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Effect of subabul (*Leucaena leucocephala*) tree leaves feeding on dry matter intake and body weight gain in growing crossbred calves

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Abstract
The present investigation was conducted at Livestock Instructional Farm, Department of Animal Husbandry and Dairy Science, Dr. PDKV, Akola, during 2024-2025. During the investigation, eighteen growing crossbred calves were divided into three groups based on nearness of the age and average body weight. The treatment was planned as T_1-Dry roughages (*ad lib.*) + Green roughages (50% Hybrid Napier + 50% Berseem) + Concentrate, T_2-Dry roughages (*ad lib.*) + Green roughages (50% Hybrid Napier + 40% Berseem+ 10% Subabul tree leaves) + Concentrate, T_3-Dry roughages (*ad lib.*) + Green roughages (50% Hybrid Napier + 30% Berseem + 20% Subabul tree leaves) + Concentrate. The results reveled that subabul leaves contain 34.45, 20.67, 16.60, 4.88, 50.45 and 7.5 per cent DM, CP, CF, EE, NFE and ash, respectively. The calves from T_2 (2.20) group consumed more DM than that of T_1 (2.02) and T_3 (2.16) kg/day/calf respectively. The dry matter intake per 100 kg body weight of calf was 3.05, 3.25, 3.16 kg/day/calf for T_1, T_2 and T_3 respectively. The average daily body weight gain of calf was 0.302 kg, 0.309 kg and 0.308 kg per day in T_1, T_2 and T_3 treatment, respectively. The average period weight gain was 36.20 kg, 37.10 kg and 37.05 kg in T_1, T_2 and T_3 treatment. The highest weight gain was recorded in T_2 followed by T_3 and T_1.

Keywords: Subabul leaves, Crossbred calves, chemical composition, dry matter intake, body weight gain

1. Introduction
At present, only about 4% of India's cultivable land (approximately 8.4 million hectares) is dedicated to fodder production (Meena *et al.* 2018) [7]. This area is inadequate to meet the nutritional requirements of the growing livestock sector. There is currently a net deficiency of 35.6% green fodder, 10.5% dry fodder and 44% concentrate feed materials in the country (IGFRI, Vision-2050). India's current fodder resources are predominantly low-nutritive, with approximately 54% derived from crop residues, 33% from natural grasses, and only 11.5% from feed weeds (Hegde, 2010) [1]. Cultivated green forages contribute 0.79% to the total fodder supply. This overdependence on coarse and low-quality feed resources has a direct negative impact on livestock health, overall productivity, and also farmers income.

Green fodder is essential for livestock nutrition due to its high content of digestible protein, minerals, and vitamins. However, the seasonal and limited availability of conventional green fodder in India poses serious constraint to sustainable livestock production. Fodder trees are one such alternative. They provide a higher protein and calcium content compared to grasses and straws and can serve as an essential component of the livestock diet, particularly in dry regions. Growing fodder crops in combination with legumes has the potential to improve fodder palatability and digestibility (Kumar *et al.* 2018) [7]. Among the various fodder trees, Subabul (*Leucaena leucocephala*) has emerged as a promising option.

Subabul is a fast-growing, drought-tolerant, leguminous tree with high crude protein content and digestibility, is a promising supplement for ruminants. It belongs to the family Fabaceae, subfamily Mimosoideae. It is native to southern Mexico and northern Central America and it has been widely naturalized in tropical and subtropical regions, including India (Mozafaryan, 2008) [9]. Due to its adaptability, nitrogen-fixing capabilities, and multiple uses it also called as "Miracle Tree". It possesses a deep root system, which enhances soil fertility and soil erosion.

It contributes up to 500 kg of nitrogen per hectare per year through biological nitrogen fixation. Its high biomass yield, rich nutritional composition, and adaptability to degraded lands make it an attractive source of supplementary feed for ruminants.

Subabul (*Leucaena leucocephala*), is highly suitable for calf feeding due to its rich protein content, high digestibility and most palatable fodder tree (Solanki *et al*. 2018) [10]. Its leaves are highly palatable and rich in digestible crude protein (up to 25–30 per cent), along with essential amino acids, vitamins, and minerals (Monoj and Bandyopadhyay, 2007) [8]. When it introduced appropriately in the diet of animal, it enhances growth rate, reduce dependence on expensive concentrates, and lower overall feeding cost. Additionally, it can be harvested multiple times a year, offering a year-round green fodder option with high biomass yield.

2. Materials and Methods

2.1 Selection of experimental calves

The present investigation entitled "Effect of Subabul (*Leucaena leucocephala)* tree leaves feeding on dry matter intake and body weight gain in growing crossbred calves" was undertaken at Livestock Instructional Farm, Department of Animal Husbandry and Dairy Science, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola during the year 2024-2025 for a period of 120 days. Eighteen crossbred calves between the age group of 6 to 12 months were selected randomly from the herd, according to nearness to the age and body weight. The calves were divided into three groups having six calves selected in each group. The experiment was undertaken in RBD (Randomized block design) with 3 treatment and 6 replications. The feeding treatment consist T_1-Dry roughages (*ad lib*.) + Green roughages (50% Hybrid Napier + 50% Berseem) + Concentrate, T_2-Dry roughages (*ad lib.*) + Green roughages (50% Hybrid Napier + 40% Berseem+ 10% Subabul tree leaves) + Concentrate, T_3-Dry roughages (*ad lib.*) + Green roughages (50% Hybrid Napier + 30% Berseem + 20% Subabul tree leaves) + Concentrate. In all treatments, green roughages and concentrates are provided on the basis of the body weight of the crossbred calves as per thumb rule.

2.2 Dry matter intake

The dry matter intake per calf was recorded on daily basis from the providing feed as per treatments by using the standard methods.

2.3 Body weight gain

The body weight of experimental animals was recorded at the start of experiment for 3 consecutive days and then at weekly intervals. The weight was taken in morning hours in between 8 to 9 AM before watering and feeding of calves on weighing balance. The body weight gain includes daily weight and total body weight gain of growing crossbred calves.

2.4 Statistical analysis: The obtained data was statistically analyzed by Randomized block design (RBD).

3. Results and Discussion

3.1 Dry matter intake

It was observed from Table 1 and Fig.1 that the average daily dry matter intake was 2.02, 2.20 and 2.16 kg/day/calf in T_1, T_2 and T_3 respectively for calves of average body weight 66.27, 67.62 and 68.35 kg respectively. The DM intake was observed significantly highest in treatment T_2 followed by T_3 and T_1 group of growing crossbred calves. It indicates that, the inclusion of 40 per cent berseem with 10 per cent subabul leaves improves the DM intake of growing crossbred calves. The present results obtained were nearer to the result obtained by Kumar *et al.* (2017) [5], Telgote Madhu (2022) [11], Jadhav *et al.* (2024) [3] noted that the average daily dry matter intake was highest in T_3 group than that of other treatment groups. The DMI /100 kg body weight was noted as 3.05, 3.25 and 3.16 kg/day in the treatment T_1, T_2 and T_3 respectively

Table 1: Average daily dry matter intake and dry matter Intake/100 kg body weight of growing crossbred calves under different treatments

Treatments	Average body weight (kg) during the experimental period	Daily dry matter intake	Daily dry matter intake/100 kg BW
T_1	66.27	2.02	3.05
T_2	67.62	2.20	3.25
T_3	68.35	2.16	3.16
'F' Test	Sig.	Sig.	Sig.
SE(M) ±	0.41	0.04	0.02
CD at 5%	1.25	0.11	0.06

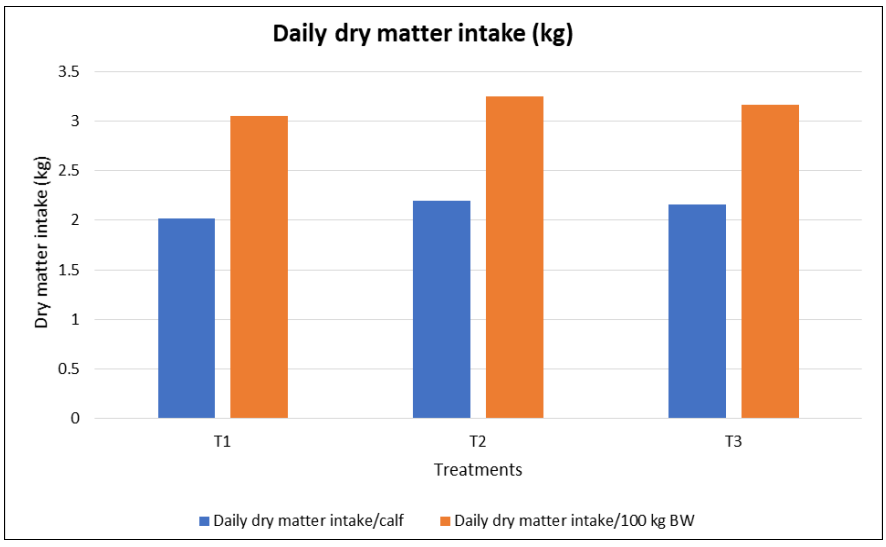

Fig 1: Average daily dry matter intake and DMI/100kg body weight of growing crossbred calves under different treatments (kg)

3.2 Body weight gain

The data from Table 2 and Fig. 2 revealed that the daily body weight gain of growing crossbred calves under the treatments T_1, T_2 and T_3 was 0.302, 0.309, 0.308 kg/day/calf respectively. The highest body weight gain per day per calf was observed in treatment T_2 (0.309) followed by T_3 (0.308) and T_1 (0.302) kg respectively. Also, over the experimental period average body weight gain (kg/calf) was recorded as 36.20, 37.10 and 37.05 in the treatment T_1, T_2 and T_3, respectively. This increase in body weight reflects the effect of feeding 40 per cent berseem with 10 per cent subabul leaves to experimental crossbred calves without any adverse effect on body weight. The present results obtained were nearer to the result obtained by Kant *et al*. (2016) [4] who found that calves in the treatment group gained an average of 274.7 g/day (total gain ~32.97 kg), compared to 249.5 g/day (29.91 kg total) in the control group, when crossbred calves fed 10 per cent *Leucaena* leaf meal supplementation.

Table 2: Average daily body weight gain (kg) and total body weight gain of growing crossbred calves under different treatments

Treatments	Initial body weight (kg)	Final body weight (kg)	Total body weight gain (kg) during the experimental period	Weight gain/day/ calf (kg)
T_1	48.17	84.37	36.20	0.302
T_2	49.07	86.17	37.10	0.309
T_3	49.82	86.87	37.05	0.308
'F' Test	NS	Sig.	Sig.	Sig.
SE(M) ±	0.41	0.44	0.24	0.001
CD at 5%		1.35	0.75	0.003

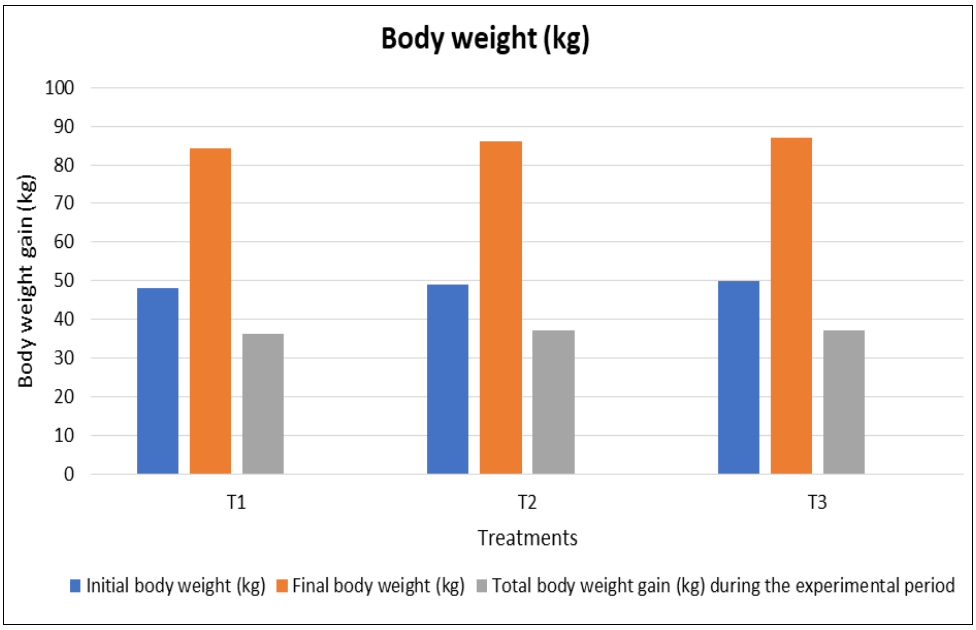

Fig 2: Average body weight (initial and final) and total body weight gain of growing crossbred calves during experimental period (kg)

4. Conclusion

From the above investigation, it is concluded that dry matter intake of the growing crossbred calves were differing significantly between the feeding groups. The calves from T_2 group shows (2.20) kg/day/calf by feeding with 40 per cent berseem with 10 per cent subabul leaves to experimental crossbred calves. Total weight gain was more obtained in T_2 (37.10) kg by feeding Dry roughages (*ad lib.*) + Green roughages (50% Hybrid Napier + 40% Berseem+ 10% Subabul tree leaves) + Concentrate to growing crossbred calves.

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Conflict of Interest

Not available

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