The feeding values of Dinanath grass and Sweet Sorghum fodder at the post-flowering stage for crossbred heifers

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ABSTRACT

The feeding value of Dinanath grass with sorghum fodder at the post-flowering stage was compared in the present study Sixteen crossbred heifers (274±11 d) and weight (85.3±4.9 kg) were grouped in 8 pairs based on their age and live weight. One animal from each pair was randomly allotted to one of the two groups T_1 and T_2. In T_1, the animals were offered Dinanath grass fodder, whereas, in T_2 sorghum fodder ad-lib, the fodders were enriched with urea, @ 0.4 and 0.2% on a fresh weight basis, respectively. They were also given 1 Kg concentrate mixture (40% wheat grain; 40% groundnut cake; 20 % gram husk), 30 g common salt, and chalk 30 g daily for 13 weeks. The body weight of the animals was calculated weekly multiplication, of length (cm) and heart girth (cm) of the animal divided by 11200. After 21 days of adaptation, a 7-days digestibility trial was conducted to compare intake and digestibility data. The samples were chemically analyzed for proximate principles using standard techniques. The data were subjected to statistical analysis using suitable methods. It can be concluded that Dinanath grass and sorghum fodders both are equally inferior in nutritive value in the post-flowering stage and should not be continued for a long period as the sole feed without nutrient supplementation.

Keywords

ADG, Digestibility, Dinanath grass, Intake, Nutritive value, Pennisetum pedicellatum, Sorghum.

Introduction

The regional deficits of fodder are more important rather than the national deficit [1]. The pattern of deficit varies in different parts of the country. To supply green fodder from one location to another is not feasible because of the involvement of transportation. In such conditions locally available weeds, inland, or imported fodder crops play important role in sustainable livestock production.

It is very much difficult to increase the area under fodder crops because of the population pressure for food and fiber [2]. Fortunately, the Indian sub-continent is one of the world's mega

centers of crop origin and crop plant diversity, because of the availability of a wide spectrum of eco-climates. The Indian gene center possesses a rich genetic diversity in native grasses and legumes. Almost one-third of Indian grasses are considered to have fodder value for livestock. It is needful explore high-yielding fodder crops which may be suitable for cultivation in particularly green fodder deficit locations, evaluate locally available fodder crops, and their improvement to overcome inferiority factors.

With profusely tillering capability, Dinanath grass (*Pennisetum pedicellatum*) is a quick-growing, luscious, leafy, and thin-stemmed grass and grows well in poor, eroded soils in areas receiving 500-1500 mm annual rainfall. It is a high-yielding, tall, erected annual tufted perennial forage [3]. This crop is of short duration and fits well in the small period between two major crops. The grass thrives and performs well on a wide range of soils (including degraded sandy or ferruginous soils) provided they are well-drained [4]. Because of high fodder production potential, tolerance towards drought, insect and disease infestation, Dinanath grass is becoming popular day by day but reducing the unwanted volume and extracting true seeds from spikelet for efficient post-harvest handling, transportation, and various farm operations is required for large-scale utilization of Dinanath grass as forage for animals [5]. Maity *et al.* [6] worked on layered pelleting of the nucleus seed of Dinanath grass with soil and observed the highest germination of 91%. Seed yield of grasses is very low, while demand for seed upgrading of grasslands [7]. The feeding value of Dinanath grass fodder at early and pre-flowering stages has been assessed and found similar to sorghum fodder [8].

Keeping the above facts in consideration, the present experiment was conducted to compare the feeding value of Dinanath grass with sorghum fodder at the post-flowering stage.

Materials and Methods

Dinanath grass (Variety T-10) and sorghum (Variety CSH-1) were sown at the farm at a suitable interval to maintain the stage of plant at harvest for feeding, following standard agronomical practices. At the stage of post-flowering, the crops (Dinanath grass: 90-110 days after sowing; Sorghum: 80-90 days after sowing) were harvested for proximate analysis [9] and offered to the experimental animals.

Sixteen crossbred heifers (Sahiwal x Jersey) were selected at the dairy farm and grouped into 8 pairs based on their age (274±11 d) and weight (85.3±4.9 kg). One animal from each pair was randomly allotted to one of the two groups T_1 and T_2.

In group T_1 the animals were offered Dinanath grass fodder whereas, in T_2 sorghum fodder ad-lib. The fodders were enriched with urea, at the rate of 0.4 and 0.2% on the fresh fodder weight basis in T_1 and T_2 groups, respectively. They were also given 1 Kg concentrate mixture (40% wheat grain; 40% groundnut cake; 20% gram husk), 30 g common salt, and 30 g chalk daily.

The experimental heifers were housed in a large-sized shed having partitions in troughs for individual feeding. The fodder was offered to the animals in the fore-noon and concentrate mixture in the afternoon. The heifers were let loose in an open enclosure for 4 hours before feeding fodder. The animals had free access to drinking water.

The bodyweight of the animals was calculated weekly based on body measurements i.e. multiplication of length (cm) and heart girth (cm) of the animal divided by 11200. After 21 days of adaptation, a 7-days digestibility and sample collection trial was conducted to find out

intake and digestibility data. The collected samples were chemically analyzed for proximate principles using standard techniques [9]. The data recorded during the experiment were subjected to statistical analysis using suitable methods [10].

Results and Discussion

The contents of dry matter, crude protein, ether extract, gross energy, organic matter, acid insoluble ash, hemicellulose, and total carbohydrates were present high and crude fiber, neutral detergent fiber and acid detergent fiber, ash, and nitrogen-free extract low in sorghum fodder in comparison to those in Dinanath grass (Table 1). These results were found contrary to Kishore and Verma [8] which could be due to the different stages of fodder harvesting. The ranges of the nutrients in both the fodders varied from the study of Tilahun *et al*. [11] which may be because of the reason of different conditions of growing dinanth grass. However, the findings confirmed the results of(Chakrabarti *et al.* [12]. Because of enrichment with urea, the content of crude protein was increased which may be due to the presence of high content of nitrogen (46%) in urea. The chemical composition of showed very little variation with the observations of Sonawane *et al*. [13] which could be due to different varieties of sorghum fodder.

The consistently but not significantly ($P>0.05$) higher dry matter digestibility of dry matter in T_1 compared to that in T_2 are presented in Table 2 confirmed the results of Kishore and Verma [8]. Higher digestibility coefficient in T_1 in comparison to those observed in the literature [14] may be due to the enrichment of fodder with urea which increased CP content of the feed and hence, enhanced microbial activities in the rumen ecosystem. It is a well-known fact that the fullest expression of potential digestibility of non-leguminous forages the crude protein content of the diet should be 8 percent. The digestibility coefficients of energy and fiber components especially acid detergent fiber were observed on the higher side in T_1 in comparison to those in T_2 and confirmed the findings of Kishore and Verma [8].

Significantly higher intake of dry matter and crude protein were recorded in T_2 ($P<0.05$) in comparison to the in T_1 (Table 2). The intake data in T_2 is in agreement with Randhawa, *et al.*, [15]. A higher intake of digestible nutrients like digestible dry matter, digestible crude protein, and digestible energy may perhaps be due to a higher intake of the nutrients. The present intake data was recorded in line with the results reported in the literature [8].

The average daily gains in two groups (Fig) under study were non-significant ($P>0.05$), despite significantly higher intake data in T_2. The average daily gain was showing a trend of fall. The animals were started losing weight in week 10 in T_1 and 12 in T_2. The reason for this declension could perhaps be due to the availability of nutrients in both the fodders at the post-flowering stage.

It can be concluded based on this study that Dinanath grass and sorghum fodders both are inferior in nutritive value in the post-flowering stage and should not be continued for a long period. If it is needful to continue with these fodders, the diet should be enriched or supplemented with the nutrients to meet the nutritional requirements of growing crossbred heifers.

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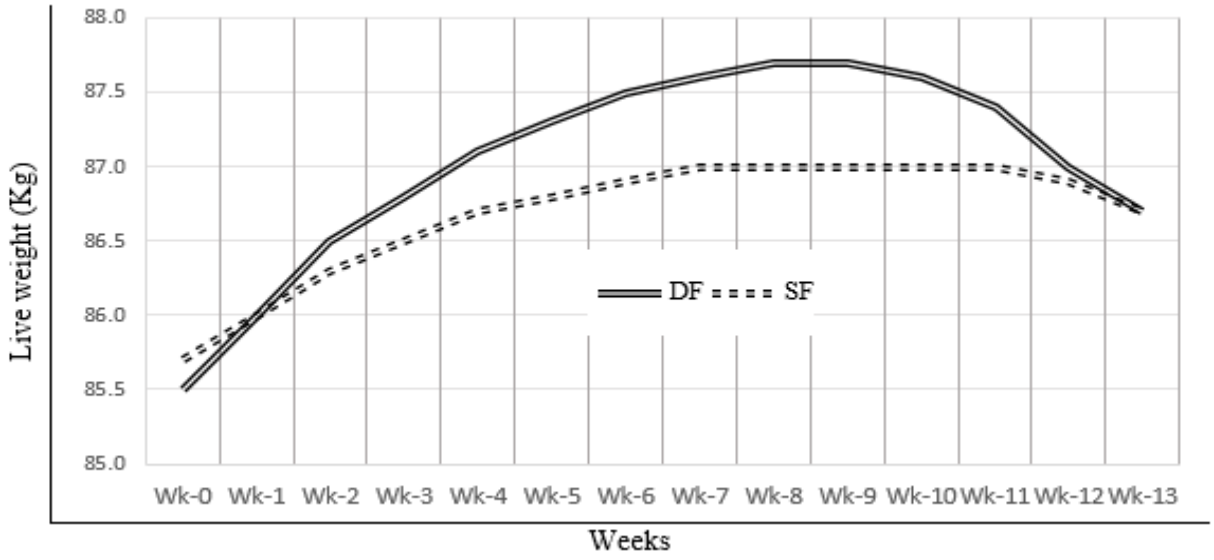
Table 1 Chemical Composition at post flowering stage (%)

ent	Dinanath grass		Sorghum fodder		oncentrate
	Enriched with urea		Enriched with urea		Mixture
	Without	With	Without	With	
	30.5	29.2	39.6	37.4	92.5
	4.90	7.00	5.16	8.04	16.9
	4.26	4.28	4.33	4.36	5.59
	38.9	38.3	36.7	36.2	18.1
	68.3	67.0	65.6	64.2	51.3
	39.4	39.0	33.7	32.	25.7
	3.31	3.28	3.35	3.33	3.73
	10.3	10.2	7.49	7.58	12.0
	46.6	39.9	46.3	43.8	47.4
	89.7	89.9	92.5	94.4	88.0
	2.79	2.78	3.05	3.02	3.09
LL.	28.9	28.0	31.9	32.2	25.6
)	80.5	78.5	83.0	80.0	65.5
					* *Mcal/kg*

Table 2 Nutrient utilization

Nutrient	**T_1**	**T_2**
Digestibility (%)		
Dry matter	60.7±1.1	57.9±1.7
Crude Protein	68.6±1.0	64.3±1.3
Crude fibre	40.7±3.9	42.8±3.0
Neutral Detergent fibre	53.2±1.2	52.9±1.5
Acid detergent fibre	44.0±2.2	39.0±1.9
Energy	60.1±1.3	57.0±1.8
Intake		
Dry matter (kg/100kg LW)	2.17±0.10	3.31±0.18
(g/kg$W^{0.75}$)	68.8±4.7	102±7
Digestible dry matter kg/100kg LW)	1.87±1.00	1.73±0.9
(g/kg$W^{0.75}$)	38.8±2.2	66.8±3.6
Crude Protein (kg/100kg LW)	243±13	352±13
(g/kg$W^{0.75}$)	7.19±0.30	10.76±0.5
Digestible Crude Protein (kg/100kg LW)	161±9	225±7
(g/kg$W^{0.75}$)	4.94±0.28	6.89±0.26
Digestible energy (M cal/100kg LW	5.12±0.27	6.57±0.37
(K cal/kg$W^{0.75}$)	134±7	190±11
Average Daily Gain (g/d)	101±99.83	76±85.57

Fig. Weight map of the experimental animals (kg)



Note: DF denotes T_1, and SF T_2.