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Study of Green Fodder Yield Potential and its Components of Different Pearl Millet (*Pennisetum americanum*) Varieties under Irrigated Conditions of Faisalabad

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Abstract: Nine varieties of pearl millet including a check were evaluated during Khraif 2000 and 2001. Significant differences were found among the varieties for plant height, number of leaves per tiller, stem thickness and green fodder yield while differences for number of tillers per plant and leaf area were non significant. The variety Tandojam Millet Selection (76 t ha^{-1}) ranked top in green fodder yield followed by NARC-1 (74.62 t ha^{-1}), Tift-383 (73.87 t ha^{-1}), ExD₂ Bulk (73.76 t ha^{-1}) and Quetta Millet Selection (71.31 t ha^{-1}). Check variety MB-87 produced the lowest green fodder yield of 51.70 t ha^{-1} . Plant height ranged from 151.39 (Check variety MB-87) to 232cm (Tandojam Millet Selection) while number of tillers per plant varied from 5.33 (Check variety MB-87) to 6.49 (Tift-383). Number of leaves per tiller ranged from 11.33 (Check variety MB-87) to 14 (ExD₂ Bulk) while leaf area varied from 194.15 (Check variety MB-87) to 242.15 cm² (Tift-383). The variety NARC-1 produced the maximum stem thickness of 1 cm closely followed by Tandojam Millet Selection (0.97 cm) while the check variety MB-87 produced a stem thickness of 0.65 cm.

Key words: *Pennisetum americanum*, varieties, green fodder yield, agronomic characters, Pakistan

Introduction

Pearl Millet (*Pennisetum americanum* L. Leek) locally known as bajra, is an important fodder and grain crop of Pakistan. It is grown throughout the country both under rainfed and irrigated conditions. Its green fodder is a valuable feed for livestock. In order to meet the growing demand of green fodder for livestock, it is essential to develop high fodder yielding varieties of pearl millet. Rao *et al.* (1986) observed considerable variation for days to 50% flowering and plant height among 260 cultivars of pearl millet. Majority of accessions flowered in 70 days and grew very tall. Sharma *et al.* (1987) found that green fodder yield and plant height varied considerably from 12x12 diallel cross. Choi *et al.* (1988) compared 26 millet genotypes for fodder yield that ranged from 64 to 154 t ha⁻¹ while plant height ranged from 3 to 4 meters. Byregowda (1990) reported that fresh fodder yield ranged widely (15.7 to 22.2 t ha⁻¹) among thirteen pearl millet genotypes. The genotype PCB produced higher fodder yield than MBFH1, L-72, VVJI and 49A. Naeem *et al.* (1991) studied the performance of seven pearl millet varieties. The variety C-47 ranked top in fodder yield by producing 15.08 t ha⁻¹ followed by Y-84 (13.58 t ha⁻¹), ICMS 7704 (13.38 t ha⁻¹) and IC-8206 (12.79 t ha⁻¹). Plant height ranged from 207 (Ugandi) to 247 cm (C-47). Akmal *et al.* (1992) studied the performance of nine varieties of pearl millet. Fodder yield ranged from 12.50 (ICMV 87902) to 20.28 t ha⁻¹ (ICMVF 84400). Ugandi was the tallest

variety with a plant height of 259 cm followed by ICMV 84108 (256 cm) and ICMS 7704 (252 cm). Bhatti *et al.* (1992) tested thirteen promising cultivars of oats and reported that PD2LV65 and S-81 were superior to all the cultivars in plant height, number of tillers per plant, stem thickness, number of leaves per tiller, leaf area, green fodder yield and dry matter. Naeem *et al.* (1993) evaluated the performance of seven varieties of pearl millet for grain and fodder yields. They observed that the fodder yield ranged from 12.76 (ICTP 8203) to 20.85 t ha⁻¹ (MP155). The variety ugandi was the tallest having a plant height of 256 cm followed by ICMS 7703 (254 cm). MDH-25-BUS-7 and MP155, each showed a plant height of 250 cm. Mohammad *et al.* (1993) evaluated six varieties of pearl millet and found that green fodder yield varied from 28.47 to 42.01 t ha⁻¹. Hussain *et al.* (1993) evaluated 15 indigenous and exotic varieties of oats. The cultivar no. 765 proved its superiority over all the other cultivars by producing tall plants, greater number of tillers per plant, more leaves and leaf area, highest green fodder and dry matter tonnage. Therefore, it was recommended for general cultivation. Naeem *et al.* (1994) in another study observed the performance of ten varieties of pearl millet. They noted that fodder yield ranged from 8.89 (B-18) to 17.11 t ha⁻¹ (PARC-MS-1) while plant height ranged from 232 (IC 8206) to 267 cm (New Composite, C-47 and Y-72). Mohammad *et al.* (1994) noted that millet cultivars MB 87 and synthetic 1/79 proved superior to all the other

cultivars because of their maximum fodder yield due to favourable influence of plant characters such as plant height, leafiness and leaf area. Mufti *et al.* (1996) tested ten promising cultivars of oats and found significant differences for plant height, number of tillers per meter, stem thickness, number of leaves per tiller, leaf area green fodder yield, dry matter, days to harvesting and protein contents. Naeem *et al.* (2002a) 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⁻¹. Number of leaves per plant varied from 9.0 to 13.78 while plant height ranged from 101.11 to 209.40 cm. Leaf area varied from 264.12 to 379.44 cm² and stem thickness ranged from 1.1 to 1.67 cm. Naeem *et al.* (2002b) also studied green fodder yield potential and its components in nine cultivars of pearl millet. They found significant differences for plant height while differences for number of tillers per plant, number of leaves per tiller, leaf area and green fodder yield were non significant. Green fodder yield ranged from 73.15 to 82.23 t ha⁻¹. Number of tillers per plant varied from 5.55 to 6.79 while plant height ranged from 148.11 to 233.78 cm. Number of leaves per tiller varied from 12 to 14.67 while leaf area ranged from 179.84 to 275.76 cm². This study was conducted to identify high green fodder yielding varieties of pearl millet under irrigated conditions of Faisalabad.

Materials and Methods

Eight pearl millet varieties viz; Tandojam Millet Selection, NARC-1, Tift-383, ExD₂ Bulk, Quetta Millet Selection, DBR-3, NARC-5, Pothwar Selection and check MB-87 were evaluated at Fodder research sub station Ayub Agricultural Research Institute, Faisalabad during Kharif, 2000 and 2001. Design of the trial was randomized complete block with three replications. Each plot consisted of six rows 6 m long and 30 cm apart. Thus, the net plot size was 1.8 x 6 m². Dates of planting were

8th July, 2000 and 21th July, 2001 while dates of harvesting were 8th Sept. 2000 and 24th Sept. 2001. Seed rate used were 15 Kg ha⁻¹ while fertilizer was applied @ 60-60-00 NPK Kg ha⁻¹. In total three irrigations were applied during the entire period of crop growth in both the seasons.

Data were recorded on plant height (cm), number of leaves per tiller, leaf area (cm²), stem thickness (cm) and green fodder yield (t ha⁻¹). The data recorded were statistically analyzed using analysis of variance technique at 5% probability (Steel and Torrie, 1980).

Results and Discussion

The data (Table 1) revealed significant differences for plant height, number of leaves per tiller, stem thickness and green fodder yield while differences for number of tillers per plant and leaf area were non significant. The variety Tandojam Millet Selection (232 cm) was the tallest amongst all the varieties followed by NARC-1 (227.45 cm), ExD₂Bulk (224.78 cm) and Pothwar Selection (224.39 cm). The check variety MB-87 was the shortest (151.39 cm). These results are supported by the findings of Akmal *et al.* (1992), Bhatti *et al.* (1992), Hussain *et al.* (1993), Mohammad *et al.* (1994), Mufti *et al.* (1996) and Naeem *et al.* (1991, 1993, 1994 and 2002 a,b). Number of tillers per plant varied from 5.33 (check variety MB-87) to 6.49 (Tift-383). Bhatti *et al.* (1992), Hussain *et al.* (1993), Mufti *et al.* (1996) and Naeem *et al.* (2002b) also reported similar results. The variety ExD₂ Bulk (14) produced the highest number of leaves per tiller followed by Tift-383 (13.78) and Tandojam Millet Selection, DBR-3, each producing 13.22 leaves per tiller. Similar findings have been reported by Bhatti *et al.* (1992), Hussain *et al.* (1993), Mohammad *et al.* (1994), Mufti *et al.* (1996) and Naeem *et al.* (2002a,b). Leaf area varied from 194.15 (check variety MB-87) to 242.15 cm² (Tift-383).

The variety NARC -1 (1 cm) produced the maximum stem

Table 1: Mean plant height, number of tillers per plant, number of leaves per tiller, leaf area, stem thickness and green fodder yield of varieties of pearl millet during Kharif, 2000 and 2001

Varieties	Plant height (cm)	No. of tillers per plant	No. of leaves per tiller	Leaf area (cm ²)	Stem thickness (cm)	Green fodder Yield (t ha ⁻¹)
Tandojam Millet selection	232.00a	6.4	13.22ab	205.78	0.97ab	76.00a
NARC-1	227.45ab	6.34	13.05ab	216.99	1.00a	74.62a
Tift-383	223.72ab	6.49	13.78a	242.15	0.91bc	73.87a
ExD ₂ Bulk	224.78ab	6.12	14.00a	219.27	0.90c	73.76a
Quetta Millet selection	211.89b	5.88	13.00ab	213.30	0.92bc	71.31a
DBR-3	216.06ab	5.88	13.22ab	218.03	0.92bc	70.83ab
NARC-5	223.22ab	5.84	13.06ab	220.76	0.86c	69.91ab
Pothwar Selection	224.39ab	5.39	12.11bc	195.91	0.60d	62.66b
MB-87 (check)	151.39c	5.33	11.33c	194.15	0.65d	51.70c
LSD (5%)	18.76	NS	1.26	NS	0.06	6.98
CV (%)	9.19	12.27	10.19	21.71	7.49	10.45

Any two means not sharing a letter, differ significantly at 5% level of probability

NS: Non-Significant

thickness closely followed by Tandojam Millet Selection (0.97 cm). The variety Pothwar Selection (0.60 cm) produced the minimum stem thickness while the check variety MB-87 produced the stem thickness of 0.65 cm. The variety Tandojam Millet Selection (76 t ha⁻¹) ranked top in green fodder yield followed by NARC-1 (74.62 t ha⁻¹), Tift-383 (73.87 t ha⁻¹), ExD₂ Bulk (73.76 t ha⁻¹), Quetta Millet Selection (71.31 t ha⁻¹), DBR-3 (70.83 t ha⁻¹) and NARC-5 (69.91 t ha⁻¹). All these varieties were statistically at par with each other. Check variety MB87 produced the lowest green fodder yield of 51.70 t ha⁻¹. Byregodwa (1990), Akmal *et al.* (1992), Bhatti *et al.* (1992), Hussain *et al.* (1993), Mohammad *et al.* (1993; 1994), Mufti *et al.* (1996) and Naeem *et al.* (1991, 1993, 1994, 2002a,b) also reported similar results. Thus the varieties Tandojam Millet Selection NARC-1, Tift-383, ExD₂ Bulk, Quetta Millet Selection, DBR-3 and NARC-5 can be considered for general cultivation under irrigated conditions of Faisalabad.

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