic potential, parity, and individual variation in metabolic efficiency, also play important roles in determining milk yield.

4.3 Early Lactation Dynamics:

The rapid increase in both feed intake and milk yield during the first 15 days post-calving highlights the critical nature of this transitional period. During this time, the animal's nutrient requirements for milk synthesis escalate while voluntary feed intake is still recovering from periparturient depression (Haque et al., 2021). The parallel rise in both parameters observed in this study suggests that the feeding management practiced on this farm effectively supported the nutritional demands of early lactation. This finding underscores the importance of gradually increasing feed provision immediately after calving to prevent negative energy balance and its associated metabolic disorders.

4.4 Factors Affecting Milk Yield:

The regression analysis revealed that feed intake explained approximately 45% of the variation in milk yield ($R^2 = 0.45$), indicating that while nutrition is a major determinant, other factors account for the remaining 55% of variation. These factors likely include genetic merit, parity, health status, environmental conditions, management practices, and individual animal variation in feed conversion efficiency. The strong correlation (r = 0.65) suggests that feed management is the single most

important controllable factor influencing milk production in this herd, supporting the focus on nutritional optimization as a key strategy for improving productivity.

4.5 Practical Implications:

The observed alignment between feed input and milk output provides quantitative validation for the feed-to-yield management approach practiced on this farm. The results suggest that regularly increasing feed provision for at least the first two weeks postpartum is recommended to help animals reach their maximum milk production potential. Continuous synchronization of feed and yield monitoring can assist in promptly addressing production dips or health issues. The finding that each additional kilogram of feed translates to nearly one liter of extra milk provides a useful benchmark for economic analysis of feeding strategies.

4.6 Study Limitations:

Several limitations of this study should be acknowledged. First, the small sample size (n=6) limits the generalizability of findings to the broader Murrah buffalo population. Second, the on-farm nature of the study, while providing real-world relevance, introduces variability that cannot be controlled as rigorously as in experimental settings. Third, milk composition data (fat, protein, SNF) were not recorded, which would provide a more complete picture of production efficiency. Fourth, the study period of 94 days, while capturing early to mid-lactation, does not encompass the entire lactation curve. Future studies should include larger numbers of animals across multiple farms, incorporate milk composition analysis, and extend observations throughout the complete lactation period.

V. CONCLUSION

The present study demonstrates a clear positive relationship between feed intake and milk yield in Murrah buffaloes, particularly during the critical first 15 days post-calving. The strong correlation ($r = 0.65$) and regression coefficient (0.98 L milk per kg feed) provide quantitative evidence supporting the importance of optimal nutritional management in early lactation. Body weight showed a general positive association with milk production, though individual variation highlights the influence of other factors.

Key practical recommendations emerging from this study include:

1. Gradually increasing feed provision during the first two weeks post-calving to support rising milk production
2. Continuous monitoring of feed intake and milk yield to identify and address production dips promptly
3. Using the feed-to-milk conversion ratio (approximately 1:1 on a kg-feed to liter-milk basis) as a benchmark for evaluating feeding efficiency

Future research should focus on larger-scale studies across multiple farms, incorporation of milk composition parameters, and investigation of genetic and environmental factors influencing feed conversion efficiency in Murrah buffaloes. Such studies will further refine feeding recommendations and contribute to improved productivity and profitability in dairy buffalo enterprises.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES

[1] Haque, M. N., Reddy, A. G., & Rao, K. S. (2021). Postpartum metabolic adaptation and feed efficiency in buffaloes during early lactation. *Buffalo Bulletin, 40*(3), 395–404.

[2] Kumar, D., & Singh, J. (2018). Impact of early post-calving feeding management on milk production in lactating buffaloes. *Indian Veterinary Journal, 95*(7), 57–60.

[3] Patil, A. N., & Kumar, V. (2022). Influence of body weight and parity on milk yield performance of Murrah buffaloes. *Indian Journal of Animal Sciences, 92*(10), 1214–1218.

[4] Rao, Y. V., & Reddy, M. D. (2019). Feed management strategies for improving metabolic efficiency and milk yield in dairy buffaloes. *Livestock Research for Rural Development, 31*(5), Article 74.

[5] Singh, R., Meena, B. S., & Lathwal, S. S. (2020). Comparative performance of Murrah and Nili-Ravi buffaloes under subtropical conditions. *Indian Journal of Animal Research, 54*(8), 1002–1007.