

Original Research Article

Proximate Characteristics of Fodder Sorghum as Influenced by Varieties and Cutting Management

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ABSTRACT

A field experiment was conducted at the experimental farm of Department of Agronomy, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, to study the “Proximate Characteristics of Fodder Sorghum as Influenced by Varieties and Cutting Management”, during *kharif* season of 2017-18. The results revealed that all the proximate characteristics are significantly influenced by various varieties of fodder sorghum. The variety Raseela recorded higher crude protein (7.19 %), ether extract (2.45 %), total ash (9.05 %) and lower of crude fibre (28.96) as well as nitrogen free extract (52.36%). In cutting management, first cut at 60DAS + Subsequent 2 cuts each at 40 days interval showed significantly higher proximate characteristics of fodder than other cutting management practices viz. crude protein (6.96 %), ether extract (2.17 %), total ash (8.72 %) and lower crude fibre (29.32) as well as nitrogen free extract (52.82%).

Keywords

Fodder sorghum,
Cutting
management,
Varieties and
Proximate

Introduction

Sorghum crop is widely grown especially in tropical and sub-tropical regions of India. As sorghum is generally cultivated in nutrient-poor soils in frequently drought-prone areas, it offers food and fodder security through risk aversion on sustainable basis. In Indian agriculture, livestock plays a vital role in the development and progress of mankind with crop production programme as a complementary enterprise. Sorghum is becoming an increasingly important fodder crop in many regions of the world. Its high resistance to drought makes it a suitable

fodder crop for drier areas, especially in light of its higher productivity under limited irrigation condition compared to corn. Fodder sorghum can be used in various forms and situations encompassing single cut types for rainfed farming and multi-cut types for irrigated agriculture in the form of Stover, silage for storage and extended uses.

Fodder and forage crops are the different terminologies. Fodder crops are the coarse grasses such as corn and sorghum harvested with the seed and leaves green or alive, then cured and feed in their entirety as forage. viz., Sorghum, Maize and Oat etc. Forage crop is

defined as a crop of cultivated plants or plant parts, other than separated grain, produced to be grazed or harvested for use as feed for animal. viz., grasses and legumes, alfalfa, hurricane grass and foxtail grass (Allen, 1991).

A general agreement is that in India there is a shortage of 40.4 per cent dry fodder and 24.7 per cent green fodder against the requirement of 650.7 and 761.5 million tonnes for dry and green fodder, respectively (Singh *et al.*, 2011). Maharashtra has about 4 crore livestock population which needs about 12 crore tones dry fodder. However, only 7 crore tonnes dry fodder is available from all sources, it means about 42 per cent fodder is deficit for livestock in Maharashtra.

Green fodder availability is very important for livestock health and productivity. This is particularly true in case of dairy enterprises where consistent supply of green fodder is vital to sustained milk production. In addition to energy, green fodder provides vitamins and minerals and helps in digestion (Surve *et al.*, 2012).

Cutting management affects crop yield. It is another important factor which determines quality of fodder since its succulence, dry matter, crude protein, and the other quality factor are largely affected by it. The prosperity of the Indian agriculture is also directly correlated to the white revolution, which depends on balanced and nutritious feed and fodder supply to the milch animals.

Materials and Methods

A field experiment entitled "Proximate Characteristics of Fodder Sorghum as Influenced by Varieties and Cutting Management " was conducted on clayey soil at the experimental field of Department of Agronomy, Dr. Panjabrao Deshmukh Krishi

Vidyapeeth, Akola, during *kharif* season of 2017-2018. The experiment was carried out in factorial randomized blocked design with three replications consisting of nine treatment combinations. The soil of experimental plot was clayey in texture, medium in organic carbon, low in available nitrogen, phosphorus and high in potash. Three varieties viz., V₁ - Heera, V₂ -Raseela, V₃ - Arya suruchi was sown on 5th june 2017 and three cutting management practices viz. C₁ (First cut at 40 DAS + Subsequent 2 cuts each at 40 days interval), C₂ (First cut at 50 DAS + Subsequent 2 cuts each at 40 days interval), C₃ (First cut at 60 DAS + Subsequent 2 cuts each at 40 days interval).

The nutrient management carried out as Azotobactor seed inoculation was given @ 250 g 10 kg⁻¹ seed, FYM @ 5 t ha⁻¹ was applied to all treatments before sowing, recommended dose of fertilizer for forage sorghum-100:50:50 N: P₂O₅:K₂O kg ha⁻¹., application of 50% N at the time of sowing and remaining 50% at 30 DAS then application of fertilizer dose i.e. P₂O₅ @ 40 kg ha⁻¹ and K₂O @ 40 kg ha⁻¹ to all treatments at the time of sowing. The proximate characteristics of the fodder was determined in terms of total solid, moisture content, crude protein, crude fiber, ether extract, total ash and nitrogen free extract by standard method at each cutting.

Results and Discussion

Effect of varieties

Significantly superior variety in proximate characteristics was Raseela as this variety recorded higher total solids and lower moisture i.e. 29.08% and 70.92%, respectively. Most valuable performance in case of proximate analysis was estimated by the fodder sorghum variety Raseela than other varieties Heera and Arya suruchi.

Table.1 The various proximate characteristics of fodder sorghum as influenced by various varieties and cutting management at first cut

Treatment	Total Solid (%)	Moisture (%)	Crude protein (%)	Crude fibre (%)	Ether extract (%)	Nitrogen free extract (%)	Total Ash (%)
Varieties(V)							
V₁ - Heera	28.57	71.43	6.10	29.88	1.75	53.90	8.37
V₂ -Raseela,	29.08	70.92	7.19	28.96	2.45	52.36	9.05
V₃ - Arya suruchi	28.29	71.71	5.54	30.87	1.78	53.47	8.34
SE(m)±	0.16	0.16	0.06	0.11	0.07	0.18	0.07
C.D at 5%	0.49	0.49	0.18	0.33	0.22	0.55	0.22
Cutting management(C)							
C₁ (First cut at 40 DAS + Subsequent 2 cuts each at 40 days interval)	26.80	73.20	5.46	30.48	1.78	53.85	8.43
C₂ (First cut at 50 DAS + Subsequent 2 cuts each at 40 days interval)	28.63	71.37	6.40	29.90	2.03	53.06	8.61
C₃ (First cut at 60 DAS + Subsequent 2 cuts each at 40 days interval)	30.51	69.49	6.96	29.32	2.17	52.82	8.72
SE(m)±	0.16	0.16	0.06	0.11	0.07	0.18	0.07
C.D at 5%	0.49	0.49	0.18	0.33	0.22	0.55	0.22

Table.2 The various proximate characteristics of fodder sorghum as influenced by various varieties and cutting management at second cut

Treatment	Total Solid (%)	Moisture (%)	Crude protein (%)	Crude fibre (%)	Ether extract (%)	Nitrogen free extract (%)	Total Ash (%)
Varieties(V)							
V₁ - Heera	32.82	67.18	5.17	28.51	1.66	56.61	8.05
V₂ -Raseela,	34.2	65.80	6.26	27.49	2.08	55.38	7.49
V₃ - Arya suruchi	32.37	67.63	4.65	30.22	1.74	55.91	8.77
SE(m)±	0.21	0.21	0.04	0.08	0.02	0.08	0.03
C.D at 5%	0.64	0.64	0.11	0.23	0.07	0.25	0.09
Cutting management(C)							
C₁ (First cut at 40 DAS + Subsequent 2 cuts each at 40 days interval)	33.35	66.65	5.41	28.62	1.81	55.06	8.11
C₂ (First cut at 50 DAS + Subsequent 2 cuts each at 40 days interval)	33.27	66.73	5.36	28.72	1.83	55.94	8.14
C₃ (First cut at 60 DAS + Subsequent 2 cuts each at 40 days interval)	32.78	67.22	5.30	28.88	1.84	55.91	8.06
SE(m)±	0.21	0.21	0.04	0.08	0.02	0.08	0.03
C.D at 5%	NS	NS	NS	NS	NS	NS	NS

Table.3 The various proximate characteristics of fodder sorghum as influenced by various varieties and cutting management at third cut

Treatment	Total Solid (%)	Moisture (%)	Crude protein (%)	Crude fibre (%)	Ether extract (%)	Nitrogen free extract (%)	Total Ash (%)
Varieties(V)							
V₁ - Heera	37.67	62.33	5.09	28.47	1.51	57.17	7.76
V₂ -Raseela,	39.10	60.90	6.14	27.40	2.03	55.97	7.15
V₃ - Arya suruchi	37.47	62.53	4.6	29.91	1.64	56.71	8.46
SE(m)±	0.25	0.25	0.03	0.10	0.04	0.11	0.05
C.D at 5%	0.75	0.75	0.08	0.29	0.12	0.33	0.15
Cutting management(C)							
C₁ (First cut at 40 DAS + Subsequent 2 cuts each at 40 days interval)	37.99	62.01	5.31	28.53	1.71	56.70	7.75
C₂ (First cut at 50 DAS + Subsequent 2 cuts each at 40 days interval)	38.04	61.96	5.24	28.46	1.75	56.72	7.83
C₃ (First cut at 60 DAS + Subsequent 2 cuts each at 40 days interval)	38.20	61.80	5.28	28.79	1.72	56.42	7.79
SE(m)±	0.25	0.25	0.03	0.10	0.04	0.11	0.05
C.D at 5%	NS	NS	NS	NS	NS	NS	NS

The proximate characteristics recorded by the variety Raseela as crude protein (7.19 %), ether extract (2.45 %), total ash(9.05 %) and lower of crude fibre (28.96) as well as nitrogen free extract (52.36%). The proximate characteristics recorded by the variety Heera as crude protein (6.10 %), crude fibre (29.88), ether extract (1.75 %), total ash(8.37 %) and nitrogen free extract (53.90%). The proximate characteristics recorded by the variety Arya suruchi as crude protein (5.54 %), crude fibre (30.87), ether extract (1.78 %), total ash (8.34 %) and nitrogen free extract (53.47%) (From Table 1).

Similar findings of proximate characteristics of fodder sorghum was found in different varieties at second and third cut (From Table 2 and 3).

Effect of cutting management

The cutting management practices among different varieties of fodder sorghum showed that significantly influenced on various proximate characteristics of fodder. The most remunerative cutting management practice is first cut at 60 DAS + subsequent 2 cuts each at 40 days interval as this recorded maximum total solid (30.51%) and minimum moisture (69.49%), respectively. The cutting management with first cut at 60 DAS + subsequent 2 cuts each at 40 days interval was recorded significantly higher crude protein (6.96 %), ether extract (2.17 %), total ash(8.72 %) and lower crude fibre (29.32) as well as nitrogen free extract (52.82%) than other cutting management practices (From Table 1).

From Table 2 and 3, the cutting management practices among different varieties of fodder sorghum shows non-significant influenced on various proximate characteristics of fodder at second and third cut of fodder. Similar result

were also recorded by Dadheech *et al.*, (2000), Durgesh kumar *et al.*, (2015) Ahmad Sher *et al.*, (2016), Jayanti Tokas *et al.*, (2017) and Nierja Prajapati *et al.*, (2017).

The superior proximate characteristics was recorded by variety Raseela and cutting management practice at First cut at 60 DAS + Subsequent 2 cuts each at 40 days interval.

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