

# Fodder quality parameters study in introgressed stay green lines on sorghum

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Accepted : March, 2010

## SUMMARY

A field experiment entitled “Study of fodder quality parameters in introgressed stay green lines of sorghum (*Sorghum bicolor* (L.) Moench)” was conducted at the Experimental Farm of Sorghum Research Station, Marathwada Agricultural University, Parbhani. Introgressed stay green genotype S35SG 06026 recorded more plant height, number of leaves per plant and leaf area per plant. The introgressed genotypes were found earlier in maturity, more in leaf dry weight, maximum total dry matter, higher brix and higher total sugar content. Genotype S35SG06026 recorded significantly higher green and dry fodder yield over all the checks. Several desirable yield determining factors and yield limiting factors in 24 genotypes have been identified. Such parameters may be helpful in further crop improvement programme. The genotype may be considered for future breeding programme for developing varieties suitable for rainfed condition.

**Key words :** Introgressed, Stay green, Plant height, Leaf area, Fodder quality, Maturity, Brix, Sugar content

**S**orghum [*Sorghum bicolor* (L.) Moench] is self pollinating crop and belongs to gramineae family. Sorghum is the fifth most important cereal crop in the world. It is dietary staple food of more than 500 million people in more than 30 countries of Africa, Asia, Oceania and the America. Sorghum carries out C4 photosynthesis which makes it adoptable to fluctuating environmental conditions. Drought stress is the second most important abiotic constraint after soil nutrient deficiency for sorghum production globally. It is well adopted to semi-arid environment as it makes efficient use of available water in the soil under limited water conditions. Hence, it is regarded model crop for studying drought tolerance among grass species. Drought condition may occur at any stages of its growth which may cause premature leaf senescence which in turn may leads to stalk lodging and significant yield losses. The plant character associated with tolerance to terminal drought is called “stay green”. In stay green senescence start on schedule but proceeds thereafter comparatively slow and chlorophyll is retained. The character is consider as valuable trait as it improves, genotype adaptation to drought stress condition. The lines are photosynthetically active as compared to genotypes not possessing this trait.

Therefore, the study was undertaken among the

character of S35 based stay green QTLs introgressed backcross progenies to assess fodder quality parameters studies in sorghum.

## MATERIALS AND METHODS

Experiment was conducted at the Experimental Farm of Sorghum Research Station, Marathwada Agricultural University, Parbhani during *Kharif* season (2008-09). Soil was medium black with moderate moisture retention capacity. Experiment was conducted on 24 genotypes in Randomised Block Design with three replications. The seeds were sown by dibbling method with 45 cm x 15 cm spacing with net plot size 2.70 m x 1.35 m. All the recommended packages of practices were followed to grow the crop. The five sample plants from each line were harvested separately and bagged properly after labeling it. These five plants were selected from each plot for recording biometric observations. The observations were recorded on characters *viz.*, plant height, number of leaves, length x breadth, leaf area per plant, leaf area index, leaf dry weight per plant, stem dry weight per plant, total dry weight per plant, green fodder yield, dry fodder yield, harvest index, total sugar content, brix reading at harvest. The statistical analysis of data was carried out by analysis of variance method suggested by Panse and Sukhatme (1967).

## RESULTS AND DISCUSSION

The data on mean values are presented in the Table 1. The plant height was significantly influenced at all the stages of crop growth, the genotype S35SG06026 recorded significantly higher plant height over checks and rest of the genotypes. The data on mean number of

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Table 1 : Mean performance of sorghum genotypes for Mean fodder yield attributing characters

Sr. No.	Introgressed genotypes	Plant height (cm)	No. of functional leaves	Length x breadth (cm)	Leaf		Leaf		Stem dry weight/plant (g)	Total dry weight/plant (g)	Green fodder yield (kg/plot)	Dry fodder yield (kg/plot)	Harvest index (%)	Total sugar (%)	Erix (%) at PM
					area per plant (dm <sup>2</sup> )	dry wt. per plant (g)	area index	dry weight/plant (g)							
1.	S 35 SG 06001	210.87	11.33	744.47	5.53	8.54	42.80	213.18	319.00	27.26	16.81	12.08	3.21	18.00	
2.	S 35 SG 06003	184.67	10.86	513.22	4.77	8.68	44.00	208.11	327.67	30.87	17.70	15.93	3.64	17.00	
3.	S 35 SG 07001	224.33	11.86	819.03	5.97	9.16	46.70	224.44	359.10	32.85	16.49	22.72	10.87	18.83	
4.	S 35 SG 07002	193.07	10.60	587.17	4.92	6.78	31.12	224.04	358.97	26.62	15.07	11.14	6.68	17.16	
5.	S 35 SG 07003	180.33	10.53	581.64	4.00	6.81	37.19	196.05	304.74	27.29	16.13	18.32	9.92	17.26	
6.	S 35 SG 06032	203.67	10.40	530.20	4.03	7.75	35.58	207.25	306.08	26.43	12.36	22.26	5.93	14.33	
7.	S 35 SG 06034	172.47	10.80	450.52	3.42	5.88	40.54	114.12	224.77	20.34	8.21	26.43	10.75	17.50	
8.	S 35 SG 06035	161.00	10.80	560.40	4.02	6.45	40.57	155.31	288.20	25.43	14.56	10.89	5.79	17.16	
9.	S 35 SG 06025	177.67	10.86	788.62	5.42	8.86	37.46	205.08	333.33	20.64	12.92	16.70	7.26	16.66	
10.	S 35 SG 06026	230.00	12.93	833.37	7.57	11.57	56.20	226.24	447.90	34.20	18.05	29.03	11.19	19.66	
11.	S 35 SG 06027	210.67	11.73	723.2	5.38	9.11	33.81	141.06	350.21	29.67	15.14	9.12	8.41	17.00	
12.	S 35 SG 06014	220.00	10.13	743.80	4.91	8.78	44.50	221.99	316.01	25.03	17.60	13.12	7.87	16.16	
13.	S 35 SG 06015	175.00	11.46	539.97	5.47	8.77	41.50	173.08	280.27	21.49	9.88	27.29	8.73	17.00	
14.	S 35 SG 06016	217.20	10.92	797.20	4.59	8.40	31.57	197.05	328.60	27.15	14.54	10.02	6.53	13.50	
15.	S 35 SG 06021-A	220.33	11.26	736.19	5.66	8.72	43.33	220.02	292.00	24.12	15.86	16.64	7.76	17.00	
16.	S 35 SG 06021-B	181.60	11.73	540.26	4.39	7.15	48.87	128.04	320.50	25.42	14.52	9.21	7.07	18.00	
17.	S 35 SG 06022	220.20	10.86	738.03	5.46	8.43	41.58	218.80	290.27	23.80	12.06	25.51	9.36	18.33	
Recurrent parent															
18.	ICSV 111	196.00	10.46	748.81	4.96	7.37	32.10	192.44	263.50	24.51	10.42	21.96	5.50	18.50	
19.	S 35	196.00	10.80	642.57	4.74	7.55	32.84	175.05	261.90	20.86	9.38	16.92	5.12	17.00	
Donar parent															
20.	B 35	55.333	9.86	541.43	3.11	5.21	31.85	95.01	204.67	11.39	7.99	23.00	4.45	14.50	
21.	E 36-1	157.33	10.40	720.39	5.37	8.37	49.54	189.15	330.83	29.02	17.65	8.50	7.27	15.50	
Checks															
22.	RSSV 9	223.67	10.20	572.96	4.88	7.84	35.29	202.32	258.13	15.11	13.92	16.73	6.71	14.50	
23.	HES 4	204.00	9.93	606.13	4.59	7.36	41.18	202.27	288.17	23.65	14.93	24.40	4.51	14.50	
24.	CSH 16	184.33	10.73	620.10	4.87	7.45	35.91	204.25	268.27	19.91	7.99	26.62	3.58	12.50	
	Mean	191.66	10.89	653.32	4.92	7.96	40.05	188.93	305.96	24.71	13.67	18.10	7.00	16.54	
	S.E. ±	13.581	0.51	49.788	0.50	0.67	3.49	1.26	31.208	2.117	0.48	0.79	1.07	0.599	
	C.D. (P=0.05)	37.587	1.14	137.79	1.399	1.87	9.68	3.50	86.369	5.858	1.34	2.20	2.98	1.858	

functional leaves per plant revealed that the leaves increased upto 90 days after sowing and thereafter decreased. All the genotypes recorded higher number of functional leaves per plant over the checks.

The genotypes S35SG06026, S35SG07001, S35SG06016, S35SG06025, S35SG06021-A, recurrent parent ICSV 111 and donar parent E36-1 were significantly superior than the checks CSH 16, HES 4 and RSSV 9.

The introgressed stay green line S35SG06026 had consistently more leaf area per plant and leaf area index per plant at all stages of its growth over the checks.

All the genotypes under investigation were found to be statistically at par with each other for leaf dry weight per plant. However, the genotype S35SG06026 recorded significantly higher leaf dry weight per plant over all the checks.

The stay green line S35SG06026 recorded higher stem dry weight as well as total dry weight per plant over all the checks.

The introgressed stay green genotype S35SG06026

recorded highest green fodder yield followed by S35SG07001 and S35SG06003 over the checks.

The introgressed genotype S35SG06026 recorded higher green and dry fodder yield over rest of the genotypes and all the checks.

The stay green genotype S35SG06026 recorded significantly higher mean brix at physiological maturity and highest total sugar content over other genotypes and all the checks. Harvest index is a function of grain yield and dry matter production. Higher harvest index leads to higher grain yield and fodder yield. Introgressed genotype S35SG 06026 recorded higher harvest index than all other genotype followed by S35SG 06015 which were at par to each other.

Results are in agreement with Babu and Reddy (1971), Rosenow *et al.* (1977), Rao and Singh (1978), McBee and Miller (1982), Chowdhary *et al.* (1987), Van Oosterom *et al.* (1996), Rana *et al.* (1998), Andrew *et al.* (2000), Borell *et al.* (2000), Howarth and Howarth (2000), Yadav *et al.* (2002), Kadam *et al.* (2002), Awari *et al.* (2003),

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