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Effect of feeding maize silage (*Zea mays* L.) and berseem (*Trifolium alexandrinum*) in different combination on growth performance of cross-bred heifers

AR Raut, SD Chavan, RR Shelke, SP Nage and KU Bidwe

Abstract

In the present investigation, A group of 20 heifers was replicated into five groups based on average body weight and age. The treatments were: T₁ (100% maize silage), T₂ (90% maize silage + 10% berseem), T₃ (80% maize silage + 20% berseem), T₄ (70% maize silage + 30% berseem), and T₅ (60% maize silage + 40% berseem). Feeding of soybean straw (*ad.lib.*) + 1 kg concentrates were common to all the groups. In terms of feed intake, T₅ - 60% Maize silage + 40% Berseem feeding shows statistically significant results as an increase in actual feed intake, DMI and DMI/100 kg body weight. Body weight and body measurements were also improved due to feeding of 60% Maize silage + 40% Berseem.

Keywords: Maize silage, berseem, feed intake, dm intake, growth performance, cross-bred heifers

Introduction

Dairy animals often receive energy and protein concentrate supplements to enhance milk production and improve stocking rates (Gracia *et al.*, 2000) [3]. These supplements help to address variations in the amount and quality of the basal diet. While the basal diet may provide all essential nutrients, it might not be sufficient for achieving optimal production levels. In such cases, supplements can offer additional balanced nutrients without reducing the intake of the basal diet (Preston and Leng., 1984) [8]. Conserved feeds, such as silages, are crucial in the diets of dairy cattle on intensively managed peri-urban farms. However, the availability of maize silage on these farms has not been extensively documented. The efficiency of using low-quality roughages can be improved through the supplementation of energy and nitrogen sources, chemical or physical treatments, and selective breeding of crops, all of which are influenced by economic factors and practical considerations

Maize silage, known for its low crude protein but high energy content, is easily mechanized and provides a highly palatable and nutritious forage source (Mohamed *et al.*, 2003) [7]. Research and practical experience in dairy farming have demonstrated that maize silage can be profitable when used as a supplement to, rather than a replacement for, pasture. Research and practical experience in dairy farming have demonstrated that maize silage can be profitable when used as a supplement to, rather than a replacement for, pasture.

Berseem (*Trifolium alexandrinum*) is known for being a substantial source of nitrogen and also offers a good amount of energy, crude protein (CP), minerals, and vitamins. It is often used as a dietary supplement. Berseem can be used for silage when mixed with oats or fed as chaff mixed with chopped straw (Hannaway *et al.*, 2004) [5]. Additionally, berseem contains higher levels of readily digestible cellulose and hemicellulose, which promote microbial fermentation and lead to increased gas production.

Material and Methods

Selection of experimental animals

A batch of twenty heifers ranging from 6 to 15 months of age was selected for conducting the experiment. The heifers were further divided into five groups comprising four animals in each group, based on nearness to age and body weight. These groups were randomly allotted to different treatments by using a Randomized Block Design.

The current study titled "Effect of Feeding Maize Silage (*Zea mays L*) and Berseem (*Trifolium alexandrium*) in Different Combination on the Growth Performance of Cross-bred Heifers" aimed to evaluate the impact of supplementing cross-bred heifers with Maize silage and Berseem on their growth was conducted during academic year 2023-2024 at the Livestock Instructional Farm, Department of Animal Husbandry and Dairy Science, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra. During the present investigation, Cross-bred heifers feed with T₁ (100% maize silage), T₂ (90% maize silage + 10% berseem), T₃ (80% maize silage + 20% berseem), T₄ (70% maize silage + 30% berseem), and T₅ (60% maize silage + 40% berseem). Feeding of soybean straw (*ad.lib*). + 1 kg concentrates were common to all the groups with four replications.

Growth parameters

Body weights of individual heifer were recorded on a standard weighing balance "AVERY" in the morning before feeding and watering. The body measurements such as body height, chest girth and body length were recorded for individual heifers. The standard procedure was adopted for

determining the body measurements.

Statistical analysis

The obtained data was statistically analyzed by applying Randomized Block Design (RBD).

Results and Discussion

Dry matter intake

It was observed from Table 1. that the daily feed intake was higher in treatment T₅. The average feed intake in T₁, T₂, T₃, T₄, and T₅ treatments was 8.80, 9.67, 10.30, 10.78 and 11.15 (kg) respectively. The results are consistent with the findings of Barbosa *et al.* (1980) [2]. The daily dry matter intake differed significantly between the treatments. The heifers from T₅ group consumed more DM than the T₁, T₂, T₃, and T₄ heifers. The average daily intake was 5.47, 6.11, 6.59, and 7.11 kg/day/heifer in T₁, T₂, T₃, T₄, and T₅ respectively. The findings are aligned with Adangale *et al.* (2009) [1] and Tipu *et al.* (2022) [10]. The dry matter per 100 kg body weight also differs significantly. DMI /100 kg body weight was noted as 2.63, 2.87, 3.07, 3.18 and 3.29 kg/day in the treatment T₁, T₂, T₃, T₄, and T₅ respectively the results are consistent with the findings of Gupta and Tiwari (2005) [4].

Table 1: Average Dry matter intake

Treatments	Average body weight (kg)	Average feed intake on fresh basis (kg)	Total dry matter intake (kg)	DM Intake/100 kg BW
T ₁	207.77	8.80	5.47	2.63
T ₂	212.84	9.67	6.11	2.87
T ₃	214.65	10.30	6.59	3.07
T ₄	216.99	10.78	6.91	3.18
T ₅	217.32	11.15	7.17	3.29
'F' Test	Sig.	Sig.	Sig.	Sig.
SE(M) ±	0.56	0.40	0.18	0.14
CD at 5%	1.72	1.24	0.55	0.43

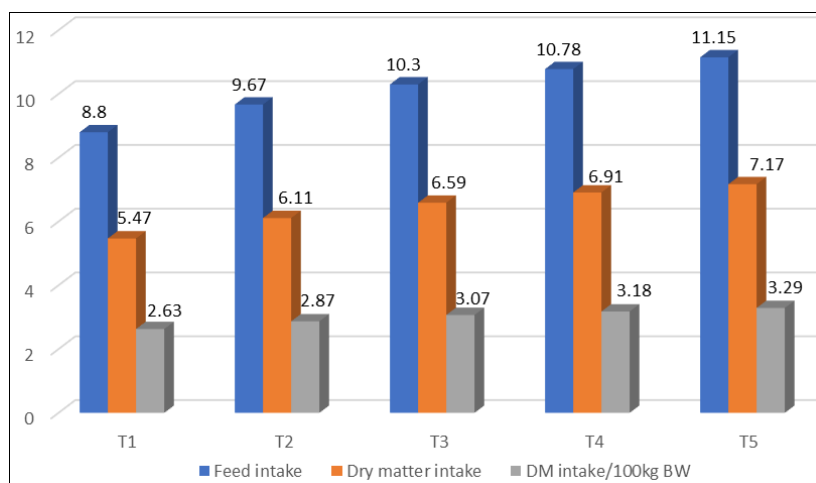


Fig 1: Average feed intake, dry matter intake and DMI/100kg body weight under different treatments of heifers (kg)

Growth performance

Body Weight

It was observed from Table 2 over the 120 day trial period, the average total body weight gains of heifers were 24.05 kg for T₁, 28.12 kg for T₂, 34.80 kg for T₃, 37.48 kg for T₄ and 39.15 kg for T₅. Notably, heifers in the T₅ group exhibited a significantly higher growth rate compared to those in the other groups. The findings are aligned with Sonone (2016) [9], reported that the average daily body weight gain was. 0.203, 0.243, 0.160, and 0.110 kg/day/calves in T₁, T₂, T₃, and T₄ treatment, respectively.

Body Height

It was observed from Table 2 increase in height was 8.51, 8.95, 9.25, 9.30, and 9.43 in T₁, T₂, T₃, T₄, and T₅ respectively. It was evident that the heifer from the T₅ group showed more body height as compared to other treatments.

Body Length

The gain in body length was 8.45, 8.58, 8.93, 9.18, and 9.35 in T₁, T₂, T₃, T₄, and T₅ respectively. This indicates that the gain in body length was significantly highest in T₅ and lowest in T₁ treatment. In other hands Li L *et al.* (2024) [6] Results

showed that calves offered CS had greater average daily gain, body length, and chest depth growth, meanwhile altered rumen fermentation was indicated by decreased rumen acetate concentrations.

Chest Girth

The differences exhibited significant differences in chest girth among the treatments. The gain in chest girth was 8.25, 8.50,

8.84, 9.10, and 9.63 in T₁, T₂, T₃, T₄, and T₅ respectively. The gain in chest girth in T₅ was higher compared to other treatments. The present observations are close to the observations reported by the past researchers Sonone (2016)^[9] reported that the gain in body length was 6.92, 8.42, 8.62 and 8.90 in T₁, T₂, T₃, and T₄, respectively.

Table 2: Growth performance of cross-bred heifers under different treatments.

Treatments	Average Period wt. gain (kg)	Average gain in height (cm)	Average gain in body length (cm)	Average gain in chest girth (cm)
T ₁	24.05	8.51	8.45	8.25
T ₂	28.12	8.95	8.58	8.50
T ₃	34.80	9.25	8.93	8.84
T ₄	37.48	9.30	9.18	9.10
T ₅	39.15	9.43	9.35	9.63
'F' Test	Sig.	Sig.	Sig.	Sig.
S.E(M) ±	0.71	0.20	0.21	0.22
CD at 5%	2.18	0.61	0.65	0.66

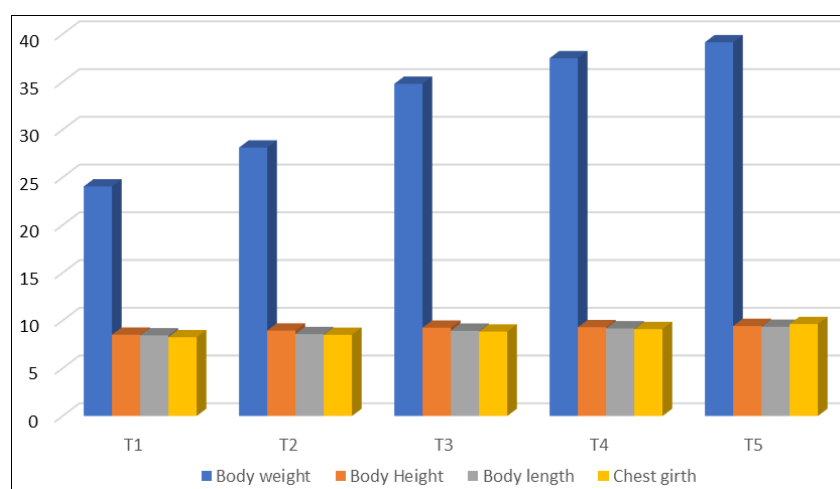


Fig 2: Average Body weight (kg), body height (cm), body length (cm) and chest girth (cm), under different treatments of heifers

Conclusion

From the result of the present investigation, it is concluded that treatment T₅ - 60% Maize silage + 40% Berseem feeding shows statistically significant results as an increase in actual feed intake, DMI, and DMI/100 kg body weight in the heifers. Body weight and body measurements were also improved due to feeding of 60% Maize silage + 40% Berseem.

Conflict of Interest

Not available

Financial Support

Not available

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