SCREENING OF MILLET NURSERY FOR GREEN FODDER YIELD UNDER RAINFED CONDITIONS OF KOHAT

BY

MUHAMMAD KHAN, M. KHAN, MUHAMMAD IDREES, JAVAD IQBAL AND ABDUL KHALIQ
Barani Agricultural Research Station Jarma Kohat, NWFP, Pakistan

ABSTRACT
Nine entries of millet (Composite-2000, DB-2003, RARI-C-1, PARC-MS-3, RARI-C-4, PARC-MS-4, DB-III, PARC-MS-2 and Local Bajra) were included to evaluate for high yielding variety for the green fodder production. The highest days to 50% earing (55) were recorded for Composite-2000, PARC-MS-3 and PARC-MS-2. Composite-2000 took the highest days (99) to maturity followed by DB-2003 and DB-III by taking 97 days to mature. Highest green fodder yield of 24900 kg ha\(^{-1}\) was produced by RARI-C-4 followed by PARC-MS-3 (19090 kg ha\(^{-1}\)) and DB-2003 (17734 kg ha\(^{-1}\)). Local Bajra produced the lowest green fodder yield of 8567 kg ha\(^{-1}\).

KEYWORDS: Millet, Varieties, Rainfed condition, Green fodder

INTRODUCTION
In NWFP, about 60% of the cultivated area is rainfed. The major rainfed areas in the province are, Abbotabad, Mansehra, Kohat, Karak, Lakki and western regions of D.I. Khan. The area receives inadequate or poorly distributed rainfall which results prolonged periods of water stress for the crops causing either the total failures of crops or extremely low yields. Kohat division consists of narrow and broad valleys surrounded by various high and low mountain ranges. The elevation ranges from 500 m to 1500 m. The area is arid to semi-arid. The soils are medium fertile in general, calcareous in nature, heavy in texture and difficult to plough. These soils are deficient in organic matter, nitrogen and phosphorus and marginal to adequate in potassium. Scarcity of irrigation water is the major constraint for production. The climate is hot and dry in summer with moderate rain spells during monsoon.

Farmer of barani area are unable to achieve the potential yields with consequent low farm income and their contribution to the country GDP is low. The barani areas farmers can boost their yields on sustainable basis by adopting improved cultural practices and cultivating high yielding improved varieties of the crops. Fodder production is the major limiting factor of livestock production in Pakistan. To increase the fodder production in Pakistan, it is necessary to develop new high yielding, drought tolerant and best adaptable varieties of fodder crops.

Millet (Pennisetum glaucum L.) belongs to the family Poaceae (gramineae) and its vernacular name is Bajra and Pearl millet in English. It is a small cereal grain consumed as human food, poultry feed and fodder for livestock. Millet often produces a greater quantity of grain than do other cereals under conditions of infertile soil, intense heat and scanty rainfall. It requires only a short growing season.
In barani area, where soils are well drained, light textured and no water is available for irrigation, the fields are left fallow after wheat and millet can successfully be raised on the available limited moisture. Millet is cultivated on 440,700 hectares in the country and produced average grain yields of 501 kg ha⁻¹. Likewise in NWFP millet is grown on area of 4,500 hectares with 511 kg ha⁻¹ average grain yield (MINFAL 2005-2006). Naeem et al. (2002) studied different millet varieties for green fodder yield. Fodder yield ranged from 73.15 (MB-87) to 83.23 t ha⁻¹ (Tift-383). Naeem et al. (2002) evaluated eleven varieties of sorghum for green fodder yield potential and observed that green fodder yield ranged from 18.06 to 69.44 t ha⁻¹. Naeem et al. (2003) studied nine varieties of millet under the irrigated condition of Faisalabad. They observed that green fodder yield ranged from 51.70 t ha⁻¹ (MB-87) to 76 (Tandojam millet selection). Much attention is required for the area where fodder supply situation is critical (Hatam et al., 2001). Rainfed sector of the province has potential as well as space for cultivating fodder in the cropping system.

The present study was aimed to evaluate and select high yielding, drought tolerant and best adaptable millet varieties in the rainfed areas of Kohat from germplasms collected from different regions of the country.

MATERIALS AND METHODS
Millet entries received from different sources were tested for fodder yield potential under rainfed conditions of Kohat division. Each entry was sown in single row 10 m long and 60 cm apart on 20-07-2006 at Barani Agricultural Research Station Kohat at proper water condition. NP @ 80:58 kg ha⁻¹ was applied at the time of sowing. The rest of agronomic practices were carried out uniformly during the growing season. Following observations were noted on the trial.

1. Days to 50% earing,
2. Days to maturity (seeds)
3. Fodder yield (kg ha⁻¹)

The following entries were tested in the trial.
Composit-2000, DB-2003, RARI-C-I, PARC-MS-3, RARI-C-4,
PARC-MS-4, DB-III, PARC-MS-2, Local Bajra

RESULTS AND DISCUSSION
Days to 50% earing
Data on days to 50% earing revealed significant differences between various entries as indicated in table-1. The millet entries took between 51 to 55 days for 50% earing. Maximum days to 50 % earing (55 days) were noted for composit-2000, PARC-MS-2, and PARC-MS-3 while minimum days (51) to 50% earing were recorded for entry RARI-C-1. The flowering usually begins at 45-50 days after emergence and plant reaches physiological maturity by 65-70 days after emergence depending upon the genetic make up of variety, (Lee et al., 2004).

Days to maturity (Seed)
Data on days to maturity (table-1) revealed that different entries took 83 to 99 days to maturity. Maximum of 99 days to maturity were taken by Composit-2000, whereas, minimum of 83 days were recorded for Local Bajra to mature. After seedling development, rapid stalk development occurs soon after if good soil moisture is available. The flowering usually begins by 45-50 days after emergence and plant reaches physiological maturity by 65-70 days after emergence depending upon the genetics of the variety. Similarly, growth and maturation are usually hastened with late planting (Lee et al., 2004). Water affected crop phenology of millet when reached at boot stage and early grain fill stage (Maman et al. 2003).

Fodder yield (kg ha⁻¹)
Different millet entries produced different fodder yields under the rainfed conditions of BARS Kohat. It ranged from 17134 to 24900 kg ha⁻¹ as indicated in table-1. Maximum fodder yield of 24900 kg ha⁻¹ was recorded for RARI-C-4.
Minimum fodder yield of 17134 kg ha\(^{-1}\) was recorded for Local Bajra. Different varieties or lines have different potential for fodder yield. The similar results obtained in this study were reported by Naeem et al. (2003), Byregowda (1990), Muhammad et al. (1993) and Akmal et al. (1992). Similar findings were also reported by Abdul et al. (1992) and Taran et al. (1998) who reported fodder yield as a varietal character.

It was concluded that new cultivars had high potential for fodder production as also reported by Solanki (1977). The millet had a greater change in biomass water use efficiency than to grain water use efficiency than sorghum (Chaudhri and Karnemasu 1985). If water is deficient prior to flowering and beginning of flowering, severely reduced biomass production and grain yield of millet would result, (Winkel, et al 1977).

**Table-1:** Evaluation of millet nursery 2006 at BARS Kohat

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Entries</th>
<th>Days to 50% earing</th>
<th>Days to maturity</th>
<th>Fodder yield (kg ha(^{-1}))</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Composit-2000</td>
<td>55</td>
<td>99</td>
<td>17560</td>
</tr>
<tr>
<td>2</td>
<td>DB-2003</td>
<td>54</td>
<td>97</td>
<td>17734</td>
</tr>
<tr>
<td>3</td>
<td>RARI-C-I</td>
<td>51</td>
<td>93</td>
<td>17580</td>
</tr>
<tr>
<td>4</td>
<td>PARC-MS-3</td>
<td>55</td>
<td>94</td>
<td>19090</td>
</tr>
<tr>
<td>5</td>
<td>RARI-C-4</td>
<td>54</td>
<td>87</td>
<td>24900</td>
</tr>
<tr>
<td>6</td>
<td>PARC-MS-4</td>
<td>54</td>
<td>91</td>
<td>17500</td>
</tr>
<tr>
<td>7</td>
<td>DB-III</td>
<td>54</td>
<td>97</td>
<td>17350</td>
</tr>
<tr>
<td>8</td>
<td>PARC-MS-2</td>
<td>55</td>
<td>95</td>
<td>17700</td>
</tr>
<tr>
<td>9</td>
<td>Local Bajra</td>
<td>53</td>
<td>83</td>
<td>17134</td>
</tr>
</tbody>
</table>

**CONCLUSION**

From the results it is concluded that RARI-C-4 and PARC-MS-4 have greater yield potential and better response to the agro-climatic condition of Kohat. The same millet entries must be further tested for confirmation of the results and for recommendation among the farming community for adoption.

**Acknowledgements:** The Research Work was carried out with the financial assistance of PARC (ALP project).
REFERENCES


