

## **FODDER YIELD POTENTIAL OF SORGHUM VARIETIES UNDER IRRIGATED CONDITIONS**

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### **ABSTRACT**

Nine sorghum varieties including a check were evaluated at Fodder Research Sub-Station, AARI, Faisalabad during kharif 2000 and 2001. Significant differences were found among the varieties for all the characteristics except leaf area and stem thickness. Variety Hegari topped in green fodder yield (64.20 t/ha) followed by F-9601 (63.42 t/ha) and JS-88 (60.88 t/ha). The check variety No.1863 produced minimum (28.01 t/ha). Hegari also excelled in plant height (226.5 cm), plants per meter (97.37) and leaf area (317.28 cm<sup>2</sup>). Leaves per plant were found maximum in F-9806 and stem thickness in PARC-SS-2 (1.38 cm).

**KEYWORDS:** *Sorghum bicolor*; high-yielding varieties; agronomic characters, Pakistan.

### **INTRODUCTION**

Sorghum (*Sorghum bicolor* L.), locally known as “jawar” is an important summer fodder crop of Pakistan particularly in the areas where moisture is a limiting factor. It can be grown successfully throughout the country both under irrigated and rainfed conditions. Therefore, it requires that sorghum varieties having high green fodder yield potential are developed to meet the increasing fodder demand for our rapidly increasing livestock industry.

Hussain *et al.* (3) concluded that two sorghum cultivars No.94 and No.5 promised well for green fodder dry matter yields and crude protein contents. Chaudhry *et al.* (1) recorded higher green fodder yield in variety JS-88 followed by a hybrid (FC-26 x 1119). They observed that plant characters like leaf area, number of leaves per plant, plant height and stem thickness were

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positively and significantly correlated with green fodder yield. Hussain *et al.* (4) observed that higher green fodder yield in Sudan-grass was positively and significantly correlated with yield components such as plant height, tillers per plant, leaves per tiller and leaf area. Kumar and Ram (7) found that genotypes AKFS4 and AKFS3 produced 181 and 138 percent more fodder yield than control (HC 136). Manhoran *et al.* (8) reported that sorghum cultivar K7 produced higher green fodder yield (22.5 t/ha) and dry matter (7.20 t/ha) while JS-20 topped in protein content (13.75%). Naeem *et al.* (10) evaluated six sorghum hybrids for grain and fodder yield. Hybrid CSH-9 produced higher fodder yield (28 t/ha) followed by CSH-11 (20.44) and CSH-1 (13.33 t/ha). The plant height ranged from 129 (904020) to 226 cm (CSH-1). Nasim *et al.* studied the performance of five varieties and six hybrids of sorghum. The variety ICSV-210 (22.22 t/ha) topped in fodder yield followed by hybrids CSH-9 (20.33 t/ha) and ICSH-205 (18.17 t/ha). ICSH-210 was observed as the tallest variety (233 cm) followed by SPV-462 (219 cm).

Musa *et al.* (9) observed that sorghum hybrid called Sadabahar harvested after heading gave significantly higher green fodder yield than crop harvested before heading. This was attributed to greater plant height, more leaf area and number of leaves per tiller. Kazmi and Ilyas (6) noted that sorghum cultivar JS-263 produced significantly more grain and fodder yields (1.33 and 13.6 t/ha) when fertilizer was applied @ 50-50-00 kg NPK per hectare against control (0.98 and 10.1 t/ha). Hussain *et al.* (5) evaluated seven cultivars of forage sorghum for various morphological characters as well as fodder and dry matter yields. They noted that genotypes like No.94, Hegari, Roma and No.1119 were medium in plant height but had more leaf area, green fodder, dry matter yield and forage quality.

Naeem *et al.* (11) 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 tons per hectare. Number of leaves per plant varied from 9 to 13.78 while plant height ranged from 101.11 to 209.44 cm. leaf area from 264.12 to 379.44 cm<sup>2</sup> and stem thickness ranged from 1.1 to 1.67 cm. Chohan *et al.* (2) studied 12 sorghum varieties and noted green fodder yield from 63.33 to 69.62 tons per hectare, number of leaves per plant varied from 15.22 to 17.99 while plant height ranged from 195.55 to 229.11 cm. Number of tillers per meter row ranged from 15.22 to 21.1 while leaf area

varied from 304.74 to 478.77 cm<sup>2</sup> Range of stem thickness was from 2.15 to 2.57 cm.

The present study was conducted to identify higher green fodder yielding varieties of sorghum.

## **MATERIALS AND METHODS**

Nine varieties of sorghum viz. Hegari, F-9601, JS-88, F-9809, F-9706, Tandojam Sorghum Selection, F-9806, F9603, PARC-SS-2 and a check No.1863 were evaluated at Fodder Research Sub-Station, Ayub Agricultural Research Institute, Faisalabad during kharif season of 2000 and 2001. Layout system was RCBD with three replications. Each plot consisted of six rows of 6 meter and 30 cm apart. Thus the net plot size was 1.8 x 6 meter. Crop was sown on 8.7.2000 and 21.7.2001 and harvested on 8.9.2000 and 24.9.2001. Seed rate was 75 kg per hectare while fertilizers were applied @ 60-60-00 kg NPK per hectare in both the years. Furadan granules were applied @ 15 kg per hectare in two doses to control shoot fly and stem borer. Half of the dose was applied at planting and remaining half when the plants were at six leaf stage. Data from five randomly selected plants in each plot were recorded on plant height, number of leaves per plant, leaf area and stem thickness. Number of plants per meter row were recorded by counting plants in randomly selected one meter length of each row of a plot. Green fodder yield was recorded by harvesting the whole plot in 50 percent flowering and then its weight (kg/plot) was converted into tons per hectare.

The data recorded were statistically analysed using the analysis of variance technique and least significant differences at 5 percent level of probability (13).

## **RESULTS AND DISCUSSION**

Significant differences were observed among the sorghum varieties for plant height, leaves per plant, plants per meter row and green fodder yield while differences in leaf area and stem thickness were non-significant (Table). Sorghum variety Hegari was the tallest (226.50 cm) while check variety No.1863 was the shortest (123.44 cm). F-9601 (215.33 cm) ranked second in plant height. F-9806 produced maximum leaves per plant (13.44) closely followed by Hegari (13.22), F-9706 (13.17) and F-9601 (13.06). Check variety

No.1863 produced minimum number of leaves per plant (9.39). Hegari also topped in plants per meter row (37.67) followed by F-9601 (36.72) and JS-88 (36). Similarly Hegari ranked first in first in leaf area (317.28 cm<sup>2</sup>) and PARC-SS-2 in stem thickness (1.38 cm). Similar results were reported by earlier workers (2,4,5,11).

Table. Average plant height, leaves per plant, plants per meter row, leaf area, stem thickness and green fodder yield of different sorghum varieties.

| Variety                    | Plant height (cm) | No. of leaves/plant | No. of plants/meter row | Leaf area (cm <sup>2</sup> ) | Stem thickness (cm) | Green fodder yield (t/ha) |
|----------------------------|-------------------|---------------------|-------------------------|------------------------------|---------------------|---------------------------|
| Hegari                     | 226.50a           | 13.22ab             | 37.67a                  | 317.28                       | 1.22                | 64.20a                    |
| F-9601                     | 215.33 ab         | 13.06ab             | 36.72ab                 | 299.67                       | 1.22                | 63.42a                    |
| JS-88                      | 208.17b           | 12.5ab              | 36.00ab                 | 303.91                       | 1.3                 | 60.88ab                   |
| F-9809                     | 209.45b           | 12.61ab             | 34.17ab                 | 285.77                       | 1.29                | 57.79abc                  |
| F-9706                     | 212.72ab          | 13.17ab             | 33.83ab                 | 278.08                       | 1.23                | 57.02abc                  |
| Tandojam Sorghum Selection | 211.17ab          | 12.17b              | 32.17b                  | 271.71                       | 1.1                 | 56.71abc                  |
| F-9806                     | 212.44ab          | 13.44a              | 32.83b                  | 278.28                       | 1.11                | 55.37bc                   |
| F-9603                     | 201b              | 12.83ab             | 21.89c                  | 265.13                       | 1.22                | 52.70c                    |
| PARC-SS-2                  | 109.67c           | 10.11c              | 22.17c                  | 271.74                       | 1.38                | 44.37d                    |
| No.1863(check)             | 123.44c           | 9.39c               | 14.00d                  | 271.71                       | 1.24                | 28.01e                    |
| LSD (5%)                   | 17.1              | 1.13                | 4.58                    | N.S.                         | N.S.                | 7.71                      |
| CV(%)                      | 9.33              | 9.74                | 16.00                   | 19.20                        | 26.34               | 15.02                     |

Any two means not sharing a letter differ significantly ( $P \leq 0.05$ ).

The sorghum variety Hegari excelled in green fodder yield (64.20 t/ha) followed by F-9601 (63.42 t) and JS-88 (60.88 t) (Table). The check variety No.1863 produced the lowest green fodder yield (28.01 t/ha). These results agree to those of previous researchers (2,3,4,5,7,8,10,11,12).

Sorghum varieties Hegari, F-9601 and JS-88 gave higher green fodder yield than all other varieties. So these could be considered for inclusion in future breeding programme. These varieties may also be recommended for general cultivation under irrigated conditions of Faisalabad.

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