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## Performance of Newly Developed Forage Varieties of Sorghum (*Sorghum bicolor* L. Moench)

Muhammad Shahid Munir Chohan, <sup>1</sup>Muhammad Naeem, Ahmad Hassan Khan and Sultan Salah-ud- Din Ayub Agricultural Research Institute, Faisalabad, Pakistan  
<sup>1</sup>Pakistan Agricultural Research Council, Islamabad, Pakistan

**Abstract:** Ten newly developed varieties of Sorghum along with two check varieties were evaluated. Significant differences were observed for plant height, number of leaves per plant and leaf area, while differences for number of tillers per meter row, stem thickness and green fodder yield were non-significant. The variety F-9905 produced the highest green fodder yield (69.62 t ha<sup>-1</sup>) followed by F-9904 (69.44 t ha<sup>-1</sup>) and F-9909 (69.06 t ha<sup>-1</sup>). The check varieties JS-88 and JS-263 produced 65.55 and 63.33 t ha<sup>-1</sup> green fodder yields, respectively.

**Key words:** *Sorghum bicolor* L., varieties, green fodder yield, Pakistan

### Introduction

Demand of green fodder for rapidly expanding livestock industry is increasing day by day. Sorghum (*Sorghum bicolor* L.) is an important kharif fodder crop of Pakistan. It has a potential to produce high green fodder yield. It can be grown successfully throughout Pakistan both under irrigated and rainfed conditions. Therefore, high green fodder yield varieties of sorghum should be developed. Hussain *et al.* (1990) studied yield and quality traits in Sorghum genotypes. It was concluded that two Sorghum cultivars No. 94 and 95 provided a better compromise of green fodder and dry matter yield and crude protein contents. Chaudhry *et al.* (1990) recorded highest green fodder yield for Sorghum variety JS-88 followed by FC26 x 1119. The check variety produced 20% less green fodder yield. Plant characters like leaf area, number of leaves per plant, plant height and stem thickness were significantly positive correlated with green fodder yield. Hussain *et al.* (1991) observed that higher green fodder yield in Sudangrass was significantly positive correlated with yield component characters such as plant height, tillers per plant, leaves per tiller and leaf area. Kumar and Ram (1991) evaluated 25 genotypes of Sorghum and observed that the genotypes AKFS4 and AKFS3 produced 181 and 138% more fodder yield than the control HC136. Manhoran *et al.* (1992) reported that Sorghum cultivar K7 produced the highest green fodder yield (22.5 t ha<sup>-1</sup>) and dry matter (7.20 t ha<sup>-1</sup>) while JS-20 had the highest protein content (13.75%). The cultivar CO27 combined high productivity (5.34 t DM) with high protein content (10.63%). Naeem *et al.* (1993) evaluated six Sorghum hybrids for grain and fodder yield. The hybrid

CSH-9 produced the highest fodder yield (28 t ha<sup>-1</sup>) followed by CSH-11 (20.44 t ha<sup>-1</sup>) and CSH-1 (13.33 t ha<sup>-1</sup>). The plant height ranged from 129 (904021) to 226 cm (CSH-1). Nasim *et al.* (1993) studied the performance of five varieties and six hybrids of Sorghum. The variety ICSV-210 (22.22 t ha<sup>-1</sup>) ranked top in fodder yield followed by the hybrids CSH-9 (20.33 t ha<sup>-1</sup>) and ICSH-205 (18.17 t ha<sup>-1</sup>). ICSV-210 was the tallest variety having a plant height of 233 cm followed by SPV-462 (219 cm). Musa *et al.* (1993) observed that Sorghum hybrid called Sadabahar harvested after heading gave significantly higher green fodder yield than the crop harvested before heading. This was attributed to greater plant height, more leaf area and number of leaves per tiller. Kazmi and Ilyas (1994) noted that Sorghum cultivar JS-263 produced grain and fodder yields of 1.33 and 13.6 t ha<sup>-1</sup>, respectively when fertilizer was applied @ 50-50-00 NPK Kg t ha<sup>-1</sup> which were significantly greater than control crop which produced grain yield (0.98) and fodder yield (10.1 t ha<sup>-1</sup>). Hussain *et al.* (1995) evaluated the performance of seven cultivars of forage Sorghum for various morphological characters and fodder yield. They noted that genotypes like No.94, Hegari, Roma and No.119 were medium in plant height, had more leaf area and higher green fodder yield. Hence these varieties were recommended for general cultivation. Naeem *et al.* (2002) evaluated eleven varieties of Sorghum for their green fodder yield potential and its components. They observed that green fodder yield ranged from 18.06 to 69.44 t ha<sup>-1</sup>. Number of leaves per plant varied from 9.0 to 13.78 while plant height ranged from 101.11 to 209.44 cm. Leaf area varied from 264.12 to 379.44 cm<sup>2</sup> and stem thickness ranged from 1.1 to 1.67 cm. The present study

was conducted to evaluate green fodder yield potential of newly developed varieties of Sorghum.

**Materials and Methods**

Ten newly developed Sorghum varieties viz., F-9902, F-9903, F-9904, F-9905, F-9906, F-9909, F-9911, F-9914, F-9917 and F-9918 were tested along with two check varieties JS-88 and JS-263 at Fodder Research Sub-station, Ayub Agricultural Research Institute, Faisalabad during kharif 2000. The design of the trial was randomized complete block design (RCB) with three replications. Each plot consisted of 10 rows of 6 m long and 30 cm apart thus having a plot size of 18 m<sup>2</sup>. Seed rate used was 75 Kg ha<sup>-1</sup>. Fertilizers were applied @ 60-60-00 NPK Kg ha<sup>-1</sup>. The trial was planted on 5th May, 2000 and harvested on 17th July, 2000 at the completion of 50% flowering. Three irrigations were applied during the entire period of crop growth. Furadan granules were applied at the rate of 15 kg ha<sup>-1</sup> at the time of sowing for control of shoot fly and at six-leaf stage for control of stem borer. Data for the following plant characteristics were recorded:

Plant height (cm), number of leaves per plant, number of tillers per meter row, leaf area (cm<sup>2</sup>), stem thickness (cm) and green fodder yield (t ha<sup>-1</sup>).

The data recorded was statistically analyzed using the analysis of variance technique and least significant differences at 5% probability (Steel and Torrie, 1980).

**Results and Discussion**

The significant differences were observed among the varieties for plant height, number of leaves per plant and

leaf area while differences for number of tillers per meter row, stem thickness and green fodder yield were non-significant (Table 1). Plant height ranged from 195.55 (F-9918) to 229.11 cm (F-9909). The two check varieties JS-88 and JS-263 showed plant height of 208.88 and 209.55 cm, respectively. Chaudhry *et al.* (1990), Hussain *et al.* (1991, 1995), Naeem *et al.* (1993, 2002) and Musa *et al.* (1993) also reported similar results. The variety F-9905 (17.99) produced the highest number of leaves per plant followed by F-9904 (17.55) and F-9909 (17.44) while F-9911 (15.22) produced the lowest number of leaves per plant. The two check varieties JS-88 and JS-263 produced 15.55 and 15.88 leaves per plant, respectively (Table 1). Chaudhry *et al.* (1990), Hussain *et al.* (1991), Musa *et al.* (1993) and Naeem *et al.* (2002) also made similar observations.

F-9905 (21.11) produced the maximum number of tillers per meter row followed by F-9904 (20.88), F-9906 (20.84) and F-9902 (20.44). The variety F-9914 (15.22) produced the lowest number of tillers per meter row. The two check varieties JS-88 and JS-263 produced 15.88 and 15.44 tillers per meter, respectively (Table 1). Hussain *et al.* (1991) also reported similar results. Leaf area varied from 304.74 (F-9906) to 535.62 cm<sup>2</sup> (F-9904). The two check varieties JS-88 and JS-263 showed leaf area of 447.31 and 418 cm<sup>2</sup>, respectively (Table 1). Chaudhry *et al.* (1990), Hussain *et al.* (1991, 1995), Musa *et al.* (1993) and Naeem *et al.* (2002) also made similar observations.

The variety F-9905 ranked top in green fodder yield by producing 69.62 t ha<sup>-1</sup> closely followed by F-9904 (69.44 t ha<sup>-1</sup>), F-9909 (69.06 t ha<sup>-1</sup>) and F-9902 (68.88 t ha<sup>-1</sup>). The check variety JS-263 and F-9918 produced the lowest

Table 1: Mean plant height, number of leaves per plant, number of tillers per meter row, leaf area, stem thickness and green fodder yield of different varieties of Sorghum

Varieties	Plant height (cm)	No of leaves per plant	No of tillers per meter row	Leaf area (cm <sup>2</sup> )	Stem thickness (cm)	Green fodder yield (t ha <sup>-1</sup> )
F-9905	228.88	17.99	21.11	478.77	2.32	69.62
F-9904	223.86	17.55	20.88	535.62	2.33	69.44
F-9909	229.11	17.44	20.33	450.55	2.39	69.06
F-9902	221.66	16.66	20.44	439.33	2.26	68.88
F-9914	213.44	15.66	15.22	444.82	2.38	67.58
F-9917	205.11	15.66	15.87	419.58	2.04	67.40
F-9903	217.88	16.44	18.44	385.03	2.47	67.40
F-9911	228.88	15.22	15.81	375.67	2.08	66.84
F-9906	209.99	15.77	20.84	304.74	2.57	66.29
JS-88 (check)	208.88	15.55	15.88	447.31	2.32	65.55
JS-263 (check)	209.55	15.88	15.44	418.00	2.29	63.33
F-9918	195.55	15.77	17.22	349.31	2.15	63.33
LSD (5%)	14.74	1.93	NS	61.31	NS	NS
CV (%)	3.33	5.77	19.31	7.18	10.38	5.52

green fodder yield of 63.33 t ha<sup>-1</sup> while the other check variety JS-88 produced 65.55 t ha<sup>-1</sup>. Previous researchers Chaudury *et al.* (1990), Kumar and Ram (1991), Manhoran *et al.* (1992), Naeem *et al.* (1993, 2002), Nasim *et al.* (1993), Kazmi and Ilyas (1994) and Hussain *et al.* (1995) also reported similar results.

Although the results for green fodder yield were non-significant, still the varieties F-9905, F-9904 and F-9909 produced far better yield than the two check varieties JS-88 and JS-263. Hence these could be considered for general cultivation.

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